# CHAPTER THREE

# INFLUENCE OF HEARING LOSS ON THE ACQUISITION OF INFORMATION LITERACY

## 3.1 INTRODUCTION

Information literacy is a prerequisite for participating in the activities involved in different cultural, socio-economic, and political processes. In the case of adolescents with hearing loss who have divergent needs and problems, and come from different backgrounds that influence their adaptation or coping in society, information literacy is a crucial key to participation in life.

In the fourth century, Aristotle made the comment that people who were born deaf are able to make sounds, but cannot speak and are therefore “dumb” (Branson & Miller, 1993:89). Historically, one of the consequences of congenital and early deafness has been that people with hearing loss were perceived as being “dumb” as a result of having a low level of intelligibility or lack of speech, and consequently had low expectations of achieving success in life (Marschark, 2003:236).

Dotter and Hilzensauer (2006:44) share Hindley’s (1997:101) opinion that adolescents with hearing loss are generally seen as “disabled” persons unable to access information. This is attributed to their limited access to auditory information as well as the limited communication they experience because of the hearing loss. This traditional understanding of “disabled” is regarded as the cause of segregation and discrimination. According to Dotter and Hilzensauer (2006:44), when special schools for adolescents with hearing loss do not provide sufficient education that prepare children for inclusion in society, parents may decide not to place their children in such a school.

On the other hand, Branson and Miller (1993:33) found that some adolescents with hearing loss have proved to be just as successful as their hearing peers in a world where accessing and using accessed academic information play a crucial role. It is

important to establish why some adolescents with hearing loss succeed academically and some are not able to succeed.

The type and degree of hearing loss could be potential differentiating factors. There are different types of hearing loss. A hearing loss can be organic, functional, and/or auditory perceptive and the more severe the hearing loss, the greater the negative impact on the ability to communicate verbally.

*Hearing* involves not only the reception of sound, but the entire process of decoding, understanding, and application of the received sound stimulus. Organic hearing loss refers to a disturbance in the ability to hear sound correctly due to a physical problem in the organ of hearing. A person with this kind of hearing loss is not able to perceive sound correctly, to make sense of it, to an extent depending on the type and degree of the hearing loss. Organic hearing loss is categorized in three types: neural/sensorineural, conductive, or a combination of both (a mixed hearing loss) (Katz, 2002: 47-48).

The different degrees of hearing loss are classified as follows:

- Mild hearing loss is where the child with hearing loss has a pure tone average (PTA) ranging from 26-40dB.
- A moderate hearing loss is when a child with hearing loss has a PTA of between 41 to 70dB.
- A severe hearing loss is when a child with hearing loss has a PTA between 71 to 90dB and a profound hearing loss is the degree in which the child only hears sounds above 90 dB or more (Katz, 2002: 47-48). .

Hearing loss often goes hand in hand with other complications, as in the case of deaf-blindness (Hugo, 1987:133; Moores, 1996:120), and is often associated with other handicaps such as mental disability, cerebral palsy, central language disorder, or an emotional handicap (Hugo, 1987:135-137; Moores, 1996:116) as well as learning and behavioural problems (Moores, 1996:122; Nowell & Marshak, 1994:60). Whether they have a single handicap or multiple handicaps, people with hearing loss are dependent on others for assistance and this could have a negative impact on their quality of life.

Hull (1998:7) confirmed that the identification of hearing loss should take place as early as possible. This is essential in order to ensure that the auditory processing skills of the child, and consequently the associated higher-order cognitive processing skills (Katz, 2002:496) can develop. This will promote the development of language and speech and potentially the acquisition of information literacy skills.

The influence of a hearing loss on the cognitive development of the child **(**Marschark, 2003:47) will be discussed in more detail later in the study. Although it is clear that children with hearing loss are similar in many ways, they have different knowledge bases, different cognitive strategies, and some shared but also some different experiences. Therefore, they have different needs and teachers who work with such children will have to apply different teaching methods than in the case of the hearing peers.

Hearing loss impacts on the receptive and expressive language development of children because they have incomplete access to sound and therefore experience problems in learning spoken language naturally (Beck, 2006:3). There is a perception that only those children with hearing loss who are born into families that use sign language as a first language would be able to develop language naturally. Adolescents with hearing loss born to hearing parents find it difficult to master language, whether the language is spoken or visual (Beck, 2006:3). The *completeness* of a first language is considered to be more crucial than the actual language which is learnt. Language cannot be taught through print, it needs to be learnt in conversation. Language is linked to high level comprehension skills, and these comprehension skills will facilitate normal development and reduce language delays (Beck, 2006:3).

In the process of reading, and also in other tasks, associations have to be made between concepts in order for the reader to derive meaning from the text. Marschark (2000:47) states that people with hearing loss need to practice skills with reference to concepts and their relationships if they are to become competent readers. Research has shown (Traxler, 2000:337-348) that the reading levels of adolescents with hearing loss are consistently lower than those of their hearing peers. Woolsey, Harrison and Gardner (2004:264) remarked that this lower literacy skills level of adolescents with

hearing loss led to them being employed in manual positions and earning a lower salary than their hearing peers, and in some cases even to unemployment.

These consequences of hearing loss have a serious impact on the ability of adolescents with hearing loss to access and use academic information and it must be stressed that a child with a hearing loss is different in this aspect from a hearing child. The adolescent with hearing loss finds it difficult to access and use academic information and needs specific training in order to be able to access and use academic information.

It is clear that hearing loss has an impact on the lives of adolescents with a hearing loss and the way in which they succeed in functioning and adapting in life and an ever-increasingly information based society (Gregory, Shanahan & Walberg, 1995:258; Mokhtar & Majid, 2006:42). The person with a hearing loss needs information literacy in order to function in areas such as living in a community, being a functional citizen, being able to make information decisions regarding all matters of his/her life as well as being able to make legal decisions and live independently and successfully. This will lead to better career opportunities, as adolescents with hearing loss will be able to obtain a tertiary education and better quality of life.

Quality of life is often measured according to the ability of a person to excel academically, to adjust socially and personally in life, as well as to function well as an adult after finishing school (Rittenhouse, 1987:24). Cook and Hawkins (2006:234) and Katz (2002:761) discussed the effect of hearing loss on quality of life, stressing that hearing loss does not only affect the child, but also the family members and the role players and educators who are involved with the child with hearing loss (Truax et al., 2004:307).

The development of successful information literacy programmes for adolescents with hearing loss poses a challenge. It requires a constant process of evaluation in order to ensure that the children are making progress, and also a concerted effort to stay abreast of new developments and strategies that keep pace with the children's changing needs (Marx, 2000:79). Research has indicated that there are some adolescents with hearing loss who have managed to become successful readers and/or

writers (Luckner *et al.,* 2005:444). However, the majority experience problems in becoming information literate.

In order to develop self-worth and to face career challenges, it is necessary that all people, including adolescents with hearing loss, develop information literacy skills to the highest level of their personal ability. Munoz-Baell and Ruiz (2000:40-44) noted that professional people who conduct research on the topic of adolescents with hearing loss, actually often have little knowledge of adolescents with hearing loss. In fact, they "...have very little or no 'gut' understanding of what childhood deafness is really like. Most of them received their knowledge and training from hearing persons who were similarly trained and from publications written mostly by hearing persons" (Munoz-Baell & Ruiz, 2000:40-44).

Teachers at special schools face unique challenges and require support from their respective schools and the Department of Education with regard to media centres at special schools. There is a need for research to determine to what extent schools and the Department of Education provide support to teachers of adolescents with hearing loss. Through research, one can better understand the problems and approach solutions by planning and implementing programmes that improve retention and academic success and decrease failure rate for adolescents with hearing loss.

Being deaf is not a simple issue. Helen Keller, who may incontestably be regarded as a reliable judge, said: "…the problems of deafness are deeper and more complex, if not more important than those of blindness. Deafness is a much worse misfortune, it means there is a loss of the most vital stimulus - the sound of the voice that brings language, sets thoughts astir, and keeps us in the intellectual company of man" (Helen Keller, in Gregory *et al.,* 1995:1-2). This statement portrays how she felt about being deaf. A person with hearing loss does not know how to communicate, is cut off from the world and is not able to understand the world evolving around him/her (Gregory *et al.,* 1995:187).

## 3.2 THE ONSET AND IDENTIFICATION OF HEARING LOSS

The *onset* refers to the time when the hearing loss commenced, whereas *identification* of hearing loss refers to the time that the hearing loss is detected. Some time may elapse before the period of early intervention is established when hearing aids are supplied and the learning and teaching strategies can be established to be followed for the child with hearing loss (Weikle & Hadadian: 2004, 653).

The configuration of hearing loss refers to the extent of hearing loss at each frequency, and may reflect a high frequency loss with good hearing in the low frequencies, a low frequency loss with good hearing in the high frequencies, or a flat profile where the same amount of hearing loss applies to both low and high tones (Type, Degree, and Configuration of Hearing loss, accessed 2007-04-10). The configuration of the loss has an effect on the quality of sounds that the child with hearing loss hears. This, in turn, has an effect on the child's communication and speech as the child is not able to hear soft sounds of a specific type. The type, nature, and onset of the hearing loss affect the development of cognition and language in a different manner.
The onset of hearing loss can be:

- Congenital (at or near birth);
- Acquired (prelingual) (when the hearing loss is present before language and speech have developed); or
- Acquired (postlingual) (hearing loss that develops after the development of speech and language has started or has been completed) (Katz, 2002: 754; Tye-Murray, 2004:15).

A child with either a congenital hearing loss or a prelingual hearing loss experiences difficulty in the mastery of oral language (Katz, 2002:759). It is important, therefore, to identify the hearing loss as soon as possible to prevent language deficits by supplying appropriate hearing aids (Dobie & Van Hemel, 2004:164; Educational impact. The sounds of hearing loss, onset, type, impacts, accessed 2007-04-17.).

The impact of a prelingual hearing disorder becomes even more obvious in adolescence, as it influences the social, educational, and vocational aspects of the

young learner's life. Severe congenital or prelingual hearing loss has a much larger impact on language and speech development than mild to moderate hearing loss. The reason for this is that a person with a severe or total hearing loss often does not have the ability to develop listening skills normally even with the aid of some form of external hearing enhancement. As the child develops into an adult, this person may continue to have limitations in language development and usually uses sign language to communicate (Hull, 1998; Katz, 2002: 759; Kansas State Department of Education, 2009:2-3).

Postlingually deafened children have a sensory impairment that interferes with their ability to perceive speech and other sounds, but a postlingual hearing loss is superimposed on normal and completely developed language ability. The child's quality of voice may later be influenced by the lack of auditory feedback and speech can become distorted although he/she may still be intelligible. Despite the fact that the hearing loss can interfere with spoken communication, the person's reading and writing capacity may remain intact (Reynolds & Janzen, 2002: 285)

The prelingually deaf child cannot acquire language through the same natural process as a child with normal hearing. Most prelingually deaf persons when leaving school as young adults have a linguistic insufficiency in addition to their sensory impairment. This is evident not only in their oral language skills, but also in their reading and writing skills (Reynolds & Janzen, 2002: 285).

A child who is postlingually deaf displays better speech perception skills than a child who is prelingually deaf. The reason is that they have acquired language in a normal way before incurring a hearing loss. The critical factors discussed above help to determine the influence the sensory impairment will have on the person with a hearing loss. The earlier the hearing loss is identified, the sooner an intervention programme can be followed (Katz, 2002:760). If a child with hearing loss receives appropriate intervention at an earlier stage in his/her life, the benefit is more than if the intervention starts at a later stage. Such a child's language base, however, has already been formed and will not deteriorate (Hugo, 1987:10). If a child was born with hearing loss, there are more negative consequences that are manifested in the child's language and communication abilities.

Children with mild or moderate hearing loss seem to develop adequate speech and language and appropriate social skills in many cases, even if the loss is identified at a late stage. The reason is that, for them, speech is audible although parts of words or sentences may not be heard, depending on the configuration of the hearing loss. They may find it difficult to understand what they hear, that is, they may find words or sentences audible but not intelligible. A child with residual hearing often proves to be successful academically and can achieve competent spoken language.

From the above-mentioned discussion it is clear that if a child's hearing loss is identified very early and intervention is started at an early stage, the impact will be less serious (De Conde Johnson, Benson & Seaton, 1997:232).

## 3.3 SITE OF LESION WITHIN THE AUDITORY SYSTEM

The site of lesion may impact on a person's perceptual, cognitive, and linguistic abilities and consequently on the ability to communicate effectively. It can have an impact on a person's ability to learn to discriminate and to identify acoustic signals, to transform and transmit information through both the peripheral and central nervous system, to filter, sort and combine information at appropriate perceptual and conceptual levels, to store and retrieve information efficiently, and to restore information.

The site of lesion, therefore, can cause an additional auditory processing disorder (APD), which impacts on learning to use phonological, semantic, syntactic, and pragmatic knowledge, and to attach meaning to a stream of acoustic signals through utilization of linguistic and non-linguistic contexts (De Conde Johnson, *et al*., 1997:374). The significance of APD lies in the fact that it can add to a child's hearing loss. It compounds the problems in auditory processing already experienced by the child with hearing loss (De Conde Johnson *et al*., 1997:374).

The site of lesion, or the exact position where the pathology in the auditory system occurs, has several implications for the child with hearing loss. The site of a lesion producing a hearing loss is important for rehabilitation programmes, because it determines the symptoms of abnormal auditory function involved in the hearing loss

(Katz, 2002: 625). Hearing loss is classified according to the site of the lesion in the auditory system into three types.

### 3.3.1 Conductive impairment

A conductive hearing loss is the result of an abnormality of the outer or middle ear that causes a hearing loss in the presence of a normal inner ear. It can also imply that the child with hearing loss suffers from either a breakdown or an obstruction in some part of the external/middle ear (Katz, 2002: 47). The most common cause of such a breakdown or obstruction is otitis media (De Conde Johnson, *et al*., 1997:231). Conductive hearing loss is typically not permanent and can be treated medically, whereas a sensorineural hearing loss is irreversible.

The degree of loss in the case of conductive hearing loss is usually from slight to moderate, not more than 60 dB. A person with a conductive loss shows delayed speech and language development and low academic skills (De Conde Johnson, *et al*., 1997:231). A temporary conductive pathology can also occur in the presence of a permanent irreversible sensorineural hearing loss.

***Conductive hearing loss*** means that the sound is not transmitted or conducted efficiently to the inner ear (Newby & Popelka, 1992:67). There is also a reduction in the intensity before the sound reaches the inner ear. There is not a distortion of sound but rather a reduction of sound energy reaching the cochlea (Newby & Popelka, 1992:67). If the sound is turned up more loudly or there is more amplification, a person with this type of hearing loss will be able to hear quite normally (Newby & Popelka, 1992:68).

A person with this type of hearing loss tends to speak in a relatively quiet voice and people may find it difficult to hear him/her. Such a person is even able to understand speech normally provided that people speak loudly enough, in other words, the speech should be well above threshold (Newby & Popelka, 1992:68).

Children who have fluctuating conductive hearing loss and those with *unilateral* hearing loss (one ear) are at risk for language and academic delays. They will need proper management in school in order to reach their potential and to achieve academically in

school (De Conde Johnson *et al*., 1997:60). Regular testing may prove to be beneficial and if the teacher understands the nature of the situation, it can also help to improve the child's language and his/her development.

### 3.3.2 Sensorineural impairment

A sensorineural hearing loss is caused by damage to the cochlear mechanism and/or to the auditory nerve (Adams, 2004:10), or the VIIIth cranal nerve which is the neural pathway from the inner ear to the brain stem. These two structures (cochlea and auditory nerve) are very complex and are interdependent. A lesion along the cranial nerve will affect the function of the cochlea as well.

This impairment is usually medically irreversible and amplification can only help partially. This type of hearing loss can be caused by a variety of illnesses and conditions. It is usually permanent and can be severe to profound. It can occur in one or both ears and its prevalence is equal across different age groups of children and adolescents. Most cases of profound congenital (innate) sensorineural hearing loss result from abnormal development of the cochlea (Newby & Popelka, 1992:93). Many congenital sensorineural hearing losses are also associated with other abnormalities constituting a syndrome such as Waardenberg's syndrome or Usher's syndrome (Newby & Popelka, 1992:93-94). The aging process, however, can also lead to sensorineural hearing loss.

A sensorineural hearing loss usually affects the high frequencies, and increases dramatically with age especially when an individual is exposed to noise (De Conde Johnson, *et al*., 1997:231). The effects of a sensorineural hearing loss can be seen in language development, cognitive development, learning, and psychosocial functioning. As the degree of sensorineual hearing loss increases, the effects are more severe (De Conde Johnson et al., 1997:232).

The degree of hearing loss can be severe or profound and the high frequency sounds are typically affected more than the middle or lower frequency sounds (Newby & Popelka, 1992:88-89). This has an effect on the individual's ability to interpret speech and music, and people with this type of hearing loss have problems with speech

discrimination, even with speech at a level above threshold (Newby & Popelka, 1992:89). A symptom of cochlear damage is recruitment, which means that the sound becomes too loud too quickly. The outer hair cells of the cochlea are responsible for the 'fine tuning' of what we hear. With cochlear damage the person cannot discriminate the words better even at higher intensities.

A person who has normal or close-to-normal hearing sensitivity through 1000 Hz and sensorineural hearing loss at higher frequencies has little difficulty in hearing people speak in normal situations. This is because the unimpaired low-frequency hearing sensitivity allows for detection of low-frequency voice and vowel sounds. People with sensorineural hearing loss typically have a problem with consonant sounds of the English language such as *f*, *k* and *s* and words with high frequencies and weak intensities. They may experience problems in differentiating between words that sound similar but that contain different high frequency consonants.

### 3.3.3 Mixed hearing loss

Mixed hearing loss is a combination of both conductive and sensorineural hearing loss where both the middle and inner ear are involved. This hearing loss can occur when a person has a permanent sensorineural hearing loss and then at some stage develops a conductive hearing loss. It can also happen in some cases that a mixed hearing loss is the result of the outer and inner ear being malformed, which causes both types of hearing loss. For the present study, no children with conductive or mixed hearing loss were used.

## 3.4 INTERVENTION AND ROLE PLAYERS IN THE LIFE OF THE ADOLESCENT WITH HEARING LOSS

The purpose of early intervention is to ensure appropriate cognitive and social development, (Kansas State Department of Education, 2009:ii) and ultimately to help the child with hearing loss to become an independent adult. For this to occur, the child with hearing loss needs well-adjusted parents, a good self-concept, sufficient amplification, and help with the development of auditory processing skills. Intervention methods are designed to help the adolescent with hearing loss to develop cognitive

skills over time, since auditory processing is indivisibly joined to higher-order cognitive processing skills, as well as communicative and language skills. Intervention management strategies include the following (Alpiner & McCarthy, 1993:160; Katz, 2002:496-252 & 768):

- Audiologic management, which involves hearing tests and hearing aids or cochlear implants, and hearing conservation (Katz, 2002:768);
- auditory management involving the development of skills for auditory learning and processing skills development;
- cognitive/linguistic development in order to develop a world schema with a symbolic system;
- speech management to develop the motor, acoustic, phonetic, and phonologic aspects of the spoken language;
- educational management to develop learning skills and to modify the learning contexts to facilitate learning for the child with hearing loss;
- social and emotional management to develop a perspective that will enable the child with hearing loss to participate actively in his/her social environment and to maintain a healthy, well-balanced self-concept; and
- parental management to help the parents to develop skills to teach and advocate for their child with hearing loss.

The provision of *early identification services* and the *age at which intervention commenced* may significantly help to reduce the influence of hearing loss on the developing child with hearing loss. When a person/child with hearing loss is taken to an audiologist for a hearing test, the audiologist can assess the child's communication requirements and measure the degree and type of hearing loss (Alpiner & McCarthy, 1993:31; Katz, 2002: 626). The audiologist aims to determine the threshold of the child's hearing. An audiologist will be able to determine the appropriate amplification and help the child with hearing loss to acquire spoken language (Katz, 2002:688). An audiologist can estimate the site of lesion within the auditory system and help to establish both the cause of the hearing problem and the extent of handicap produced by the hearing loss (Bess & Humes, 1990). Furthermore, the audiologist plays an important role in determining the intervention method and rehabilitation required to help the child to achieve academically (De Conde Johnson *et al*., 1997:50).

The audiologist illustrates the degree of the child's hearing loss by using an audiogram. An audiogram is a graphic result of a hearing test, with the frequencies of the signal presented on the horizontal axis (in Herz) and the intensities of the signal on the vertical axis (in decibels) (Bess & Humes, 1990). During a hearing test, the audiologist aims to determine a threshold, defined as the lowest level in dB where a specific sound can just be heard 50% of the time it is presented at that level. These thresholds are used to determine if hearing loss are present and the amount of hearing loss at each frequency (De Conde Johnson *et al*., 1997:51). It can also indicate whether a person with hearing loss has sensorineural, conductive or mixed hearing loss and whether the hearing loss is unilateral (one ear) or bilateral (both ears).

These thresholds can predict the effects of the hearing loss on the child's speech perception as well as giving significant role players such as the teachers, audiologists, support persons, and parents an understanding of the impact that hearing loss has on the child (De Conde Johnson *et al*., 1997:51). The audiologist needs to determine the child's speech thresholds as well as thresholds for hearing pure tones. The audiologist can suggest to the parents that the child can benefit from assistive devices because these devices help the child with the communication process (Katz, 2002: 547, 628 & 768).

The other type of intervention that children with hearing loss benefit from is *amplification.* The sooner children with hearing loss obtain amplification, the easier it is to adapt to hearing aids and acquire and improve language acquisition and communication skills (Cook & Hawkins, 2006: 235-236; Katz, 2002:550-552 & 688). This will help children with hearing loss to achieve academically in school. These assistive devices help with the hearing process and help users to cope better in classroom settings (Katz, 2002: 628).

Amplification is delivered by assistive devices such as hearing aids and/or cochlear implants (Katz, 2002: 768). It is essential that assistive listening devices meet the specific hearing and listening needs of the child with hearing loss as determined during the evaluation of the child's hearing (De Conde Johnson *et al*., 1997:86).

Children often need motivation for using an amplification device such as an FM system (De Conde Johnson *et al*., 1997:86-87). They often experience problems with regard to learning and social contexts and find it difficult to utilise visual and contextual cues to fill in the necessary information that they do not hear or understand. If the environment is quiet, they may not experience undue trouble, but in noisy environments they may find it difficult to cope (De Conde Johnson *et al*., 1997:87). They may be subjected to sound distortion and then an FM system could help, especially in a classroom situation.

In some cases, a child might refuse to wear amplification. This will lead to a delay in the development of communication and listening skills and poor academic achievement (De Conde Johnson *et al*., 1997:89). Adequate training is necessary to teach the child how to wear the assistive device and how to care for it and to ensure its proper functioning.

The benefit of assistive listening devices is that they can improve signal-to-noise ratios, minimize distance, and reduce reverberation factors; they can also reduce distractibility, improve sound quality, and make children with hearing loss aware of sound and improve their discrimination skills (De Conde Johnson *et al.,* 1997:87). A significant benefit of assistive devices is that the children who use them develop better speech abilities from an early stage and they seem to do better academically (Sanders, 1982: 159-160). These assistive devices can reduce the impact of communication problems that adolescents with hearing loss might encounter in the classroom setting (Katz, 2002: 628).

Children with hearing loss using amplification can benefit from assistive devices such as FM systems, especially in the classroom environment where spoken language training is acquired (Katz, 2002:547, 550-550, 628, 688 & 768). Adolescents with hearing loss often vary in their response to amplification in utilizing hearing aids. Some learn quickly and easily to obtain maximum benefit from the auditory signal, whereas some never learn to do so. It has been found that children with residual hearing especially benefit from wearing assistive devices.

If an adolescent with a hearing loss can hear sounds better by means of a hearing aid or cochlear implant, academic information will be better transferred, assimilated, and

processed in order to attach meaning to it. He/she will be more aware of information (Katz, 2002:768) and this will lead to better academic achievement.

*Parents* also play an important role in intervention for the child with hearing loss. They are intrinsically involved when the child's needs are determined, during visits to audiologists and/or physicians, and the main recipients of consultation and advice with regard to intervention methods, school placement and the care and maintenance of the hearing aid or amplification system that the child wears (Katz, 2002:550-552, 758 & 760).

In the early life of the child with hearing loss, the parents make the final decisions regarding their child – to visit the doctor and audiologist, and to help to decide which amplification is necessary to help their child and to which school their child with hearing loss ought to go. However, when parents hear their child has a hearing loss, they need adequate support from physicians, audiologists and teachers (De Conde Johnson *et al*., 1997:22 & 146). They need advice with regard to intervention methods and placement in school, and should receive adequate counselling.

When parents decide on the kind of support their child with hearing loss needs or may need in the future (Katz, 2002: 547), they need to make informed decisions. This can only be achieved when parents and professionals "…work side by side driven by the belief that families must have choices and families must have access to the information that will allow them to make those informed choices" (Katz, 2002: 547).

If parents can make informed decisions with regard to school placement and send their children with hearing loss to the best school according to their type of hearing loss and need, their children will succeed better at school. It will also help the children to function better in the school environment (Sanders, 1982:254, 386; Katz, 2002:766).

*Teachers* and *media teachers* are other important role players in the life of the adolescent with hearing loss, as they have the knowledge and training to work with them. The classroom teacher and media teacher play a specific role in total education planning and programming for children with special needs (Mayer, Akamatsu & Stewart, 2002:485).

Teachers can play a role in intervention for the child with hearing loss with regard to his/her cognitive and emotional development as well as social competence. Teachers can help the child with hearing loss to learn to communicate, to develop speech, and to interact with peers. If teachers and media teachers provide an environment where the adolescent with hearing loss comes into contact with the printed material and provide a positive learning environment, it will encourage them to access and use academic information (Truax *et al.,* 2004: 309; Fuhler *et al*., 2006: 646).

Teachers are therefore the facilitators, guiding and training adolescents with hearing loss in academic terrains and subjects in order to enable them to access and use academic information. It is important for the teachers and media teachers to be part of the team which assists the adolescents with hearing loss in their education (Murray, 2001: 5).

Teachers and media teachers support adolescents with hearing loss according to their needs and can include among others sign language interpreting/transliteration, speech-to-text technology, note taking, tutoring and academic advising assistance (help answer questions, clarify concepts and procedures, and provide background information on course content) as well as other forms of support.

*Media teachers* are also role players involved with adolescents with hearing loss, if they display a positive role and attitude and are willing to help the child in school. In most cases, adolescents with hearing loss value the media centre as a place to relax, to talk quietly with other pupils, or to use the sources that are available to them (Murray, 2000:7).

Apart from important persons, *school experiences* also play an important role in the lives of adolescents with hearing loss, and specifically in peer interaction (Katz, 2002: 546 & 626). It would therefore be beneficial if they could interact with child that can hear as well, and learn to participate in a hearing world.

*Interpreters* also play a role in the life of the adolescent with hearing loss, especially with regard to children's language development. An interpreter can facilitate

communication with/between adolescent with hearing loss and teacher as well as participation in classroom activities (Stinson & Liu, 1999:200).

If the adolescent with hearing loss only knows how to sign (Katz, 2002: 759) and does not use oral language, it will result in lack of knowledge regarding the syntax of written language, which is essential for proficiency in writing and reading skills. All young school children who begin to read will need to acquire the more formal syntax of written language; however, the syntax of written language, though different in some aspects from the syntax of spoken language, is still more familiar to the hearing person than to the adolescent who uses signing (Hindley, 1997:104; Katz, 2002: 758-759). There is no one-to-one correspondence between signed and spoken language, since a person who signs may use one sign for a whole spoken sentence, or require a set of signs to convey a concept that needs one spoken word. A person who signs does not have the same knowledge with regard to the syntax of spoken language as a hearing person, and even less knowledge of the stricter syntax code used in written language.

Interpreters (who are proficient in sign language, cued speech, and oral language) are professional people who repeat the teacher's instructional language in the school environment as well as other pupils' responses during discussion. They also provide a voiced version of the pupil's sign language response (Katz, 2002:759). Spencer, Erting and Marschark (2000: 280) made the interesting remark that interpreters in educational settings cannot provide information to adolescents with hearing loss if they do not possess sufficient linguistic competence to follow what is going on in the classroom. It is also significant that if there is a fundamental difference in the communication method of the child with hearing loss and the language needed for literacy, the child may face a barrier to literacy (Spencer *et al.,* 2000:281). Spencer *et al.* (2000:281) noted that sign language generally "…does not have widely accepted written forms", and that sign language users cannot acquire literacy skills in their first language to transfer to the written form of a second (spoken) language. This has severe implications for the adolescent with hearing loss.

The teachers and media teachers must therefore focus on the dissemination of knowledge, didactic principles as conditions for effective instruction, and the learning

style of the adolescent with hearing loss, in order to enable them to learn how to access and use academic information (Fraser, Loubser & Van Rooy, 1996:165).

Intervention includes *educational practice*. All adolescents with hearing loss need effective communication development strategies and instructional methods in order to succeed in school (Alpiner & McCarthy, 1993:161). The key to intervention strategies is therefore the interfacing of services he/she needs. It requires a team effort of doctors, audiologists, teachers and parents to successful integrate these services (Katz, 2002:626). There should be continuous assessment of the child with hearing loss and of the child's communication strategies regardless of the use of an oral or signing approach.

Well designed and successfully early intervention services can result in improved communicative and academic functioning and abilities and participation for adolescents with hearing loss (ASHA, 2004 in Kansas State Department of Education, 2009:3-1). Speech intervention, language intervention, and educational intervention are keystones for the development of the child with hearing loss as well as for providing extra help for those children experiencing additional learning difficulties (Alpiner & McCarthy, 1993:162-164; Katz, 2002:760).

## 3.5 CONSEQUENCES OF A CONGENITAL HEARING LOSS

The effects of a hearing loss are manifested on personal, emotional, and cognitive levels, in educational, career, and social spheres. Hearing loss can affect a child in different ways and these consequences will be discussed in detail. The most devastating effect is often a delay in the development of receptive and expressive communication skills involving speech and language. The resultant language deficit can lead to learning problems and subsequently lower academic achievement. The communication difficulties suffered by a child with hearing loss can also lead to social isolation that can have an impact on vocational choices (De Conde Johnson *et al*., 1997:232).

Each child is unique, with outcomes depending on type and degree of hearing loss as well as language, academic, and psychosocial functioning ability. Early identification,

intervention methods, assessment, audiological services, and management programmes will help to counteract some of the effects of hearing loss. Parent support, counselling, and teacher training can be of beneficial value to the child with hearing loss (De Conde Johnson *et al*., 1997:232-233).

Hearing loss is measured in decibels (dB) and the degree of loss is classified according to the pure tone average (PTA). A child with *minimal* hearing loss (16 to 25dB PTA) may find it difficult to hear faint or distant speech. If the child has 15 dB hearing loss, he/she can miss up to 10% of what is said if the teacher is at a distance greater than 3 feet. This is even more of a problem if the classroom situation is very noisy and the classroom instruction is verbal. This hearing loss has therefore an impact on the child's ability to understand speech and language although it is regarded as minimal.

With regard to the psychosocial impact of this hearing loss, the child may miss out on soft conversations and get tired due to having to concentrate to listen. This child may also have poor peer interactions that can impact negatively on the child's socialization and self-concept and lead to immature behaviour. Other people may perceive the child to be awkward

If the classroom is noisy, the child with this degree of hearing loss will benefit from the use of a hearing aid (Katz, 2002: 768) and/or FM system (Katz, 2002: 547; Newby & Popelka, 1992:167-168), to create a favourable classroom setting. He/she will also need special attention and training with regard to vocabulary and speech. A child with a conductive hearing loss is in need of medical management. It is very important that teachers working with children with this type of hearing loss receive in-service training, in order to understand the children's needs. A child with a minimal hearing loss will benefit from a special school but may be able to cope in inclusive education provided elements such as seating, assistive devices, training of teachers and educational programmes are taken into consideration (Hugo, 1987:45).

A child with *mild* hearing loss has a PTA of 26 to 40dB. A child with this hearing loss, especially with a high frequency hearing loss, will find it difficult to hear faint, distant speech as well as certain consonant sounds and will miss up to 10% of the sound signal. This will have a significant effect on understanding speech and language. This

child will need amplification and the child with a hearing loss of 35 to 40dB loss will even miss out on 50% of any classroom situation. This is especially the case if the voice of the speaker is faint, if the distance between the child and speaker is far, and if the child cannot see the speaker at all.

Children with this degree of hearing loss may have problems with self-esteem; they may be accused of not paying any attention or only paying attention when they want to, or that they are daydreaming. Children with this type of hearing loss find it very difficult to filter out background noise.They find the learning environment extremely stressful and get very tired trying to listen in the classroom.

Sanders (1982:160), Hull, (1998:25), and Katz (2002: 759) observed that when the extent of the hearing loss is mild, the consequences are not as severe as in the case of a child with a more severe hearing loss. However, it may affect speech and language development negatively. This child will miss hearing many consonants, will have difficulty in auditory learning, and demonstrate poor auditory processing skills that impact on higher-order cognitive processing skills (Katz, 2002:496).

Mild hearing loss has an effect on the child's education and needs in school. Apart from using a hearing aid and/or a personal FM system (Katz, 2002:550-552; 760 & 768) in school, favourable classroom seating, language evaluation, and educational follow-up are essential for this child. If amplification is supplied, the child will be able to acquire spoken language (Katz, 2002:688). The teacher working with children with this type of loss needs special in-service training in order to provide the children with vocabulary skill building capacity skills. This child may need specialised training with regard to language development, articulation, and speech reading, and/or support in reading skills, and may also need help in building his/her self-esteem. This child will benefit from placement in a special school.

Children with a mild hearing loss can be educated in inclusive educational settings, but may need support services, often because their needs are not recognised or identified. These children are at educational risk as they have delayed language development (Hugo, 1987:45). Their hearing loss may influence their speech and language development, which impacts their education. They may have a low self-esteem

because they harbour feelings of inadequacy in the hearing world. This, however, depends on their environment (Katz, 2002: 550-552; 759-760 & 768). Some children may need individual learning sessions and speech therapy (Clinical correlations related to the auditory system, 2007 & Katz, 2002:760).

A child with a *moderate* loss has a hearing loss between 41 and 70 dB. This child will be able to understand conversational speech face-to-face at a distance of 3 to 5 feet if there is structure and vocabulary control (Katz, 2002:250-252; 550-552; 688 & 760). If the child with a 50 dB loss uses no amplification system, about 50% of the speech signal will be missed. This will result in developmental delay with a defective syntax, limited vocabulary, imperfect speech, and atonal voice quality. There is a significant impact on the child's ability to understand language and speech.

Children with a moderate hearing loss may find it very difficult to socialize with peers who have normal hearing. Even though these children may wear hearing aids or FM systems, they may still be regarded as less competent learners. Such judgement will have a negative impact on their self-perception, and lead to a low self-esteem that can increase over time.

Children with moderate hearing loss may need special education support (Katz, 2002: 547) and auditory processing skill development (Katz, 2002:496). They will need additional help with regard to oral language development, reading, written language, and auditory skill development. These children will benefit more from placement in a special school than in a regular school, unless the teacher in an inclusive setting has received adequate in-service training.

If there is no amplification system at all, conversation will need to be very loud for a child with moderate to severe hearing loss to understand it (Katz, 2002:250-252; 550-552; 688 & 760). If a child has a 55 dB hearing loss, it can cause the child to miss 100% of speech information. In a classroom situation, verbal communication in one-to-one and in group situations will prove to be very difficult due to delayed language, inadequate syntax, reduced speech intelligibility, and atonal voice quality.

The psychosocial impact of hearing loss on the child with this degree of hearing loss is the same as for the child with moderate hearing loss. This child will need amplification. Others may regard this child as a less competent learner and this child will have a low self image, be socially less mature than peers, and feel rejected.

On an educational level it is important that the child with this degree of hearing loss should use amplification on a full-time basis. The child needs special education and the teacher should receive in-service training (Katz, 2002:250-252; 550-552 & 688). This is necessary because the child with this degree of hearing loss has a serious language delay, and needs special help in all language skills, language based academic subjects, vocabulary, grammar, pragmatics, reading and writing.

The more severe the hearing loss, the more the development of speech and language development is affected. A child with a moderate hearing loss's speech and language development is seriously affected unless he/she receives early intervention and help or support. Children with moderate hearing loss can be educated in inclusive education schools. They usually find it difficult to hear in a noisy environment and if there is too much distance between them and the speaker. This has an influence on their speech and language development. These children underachieve in school, especially in group-learning environments, and display various communication problems (Hugo, 1987:45 & Katz, 2002: 760).

With a PTA of 71 to 90 dB the hearing loss can be classified as *severe* hearing loss. This child will require a hearing aid or cochlear implant to be able to hear conversations (Katz, 2002: 768). Without amplification a child with severe hearing loss may be able to hear loud voices at a short distance (about 20cm from the ear) (Katz, 2002:250-252; 550-552; 688 & 760). With optimal amplification, a child with a 90 dB loss may be able to hear or identify environmental sounds and speech. If the loss is of prelingual onset, oral language and speech may not develop spontaneously and may be severely delayed (Katz, 2002: 754). If the child's loss is of recent onset, his/her speech is likely to deteriorate with the quality becoming atonal. The loss also has an impact on his/her ability to understand speech and language.

It has been found that children with severe hearing loss prefer children with the same degree of hearing loss as companions (Marschark, 2007:214). This leads to improved self-concept and develops a sense of cultural identity, even if it means that they are excluded from inclusive education. A child with this degree of hearing loss needs to be placed in a special school. This child may need a full-time special aural/oral programme emphasizing all auditory processing skills and the concomitant higher-order cognitive processing skills, all of which will have an impact on language skills, speech-reading, speech and concept development (Katz, 2002:496).

Children with severe hearing loss who were identified early and received appropriate intervention might have the opportunity to be educated in local regular schools (Denton & Hasbrouck, 2000:8-9). If these conditions were not in place, they should rather be placed in a school setting with peers with the same degree of hearing loss. Children with severe hearing loss can display linguistic and educational problems, but may perform better depending on the kind of assistance, amplification, and rehabilitation services they receive. Some of them will not be able to progress with the oral method and they will benefit from using sign language and cued speech combined with speech (Katz, 2002: 759 & 768).

A child with a hearing loss of more than 90 dB is classified as having a profound hearing loss and his voice and speech have a characteristically “deaf” quality. Such a child displays severe speech and language learning problems (Clinical correlations related to the auditory system, 2007; Katz, 2002:760). Children with *profound* hearing loss rely more on vibrations than on tonal patterns, and more on vision than on hearing for learning and communication. Detection of speech sounds is dependent upon the configuration of hearing loss and use of amplification. Speech and language do not develop spontaneously (Katz, 2002:250-252; 550-552; 688 & 760). If a child has a profound hearing loss of recent onset, speech tends to deteriorate rapidly. The loss has a serious impact on his/her language and speech ability.

A child with this degree of hearing loss also usually makes use of sign language to communicate with peers and depends on his/her parents for communication support. Depending on his/her auditory/oral competence or auditory processing skills (Katz, 2002:496), peer use of sign language, and attitude of parents, the child may or may not

prefer to associate with the Deaf culture. The child may need to be placed in a special school, as he/she will need training in all areas with regard to language skills and all academic areas.

Regarding educational training, this child therefore needs special programmes with emphasis on all language skills and academic areas, and requires constant supervision and support services. If the child uses amplification (Katz, 2002:250-252 & 550-552) from an earlier stage, he/she may benefit from it regarding the ability to acquire spoken language (Katz, 2002:688). This child may also be a candidate for a cochlear implant. Children with this loss need continuous appraisal of needs with regard to communication and their learning need.

If a child with a profound hearing loss wears a hearing aid, it might help somewhat, but the child will find it difficult to articulate words normally. This hearing loss has a severe impact on speech and language development. It results in poor language development, poor auditory attention skills, learning problems, and speech development problems (Hugo, 1987:45). Children with profound hearing loss usually underachieve in language-based subjects. They usually need a combination of speech, signing, and cued speech in order to have information relayed to them as correctly as possible (Katz, 2002: 759).

Hearing loss is classified according to type (site of lesion) and degree, but can also be classified according to time of onset (pre- or postlingual) and *period* of onset, that is, a hearing loss can have a progressive or sudden onset. If one has a hearing loss that occurs over the course of several months or years, he/she has a progressive loss, but an individual who lost his/her hearing suddenly, for example through head injury, has a sudden hearing loss (Tye-Murray, 2004:16). Each of these classification categories carries its own consequences and implications for communication, cognitive functioning, learning, and social skills.

### 3.5.1 Influence of hearing loss on auditory processing and perception

Auditory perception is a cognitive process that supplies information as soon as a person becomes aware of observing information or coming in contact with it. The child with

hearing loss experiences problems due to certain limitations, such as degree of hearing loss.

*Auditory processing* refers to a set of skills related to how a person's brain recognizes and interprets information presented orally. This can include not only speech, but also the processing of non-speech auditory stimuli like music and environmental noise (Other Sources of Reading Difficulty, accessed 2009-06-12.). Children with auditory processing disorders can experience problems with reading, they often find it difficult to pay attention, listen to, and remember orally presented information, and need more time to process information. They also find it difficult to recognize subtle differences between sounds in words (Phonological and Phonemic Awareness, accessed 2009-06-07).

Because hearing loss is "invisible", it is often ignored, and often the problems experienced by a child with hearing loss are associated with factors other than the hearing loss itself. Any type of hearing loss and degree of hearing loss can present a barrier to effective instruction in class (Alpiner & McCarthy, 1993:178).

If a child with hearing loss can manage to acquire auditory perception skills, it will benefit the active learning process in class. *Active learning* is a most desirable outcome for adolescents with hearing loss because it will help them to participate in class. In order to achieve academically, it is important for the child with hearing loss to discriminate between words/sounds. These auditory discrimination skills or auditory processing skills are associated with the development of academic competencies that are necessary for academic success in schools. A child needs to "hear" phonemic distinctions otherwise he/she is doomed to failure in reading and writing (Alpiner & McCarthy, 1993:178).

Prelingual hearing loss results in poor speech development unless intervention has occurred. A child needs to hear clear and consistent and intelligible sounds to be able to develop speech and language (Alpiner & McCarthy, 1993:178). Prelingual hearing loss can also secondarily cause several different disabilities affecting hearing ability, speech intelligibility, as well as language development. This impaired language development may result in academic or occupational problems and can diminish quality

of life for children with hearing loss especially after their adolescence period (Kunisue, Fukshima, Kawasaki, Maeda, Nagayasu, Katoaka, Kariya, Fukutomi, Takami & Nishizaki, 2006: 1671-1672).

Auditory learning involves the reception, processing, representation, recognition and comprehension of sound and is interactive with other sensory knowledge. Sensory perception is important in order to access and use information and to get a full picture of the world, to protect individuals, and to help in the process of orientation (Sanders, 1982:83). The adolescent with hearing loss experiences a serious challenge in acquiring language, and this can give rise to secondary problems such as communication, speech, personal and emotional development delays.

Sensory knowledge helps to create internal representations in the form of concepts and data. Lack of sensory knowledge and skills makes it difficult for the child with hearing loss to understand abstract ideas. He/she needs to actually 'see' the object in order to link it with the sound that he/she hears. It is important for the child with hearing loss to understand abstract words in order to form the concepts that are central to their academic learning and adaptation in school life. If school children cannot learn to understand abstract words and meaning, it can hamper their quality of life (Kunisue *et al.,* 2007: 1672).

A child with hearing loss experiences a breakdown in the detection of sounds, which limits the quantity and quality of the sound he/she receives. This has an effect on the child's ability to process auditory information accurately. The fragmented auditory information that the child receives does not present a true picture of typical auditory experience. He or she can therefore not form a true picture of the sound that he/she hears.

The child's interpretation of auditory information and the ability to associate the spoken symbol or word with the environment being experienced (Alpiner & McCarthy, 1993:146) are affected. It is difficult for the child with hearing loss to construct meaning, due to restricted auditory input. **Table 3.1** describes the different stages of auditory skill development.

**Table 3.1: Stages of an auditory skill development (De Conde Johnson et al., 1997 in Anthony & Lowry, 2008).**

| Stage | Main theme | Behaviour examples |
|---|---|---|
| Stage 1 | • Sound awareness<br>• Early attending<br>• Sound as meaningful event | • Obvious response to intense sounds<br>• Obvious response to soft sounds<br>• Obvious response to caregiver's voice |
| Stage 2 | • Beginning localization<br>• Early sound recognition<br>• Beginning deliberate vocalization | •Search for sound, looking/ reaching<br>• Increased vocalizations<br>• Responds to different voice tones<br>• Beginning vocal play |
| Stage 3 | • Accurate localization and tracking<br>• Meaningful sound recognition<br>• Deliberate vocalization | • Manipulates toy to make sound<br>• Attends to and follows voice<br>• Searches for changes in sound<br>• "Calls" for caregiver for basic needs<br>• Unfamiliar sounds are upsetting<br>• Anticipates events based on sounds<br>• Makes gestures to familiar words |
| Stage 4 | • Increased sound comprehension<br>• Increased speech comprehension<br>• Improved vocalization control | • Understands familiar phrases<br>• Responds to name<br>• Participates in familiar vocal play<br>• Vocalizations sound like words<br>• Better use of inflectional patterns<br>• Plays with complex sound toys |
| Stage 5 | • Early auditory comprehension<br>• Meaningful use of oral language<br>• Increased ability to converse | • Follows one-step directions without gestures<br>• Expressive vocabulary increases<br>• Attends to people despite background noise |

**Table 3.1** describes a child's auditory skill development in five stages, from the moment that he/she becomes aware of a sound as a meaningful event. Then the child starts to localize the sound and recognize the sound, starts to vocalize, and is able to track and recognize sounds. This leads to increased sound comprehension as well as speech comprehension and improved vocalization control. Stage five is where early auditory comprehension starts, oral language begins, and the child is able to converse.

The child's behaviour in response to auditory stimuli progresses over time. The child starts by reacting to intense sounds as well as to soft sounds and to the caregiver's voice and tones. He/she follows the voice, calls for basic needs, anticipates events based on sounds, makes gestures, understands phrases, responds to name and participates and plays with toys. Later on the child is able to follow one-step directions without gestures, his/her receptive as well as expressive vocabulary increases and he/she can attend to people despite background noise.

Hearing loss may have a significant effect on the development of cognition and language.

### 3.5.2 Impact of hearing loss on intellectual and cognitive development

Hearing loss has a significant effect on intellectual and cognitive functioning, and can eventually influence an adolescent's ability to access and use academic information. Research has shown that hearing loss has far-reaching effects on childhood development of cognitive (thinking) and linguistic (language) skills.

Before cognitive development was studied, there was a perception for many centuries regarding the "psychology of deafness" that was examined in literature by previous researchers (Spencer *et al*., 2000:255). Three major perspectives emerged (Spencer *et al.,* 2000) from the literature:

- Deafness is a deficit (Spencer *et al*., 2000);
- Deafness leads to concrete thinking (Myklebust, 1964) and
- To be deaf is to be different (Spencer *et al.,* 145-162).

Hearing loss has an influence on cognition, as cognition and cognitive development are perceived as interpersonal aspects. Social interaction influences cognitive development and is based on the use of meaningful symbols namely on language (Vygotski, in Spencer *et al.,* 2000:256). By means of language, an individual can create his/her own internal symbolic system that is used in his/her thinking ability. Language empowers intelligence because language development supports intellectual development (Spencer *et al.,* 2000:256). When adolescents with hearing loss display problems with regard to language skills, especially in their formation years, it has profound consequences for the developing child (Spencer *et al.,* 2000:256). Intellectual skills are based on certain processes such as stimulus recognition, response generation, following of procedures, terminology use, discrimination of words and concept formation, rule formulation and problem solving. These factors are all necessary in order to enable a student to facilitate learning at all levels (Gagne, accessed 2008-03-10).

*Attention* is the first process in successful instruction before a child can engage in the learning process (Gagne, 2008-03-10). If a child has a mild to severe hearing loss, he/she may find it difficult to pay attention in class as the hearing loss impacts on the auditory perception process. If school children cannot pay attention, they cannot succeed in the learning process.

*Memory* relates to the ability to retain or recover information about previous experiences. Memory is a function of the brain, which reconstructs information about things that a person has done or learned. Memory can be short-term (for recent knowledge or happenings) or long-term (knowledge from the personal past). There are also two types of memories namely explicit memories that one can recall consciously and verbally such as facts, people, and places that one encounters daily or encountered in the past. The other is implicit memory that describes the capacity for learning skills and procedures such as playing golf or dancing. The child with hearing loss finds it difficult to retain and recover information relating to verbal concepts.

Part of the process of intellectual and cognitive development is a child's capability to handle problems and to apply solutions. If a person does not have at hand readily

accessible methods to solve various problems, it can lead to failure (Sutton, 2003:1-2). The child with hearing loss finds it difficult to apply solutions to problems due to the impact of the hearing loss on his/her ability to remember things.

Learning and development necessitates the ability to solve problems. *Problem solving* is not necessarily active or conscious, but requires dynamic interaction with an accessible environment. Adolescents with hearing loss have different knowledge bases, strategies, and brain organizations that can or may affect learning because of cognitive development that is different (Spencer, *et al.,* 2000:278).

Early access to language, social interaction, and diversity in both object- and person-oriented experience also play a role in understanding adolescents with hearing loss' educational and their psychological interactions with the world (Spencer *et al.,* 2000:279). *Knowledge* and *comprehension* are variants that play a role in cognitive and intellectual development of a child with hearing loss. Cooper (1993:10) refers to this as the "schemata", the structures that "...represent the generic concepts stored in our memory" (Cooper, 1993:10-11; Luckner *et al.,* 2005: 445). Knowledge and comprehension play a role in the school systems and are dependent on a child's understanding of language (Paul & Quigley, 1994:94; Welch, 1993:195).

Vygotksi (in Nowell & Marschak, 1994:16) accentuated that although all people have mental activities (e.g. specific memory skills, organisation, and learning), these skills can only come to the foreground due to that which is being *taught or mediated.* These mental activities can only be substantiated by means of language. This learning process is an easier natural process for the hearing person, but in the case of a child with hearing loss, this process proves to be very difficult.

Language development also plays a part in the cognitive development of a human, the self-identification, access to information, deposition of information and it is also the manner in which the emotional feelings are expressed (King & Quigley, 1985:59). The child with hearing loss is able to develop thought processes but in a different manner from a hearing person and this is reflected in the language. The implications are quite severe.

The child with hearing loss finds it difficult to work with abstract ideas and thoughts such as the concepts of death, loss and sympathy (Hugo, 1987:8). A child with normal hearing grows up and understands these concepts whereas it is very difficult for the child with hearing loss to do so. All children need effective communication from the start with people around them. By communicating from an early stage, children will be able to develop problem solving and cognitive strategies, be able to successfully integrate socially, gain information about themselves and others and acquire a sense of being part of the environment (Spencer *et al.,* 2000:280).

### 3.5.3 Impact of hearing loss on communication, speech and language development

Whereas communication is having one's meaning understood and speech focuses on articulation and voice quality, a person's language is the combination of semantics, syntax, and pragmatics. Language is the cornerstone of human social interaction, is impacted by experience and evolves over time (Kansas State Department of Education, 2009: 6-1). Language development is linked to both *communication* and *speech*, which is a vehicle for the transfer of information during communication. Children with hearing loss experience delay with regard to communication, speech, and language development. "Because of impaired hearing, such children are unable to develop the same competent and intuitive grasp of the language as do their normal hearing peers" (Ross, Brackett & Maxon, 1991:21; Kansas State Department of Education, 2009: 2-3).

*Communication* can be formal or informal, planned or spontaneous, structured or unstructured, and all of these forms occur in a school context. Some see formal communication as that form of communication that is applied in a school setting for academic purposes whereas informal information communication is seen as social interaction. It appears, however, that the two forms often overlap (Stinson & Foster in Spencer *et al.,* 2000:193). All students, regardless of the degree of their hearing loss, need formal as well as informal communication in a school environment.

Speech is the way in which words are manifested. Children with hearing loss display speech problems because they cannot hear the acoustic cues during the time when the phonemes of spoken language forms are emerging (Brackett, 1997:358). They also

find it difficult to monitor their own speech and rely on visual, tactile, and kinaesthetic senses. Speakers with hearing loss display substitutions, distortions, nasalisations, and inappropriate co-articulation of consonants (Ross *et al*., 1991:29-31).

Language is a set of rules for verbal communication. It involves "...higher order cognitive, meta-cognitive, and linguistic skills, such as interference, syntax, and semantics, as well as lower order decoding skills and letter and word recognition" (King & Quigley, 1985:xi-xii).

Communication refers to interaction between two or more persons by means of which a person can learn about the world. "Everything he knows as a human being, man has had to learn from other human beings" (Levine, 1981:21). This implies a constant process of encoding and decoding. Communication that is meaningful, engaged and smooth is critical for the socio-emotional development of a child with hearing loss (Spencer *et al.,* 2000:171).

Communication through language is pivotal to human existence. By means of language, ideas can be transferred, identities can be established, information can be stored, social interaction can take place, thoughts and emotions can be shared, and all of these processes can be applied in areas such as for example participation in family, community life and education, religion, and the politics (Paul & Quigley, 1994:2-7).

Language is not only a matter of symbols that are expressed, it must be organised according to specific rules in order to lead to complete understanding (Sanders, 1982:168). Language has three aspects namely *content* (for example vocabulary), *form* (for example syntax), and *use* or pragmatics (Ross *et al*., 1991:36; Tye-Murray, 2004:638-641; Paul & Quigley, 1994:105-117). The latter may be regarded as the most significant aspect, as exemplified in the statement of Uys, Hugo and Louw (1994:2): "...the development of language in hearing-impaired children is a direct product of use, functions and extent of communication, regardless of the form, modality, or symbol used".

### 3.5.3.1 Vocabulary

Adolescents with hearing loss display slow development of vocabulary, and less flexibility in extended conversations, especially in abstract topics. They have difficulty in understanding analogies, multiple meanings of words, and synonyms. They find it difficult to learn both content words and those that do not literally convey dictionary meanings. They find academic tasks arduous because there is a misunderstanding of vocabulary and/or syntax, and they cannot make out the meaning of a new word when the language itself is understood insufficiently (Marschark & Spencer, 2003:99). This results in a correlation between reading vocabulary knowledge and reading achievement. Many adolescents with hearing loss display problems in understanding in addition to vocabulary and syntax, figurative language and expressions (Marschark & Spencer, 2003:100). They display limited use of imaginative and idiomatic expressions (Marschark & Spencer, 2003:99).

### 3.5.3.2 Syntax

With regard to *syntax,* adolescents with hearing loss might have knowledge of words and still not be able to comprehend phrases and sentences. Syntactic knowledge is a good predictor of reading level because it requires the ability of a person with hearing loss' ability to integrate information across connected linguistics units such as phrases, sentences and paragraphs (Marschark & Spencer, 2003: 100). This would explain the reason why they find it difficult to create complex sentences. Adolescents with hearing loss may be able to decode and learn words from contexts if words are repeated in sentences that are relatively simple and appear a number of times (Marschark & Spencer, 2003:99).

### 3.5.3.3 Pragmatics

Pragmatic behaviours range from preverbal communicative acts to conversational devices such as signals (Marschark & Spencer, 2003: 282). Adolescents with hearing loss find it difficult to express themselves verbally although most of them are able to communicate in a non-verbal manner. They make use of gestures, facial expressions,

and intonation patterns. They also find it difficult to maintain a conversation especially when they try to repair a communication breakdown.

The social or pragmatic rules that a child constructs, reflects the child's understanding of who can say or write what to whom. These rules also help the adolescent with hearing loss to be able to say or write for certain purposes. Receptive development is reflected in how well a person responds to what is said or read. Expressively, pragmatic development is realised when the adolescent with hearing loss is able to accurately phrase what he/she says or writes within a specific environment. An adolescent with hearing loss has to have a basic knowledge and understanding of non-verbal routines as well as of social interactions that can serve as a foundation for his/her decisions as he/she learns linguistic pragmatic conventions or processes (Truax *et al.,* 2004:311). Pragmatic processes focus on the *reason* and *manner* why a person communicates whereas semantic conventions focus on the *what* or content of a discourse or conversation.

Each language is dependent on a set of symbols such as sounds and letters to construct spoken as well as written words for a specific discourse. Over years the adolescent with hearing loss will develop a repertoire of intonation and phonemes that will encompass words, phrases and sentences (Truax *et al.,* 2004:311).

#### 3.5.3.4 Sign language

Signing as primary language has the implication that the communicator (for example an adolescent with hearing loss) relies on signs and non-verbal clues to be able to interpret what is being said. A person with hearing loss using sign language usually does not use the same sentence structure as a person communicating verbally, depending on the nature of the signing system (Bench, 1992:9). Only Signing Exact English has the same structure as spoken English. Children with the ability to use exact English, that is, children with adequate amplification or who use Signing Exact English, are able to understand the syntactical structure of sentences, and to comprehend abstract word and meanings.

Signing is considered amongst members of the so-called Deaf culture to be the natural language of deaf adults (Katz, 2002: 759). One has to keep in mind, however, that there are many variations of sign language and they have different signs for a single concept. This means that children with hearing loss may often not understand one another. Bench (1992:9) indicated that even deaf adults using sign language sometimes can not understand each other. Some children with hearing loss are multilingual, for example adolescents who are familiar with more than one sign language (Katz, 2002: 759) and those using sign language and a second spoken language such as Afrikaans and/or English. Adolescents with hearing loss often experience difficulties in mastering more than one language modality, such as signing, speaking and writing (Nowell & Marshak, 1994:30, 42; Braden, 1994:32). Tye-Murray (2004:638) found that, regardless of which communication mode is applied (signing, oral or total communication), children with hearing loss find it difficult to learn any language well.

### 3.5.4 Influence of hearing loss on literacy, reading, and reading comprehension

Literacy proficiency is usually measured in terms of a person's ability to read, to write, and to understand written material. In order to understand how adolescents with hearing loss learn to read and spell, it is necessary to consider which cognitive and language-based skills predict individual differences in literacy achievement (Kyle & Harris, 2006:273-288). Literacy is valuable for everyday life, as well as being the means to obtain and evaluate information for a wide range of work purposes. Literacy leads the way to gaining information, and access to information is a basic right, as stated in the South African Constitution (1996, Chapter 2, article 32, 2007). It is important for economical, social, and political reasons (Boon, 1990: 2 & 1992: 232; Britz, 1996:243; Marschark, 2003: 42-43; Luckner *et al.,* 2005:444).

Language and reading ability are issues related to training, schools, and resource centres. For the hearing child, phonological awareness (i.e. the ability to distinguish between and manipulate the constituent sounds of words) plays an important role in reading and spelling and is one of the strongest predictors of literacy achievement, especially in a child's early years (Kyle & Harris, 2006: 273-274). It is easy to see that

the development of phonological awareness can be a challenge for a child with hearing loss.

Individuals, and more specifically children with hearing loss in their school-going phase, need academic information (Paul & Quigley, 1994:93-94) in order to develop to their full intellectual ability (Boon, 1992 (a): 232). As a child grows older, he/she learns by means of repetition how content meaning is organized and coded, and he/she will learn the associative nuances and how stories are organized. Through effective training at their special school, adolescents with hearing loss can also learn information literacy skills, which will enable them to understand academic information and be aware of the importance of this information.

Research has shown that hearing loss has an impact on the adolescent's reading, writing, and comprehension skills. Reading and literacy play a significant role in cognitive ability and the power of the written word must not be underestimated. Reading implies a process of decoding, that is, the use of graphic symbols, contexts, phonetics and structural analysis (Cooper, 1993:15). Research has shown that though many pupils who are deaf or hard of hearing are skilled in literacy areas, the majority of pupils find literacy hard to master. Research indicated that the average pupil graduates from high school with reading comprehension of approximately at fourth grade level (Woolsey *et al*., 2004:264). Marschark and Spencer (2005: 27) also indicated that the average performance of reading comprehension for deaf and hard-of hearing students is roughly six grades lower than their hearing pears at the age 15).

Vocabulary knowledge is essential for a person with regard to his/her reading ability and to be able to comprehend what he/she is reading (Luckner *et al.,* 2005: 444). If a person with hearing loss has a restricted vocabulary due to the hearing loss, this is an additional disadvantage for literacy development.

Adolescents with hearing loss have difficulty with all areas of academic achievement, not only with reading text, but also with mathematical concepts (Charlesworth, Charlesworth, Raban & Rickards, 2006:29-51). Research has shown that adolescents with hearing loss may experience more problems as they progress through their school years and they come to depend to a large extent on their parents, support systems and

the training provided by teachers in their respective schools (Marschark, 2003: S41-S47).

#### 3.5.4.1 Impact of hearing loss on reading

A child has to learn language before learning to read. The auditory channel for acquisition of language is very important before a child can learn to read. One possibility is that children with hearing loss who have good phonological awareness and coding skills can learn to read in the same way as hearing children by developing their knowledge about letter–sound correspondences. These skills are strong predictors of reading success among children with hearing loss (Harris, 2006:190). An additional factor is that the child with hearing loss needs systematic instruction in vocabulary, especially in order to understand multiple dimensions of words before they can become independent readers (Paul, 1998:2001).

Through reading, the child will be able to learn to link the visual with the auditory processing procedure (Katz, 2002: 496) which is very important, because the child has to learn to form associations at a later stage in the reading process; the reader needs the ability to evaluate the text. This refers to the way in which the style, clarity, and cohesion of the text is comprehended and appreciated. The style can vary between the narrative form (stories or novels) and the expository form that supplies information and facts as in academic information (Cooper, 1993:14). Language skill is an important determiner of text evaluation. Engel-Eldar and Rosenhouse (2000:460) found in their research that there were factors playing a role in the reading skills of adolescents with hearing loss such as lack of motivation; environmental factors; the mental-cognitive factor; the psychological-sensory factor, and the neuron-developmental factors. If the adolescent with hearing loss is not motivated to learn or does not find him/herself in a positive environmental situation, it can have an impact on the ability to read (Schein, 2000:34).

It is clear that hearing loss has a multidimensional impact on the adolescent's ability to learn to read. A hearing loss affects the reader's ability to learn to read (acquisition of reading); the ability to extract meanings from the written message; and the ability to express the written message. The more readers read, the more likely they are to enjoy

reading, which means their reading can improve, as researchers have indicated (Wurst, Jones & Luckner, 2005: 57; Gray & McCutchen, 2006:325). Steiner, Panofsky, Smith (1996:5) indicated that reading improves quality of life and children should therefore be encouraged to read.

Three important aspects related to hearing for reading are *discrimination* of particular phonemes within words, *auditory discrimination* of words, and *auditory synthesis* (Hall & Mueller, 1997: 492). The child with a moderate to severe sensorineural hearing loss experiences the following:

- inability to hear similarities in the initial and final sounds of words;
- cannot perceive the similarities in words;
- unable to hear the consonant combinations in consonant blends;
- an inability to discriminate short vowel sounds;
- cannot break words into individual sounds;
- an inability to combine parts of words to form a whole;
- cannot hear the sounds for the printed symbols or the names for the printed words;
- difficulty in distinguishing similarities and differences in sounds;
- an inability in retention of sounds or syllables long enough to make matches or blends;
- an inability to relate the visual components of words to their auditory counterparts;
- does not relate a part of a word to the whole word and
- unable to synthesize or analyze unfamiliar words (Hall & Mueller, 1997:492).

The above-mentioned aspects are prerequisites for learning to read and it is clear that the child with hearing loss experiences problems with regard to learning to read due to his/her hearing loss. Children with hearing loss show delays or differences when compared to their hearing peers with respect to literacy development (Tye-Murray, 2004:642). In addition to the problems listed above, Tye-Murray (2004:642) gave two reasons for the delays in reading. The first is that the problem could stem from inadequate language systems that are manifested in deficits in vocabulary and unfamiliarity with groups of related words and secondly, the reader can be unfamiliar

with complex syntactic structures, which interferes with their ability to understand printed text. When the child with a hearing loss reads he/she is confronted with the full message for the first time.

Individuals with hearing loss have a tendency to concentrate more on the lower level skills of decoding and transcription when reading instead of trying to acquire background or content knowledge, which can be achieved by access to relevant information, extended reading and discussion of text (Lloyd *et al*., 1997:239-240). A reader has to be able to give a realistic account of the text and has to be able to reconstruct the contents of the reading material to own life experiences. Cooper (1993:13) stated, "...the meaning that the reader constructs or assigns does not come from the printed page; it comes from the reader's own experiences that are triggered or activated by the ideas the author presents".

In order to read effectively, therefore, the adolescent with hearing loss must have a good language base and be able to understand what he/she reads (Schirmer, 1994:139; Paul & Quigley, 1994:145-147). Reading involves a combination of *bottom-up* and *top-down* processing. When one reads, there is an ongoing process of interaction involving the language being used, cognitive processes including memory, and knowledge (Marschark, 2003: S42). The top-down and bottom-up processes that take place during reading are illustrated in **Figure 3.1.**

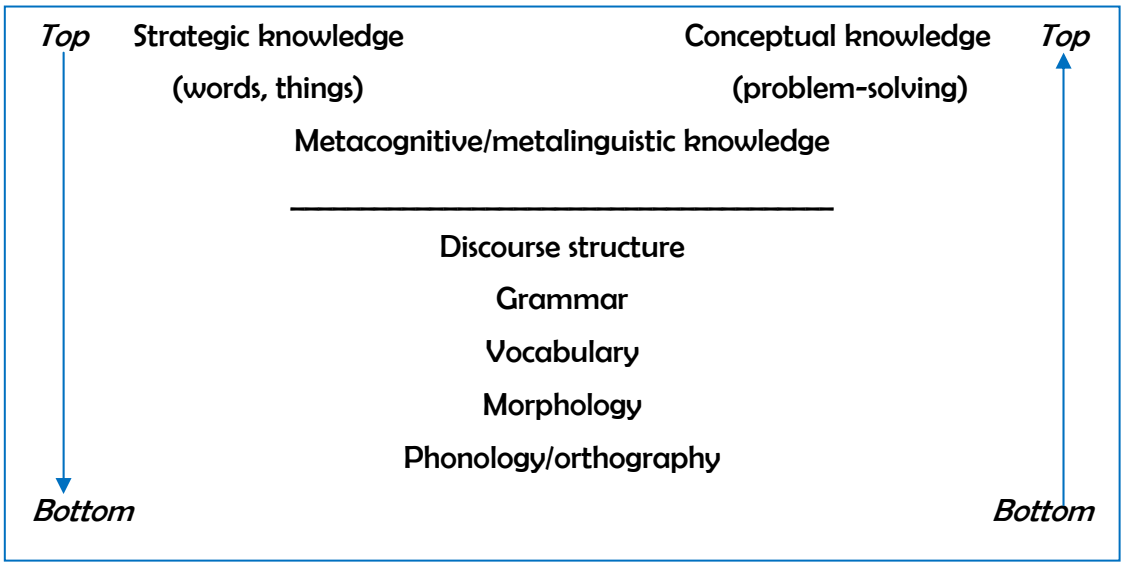



**Figure 3.1: Bottom-up and top-down aspects of reading (adapted from Marschark, 2003: S42)**

Several authors have argued that children with hearing loss experience such severe delays in reading achievement because they have problems with both top–down and bottom–up processes (King & Quigley, 1985; Marschark & Harris, 1996; Webster, 1986). The reason for this may lie in the adolescents with hearing loss' inability to retrieve word meanings, leading to wrong and inaccurate interpretations. Many of the reading problems that readers encounter are related to five components of reading namely phonological and phonemic awareness, word decoding and phonics, fluency, vocabulary, and comprehension, and weakness in a combination of any of the components can occur. It can also be due to secondary complications such as problems with attention, memory or the learning of a language e.g. English as a second language.

Marschark (2003:43) found in his research that adolescents with hearing loss understand captioned TV and videos better than connected text, and suggested that this "reduced form – high content" format can be utilised in the literacy process. If a child with hearing loss has a relatively good semantic knowledge, he/she can use it to compensate in some way for the comparatively poor phonological coding skills usually observed in children with hearing loss. Reading is reliant on both semantic knowledge and phonological coding, and the child typically experiences problems with regard to one or both of these aspects. As words convey activated knowledge, the memory becomes involved. The learning process draws on both current and prior reading experiences (Marschark, 2003:S42). Learning is also influenced by attention span, working memory and semantic memory (Marschark, 2003:S44).

It is well documented that, judging from standardized reading scores, most students with severe to profound hearing loss who graduate from high school do not read as well as their normally hearing counterparts. Poor reading levels signify illiteracy (Schein, 2000:32). Even more interesting is the fact that these results have not changed much since standardized tests first came into use. Two general patterns have been observed. Firstly, the average 18 to 19 year old student with a severe to profound hearing loss reads no better than the average nine to ten year old normal hearing student, and secondly, there seems to be an annual growth rate of less than half a grade per year, with a levelling off or plateau effect occurring at the third- or fourth-

grade level for most students with a hearing loss (Paul, 1998:90). This is ascribed to language problems (receptive) that the child with hearing loss experiences.

The majority of adolescents with hearing loss find it hard to master all aspects of reading, as reading depends on receptive processes. Harris and Moreno (2006:190) found in their research that early exposure to both sign and oral language is an important contributor or factor that leads the child with hearing loss to achieve academically. Research indicates that the average adolescent with hearing loss graduates from high school with reading comprehension at approximately the fourth grade level (Traxler, 2000:337-348). It must be noted, however, that this depends on the degree of hearing loss. It is interesting to note that research has indicated that for children with hearing loss, reading achievement was predicted by three factors: the degree of hearing loss, skill in speech reading, and productive vocabulary, since it is easier to read a word that is already in one's vocabulary (Kyle & Harris, 2006: 284).

Speech reading is a more current term than lipreading that encompasses lip movements, facial expressions and gestures — all of which augment acoustic information to aid receptive communication (Advanced Bionics, 2009-27-08-27). Speech reading plays a role in single-word reading ability whereas productive vocabulary plays a role in sentence comprehension ability. Speech reading forms the input on which a adolescent with hearing loss' phonological code is based. Speech reading is therefore based upon the articulatory gestures and motor movement of the lips.

It is clear that reading can help the child with a hearing loss to expand his/her behavioural patterns in such a manner that it would empower him/her to adapt to loss of hearing, to excel and to solve problems It is also important to establish the impact of hearing loss on writing.

#### 3.5.4.2 Impact of hearing loss on writing

Writing is one of the most complex and difficult tasks for students to master. At a basic level, a person who writes must be able to produce words and sentences that are readable (Antia, Reed & Kreimeyer, 2005:244). According to Marschark (1997:145),

the “output” domain of reading mirrors the “input” domain of writing. Language problems are reflected in the written language of the child/adolescent with hearing loss. They rarely use synonyms, antonyms, metaphors, or cohesive forma of substitutions or ellipsis (Tye-Murray, 2004:643).

Marschark (2003:43) has found in his research that adolescents with hearing loss display disordered and poorly structured sentences in their writing, as they lack the ability to coherently organize language. Adolescents with hearing loss also find it difficult to cluster familiar words according to meaning in recall. This means they lack the ability to adopt semantically-based retrieval strategies. They find it difficult to form concepts of relationships between words, phrases and ideas. Adolescents with hearing loss do not recognize relational information, or are unable to make use of category information in the same way as their hearing peers. This category information is important, as different/various categories are automatically active in memory during the processes of reading, recall and problem-solving.

In order to be able to write, the adolescent with hearing loss needs to possess good language skills. A writer has to have knowledge of vocabulary and syntactical structure and at a higher level must be able to select topics, plan, and be able to organise ideas and make decisions on how to provide information (Antia *et al.*, 2005: 244-255).

According to Schirmer (1994:140), all people possess sufficient cognitive skills to become proficient readers and writers, but although adolescents with hearing loss may become literate, it must be kept in mind that their their ability to comprehend concepts is different from that of their hearing peers. Antia *et al.* (2005:244-255) have also found the following:

- Adolescents with hearing loss make numerous errors at sentence level.
- Their writing may be uninteresting, uninformative and is also not coherent.
- Lexical cohesions consisted mainly of word repetition.
- Their writing skills improved with age.
- Their compositions were less frequently conceptually linked than those of hearing peers.

- Adolescents with hearing loss using auditory/oral communication scored higher than those who used signing.
- Variables such as gender, socio-economic status, grade, degree of hearing loss, and interpreter use all affected the adolescents with hearing loss' ability to write. The interpreters reduced the adolescents with hearing loss' access to instructional content as they learned to rely on signing.
- Adolescents with hearing loss rely heavily on teachers to help them to develop their writing skills.

In earlier research, Yoshinga-Itano and Downey (1997: 63-64) found that it is possible to become a proficient reader and writer using different ways of communication. For adolescents with severe to profound hearing loss, however, it may be difficult to master the techniques of writing and reading (Bench, 1992:159; Katz, 2002:760). It is clear that children need to be prepared for reading and writing of a text through e.g. discussion of content that is based on a title, subtitles and illustrations. By means of questions, the adolescent with hearing loss develops the ability to make inferences and connections. What a reader gets out of print also depends on what he/she brings to that task (Truax *et al*., 2004:314).

### 3.5.5 Influence of hearing loss on academic achievement

Hearing loss can have a direct effect upon learning and academic achievements, especially when learning depends on reading and mathematical concepts (Effects of hearing loss on development, 2009). This may lead to children with hearing loss having to repeat grades. Furthermore, lack of access to formal and informal education leads to increased frustration for adolescents with hearing loss (Cook & Hawkins, 2006:234). Bracket (1997:355) stated: "Although the primary effect of a hearing loss is an inability to hear some or all of conversational speech, its impact on communication development dramatically alters social and academic skill acquisition". The relationship of hearing and hearing loss to academic performance is therefore important to consider. If an adolescent is placed in a special school, the school caters for his/her needs. A special school uses audiological services in school in order for the teachers to fully understand the consequences of hearing loss.

Hearing loss leads to problems with regard to intellectual and cognitive development and impacts on the way in which the child with hearing loss experiences his/her macro- and micro-environment. The ultimate consequences are limited social and career opportunities (Hugo 1987:1, 5; Katz, 2002: 510; Effects of hearing loss on development, accessed 2007-08-14). According to the National Technical Institute for the Deaf (NTID, 2003 Annual Report) "…*students who are deaf take a longer time to get a degree than hearing students. There are many reasons for this, not the least of which is academic preparedness"* (Stevens, 2004:7).

Some authors have voiced the opinion that these consequences can be prevented by appropriate teaching and learning endeavours. According to Moores (2001:119), "…many deaf children have low academic achievement simply because we have not yet developed sufficient skills to teach them effectively". He also found there was limited time for teacher preparation and a lack of teaching skills.

Adolescents with hearing loss want to be treated the same as hearing people. Having a hearing loss does not necessarily imply intellectual weakness (Norton, 1992). For people who are deaf or hard of hearing and who choose to use spoken communication, feedback mechanisms are limited; therefore, vocal control, volume and articulation may be affected. These secondary effects are purely physical, but are often misinterpreted as intellectual weakness, which they emphatically are not (Teaching strategies for students who are deaf or hard of hearing, accessed 2008-13-29).

The age of onset of the hearing loss, the aetiology, the age of amplification, prior management of the hearing loss, the parental support of the children with hearing loss, the child's intelligence and personality will have an effect on children's academic achievement. The same applies to neurological functions such as attention processing and sensory integrations skills (De Conde Johnson *et al*., 1997:60).

If the adolescent with hearing loss has severe difficulties with language and communication strategies, it impacts on literacy level and consequently on the access and use of academic information. Spencer *et al. (*2000:256) emphasized the importance of schooling and suggested that adolescents with hearing loss should be assessed on performance of different cognitive tasks rather than considering cognition

as a unitary skill. This would enhance the process of teaching and learning (Spencer *et al.,* 2000: 256). The adolescents with hearing loss cognitive development can be determined by the teachers and adolescents with hearing loss' inherent abilities, while measurement of cognitive development can be influenced by task dimensions such as visual stimuli vs. non-visual stimuli, verbal vs. nonverbal processing and concrete vs. abstract stimuli (Spencer *et al.,* 2000:257).

Although the literature describes different forms of educating children (Spencer *et al.,* 2000: 277-278), it is clear that adolescents with hearing loss have different learning styles and needs from hearing children and, in addition, that each child learns differently and at a different rate. Such differences may be difficult or impossible to accommodate in classroom situations (Spencer *et al.,* 2000:278).

The influence of a hearing loss on a child's academic achievement is also evidenced in a low self-esteem (Katz, 2002: 510; Marschark, 2003: S41-S47). Students with hearing loss often learn to "feign" comprehension because they do not understand the context of the academic material. Therefore, it is necessary to provide extra facilities and communication strategies for the student with hearing loss in order for them to benefit from academic education. Deafness is an invisible disability. It is easy for teachers to "forget about it" and treat the student as not having a disability.

Access to academic information is essential to academic progress. Academic information refers to all written information pertaining to the school curriculum. This involves all the different sources of written information that adolescents with hearing loss need to access and use for academic purposes when acquiring high school qualifications. Not all individuals and/or groupings within a specific structure have the same access to academic information. Research shows that people with a hearing loss are often limited in their utilisation of academic information both in quantity and quality (Kerschner & Chaplain, 2001:98; 104; Morris & Blatt, 1986:314; Kuder, 1997:144; 150). Mokhtar and Majid (2006:36) pointed out that although some schools may have been outfitted with current information and/or communication technologies and infrastructures, it does not necessarily mean that adolescents with hearing loss will be competent to use these amenities effectively.

It appears that adolescents with hearing loss, especially those in special schools, experience limitations in literacy and information literacy skills. This refers to the ability to recognise when information is needed and have the ability to locate, evaluate, access and use effectively the needed information for his/her own purposes. This has an impact on the ability to achieve academically.

### 3.5.6 Influence of hearing loss on the emotional and social adolescents with hearing loss

The language and communication characteristics of children with hearing loss may affect their social and emotional development (Elkayam & English, 2003:485-499). Many adolescents with hearing loss are aware of the fact that they have certain limitations and limited career possibilities. They are aware of the reality and that they are not really part of the hearing community (Welch, 1993:1984; Hugo, 1987:7). This leads to the children feeling unhappy and isolated as they find it difficult to communicate with others.

One has to bear in mind that the process of socialising is a learned process for the adolescent with hearing loss (Higgins & Nash, 1987:59). Poor social relationships have a negative impact on cognitive development (Nowell & Marshak, 1994:53). Members of society also have a poor knowledge of adolescents with hearing loss, their needs and their communication needs (Bench, 1992:207). Adolescents with hearing loss are very dependent on the other persons with whom they socialize.

Children with hearing loss feel isolated - those with mild to or moderate hearing losses even more so than those children with severe to profound hearing loss (De Conde Johnson *et al*., 1997:232). Zapata (1994:124) noted that people with hearing loss experience problems regarding joining in social and political activities, and that this prevents them from adapting or playing a meaningful role in society. Nowell and Marshak (1994:83) noted that people with hearing loss find it difficult to gain confidence in life. The impact of hearing loss is that the person with hearing loss may suffer from depression due to isolation (is unable to hear properly what is being said) and finds his/her hearing loss difficult to accept (Wikipedia, hearing loss, accessed 2007-07-10).

If a child with hearing loss is able to access and use academic information, it will help the adolescent with hearing loss to overcome the influence and consequences of hearing loss on his/her emotional and social development. Literature research indicated that the adolescent with hearing loss battles to survive in this world. They have "...a *daily struggle to overcome the threat to selfhood that deafness imposes and their exclusion from full participation in inclusive education life"* (Welch, 1993:96).
Hearing loss in childhood will affect a child's academic and social abilities as well as his/her self-concept. The child with hearing loss may find it extremely difficult to overcome his/her low self-esteem even as he/she matures (Moeller, 2007:734). The child with hearing loss has problems with his/her own identity, interaction with peers, and school experiences. Social perceptions and experiences are influenced by lack of peer acceptance (Moeller, 2007:734). The child with hearing loss has feelings of insecurity, isolation and poor self-confidence (Moeller, 2007:735).

This has also an influence on his/her academic performance because the child with hearing loss does not believe in his/her own ability to achieve academically (Moeller, 2007:735). Such a child may experience feelings of sadness, anxiety and loneliness. The opposite is also true. If a child with hearing loss can experience peer acceptance, it can lead to successful social development, as well as emotional and cognitive growth (Moeller, 2007:735). Friendship relationships also play a vital role in academic achievement as it leads to effective task performance (Moeller, 2007:735).

De Conde Johnson *et al*., (1997:232) found in their research that children with severe to profound hearing loss felt isolated, had no friends and were unhappy in school and if they had no other friends who also have a hearing loss, they felt more isolated. They also found, however, that social problems were more prevalent in children with mild to or moderate hearing losses than those children with severe to profound hearing loss.

*Socioemotional development* plays a significant role in the lives of adolescents with hearing loss and is a critical foundation for life success (Spencer *et al.,* 2000:169). Competencies that are generally accepted as defining healthy socioemotional development are also essential for individuals to realize their academic and vocational potential (Spencer, *et al.,* 2000:169-170). Greenberg and Kusche (1993, in Spencer *et*

*al.,* 2000:170) include the following characteristics as central to the development of socio emotional competence:

- Good receptive and expressive communication skills;
- the capacity to think independently;
- a capacity for self-direction and self-control;
- understanding the feelings, motivations, and needs of self and others;
- flexibility in adapting to the needs of a particular situation;
- emotional stability to tolerate frustration;
- development of the capability to endure or tolerate frequent ambivalence in feelings, cognitions, and internal structures and therefore addressing inner conflicts, needs and desires that he/she encounters;
- understanding and appreciating his/her own culture and values and those of others; and
- using skilled behaviours to maintain healthy relations with others and to achieve socially approved goals.

The above-mentioned characteristics will determine a child's socioemotional competence. It is the joint responsibilities of parents and professionals such as teachers and counsellors to assist adolescents with hearing loss to successfully master these competencies. Parents and professionals need to serve as role models for adolescents with hearing loss. This is not an easy task. In fact, it requires much caring, thoughtfulness, training, effort, and collaboration between teachers of special schools and professionals across the child's development (Spencer *et al.,* 2000:171).

*Social interaction* also plays a vital role in the development of a child with hearing loss. Parental and peer relationships are essential to social development (Spencer *et al.,* 2000:281). Spencer *et al.* (2000:282) remarked that children's language experiences have to be linked with social interaction because as children grow older, linguistic abilities become more and more important with regard to social and emotional development. This link to social interaction will become more apparent in their academic years.

*Socialization* is a process that involves diverse social agents, promotes psychological as well as social development, and develop adolescents with hearing loss who can be integrated into society as respected participants (Spencer *et al.,* 2000:191). The family is the first step in the socialization process, as the family provides stability and education (Katz, 2002:758 & 761). The next step in the socialization process where emotional, cognitive and educational development takes place is the school. The school helps adolescents with hearing loss become economically self-sufficient, and helps to teach them the roles, rules and norms and expectations of society (Spencer *et al.,* 2000:191). The three main components that play an important role in the process of socialization are (a) *formal* and *information communication*, (b) *peer interaction* and (c) the *informal curriculum* and *extracurricular activities* (Spencer *et al.,* 2000:192).

*Peer interaction,* which plays a significant role in the socialization process of adolescents with hearing loss, can vary from formal interaction, such as structured group work in class, to informal interaction in a setting such as general conversation (Spencer *et al.,* 2000:193). The significance of peer interaction lies in the fact that children with hearing loss often rely on one another or on hearing peers for help in accessing, using, and understanding academic material.

A further reason why the extracurricular activities and peer relationships are so important is that they play a role in helping the child with hearing loss to develop social skills, which are useful in turn and it help them in the school as they learn to rely on one another (Spencer *et al.,* 2000:194). Apart from learning in the classroom setting, the child with hearing loss can learn from his/her friends by means of social interaction and by participating in extracurricular activities. All these factors will enable adolescents with hearing loss to participate in society and to become a member of a group in work situations. They learn to develop their self-esteem and feel part of a larger social group (Spencer *et al.,* 2000:195). They learn to develop skills for working purposes, and through social interactions they learn the difference between assertive behaviour and aggressive behaviour and learn to collaborate with others (Spencer *et al.,* 2000:195).

Research has shown that adolescents with hearing loss tend to be immature; they rely on a set daily routine; have a negative self-image; have limited attention span; are naïve; rely on other people; are sometimes irresponsible, passive and tend to accept

things as they come (Hull, 1998:39). Adolescents with hearing loss may need role models from whom they can learn how to react in certain situations. The result, however, is those adolescents with hearing loss learn to become excessively dependent on other people. Adolescents with hearing loss are aware of their hearing loss and their limitations, and they know there are limited career options available or open to them. They are aware of the reality of the hearing world and know they do not form part of the hearing society (Hugo, 1987:7; Welch, 1993:198). By acquiring knowledge by means of accessing and using academic information, the adolescent with hearing loss will acquire more self-confidence and the ability to achieve academically.

## 3.6 EDUCATIONAL PLACEMENT

The changes in world initiatives with regard to inclusive education have influenced the situation in South Africa (Naicker, 1999:12). This happened when the shift occurred from the so-called medical model towards an ecological and systems theory (Hay, 2003:135). With the democratic dispensation in South Africa since 1994, the country has been in a process of transformation including social, political and educational transformation aimed at an inclusive society for all (Hay, Smit & Paulsen, 2001:123).

All pupils, including those with hearing loss, should have the right to quality education and reading opportunities, regardless of being in the elementary or high school. Parents should also have the right to insist on proper instruction to improve their children's academic proficiency including reading skills (Williams, accessed 2004-10-13). In order to achieve this, every pupil's needs and abilities should be taken into account. It is important that adolescents with hearing loss have to learn to read, whether for specific purposes such as school assignments or for enjoyment. These skills are learnt in an educational environment.

Alpiner and McCarthy (1993:156) stressed that psycho-educational assessment for adolescents with hearing loss is necessary in order to determine the type of services needed for these children and to make the correct decisions regarding school placement and in order to establish which educational and rehabilitative objectives have to be reached. The correct school placement ensures that the areas of nonverbal and verbal cognitive functioning or learning abilities, the skills of reading and writing,

mathematic and other content academic areas, information processing performance and psychosocial characteristics are developed (Alpiner & McCarthy, 1993:157).

Different school-related variables play a role in the lives of adolescents with hearing loss (Alpiner & McCarthy, 1993:147). One such variable is the option of school placement (whether in special school or inclusive education) that does not necessarily relate to the educational needs of a learner. The more severe the hearing loss of a child, the more attention the placement should receive. Special schools may be more successful in providing maximum language stimulation through all sensory systems with the minimum ambiguity – this will provide more information to the child with hearing loss and make the hearing process easier and more complete (Katz, 2002:761).
A variety of residential schools, special schools and community schools are typically considered for placement purposes. Woolsey *et al.* (2004: 269) confirmed that adolescents with hearing loss are more restricted with regard to school placement, and that they have to be evaluated more accurately in order to determine in which school they ought to be placed.

The adolescent with hearing loss needs to be placed in the best school according to his needs. For instance, poor acoustics or poor listening skills can have a negative influence on his/her academic achievement. An adequate intervention process is required (Alpiner & McCarthy, 1993:178). A factor that also influences the academic achievement of a child with hearing loss is the distance between the adolescent with hearing loss and teacher regardless of amplification (Katz, 2002:550-552). The more severe the hearing loss, the bigger impact distance hearing will have on the child with hearing loss in the classroom (Alpiner & McCarthy, 1993:180).

In a classroom setting, the child with hearing loss may often not hear what is being said, and consequently his/her attention may wander from the teacher and from what is being taught. Children with no hearing loss may hear all the information presented in the classroom, but the adolescents with hearing loss may not hear enough in order to benefit from it especially in inclusive education (Alpiner & McCarthy, 1993:180). It is clear that a child with hearing loss needs to expend more effort to listen to information in the classroom.

Appropriate hearing management such as effective hearing aids and the use of an FM system may help the child to hear better in the classroom setting (Alpiner & McCarthy, 1993:181; Katz, 2002: 547 & 768), but the importance of hearing is not limited to scholastic activities. A child with hearing loss cannot hear if conversation is very soft, therefore some social conversations are lost to the child with hearing loss (Alpiner & McCarthy, 1993:181). Different degrees of hearing loss have a significant effect on understanding of language and speech as well as on the psychosocial being of a person with hearing loss. This is an additional factor that may determine whether a child with hearing loss should be placed in a special school or inclusive education (Alpiner & McCarthy, 1993:194-194; De Conde Johnson *et al.,* 1997:340-341).

Support services in the educational setting such as speech services, language therapy, counselling and help with additional disabilities such as learning disabilities are significant considerations for school placement (Katz, 2002:546 & 550). The placement of a child with hearing loss is dependent on the audiologist's evaluation, the case history provided by the parent, the medical evaluation by the physician, and the appropriateness of the special education referral (De Conde Johnson *et al*., 1997:152). These different evaluation criteria can help to determine the adolescent with hearing loss's academic achievement in school, because it can give the necessary background to know where to place the child in order for him/her to benefit the most. For example, research has shown that children with hearing loss have a lower self-esteem, feel isolated and lonely when placed in the inclusive education (Musselman, Mootilal & MacKay, 1996:52).

The implications of hearing loss in an active learning environment must not be underestimated (Alpiner & McCarthy, 1993:177). Active learning leads to lifelong learning, providing adolescents with hearing loss to become information literate. Active learning implies that adolescents with hearing loss will learn and understand the different processes and systems of learning for acquiring current and retrospective information. They will also learn to be able to evaluate the effectiveness and reliability of various information channels and sources in order to satisfy their different needs.

In the past, the perception existed that adolescents with hearing loss could not become information literate. People with hearing loss were deemed to be constantly aware of

their battle to survive, and various factors were seen to "…*remind deaf individuals both of their daily struggle to overcome the threat to selfhood that deafness imposes and their exclusion from full participation in inclusive education life"* (Welch, 1993:96).

From research it became evident that educational history, that is, the history with which a child comes to school, plays a role in auditory learning. This history can include factors such as earlier educational methods, skills, and family factors because this involves the attitudes of parents and support and also life factors such as access to services and environmental issues (Katz, 2002:761). These factors all help to prepare the child with hearing loss for the social and academic challenges of school and education (Alpiner & McCarthy, 1993:147).

### 3.6.1 Inclusive education

Some children with hearing loss are placed in inclusive education, which means that children are educated with their 'typical' peers (Katz, 2002: 759). In inclusive education, children with disabilities are considered to be equal members of the regular classroom at school, curriculum adaptations are made, and support services are delivered to children with disabilities. This is done so that the education and training system can provide for all children to foster the development of all learners in the school environment and enable them to participate actively in the education process. This is necessary in order to develop learners with disabilities' potential and to participate as equal members of society (South African Education White Paper no. 6, 2001:5).

The support services that are provided in the regular classroom are also available to the adolescent with hearing loss (Katz, 2002:759). Inclusive education classrooms are seen as auditory-verbal environments because the instructional information is presented orally through the speech of the teacher with the underlying assumption that the pupils can clearly hear and attend to the teacher's voice (Alpiner & McCarthy, 1993:176). Adolescents with hearing loss may experience problems due to the overall noise level in class.

The South African Educational System is described as an Outcomes Based System. The aim of Outcomes Based Education is to facilitate the achievement of specific

outcomes by learners. Steps are followed in each subject or activity, information is supplied on what to do, and the learners are helped to plan, to execute the learning process and to master the contents and processes. Teachers receive training based on outcomes-based principles. There were, however, several gaps in the Curriculum 2005 syllabus, due to lack of training and available academic information in most of the schools (Bloch, accessed 2009-08-27).

Outcomes Based Education implies that all learners, regardless of hearing loss or other impairment, have to learn to communicate effectively, solve problems, organise themselves and to work effectively with others, to process information, to make use of science and technology and to understand the relationship that exists between society and environment (Potgieter, 1992:76, 82).

Outcomes Based Education has implications for the adolescent with hearing loss, because their level and degree of hearing loss often goes hand in hand with a feeling of insecurity, or a lack of confidence. Outcomes Based Education has the aim to teach all learners to be more confident and to know that they can also possess qualities to make a positive contribution in any given situation (Principles of Outcomes Based Education, accessed 2009-08-27 & The NQF and Curriculum 2005, A SAQA Position Paper, accessed 2007-08-27). Curriculum 2005 is based on evaluation criteria that have to be applied by school teachers on work that school children perform. These evaluation criteria are based on the learners' ability to demonstrate such outcomes, based on knowledge, skills, attitudes and values. Teachers use a control list of ten learning programme development steps to evaluate the learners' progress. These steps include oral presentations, practical activities, reports, and written assignments. Other evaluation criteria are elements such as the local impact of the environment, learning content, learning activities, programme theme or subject, learning context, facilitation and preparation evaluation.

Joubert (1999:8) stated earlier that the Department of Education aimed to make the educational facilities more accessible in order to meet the needs of all children with special needs. It was anticipated that a flexible policy would be followed regarding the age of children with impairments. The Department of Education initiated Curriculum 2005 as a long-term process that included the following aims:

- to extend the capacity, revise the policy, and augment the power of school regulatory bodies;
- to provide more accessibility for children with impairments in the inclusive educational system and
- to reach as many people as possible (Joubert, 1999:8).

Luterman (1986:67) accentuates that if a child with hearing loss is able to master vocabulary, he/she may be able to adapt in inclusive education. He also states that language problems lead to reading problems and this can result in the adolescent with hearing loss taking longer to complete an educational career or training compared to the hearing child.

### 3.6.2 Special schools

The special school is a *resource* centre, the institution where specially trained teachers, assistants, remedial teachers, speech, language therapists/audiologists, physiologists, social workers, hostel parents, all those involved with the adolescent with hearing loss can provide educational training within this team approach. The special school is an institution that provides education to learners in need of a high level of intensive support, as well as guidance to teachers and parents of adolescents with hearing loss (Special schools as resource centres, 2002:1). The special school teachers and media teachers perform specialised roles and functions and provide services regarding learners who experience barriers to learning and development.

According to the South African Education White Paper no. 6 (2001:17), the inclusive educational system was about “supporting all learners, educators and the system as a whole…with the emphasis on the development of good teaching strategies that will be of benefit to all learners”. This implies that teachers need to be trained in the educational management of the child with hearing loss. In one of the South African newspapers, Beeld (May, 2007:13), an article was published maintaining that excessively large numbers of learners in classes and teachers that had no training were two of the reasons why learners with special needs could not be accommodated in inclusive education.

Special education has the aim of developing a number of effective practices for improving the educational outcomes of students with disabilities. This is necessary to make a difference in the education and lives of the learner with disabilities (Cook & Schirmer, 2003:20).

Cook and Schirmer (2003:20) describe the beliefs and practices which should form the basis of special education. These are:

- Providing individualized instruction;
- Planning carefully sequenced series of tasks;
- Putting emphasis on stimulation and awakening of the child's senses;
- Helping with the arrangement of the child's environment;
- Giving immediate reward for correct performance;
- Giving tutoring in functional skills, and
- Establishing the belief that every child should be educated to the greatest extent possible.

If an academic curriculum is to be followed, whether in special schools or in regular education, the development of academic literacy must be one of the non-negotiable underlying goals of the school programme.

## 3.7 INFLUENCE OF HEARING LOSS ON THE DEVELOPMENT OF ACADEMIC LITERACY

Research findings on the access and use of academic information by adolescents with hearing loss indicated that although most people have the prerequisite mental capabilities, specific academic and other skills still have to be learned (Vygotski in Nowell & Marschak, 1994:16). One of the learned processes is the ability to listen, which is a natural process for a child possessing normal hearing.

The importance of hearing loss in the communicative and educational process tends to be underestimated because hearing loss is "invisible". The effects of hearing loss are

often associated with other problems than the hearing loss itself, for instance “slow learning” or “attention problems” (Alpiner & McCarthy, 1993:178).

### 3.7.1 Access and use of academic information

Adolescents with hearing loss are expected to understand and use a variety of text types such as textbooks, material from the Internet, resource books, newsmagazines, etc. They are also expected to demonstrate the same proficiency on achievement tests as shown by their hearing classmates. Unfortunately, most deaf students historically plateau at the third- or fourth-grade level in reading and writing achievement (Nielsen & Luetke-Stahlman, 2002:11). It has been found that phonological awareness and language proficiency are essential if children are to be able to efficiently decipher words and to understand all text without continual assistance from teachers (Nielsen & Luhtke-Stahlman, 2002:12). One of the problems with regard to accessing and using academic information lies in the lack of phonological awareness, as it contributes to the low level of reading achievement of adolescents with hearing loss (Nielsen & Luetke-Stahlman, 2002:12).

The education process of the adolescent with hearing loss must therefore be adapted in such a manner as to enable him/her to pursue a career in later life. In order to be information literate and have access to information, an adolescent with hearing loss has to learn to read. It is clear from the research that a person is not born as a reader, but that language forms the basis that leads to the learning process (Sampson, 1991:311).

Schirmer (1994:113) indicated that the reading process originates from the language basis of the child. It is an interaction occurring between the reader and the text. Reading leads to the extension of behaviour patterns and skills and empowers the adolescent with hearing loss to overcome his/her hearing loss and to solve problems, even though each adolescent with hearing loss progresses at his/her own pace. The literacy process involves all printed forms, whether in books or magazines or other sources, and all genres, whether prose, poems, or expository text; it occurs wherever the reader comes into contact with other literary opinions (Sampson, 1991:14). Whenever the person with hearing loss encounters a complete message, he/she will

understand the written format to the extent that the reading material corresponds with his/her language and cognitive abilities.

Children who have a hearing loss find it difficult to access spoken content without intermediary support (Bain, Basson, Faisman & Kanesvsk, 2005:592). Paul and Quigley (1994:153) indicate that interactive methods are important such as "text-based, reader-based and context-based (or task-based) methods that influence the adolescent with hearing loss regarding his/her ability to access and use academic information". These abilities imply the use of vocabulary (word knowledge); grammar (phonology, morphology and syntaxes) of the language; and orthographies (such as signs, etc) (Gray & McCutchen, 2006:325-327; Katz, 2002:517). The body of research indicates compelling evidence promoting the teaching of phonological coding (Beck, 2006:4). Phonological awareness means that the reader has the ability to think about and manipulate different speech sounds segments of a language and to represent the individual speech sounds through the application of symbols such as letters (Katz, 2002:517).

Another factor that influences adolescents with hearing loss is their lack of general knowledge and awareness of what is going on in the world. The type of academic information that teachers apply and provide to adolescents with hearing loss must reflect all the information that they would need in later life for successful integration in the hearing world (Lloyd *et al.,* 1997:181).

Although the role of support services and individuals can not be underestimated, adolescents with hearing loss face various barriers that prevent them from becoming information literate and developing academic literacy. Another important matter is the issue of access to facilities and materials (Alpiner & McCarthy, 1993:147). Adolescents with hearing loss need support services according to their needs and these may include services such as sign language interpretation, speech-to-text technology, note taking, tutoring and academic assistance. This assistance can be to answer questions, clarify concepts and procedures and to give background on course content (Stevens, 2004:11). Adolescents with hearing loss, like other students with disabilities, need to develop their self-esteem and self-concept to enhance their ability to achieve academically (Murray, 2000: 6).

### 3.7.2 Barriers adolescents with hearing loss experience to developing academic literacy

The major barriers to learning associated to hearing loss are related to language and communication, which profoundly impacts most aspects of the educational process. Adolescents with hearing loss seldom bring to their educational experience the same language background or experiences or skills as children who can hear (Kansas Department of Education, 2009:3-6). Lang (2002:267) described a significant body of information regarding the barriers that adolescents with hearing loss face in gaining access to information. **Figure 3.2** displays the characteristics of the child with hearing loss that can lead to poor academic achievement. Much less is known, however, regarding possible ways to overcome or remove these barriers.

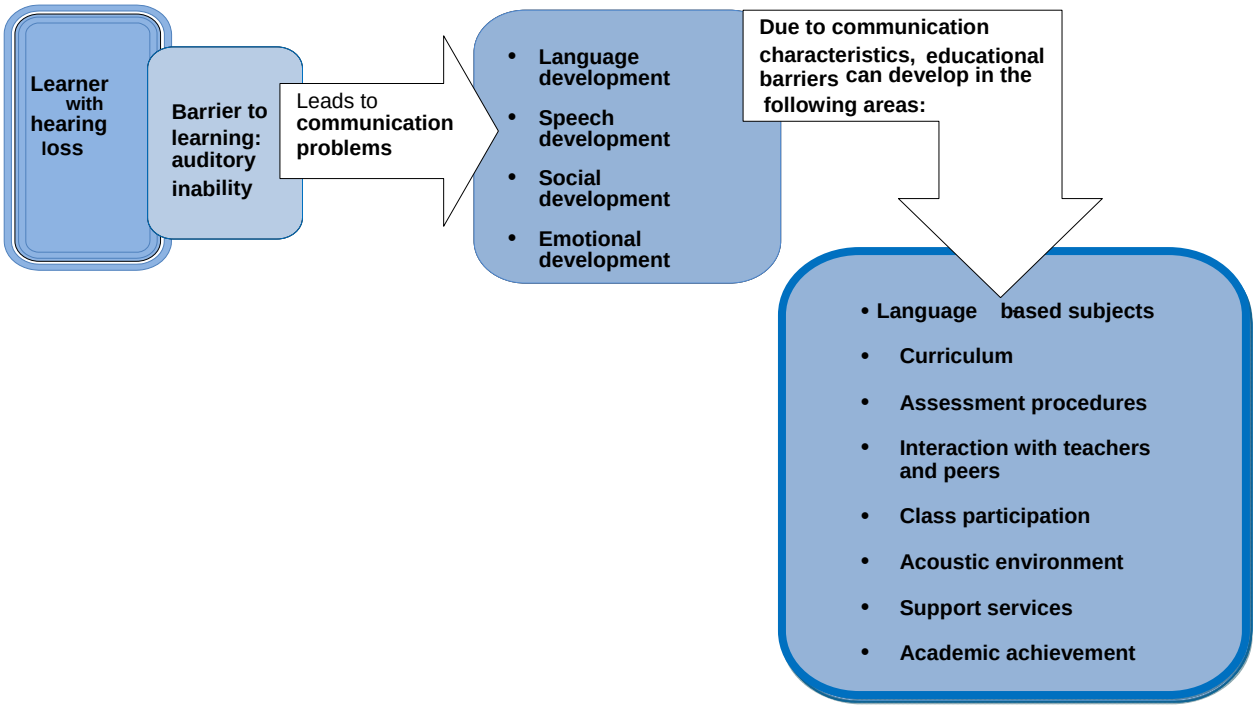



**Figure 3.2: Characteristics of a child with hearing loss that can lead to poor academic achievement.**

**Figure 3.2** indicates that if a child with hearing loss experiences a barrier to learning due to auditory inability, it will lead to communication problems that can manifest in delays in language, speech, social, and emotional development. These delays will cause educational barriers that may prevent the child with hearing loss from achieving academically in language-based subjects as well as general curriculum subjects. The

child with hearing loss may also find assessment procedures challenging and find it difficult to participate in class. The acoustic environment may not be suitable due to his/ her hearing loss. Interaction with teachers and peers can be an additional challenge. Other barriers that may lead to poor academic achievement are poor support services.

Before the First World War, the schools for the deaf provided career opportunities regarding baking, clothing industry, carpentry, and shoemaking (Nieuwenhuis, 1980:33). There were opinions that training should not only provide opportunities in these fields, but should also make provision for higher education opportunities in all fields (Nieuwenhuis, 1980:33). Even in Britain no opportunities existed for the deaf regarding college or university education. Training was only provided in big cities (Nieuwenhuis, 1980:33).

At present, options for education and training are wide open to all children with hearing loss; however, deficient information literacy may prevent children with hearing loss from availing themselves of many of these opportunities. Eriks-Brophy, Durieux-Smith, Andrée, Fitzpatrick, Duquette and Wittingham (2006) identified the following barriers, which prevent adolescents with hearing loss from becoming information literate:

- The degree of hearing loss and fitting the child with inappropriate amplification may present a barrier to the acquisition of spoken language and could lead to reduced academic performance (Eriks-Brophy *et al.,* 2006:55).
- If the educational approach is not effective, it can present a barrier because only effective teaching methods enable the adolescent with hearing loss to develop information literacy skills (Eriks-Brophy *et al.,* 2006:57).
- Ignorance of teachers concerning the problems and background of adolescents with hearing loss, especially with regard to communication development and academic performance (Eriks-Brophy, *et al.,* 2006:66).
- Negative attitudes of teachers, especially if they do not communicate effectively with parents of adolescents with hearing loss (Eriks-Brophy *et al.,* 2006:66).
- Underestimating the potential of adolescents with hearing loss with regard to learning and/or social behaviour (Eriks-Brophy *et al.,* 2006:67).

- Unwillingness of teachers to apply assistive technology and use adapted techniques and/or strategies to make information more accessible to adolescents with hearing loss (Eriks-Brophy, *et al.,* 2006:67).
- Uninvolvement of parents and/or lack of communication with school and/or teachers can prevent an adolescent with hearing loss from achieving academically and becoming information literate (Eriks-Brophy *et al.,* 2006:70).
- Poor communication from the parents' side with regard to their child with hearing loss's needs to teachers of the school which their child is attending (Eriks-Brophy *et al.,* 2006:71).
- If the home language is not the same as the school language, the child will have to learn an additional language which is often a problem for a child with a hearing loss (Eriks-Brophy *et al.,* 2006:72).
- More and more parents have to work away from home. This means that they may not be available to help the child with schoolwork and/or assignments (Eriks-Brophy *et al.,* 2006:73).
- The attitudes of peers may influence the child with hearing loss, especially if the child is very sensitive. Attitudes of peers may hold back the child with hearing loss in the classroom setting and on a social level (Eriks-Brophy *et al.,* 2006:73).
- Adolescents with hearing loss may feel isolated and lonely and this can also be a barrier that prevents them from participating in the classroom (Eriks-Brophy *et al.,* 2006:75).
- Poor speech intelligibility, communication abilities, auditory skills, reading abilities and organizational skills can all influence the adolescent's ability to become information literate (Eriks-Brophy *et al.,* 2006:76).
- Adolescents with hearing loss may experience perceived lack of independence and poor academic and learning skills. These perceptions may prevent them from achieving academically in school (Eriks-Brophy *et al.,* 2006:77).
- Adolescents with hearing loss may also display poor aptitude for solving problems and for learning new skills (Eriks-Brophy *et al.,* 2006: 77).
- Shyness and lack of assertiveness can also be a barrier because it can prevent the child with hearing loss from participating in all school and social activities (Eriks-Brophy *et al.,* 2006:78).

It is clear that learners' prior learning and experiences may pose a barrier to information literacy (Sayed & DeJager, 1997:8). If adolescents with hearing loss do not have a good learning background, it may prevent them from becoming fully information literate. Adolescents with hearing loss will benefit from education when information literacy skills have been acquired and the information literacy instruction is used in collaboration with educational technology. In order to integrate information literacy within the school curriculum, the following aims need to be reached:

- Student-centred and collaborative learning methods have to be applied;
- the media centre teacher needs to collaborate with the teaching staff of the school;
- the adolescents with hearing loss need access to online information literacy and courses and
- the information literary instruction has to take place in the context of the content-based courses of the school curriculum, assignments or projects that the pupils undertake (Mokhtar & Majid, 2006: 36).

Previous knowledge and experiences are the starting points for learning about new things. Adolescents with hearing loss should be motivated to keep on mastering new knowledge and absorb academic information. In recent years, the use of computers and information technology has profoundly affected all people's lives and work. The internet has become an important vehicle for information dissemination across the world (Agboola & Lee, 2000:286). Research has shown that the difficulties with regard to computer and information technologies experienced by adolescents with hearing loss include not only lack of education, but also other barriers such as the high cost of computers (Agboola & Lee, 2000:288). Limited electronic access due to limited availability of computers, financial costs and inappropriate training can prevent adolescents with hearing loss from becoming fully information literate.

Poor collaboration between media and special education teachers and lack of time can also play a role in delaying the process of becoming information literate for adolescents with hearing loss (Lang, 2002:268). Adolescents with hearing loss often do not have enough time to spend in the media centre, according to Bishop and Larimer (1999:15-

20) and Eissenberg and Berkowitz (1998, in Spitzer *et al.,* 1998:73). Teachers and media teachers need to collaborate with one another to ensure that adolescents with hearing loss can become information literate.

Some of the barriers that the adolescent with hearing loss experiences are the result of dilemmas that media teachers face, such as:

- Media teachers only see the adolescent with hearing loss for a limited period of time in the media centre;
- Some of the media teachers have to teach additional special education subjects as well;
- The media teachers find the number of adolescents with hearing loss in the group too big; and
- The media teacher often has to modify teaching methods for the adolescents with hearing loss according to their different modes of communication (Lorenzen, 2001).

One of the major barriers in becoming information literate, according to Brelje (1999:418) and Welch (1993:197), is the "continuing attitude…that deaf individuals are not capable of successfully completing a college or university education", and another is the lack of educational opportunities on an elementary and secondary school level. It is therefore important that there should be equal training opportunities for adolescents with hearing loss and for their hearing peers. All children with hearing loss need to know how to work with computers, how to access and how to use audio-visual materials and equipment (Nowell & Marshak, 1994:83).

There are other factors preventing adolescents with hearing loss from becoming fully information literate. Their performance and motivation with regard to becoming information literate are affected by the extent to which they manage to master academic material. Adolescents with hearing loss have to learn to read while simultaneously learning other skills such as accessing information, analysing, and problem solving (Lloyd *et al*., 1997:177). Adolescents with hearing loss have to learn to use, to access, and to apply academic information in order to play an active role in

mastering academic information and to construct knowledge while interacting with a perceived world (Lloyd *et al.,* 1997:241).

## 3.8 INFORMATION LITERACY SKILLS OF ADOLESCENTS WITH HEARING LOSS

Hough and Horne conducted a study in South Africa (Rademeyer, in Beeld, 2005:15), the results of which indicated that the standards of language and numeric skills of pupils were “not high enough”. This finding was based on a comparison with normal hearing pupils. In the educational system, new information is expected to add to the child’s existing knowledge in different subjects, to expand or to change his/her perceptions, depending on the circumstances. Information opens the door for the adolescent with hearing loss to be able to function better in society.

Acquiring information literacy and skills will help the adolescent with hearing loss to take his/her rightful place in society in order to improve his/her quality of life, enabling him/her to play a more meaningful role in society on economical and social levels (SALIS, MSSW & UNESCO Workshop Proceedings and Workshop Report, 2006:13).

### 3.8.1 Advantages of information literacy and information literacy skills for adolescents with hearing loss

If adolescents with hearing loss are able to acquire information literacy skills, it will enable them to access and use academic information. It will help them to perform better in their work situation. It will also help them to learn more about the community and interpersonal relationships in which they function, and to be more positive, take part in the transformation process, take initiative, participate in projects and to develop their culture awareness (SALIS, MSSW & UNESCO Workshop Proceedings and Workshop Report, 2006: 6-10).

As the adolescent with hearing loss gets older, academic information plays an even more significant role in his/her life and therefore such a person needs information literacy skills in order to develop his/her ability to access and use academic information.

Information literacy is a continuum that develops from the process of literacy (being able to read) to information literacy that is reached through application of an information literacy programme (Owusu-Ansah, 2003:220).

If adolescents with hearing loss are able to learn how to access and use academic information successfully, it will enable them to live independently, to lead a life based on self-exploration and knowledge. It can be a lifelong tool encouraging the building of self-esteem and confidence and the feeling of independence (Murray, 2000a: 8). Such students will be able to display emotional intelligence, a positive attitude, respect and positive behavioural traits towards themselves and others. As was discussed previously, acquiring information literacy skills is a complicated process for the individual with a hearing loss as it includes or involves communication skills.

Availability and utilization of academic information in schools can add to the existing knowledge base of any child at any school, whether the child has a hearing loss or not. It can expand the perception of academic information or even change it, leading to better quality of life for the adolescent with hearing loss and allowing independent study and lifelong learning. It will enable the adolescent with hearing loss to acquire tertiary education, to be employed, to make decisions as well as to participate effectively in groups, and to pursue and generate information in the same way as his/her hearing peers (Morris & Blatt, 1986:314; Paul & Quigley, 1994:93-94; Boon, 1992a: 232; Behrens, 1992:82; Roetz, 1991:16).

Information also opens the door for the adolescent with hearing loss to be able to function better in society. When the hearing child enters school, he/she already has a language base whereas the child with hearing loss has to learn to read and write a language that he/she still has to master. This shows how important the process of literacy is that precedes the information literacy process (Nowell & Marshak, 1994:25). Poor skills of writing and reading have a big influence on the level of adolescents with hearing loss's ability to achieve information literacy. Although it is difficult to measure the level of reading ability of the adolescent with hearing loss, he/she should be made aware of all kinds of experiences than can enrich his/her life (Moores, 1996:171 in Woolsey *et al.,* 2004; Paul & Quigley, 1994:10). In our present society, education has moved forward to include information literacy as a key factor to benefit all children in

school in the future; it can only be achieved, however, if there is collaboration between the media teacher, school teachers, support staff and administrators (SALIS, MSSW & UNESCO Workshop Proceedings and Workshop Report, 2006:64).

According to Van der Walt (1992:39), there are six questions that need to be answered in order to determine the level of information literacy in adolescents with hearing loss:

- Can the adolescent with hearing loss formulate his/her needs in such a manner that it can be effectively met?
- Is he/she able to locate the necessary information?
- Is he/she able to evaluate the information in order to determine if it is the correct information that is needed?
- Can he/she organise the information in a specific form in order to work with it?
- Is he/she able to process the information cognitively in order to interpret it meaningfully?
- After understanding the information, is he/she able to communicate the information to someone else?

For the adolescent with hearing loss, the ability to access and use academic information can be achieved through training (Nowell & Marshak, 1994:16). The reason for this is because this will be the first time that the adolescent with hearing loss is confronted with a full message. This is especially true in the case where the adolescent with hearing loss becomes acquainted with different types of academic information and the skills and abilities to access and use it.

Through resource-based learning and acquisition of information literacy skills, adolescents with hearing loss will assume more responsibility for locating the materials from which to learn, thereby developing lifelong learning skills, because students will learn from the same sources that they will use in their daily lives such as books, newspapers, databases, documents, and others (ALA 1989). In order to facilitate the acquisition of information literacy skills, schools have to integrate information sources and skills across the curriculum in all subject areas beginning in the earliest grades possible.

The Department of Education needs to collaborate with the school principals of special schools in order to provide outcomes for all pupils in the areas of critical thinking, problem-solving and information skills. This involves integrating media centre instruction and encouraging collaboration between teachers and media teachers (Rader 1995:13). This may have implications for the school budget.

By accessing and using academic information effectively through information literacy skills, adolescents with hearing loss in special schools will not only be able to find materials for their assignments and projects, but also to research opportunities for higher education and jobs, and to discover resources related to their interests and hobbies. It will also help them to find information regarding their medical care and later for parenting information, good buys, maintenance tips, bus and train schedules in a quick and efficient manner because they will be able to know what and where to locate the information that they need (*What should parents know about Information Literacy*, accessed 2005-08-12).

If adolescents with hearing loss are able to acquire information literacy skills, they will experience the advantages of information literacy and of being an information literate person.

### 3.8.2 The development of information literacy programmes

Information literacy programmes are integral to the education process which seeks to prepare people for the demands of the information age by developing the appropriate knowledge, attitudes, and skills (Breivik, in Boon, 1992:4; Marais, 1992:75) (see also **2.6.4**). Breivik (in Boon, 1992: 40) refers to an "integrated set of skills and knowledge" that can enable a person to live fully. Information literacy has also been described as relating to developing lifelong learning skills essential for living and working in knowledge-based environments, characterised by continuous information explosion and change (UTS, 2008:730). If information literacy programmes are integrated successfully in school, it can create opportunities for adolescents with hearing loss to become self-directed and independent learners because they will have learnt how to use a variety of information sources to expand their knowledge. It will also help them to learn to think critically (Bundy, 2004:6).

Implementing information literacy programmes by means of a school library media programme will help children in school to develop thinking skills in all curricular areas. It requires, however, that information literacy skills be integrated and information technologies be applied to provide access to information resources that are vital and critical to student learning (Spitzer *et al.,* 1998: 37).

A library media centre must provide intellectual and physical access to materials in all possible formats, as well as providing instruction in order to improve competence and to stimulate children in school's interest in reading, viewing and using and applying information and ideas. A media centre should work with other educators in order to design and develop strategies to meet the needs of the children attending their school (Spitzer *et al.,* 1998: 38). The role of a media teacher cannot be underestimated as such a teacher has to provide the necessary resources to encourage the learning process, help the child with hearing loss to acquire the necessary information literacy skills, and collaborate with other teachers.

The library media programme is therefore essential to learning and teaching and information literacy skills are integral to the content and objectives of the schools curriculum (AASL & AECT, 1998:58 in Spitzer *et al.,* 1998:42). In order to succeed in higher education, adolescents with hearing loss need to understand basic media centre procedures, and learn to work independently to access and use academic information, which includes knowledge on how to use bibliographic sources (Norton, 1992:1).

Adolescents with hearing loss in special schools must therefore be aware of the fact that information comes in different mediums. They have to be able to learn how to access and use information because as they grow older they will need information for other purposes whether for personal, functional, social, general, training, political, business, entrepreneurship, environment, demographic, agriculture, legal, statistics, voting or citizenship information (Boon, 1992:232; Luckner *et al.,* 2005:444). Adolescents with hearing loss will not be able utilise this information if they have not learned how to access and use academic information at school or to apply information literacy skills.

Collaboration between teachers and media teachers implies shared goals and a shared vision, and advocates a climate of trust and respect (Muronago & Harada, 1999:9-14). The result of this collaboration is only visible after many years of effort (Callison, 1999:38-40). It could take up to five years (Haycock, 1999) to see changes due to the collaboration that involves the sharing of the pupils' strengths, weaknesses, attitudes and interests and the content to be taught, to which the media teacher adds the understanding of information resources, the training of information literacy skills and methods to integrate them (Doiron & Davies, 1998:20).

Schoolteachers view the role of media teachers more positively in the long run, and tend to work together with the media teacher, especially with regard to the teaching materials used in the classroom. The school media programme must be recognized as part of the curriculum. It also depends upon the principal of the school how much time the children with hearing loss are allowed to spend at the media centre. The principal should also recognise the value of processing and use of information and the need for integration of academic material with classroom content instruction. Cooperation with teachers and team planning are necessary for successful integration of information literacy and school media programmes (Spitzer *et al.,* 1998:43).

Through a school media programme, children can learn to become independent learners or students but this will only occur if enough time is spent in a media library and if children receive adequate information and literacy skills training (Spitzer *et al.,* 1998:41). Teachers face a challenge in motivating adolescents with hearing loss to learn information literacy skills. They have to be prepared to teach children to be critical thinkers and to carry their skills into all areas of their lives in order to be independent. This requires the children to be more self-directed in the learning process and prepares them for problem situations that may occur in other areas of life (Breivik and Gee, 1989:25).

In "Educating Students to Think: The Role of the School Media centre Media Program" (Mancall *et al*., 1986:18-27), the role of the school media centre was accentuated. The school media teacher's objective is to apply a media programme in order help pupils develop thinking skills, taking into account the existing research on how children process ideas and information, and to assist with the development of an information

skills programme in all curriculum areas of the special school. In other words, a school media teacher applies an information literacy programme. It was found that pupils' scores increased as soon as media teachers spent more time collaborating with and provided training to teachers, giving input into curricula and managing information technology for schools (Russell, 2005).

Academic information is a prerequisite to teaching and learning. It is the core of education, task performance and scholastic achievement. Academic information will enable adolescents with hearing loss to stay abreast of new developments (Boon, 1990:2) and to understand the world in which they live. There is a need for well-trained teachers, effective teaching methods, applicable academic information, and knowledge of the needs of children in special schools, especially adolescents with hearing loss (Sanders, 1982:18).

From the above discussion, it is clear that a school media centre programme can make an important contribution to the education of adolescents with hearing loss (Murray, 2001: 1). For the school to have a successful information literacy programme, it is necessary that the Department of Education supports the Special School, its vision of information literacy, the establishing of a media centre and training of special education teachers and media teachers. The situation in the South African context is discussed in section 3.9.

## 3.9 THE SOUTH AFRICAN CONTEXT AND TEACHER TRAINING

Policy development in South Africa has received much attention and it reflects South Africa's commitment to address the diversity of the learner population in order to provide a continuum of support within a democratic South Africa. International guidelines were applied for a framework for policy development in South Africa (Lomofsky & Lazarus, 2001:307).
Several government initiatives[1] with regard to education such as the following have been put in place:

[1] The government policies included in this section do not include a complete list of all policies, but only those relevant to the specific discussion and selected with the specific research question in mind

- The White Paper on Education and Training in a Democratic South Africa (Department of Education, 1995)
- The South African Schools Act (Department of Education, 1996)
- The White Paper on an Integrated National Disability Strategy (Ministery in the Office of the Deputy President, 1997)
- The National Commission on Special Educational Needs and Training and the National Committee on Education Support Services (Department of Education, 1997)
- White Paper & Building an Inclusive Education and Training System (Department of Education, 2001)

The South African government recognises the importance of early intervention for children in the preventative approach proposed in the White Paper for the Transformation of the Health System in South Africa (Department of Health, 1997). This prevention also includes preventing secondary complications, such as developmental delays in language for infants and children with hearing loss. The White Paper on an Integrated National Disability Strategy (1997) furthermore calls for "early identification of impairments and appropriate interventions" within the primary healthcare system, while it also announces "free access to assistive devices and rehabilitation services… to all children under the age of six". It is clear that South African governmental policy guidelines favour the philosophy of screening for hearing loss in infants – it is only the implementation of such policy that is left wanting.

Professor Kader Asmal, MP, Minister of Education at the time, delivered a speech at the launch of "Education White Paper 6 on Special Needs Education: building an inclusive education and training system in South Africa" in Pretoria on 26 July 2001 (Asmal, 2001, accessed 2005-09-12). Referring to the White Paper, the minister stated that special schools would be strengthened to fit in with the quality of education as part of the inclusive education (Education White Paper, 2001 6:3). It was recommended that education and training in South Africa should promote education for all children "…to participate actively in the education process so that they could develop and extend their potential and participate as equal members of society" (Education White Paper 6, 2001:5).

According to the recommendations of the White Paper there should be sufficient quantity and quality of academic information for pupils in the education system. It was found, however, that there was a serious problem in the rural areas where all the schools did not have access to academic information, due to logistic and financial reasons. This was a serious problem and meant that not all children had equal access to academic information. If media libraries were better funded, it will lead to adolescents obtaining higher academic achievement; more media staff can be appointed and more information sources can be added or acquired (Spitzer *et al.,* 1998:74).

South Africa's diversity of languages and cultures also presents a challenge to the adolescent with hearing loss with regard to the provision of translators, specialised training whether at school or tertiary level, and suitable work opportunities. This presents a serious problem because there are simply not enough translators available for all different languages in South and Southern Africa. This fact was highlighted by Mr N. Mbumba, Minister of Education of Namibia at 12 March 2007 when he remarked: "The lack of professionally educated interpreters from the tertiary institutions which is a major concern to the Ministry of Education since having educated qualified interpreters contributes immensely to communicating with, teaching of and learning by deaf learners".

In the past, organisations such as the United Nations Educational, Scientific and Cultural Organization (UNESCO) painted a gloomy picture of training and mentioned that only a minority of 58 countries provided sufficient teacher training regarding disability issues (Special Needs Education, 1994:26). The data of the World Federation of the Deaf (WFD) Survey in the Developing World in 1989 to 1990 also indicated that there was limited access to educational programmes for deaf people in Asia and educational opportunities leading to diminishing role for participating in society, lack in making informed decisions and showing a lack of equalisation of opportunities (Special Needs Education, 1993:86). The current situation may not be far different.

Harrison (1991:84) was of the opinion that the teaching methods of the eighties were insufficient to handle the problems that adolescents with hearing loss encountered. Woolsey *et al.,* (2004: 22, 269-273) and Pagliaro (1998a: 373-379) also found in their

more recent research that there were insufficient teaching skills and that teachers showed a lack of content area background with regard to pupils with hearing loss. These incompetencies have an influence on reading, speech and literacy development with a resultant impact on information literacy. In 1997 Deputy President Thabo Mbeki mentioned before his inauguration that people with impairments will play a more significant role in the South African community and he advocated that there would be no discrimination and lack of training (Van der Spuy, 1997:13). In these papers, it was stated that training and education are basic human rights. Every person, child, adolescent and adult person must be able to benefit from the education opportunities that aim to fulfil their basic learning needs (Department of Education, 1994:24).

## 3.10 SUMMARY AND CONCLUSION OF CHAPTER 3

Chapter 3 described the influence of hearing loss on the acquisition of information literacy by the adolescent with hearing loss. Attention was given to the onset and identification of hearing loss and the intervention methods that can be implemented in the case of adolescents with hearing loss. The different role players in the life of adolescents with hearing loss were discussed.

Thereafter the site of lesion within the auditory system was discussed with its implications for the child with hearing loss. The consequences of a congenital hearing loss were discussed in detail, with particular attention to the influence of hearing loss on the auditory processing and perception. The researcher came to the conclusion that congenital hearing loss definitely impacts on the development of the adolescent with hearing loss. Available research was studied to determine the impact of hearing loss on intellectual, cognitive, receptive and expressive language development. From this research it can be concluded that adolescents with hearing loss experience a delay in these aspects. The researcher also gave attention to the influence of hearing loss on verbal and non-verbal communication, the influence on literacy, reading, and reading comprehension, as well as on the writing ability of the adolescent with hearing loss.

Attention was given to the educational placement of the adolescent with hearing loss and the issue of inclusive education versus special school was discussed. For the purpose of the study and to answer the research question, special emphasis was

placed on the influence of hearing loss on the development of academic literacy. This involved the discussion of access and use of academic information and the different barriers that adolescents with hearing loss experience that can influence their academic achievement.

The information skills of adolescents with hearing loss were described, as well as the advantages and the development of information literacy programmes. Attention was also given to the influence of hearing loss on the emotional and social development of adolescents with hearing loss.

The chapter ended with a discussion of the South African context, including teacher training and its impact on the adolescent with hearing loss. Finally a summary was provided together with specific conclusions.

By reviewing the literature, the researcher discussed the theoretical underpinnings necessary to conduct the study of adolescents with hearing loss in the current South African setting. This chapter aimed to address the question: *To what extent is the adolescent with hearing loss in special schools able to access and use relevant information for academic purposes?*

# CHAPTER 4

## METHODOLOGY

***"…scientific human inquiry might be the greatest gift that Western consciousness has given the world."***
**Reason, 1994:9.**

## 4.1 INTRODUCTION

From the theoretical background discussed in **Chapters 2** and **3** and according to the bulk of the existing literature, it is clear that adolescents in special schools are regarded as lacking the ability to access and use academic information. Against this background, the current study was planned and executed in order to investigate the nature of this situation. **Chapter 4** presents the research aims of the study, the research design, a description of the participants, and a full description of the procedures used to collect, record, and analyse the necessary data.

The aims, objectives, and the results of the *pilot study* will be described as part of the procedures. Ethical considerations, data collection procedures of both **Phases I** and **II** of the study, the recording procedures, data analysis, and results will also be discussed. After the analysis of the results of the pilot study, the questionnaires were adapted for the main study. **Chapter 4** concludes with a summary and conclusion.

Research provides a framework for accountable practice. A scientific approach is needed to obtain optimal results. Clarification of terms and concepts is essential and has to be tied to the empirical investigation. Researchers may make use of existing definitions formulated by other researchers or form their own definitions in order to clarify the concepts to be used in a study. After data collection and analysis, alternative explanations have to be investigated, and research-based knowledge has to be applied (De Vos, 1998:6). The current study was designed to determine if adolescents with hearing loss in special schools have the ability to access and use

academic information. For the purpose of this study, this refers to utilizing reference sources such as encyclopaedias and dictionaries in the media centre (Lor, 1990:173).

## 4.2 RESEARCH AIMS

The main goal of the research was to determine whether adolescents with hearing loss in special schools have the ability to access and use relevant academic information. In order to achieve the main goal, four sub-goals were formulated as indicated in **Figure 4.1.**

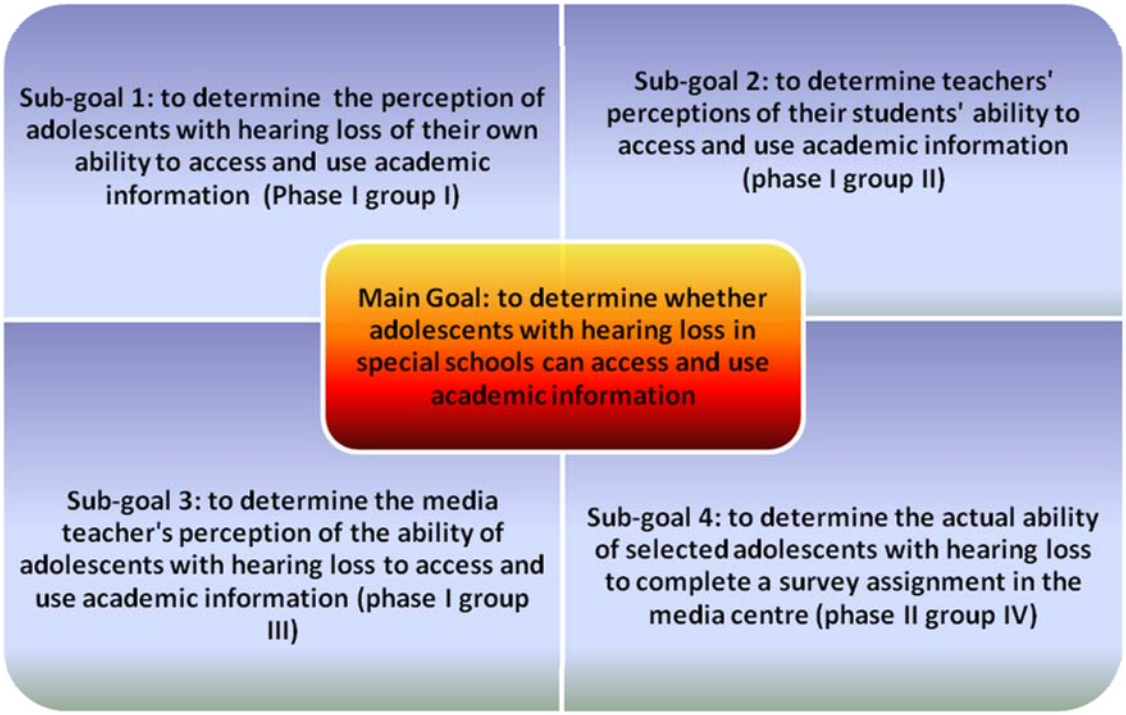



**Figure 4.1: Main goal and sub-goals of the study**

**Figure 4.1** illustrates how the four sub-goals originated from and contributed to achieving the main goal, namely, to determine the ability of adolescents with hearing loss in special schools to access and use academic information. In order to be able to answer the research question, the researcher needed to select an appropriate research design.

The research design (section **4.3**) is determined by the nature of the specific research, whether basic or applied. The current research was conducted in two phases**.** In **Chapter 2**, section **2.3.6,** the so-called big six (most significant) "information skills" were discussed: a person's ability to define his/her information needs, to know where to find relevant information, how to evaluate, access, and interpret information, and how to communicate it effectively and with insight (Van der Walt, 1992:29; Boekhorst, 1999:57-68). Two of these skills were addressed in this study, namely, the ability of adolescents with hearing loss to *access and to use* academic information, as well as their ability to *evaluate and apply* academic material in the media centre for a particular assignment.

The empirical study consisted of a **pilot study** and a **main study.** The main study was executed in two phases. After the researcher conducted the *pilot study*, adaptations were made to the questionnaires to be used in **Phase I** and the survey assignment of **Phase II.** During **Phase I,** three different groups of participants were used (**Groups I** to **III**) and questionnaires were used to collect data. **Phase II** comprised the survey assignment, completed by **Group IV** in the media centre. The study concluded with the analysis of the data and the interpretation of the results. Each phase used different groups of participants, had a different goal, employed a different design and used different data collection methods**.** The research was planned to proceed according to the following steps (**Figure 4.2**):

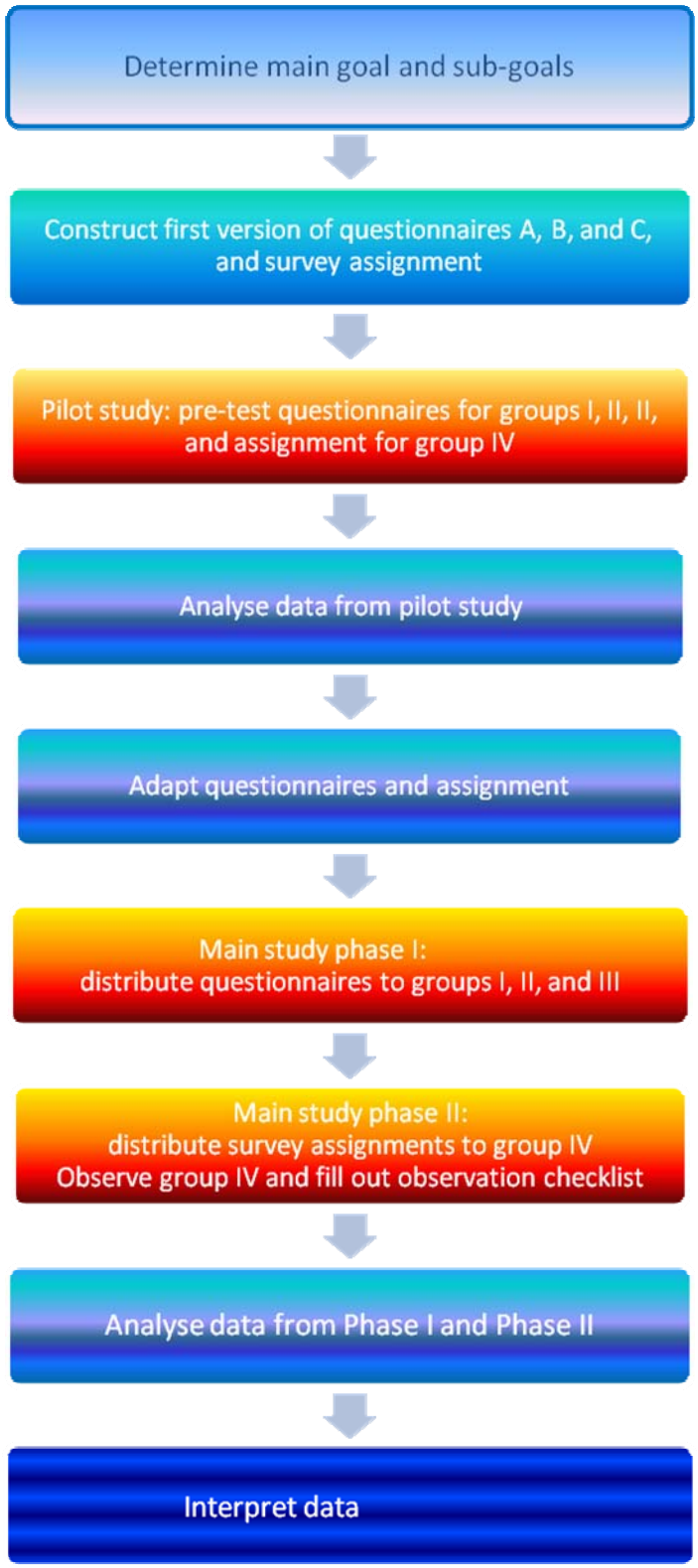



**Figure 4.2: Steps in research procedure.**

**Table 4.1** provides an overview of the goals and planning of the *pilot study* as well as the *main study* (De Vos, 2002:122).

**Table 4.1** Indicates the steps in the research procedure. It indicates how the main goal and sub-goals were to be achieved, beginning with the construction of the questionnaires and the survey. Before the execution of the main study, a pilot study has to be executed in order to pre-test the questionnaire for the different groups, in this case for groups I, II, III and the assignment for group IV.

The analysis of data from the pilot study leads to adaptation of the questionnaires and assignment. The main study of Phase I can subsequently be executed and the questionnaires can be distributed to groups I, II and III. Questionnaires will be distributed by the researcher personally, and participants will complete the questionnaires without delay in the presence of the researcher. This takes place at a time and date agreed upon by the researcher and the head of the school involved in each case. In this way the researcher aims to ensure that the data is valid in that it reflects only the opinion of the relevant participants.

The next process comprises the distribution of the survey assignment to group IV of the main study in Phase II where group IV is to be observed in the media centre. The researcher will also fill out the observation checklist.

After these procedures, the data from Phase I and Phase II will be analysed and the data ill be interpreted.

**Table 4.1: Goals of the pilot study and the main study (De Vos, 2002: 122 & Babbie, 2004:248).**

| **PILOT STUDY** (post-test design - De Vos, 2002:122) | | | | |
|---|---|---|---|---|
| **GOAL** | To pre-test questionnaire 1 that was used in the main study and to make adaptations to the questionnaire if necessary | To pre-test questionnaire 2 that was used in the main study and to make adaptations to the questionnaire if necessary | To pre-test questionnaire 3 that was used in the main study and to make adaptations to the questionnaire if necessary. | To pre-test the survey assignment that was used in the main study and to make adaptations to the questionnaire if necessary. |
| **PARTICIPANTS** | Four adolescents with hearing loss from three different special schools in three provinces were selected (these participants were excluded from **Group I** of the main study). | Two teachers were randomly selected from two separate special schools from three provinces (these two participants were excluded from **Group II** of the main study). | One media teacher from one special school from one province participated in the pilot study (this participant was excluded from **Group III** of the main study). | Two randomly selected adolescents from two different special schools from two provinces (these two participants were excluded from **Group IV** of the main study). |
| **DATA COLLECTION METHOD** | Four adolescents with hearing loss from three different special schools in three provinces had to complete a questionnaire (these participants were excluded from **Group I** of the main study). | The two teachers had to complete a questionnaire (these participants were excluded from **Group II** of the main study). | The media teacher had to complete a questionnaire (this participant was excluded from **Group III** of the main study). | Two methods were applied:<br>1. Assignment (**Phase II)** completed by randomly selected adolescents from **Group I** at two different special schools.<br>2. Observation form completed by researcher during observation of the adolescents with hearing loss in the media centre. |

| **MAIN STUDY: DETERMINING THE ABILITY OF ADOLESCENTS WITH HEARING LOSS TO ACCESS AND USE ACADEMIC INFORMATION IN SPECIAL SCHOOLS IN THE MAIN STUDY** (descriptive survey) (Leedy and Ormrod, 2005:179) | | | | |
|---|---|---|---|---|
| | **PHASE I** | | | **PHASE II** |
| **GOAL** | **Questionnaire 1**<br>1. To determine the perceptions of *adolescents with hearing loss* of their ability to access and use academic information.<br>2. To determine whether adolescents with hearing loss are aware of the importance of their ability to access and use academic information. | **Questionnaire 2**<br>1. To determine the perceptions of school *teachers* of the ability of adolescents with hearing loss to access and use academic information.<br>2. To determine whether teachers are aware of the importance of accessing and using academic information. | **Questionnaire 3**<br>*1.* To determine the perceptions of the *media teachers* of the ability of adolescents with hearing loss to access and use academic information.<br>2. To determine whether media teachers are aware of the importance of accessing and using academic information. | **Survey assignment**<br>To determine the quality and quantity of the academic information used by adolescents with hearing loss in the media centre at special schools. |
| **PARTICIPANTS** | 326 adolescents with hearing loss (**Group I)** from three different special schools in three provinces. These participants were excluded from the pilot study. | 19 teachers (**Group II)** from special schools in three provinces. These participants were excluded from the pilot study. | Six media teachers from one special school (**Group III)** in one province participated in the main study. These teachers were excluded from the pilot study. | 48 adolescents with hearing loss (**Group IV)** from three different special schools in three provinces. These participants were excluded from the pilot study. |
| **DATA COLLECTION MATERIAL** | A questionnaire completed by **Group I** of the main study was used for the collection of data in the main study | A questionnaire completed by **Group II** of the main study was used for the collection of data in the main study | A questionnaire completed by **Group III** of the main study was used for the collection of data in the main study | **C**ompleted by 48 selected adolescents from **Group I** at two different special schools. |

| **MAIN STUDY: DETERMINING THE ABILITY OF ADOLESCENTS WITH HEARING LOSS TO ACCESS AND USE ACADEMIC INFORMATION IN SPECIAL SCHOOLS IN THE MAIN STUDY** (descriptive survey) (Leedy and Ormrod, 2005:179) | | | | |
|---|---|---|---|---|
| | **PHASE I** | | | **PHASE II** |
| **ANALYSIS OF RESULTS** | The results were analysed qualitatively and quantitatively as will be described in **Chapter 5**. | The results were analysed qualitatively and quantitatively as will be described in **Chapter 5**. | The results were analysed qualitatively and quantitatively as will be described in **Chapter 5**. | The researcher observed the adolescents with hearing loss in the media centre (**Group IV** from **Phase II**) and completed an observation form based on the observation. The results were analysed quantitatively and qualitatively. |

## 4.3 RESEARCH DESIGN

A research design can be described as "a blueprint or detailed plan for how a research study has to be conducted" (Mouton, 2001:55). According to Thyer (1993:94), research design refers to the process of "…operating variables so they can be measured selecting a sample of interest to study; collecting data to be used as a basis for testing hypotheses, and analysing the results." Leedy and Ormrod (2005:85) define research design as "the overall structure for the procedures that the researcher follows, the data that the researcher collects, and the data analysis that the researcher conducts." The research design, therefore, includes specifications for procedures of data collection, as well as analysis and interpretation of observation or information. This implies that guidelines are provided for realising the research through the implementation of the selected design (Leedy & Ormrod, 2005:88; Mouton, 2001:108).

Research can be either *basic* or *applied* (Mouton, 2001:136). *Basic* or pure research searches for *empirical observations* in order to refine a formulated theory. It does not attempt to solve the immediate problems of the discipline but focuses on extending the knowledge base of the discipline (De Vos, 1998:8). Research decisions are placed within the wider context of a philosophical or meta-science paradigm. Quality checks are performed on a regular basis to attain reliable and valid results. The wide framework will give substance to the researcher's' basic assumptions about the nature of humanity, reality, knowledge and knowledge accumulation, and the place of actions and values in research.

This research study, however, is an *applied study* as it aimed to solve problems in practice. Theories were applied in various ways in the research, following the traditional approach or grounded theory throughout. *Conceptual* frameworks in research are usually *applied* in the following way (Lor, 1990:96-97):

- Facts that are relevant to a specific research problem are investigated and applicable variables are discussed;

- a framework is supplied where theoretical constructs can be formulated within certain theoretical frameworks;
- a general summary of that which is known within the research area is supplied;
- facts that have not yet been observed are predicted and
- an indication of questions relevant for further research is given.

The research design for the current study therefore focused on the end product (Lor, 1990:220) that stemmed from the research problem or question, increasing the validity of the research findings, because it focused on the logic of the research done through systematic and objective gathering of information from a representative sample (Mouton, 2001:56). This research was concerned with addressing questions aimed at determining the nature of a phenomenon (Mouton, 2001:56), which in this case was the ability of adolescents with hearing loss to access and use academic information in special schools. It was done by means of submitting questionnaires and a survey assignment to participants from special schools. Participants included adolescents with hearing loss, teachers, and media teachers.

The research design of the current study was a **descriptive design** devised to describe the current condition of the situation in two ways. A *quantitative research method* was implemented for systematic and objective gathering of information from a *representative* sample through submitting questionnaires, whereas the survey assignment employed *qualitative* methods to investigate characteristics of a group of adolescents with hearing loss with regard to their ability to access and use academic information in the media centre as described in **Table 4.1.** Leedy and Ormrod (2005:94- 96; 106) described *qualitative research* as the process of observing, describing, explaining, interpreting, and presenting a phenomenon in an organised way in order to contribute to the development of a theory. The *qualitative* as well as *quantitative* approaches employed in the research design are described in the following sections.

### 4.3.1 Qualitative research

For the purpose of this study, the application of a quantitative approach meant that findings were interpreted in terms of their general applicability to a part of the population of adolescents with hearing loss in special schools in South Africa. The purpose was to obtain representative data (De Vos, 2002:271) by submitting questionnaires to adolescents with hearing loss in special schools in South Africa. Certain criteria of quantitative approach had to be met in this study such as *reliability* and *validity* (Leedy & Ormrod, 2005:29; 99-100). *Validity* is the extent to which a type of measurement actually measures what it presumes to measure (Mouton & Marais, 1996). The criterion of *validity* is usually difficult to measure due to constructs being abstract, in the sense that they cannot be directly observed or isolated. Validity is therefore established through a process of accumulating evidence. Scientific measurement cannot exist without validity (Leedy & Ormrod, 2005:28 7 & 100), as it is incumbent upon the researcher to ensure that the instrument measures what it is supposed to measure as accurately as possible (Leedy & Ormrod, 2005:28-29). Various types of *validity* have been described namely *content, face, criterion* and *construct* validity (De Vos, 2001:83-85, 98; Leedy & Ormrod, 2005:92).

- The content validity describes the extent to which the instrument is really measuring the particular characteristic and whether it provides an adequate sample or items representing the concept. In this study, the researcher used the assignment as a valid instrument to measure the various abilities of the participants with hearing loss with regard to academic achievement.
- The face validity refers to the concept of “what it appears to measure”. If this type of validity is not considered, the researcher may encounter resistance from the respondents that can affect the results adversely. It is often useful to ensure the cooperation of the participants. For the purpose of this study, by means of submitting a questionnaire and assignment, the researcher attempted to ensure that the participants would give their cooperation. As pointed out in the explanation following **Table 4.1**, the

method of distribution and the completion of the questionnaires also contributed to face validity.

- The criterion validity involves more than one measurement and compares scores on an instrument with external criteria known to, or believed to, measure the concept, trait or behaviour being studied.

*Reliability* as a criterion is used by social scientists. They describe the term as the accuracy and precision of the selected instrument in a research project, referring to its dependability (Durrheim & Wassernaar, 1999:63), stability, consistency, predictability, reproducibility, repeatability, and generalisation (De Vos, 2001:85; Leedy & Ormrod, 2005:92). This criterion was met by the researcher by means of formulating the items in the questionnaire as clearly and concisely as possible in order to exclude any possible ambiguities that could occur. The criterion of reliability was therefore concerned with the accuracy and consistency of measurements by use of a pilot study (Leedy & Ormrod, 2005:110). It also implied that the information did not vary because of characteristics of the indicator, instrument, or measurement device itself.

The criterion of reliability is necessary to ensure validity, and is more achievable than validity. Reliability can be determined by means of providing concise, clear and simple instructions; keeping the length of the questionnaire within reasonable limits; and by ensuring that questions are user-friendly and can be answered as effortlessly as possible (Leedy & Ormrod, 2005:93 &190-192). The researcher attempted to ensure reliability by first conducting a pilot test in order to ensure reliability. After the pilot test was conducted the main study was executed and the researcher found that the criterion of reliability was met.

A *qualitative* approach was therefore applied and had specific criteria that had to be met.

A qualitative approach requires that the criteria of *credibility*, *transferability*, *dependability*, *conformability (*Babbie & Mouton, 2002:278) and *reliability* be met. These criteria were applied for the *survey assignment* and are described separately.

#### 4.3.1.1 Credibility

Credibility refers to the authentic representation of human phenomena (De Vos, 2002:351; Babbie & Mouton, 2002:277). Credibility may be obtained by the execution of a thorough literature review, such as was done in the current study. Other aspects refer to the carefully constructed discussion of the aims and objectives of the study, and the combination of two or more data collection instruments (e.g. questionnaire survey and survey assignment for this study). The *credibility* of a research design (Leedy and Ormrod, 2005: 93) refers to the extent to which certain outcomes are met and were achieved through accurate phrasing of questions in order to elicit the specific information from the participants in the special school. The researcher, being deaf herself, also had to reflect on her own perceptions and experiences in order to be unbiased so that the findings could not be influenced.

#### 4.3.1.2 Transferability

The criterion of *transferability* refers to contexts outside of the study situation, i.e. applicability (De Vos, 2002:352; Babbie & Mouton, 2002:277) This criterion was also described earlier by Leedy & Ormrod (2005:100). In the case of this study, it was relevant with regard to the media survey assignment involving a small purposefully selected sample of adolescents. In order to reach the criterion of *transferability*, this study involved detailed descriptions of the participants, data collection instruments, procedures and variables in order to allow *transferability* to other contexts.

#### 4.3.1.3 Dependability

*Dependability* refers to the exact methods of data collection, recording, and combination of research methods, analysis, and interpretation of results in order to provide information on the *repeatability* of the research (De Vos, 2002:352). The criterion of *dependability* was at issue when the researcher attempted to account for the changing situation or conditions in a phenomenon by tracking it to identifiable sources (De Vos, 2002:352). The outcomes of the questionnaire survey were verified with findings in the literature. The terminology that was used had a great

influence on the *dependability* of responses obtained from participants (Leedy & Ormrod, 2005:55). For example, it was clear from the pilot study that the term *academic information* as opposed to the term *information* should be used in questions where participants had to indicate their perceptions regarding various aspects of academic information. This was done in the main study in order to clarify the term and to ensure uniformity and dependability.

Through ensuring the confidentiality of the participants' responses by not letting the participants write their names, the *dependability* of the responses was increased. The participants could freely state their true opinions and views about the topics of discussion. Great care was taken in translation of the questionnaires from English to Afrikaans so as not to change the meaning of content in any way. In some schools, however, interpreters were present, and where participants used sign language, an interpreter assisted and verified that the translations were accurate (Katz, 2002:758-759). An interpreter can play a vital role in the life of an adolescent with hearing loss in the classroom setting, translating words into signing or vice versa, as they are proficient in sign language, cued speech and the oral approach (Katz, 2002:759). This is an important factor in the current research because it influenced the dependability of the responses, and the criterion of reliability was not met as the interpreters could have influenced the responses of the participants.

Discussing questions that were of particular interest and relevance to the participants also increased the criterion of *dependability* (De Vos, 2001:351). This was done after the pilot study was conducted at the specific schools by discussing some items of the questionnaire with the participants. Although the criterion of complete reliability, validity and trustworthiness can never be completely achieved, the application of the above-mentioned criteria contributed to ensure quality measures in this study.

#### 4.3.1.4 Conformability

Conformability refers to the need to determine whether the findings of the study could be verified or confirmed by someone else and whether the researcher's

biases, motivations, interests or perspectives could have influenced the interpretations (De Vos, 2002:352; Leedy & Ormrod, 2005:100). The researcher attempted to take an unbiased stand during data recording and when drawing conclusions from the data. In applying a qualitative approach, the criterion of reliability was also applicable as in the case of a quantitative approach (section 4.3.1).

*A qualitative* research approach is often chosen over a *quantitative* approach (although not exclusively) because of its adaptive nature in dealing with multiple realities (Leedy & Ormrod, 2005:94; De Vos, 2002:271). Both these approaches were employed in this study to gather information, form interpretations, analyse data, and to reach specific conclusions (Mouton & Marais, 1996). During analysis of the data from the questionnaires, the researcher coded the participants' responses so as to avoid the possibility of inter-coder discrepancy, which could affect the reliability of results (Leedy & Ormrod, 2005:94).

## 4.4 PARTICIPANTS

The participants in **Phase I** of the study involved **Group I** (adolescents with hearing loss); **Group II** (teachers of adolescents with hearing loss) and **Group III** (media teachers of adolescents with hearing loss). **Phase II** involved **Group IV** (adolescents with hearing loss who completed an assignment in the media centre). All the participants in the different phases of the study are described separately.

### 4.4.1 Phase I

**Group I** consisted of adolescents with hearing loss who were in special high schools that provided for children with hearing loss. **Group II** and **Group III** consisted of teachers at the selected special high schools. The participants came from three provinces in South Africa, namely Gauteng, KwaZulu Natal and the Western Cape. These three schools were selected because the researchers knew that these three provinces provided education for adolescents with hearing loss and had specialised teachers.

### 4.4.2 Phase II

The participants in **Group IV** consisted of adolescents in special high schools selected from the same provinces as in **Phase I.** These special high schools also provided education for adolescents with hearing loss.

### 4.4.3 Selection criteria for the inclusion of special schools and participants of phase I, II and III

The researcher selected participants for the study from the population of individuals possessing certain characteristics and about which she wished to make decisions (De Vos, 2001:190; Leedy & Ormrod, 2005:210). With regard to special schools, the researcher contacted the Department of Special Education to obtain a list of relevant specific schools. The Department of Special Education provided the researcher with a list of all the special schools in South Africa. The criteria for inclusion of special schools and participants for Phase I and II for the different groups are the following.

#### 4.4.3.1 Special schools

**Table 4.2** illustrates the number of participants in each grade of the different schools in the three provinces that were used for the **main study** in **Phase I**.

**Table 4.2: Number of adolescents with hearing loss in the selected provinces participating in the study**

| PROVINCE | SCHOOL | GRADE 7 | GRADE 8 | GRADE 9 | GRADE 10 | GRADE 11 | GRADE 12 | TOTAL |
|---|---|---|---|---|---|---|---|---|
| Gauteng | School No. 1 | 12 | 14 | 8 | 3 | 3 | 5 | 45 |
| | School No. 2 | 10 | 10 | 3 | 4 | 4 | 3 | 34 |
| | School No. 3 | 9 | 10 | 9 | 4 | 6 | 6 | 44 |
| | School No. 4 | - | 25 | 32 | 36 | 10 | - | 103 |
| KwaZulu- | School | 4 | 6 | 5 | 11 | 4 | 3 | 33 |

| PROVINCE | SCHOOL | GRADE 7 | GRADE 8 | GRADE 9 | GRADE 10 | GRADE 11 | GRADE 12 | TOTAL |
|---|---|---|---|---|---|---|---|---|
| Natal | No. 5 | | | | | | | |
| | School No. 6 | 3 | 6 | 7 | 4 | 8 | 3 | 31 |
| Western Cape | School No. 7 | 6 | 5 | 5 | 7 | 6 | 7 | 36 |
| TOTAL | 7 | 44 | 76 | 69 | 69 | 41 | 27 | 326 |

**Table 4.2** indicates the number of schools in the selected provinces and the number of adolescents with hearing loss in the different grades participating in the study. The different criteria that were applied include the criteria of hearing loss, age, geographical area, language, and participation as indicated in **Table 4.3**, which appears later. It must be noted that Phase I only consisted of Groups I to III whereas Phase II consisted of Group IV (randomly selected group of adolescents with hearing loss from Group I). The researcher excluded the participants in the pilot study from the main study.

The selection criteria for inclusion of special schools are the following:

- The special schools included in the study had to be institutions that specifically provide education for adolescents with hearing loss in South Africa.
- The special schools had to provide education for adolescents in high school from grade 7 to grade 12.
- The special schools had to provide education for adolescents with hearing loss in Afrikaans, English and sign language.
- Due to geographical distances the special schools that were included were in three provinces only, namely Gauteng, Western Cape and KwaZulu-Natal because these provinces provided for education for adolescents with hearing loss. The researcher could not visit more schools and had to take time and cost factors into consideration (see Figure 4.3), as there was not enough time to travel to visit more schools and accommodation was expensive.

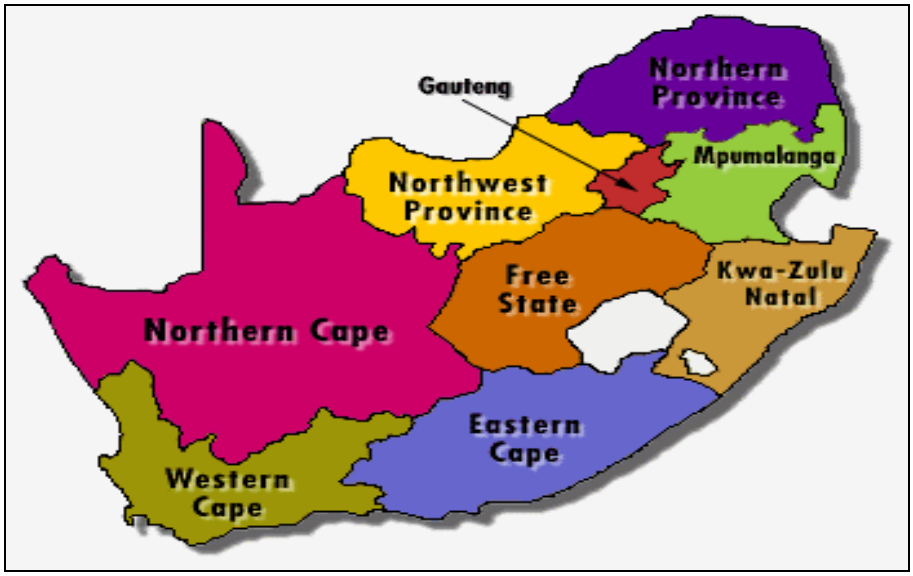



**Figure 4.3: Geographical distribution of provinces in South Africa (NMLC Land Development Objective, 1997).**

- Schools had to have displayed a willingness to participate voluntarily in research endeavours, as evidenced during previous visits of the researcher.
- The special schools had to employ special teachers that are specifically trained to educate adolescents with hearing loss.
- The headmasters and teachers at the schools that were selected had to express their goodwill towards both their adolescents with hearing loss and the current study, in order to guarantee their full participation.

The participants in **Phases I** and **II** of the study were selected from the special schools mentioned above and consisted of adolescent participants with hearing loss (**Group I**); teachers (**Group II**); media teachers (**Group III**) and a selected group of adolescents (**Group IV**).

#### 4.4.3.2 Phase I: Group I: Adolescents with hearing loss in special schools

Participants in **Group I**, namely adolescents with hearing loss in special schools, had to comply with the following selection criteria in order to participate in the study.

- They had to have an irreversible sensorineural hearing loss, as the purpose of the research was to study the behaviour of adolescents with hearing loss. A temporary hearing loss would not have the same effect on abilities and behaviour as a permanent hearing loss.
- They had to be in Grades 7 to 12 or be age 14 and older to participate in the study. The access and use of academic information becomes a critical issue at this academic level.
- They had to live in the selected geographical areas because the researcher visited these provinces and because these special schools provide education for adolescents with hearing loss.
- They had to attend a special school in South Africa providing education for adolescents with hearing loss regardless of assistive devices being used (Katz, 2002:628) such as a hearing aid or cochlear implant, and using different modes of communication (Katz, 2002:759). Special schools are better equipped than regular schools to work with adolescents with hearing loss.
- They had to be able to read and understand Afrikaans or English, because the Questionnaires were presented in these two languages (See Appendices D to G). For the purpose of this study, the adolescent participants' language base had to be already adequately formed for them to understand the nature of the questions regarding their ability to access and use academic information (Hull, 1998:7).
- They had to be willing to take part in the study in order to ensure a good response rate and reliable results from the questionnaires. Table 4.3 indicates the general selection criteria of participants of Group I of Phase I and also those of Phase II.

#### 4.4.3.3 Phase I: Group II: Teachers at special schools

The selection of two teachers per school was regarded as providing a sufficient number of participants, because according to Leedy and Ormrod (2001:273), a smaller number of participants are required if the participants have a level of involvement with the topic. Furthermore, a smaller group allows the researcher to

exercise more control over the active involvement of each participant. Findings from the pilot study also indicated that this number of teachers was sufficient for participation as is illustrated in **Table 4.11.**

Specialized teachers are well equipped to teach adolescents with hearing loss because they have been specifically trained in this area. The general selection criteria that applied to teachers at special schools are the following.

- Teachers had to be employed by special schools and engaged in educating adolescents with hearing loss.
- They had to have specialised training because their knowledge of adolescents with hearing loss with regard to their background as well as their type and degree of hearing loss was a prerequisite in order to deliver adequate education, training and services for the adolescent with hearing loss.
- Teachers preferably had to see their pupils with hearing loss work on a daily basis in order to get to know them thoroughly and to be aware of their educational needs.
- Teachers had to have experience in collaborating with other teachers and the media centre with regard to planning and executing education programmes in order for the adolescents with hearing loss to benefit from all possible educational opportunities. Where special schools did not have a media teacher, the school teacher or teachers had to work in the media centre when needed and had to have knowledge of all the information sources and how to make them accessible to the adolescents with hearing loss.

The general selection criteria for media teachers (**Group III**) are very similar to that of teachers at special schools, but additional selection criteria were applied.

#### 4.4.3.4 Phase I: Group III: Media teachers at special schools

The media teachers had to answer to the same criteria as the teachers at special schools as set out above. Media teachers also offer specialised education to

adolescents with hearing loss in special schools. The following additional criteria were set to select media teachers at special schools:

- Media teachers had to be employed and work in the media centre at one of the special schools in order to be available for adolescents with hearing loss who needed to access and use academic information.
- The media teachers had to be specifically trained to work in the media centre, and to have knowledge of the different media sources and techniques how to access and use academic sources for academic and personal needs.

The last group of participants (**Group IV)** in this study were selected adolescents with hearing loss who had to complete a survey assignment in the media centre.

#### 4.4.3.5 Phase II: Group IV: Selected adolescents with hearing loss who completed a survey assignment in the media

The adolescents with hearing loss who completed a survey assignment in the media centre were selected from the participants of **Group I.** This sub-group therefore complied with the same general criteria as **Group I**:

- They also had to have an irreversible sensorineural hearing loss, as the purpose of the research was to study the behaviour of adolescents with hearing loss.
- They had to be in Grades 7 to 12 or be age 14 and older to participate in the study.
- They had to live in the selected geographical areas because the researcher visited these provinces and because these special schools provide education for adolescents with hearing loss.
- They had to attend a special school in South Africa providing education for adolescents with hearing loss regardless of assistive devices being used (Katz, 2002:628) such as a hearing aid or cochlear implant, and using different modes of communication (Katz, 2002:759). Special schools are

better equipped than regular schools to work with adolescents with hearing loss.

- They had to be able to read and understand Afrikaans or English, because the Questionnaires were presented in these two languages. These adolescents were randomly selected and excluded from Group I.

**Table 4.3** summarizes the main points of the selection criteria for the inclusion of special schools and the various groups of participants for Phases I and II.

**Table 4.3: General selection criteria for participants in Phase I and Phase II**

| GROUP | STATUS | AGE | GEOGRAPHICAL AREA | LANGUAGE | PARTICIPATION |
|---|---|---|---|---|---|
| **Group I:** Adolescents with hearing loss | The adolescents had to have a sensorineural hearing loss as this formed the basis of the research question. They also had to under-stand Afrikaans or English as the questionnaire was presented in either of these two languages. | The participants had to be in Grade 7 to12 or be of the age 14 and older as this group was selected to be the focus group of the study. | The special schools had to be in Gauteng, Western Cape and KwaZulu-Natal. | Afrikaans and/or English, because the researcher presented the questionnaire to the participants in either of these two languages. | Participation was voluntary and the subjects had to complete a letter of consent in order to participate in the study (Leedy & Ormrod, 2005:101) (See **Appendix D).** |
| **Group II:** Teachers of adolescents with hearing loss | Teachers that were appointed to teach one or more subjects to adolescents with hearing loss and had to have a sound knowledge of such subjects to educate them in all areas of academic information. | Age was not relevant but at least three years of experience at the special school was required as they needed the experience to work with adolescents with hearing loss. | Special schools in South Africa, except in Northern Cape were included as the researcher was able to visit these schools. | The language was not considered to be a criterion because it was assumed that the teachers could speak English and the questionnaire was presented to them in English. | The teachers had to participate voluntarily and had to complete a letter of consent in order to participate in the study (See **Appendix E**). |

| GROUP | STATUS | AGE | GEOGRAPHICAL AREA | LANGUAGE | PARTICIPATION |
|---|---|---|---|---|---|
| **Group III**: Media teachers at special schools who work with adolescents with hearing loss | Media teachers appointed to teach at a special school see the subjects with hearing loss at least once a week and had to have knowledge of the subjects with hearing loss. | Age was not relevant but at least three years of experience at the special school was required, as they needed the experience to work with adolescents with hearing loss. | Special schools in South Africa, except in Northern Cape were included as the researcher was able to visit these schools. The teachers were specially trained in the field of adolescents with hearing loss. | The language was not considered to be a criterion because it was assumed that the teachers could speak English and the questionnaire was presented to them in English | Participation had to be voluntary and the media teachers had to complete a letter of consent in order to participate (See **Appendix F).** |
| **Group IV**<br>Four randomly selected adolescents from one special school | Adolescents had to have a hearing loss and had to be able to understand Afrikaans or English as the questionnaire was presented in either Afrikaans or English. | | | Afrikaans, English, or sign language was a criterion as the subjects with hearing loss could speak any of these languages. | Selected participants had to be omitted from the pilot study |

### 4.4.4 Variables considered in selection of special schools and participants

Certain *variables* were considered in the participant selection of the four groups of the study of Phase I and Phase II, namely Group I which consisted of adolescents with hearing loss; Group II, the teachers; Group III, the media teachers; and Group IV, the selected group of adolescents with hearing loss that completed an assignment in the media centre.

A *variable* is a characteristic of the participants, or a condition to which they have been exposed, and that is not the same for all participants (De Vos, 2002:33; Leedy & Ormrod, 2005:254). *Variables* can influence meaningful interpretation of the results or findings and therefore have to be included in the discussion. It is also a symbol to which numerals or values can be assigned. The categories of a variable are its attributes or characteristics (De Vos, 2002:33) and the dependent variables are the specific, measurable indicators that allow the researcher to evaluate any changes or differences that were noted in the study. Dependent variables can therefore be equated to outcomes in a quasi-experimental design (De Vos, 2002:154-155; 39). In descriptive research, variables can have explanatory value.

People with hearing loss can be considered to be a heterogeneous group (Katz, 2002: 759) as was discussed in **Chapter 3,** section **3.7.8.** They are a diverse group with little in common except that they have a decrease in their hearing ability and sensitivity that may occur in one or both ears. There will consequently be potential variables within the population of people with hearing loss. Some of these variables were determined in the biographical section of the questionnaire and played a role in the manipulation of the data.

- *Age a*nd experience of adolescents with hearing loss were considered to be variables as it could help to determine their need for instruction at certain ages with regard to their ability to access and use academic information. The older the adolescents with hearing loss are, and the more background and experience they have, the better they will be able to

access and use academic information. Hull (1998:39) supported this view.

- *The mode of communication* is also an important variable as it greatly influences progress and scholastic performance at school in the case of adolescents with hearing loss. The mode of communication also influences the learning ability of the adolescent with hearing loss. For the purpose of this study, the different modes of communication that applied were oral language or signing, wearing a hearing aid, having a cochlear implant, and making use of finger spelling and/or speech reading. The *auditory-oral* mode of communication is based on the presumption that the acquisition of spoken language is a realistic goal for children with hearing loss. This approach teaches the child to maximize the use of residual hearing in combination with speech reading. These children will not make use of manual communication namely signing (Katz, 2002: 759-761). If children with hearing loss use manual communication, their skills of reading and writing typically tend to be underdeveloped (Hearing loss disorders, accessed 2009-08-30) because phonological awareness is unlikely to develop.

Variables that could not be controlled were variables such as age, level of education, literacy levels, communication modes, level of reading and writing skills, and motivation. It will be necessary to bear this fact in mind when considering the description of participants in Phases I and II of the study.

### 4.4.5 Description of subjects of phase I and phase II

As was stated before in the study, the subjects came from three provinces in South Africa, namely Gauteng, KwaZulu-Natal and the Western Cape because the researcher knew that the special schools in these provinces provided education for adolescents with hearing loss. There were 326 participants in **Group I,** 19 participants in **Group II,** six participants in **Group III,** and forty-eight participants in **Group IV**. **Group I** were adolescents with hearing loss; **Group II** the special teachers from special schools from the three provinces; and **Group III** the media

teachers, also from the three provinces. **Group IV** was the selected group of participants from **Group I** from one of the three provinces, in this case, Gauteng. All the participants in Group IV were participants with hearing loss from School G1. The schools from each province as well as the number of participants that were included for the study can be seen in **Table 4.4**.

**Table 4.4: Participants (Phases I and II) from the Three Provinces**

| | GAUTENG | P | KWAZULU-NATAL | P | WESTERN CAPE | P | Total P |
|---|---|---|---|---|---|---|---|
| PHASE I: ADOLESCENTS WITH HEARING LOSS (Group I) | 1. School G1<br>2. School G2<br>3. School G3<br>4. School G4 | 10<br><br>45<br>103<br>46 | 1. School KZN1<br>2. School KZN2<br>3. School KZN3 | 33<br>31<br>22 | School WC1 | 36 | |
| **Total** | | 204 | | 86 | | 36 | 326 |
| PHASE I; TEACHERS (Group II) | 1. School G1<br>2. School G2<br>3. School G3<br>4. School G4 | 3<br>3<br>2<br>3 | 1. School KZN2<br>2. School KZN2<br>3. School KZN1 | 2<br>2<br>2 | School WC1 | 2 | |
| **Total** | | 12 | | 6 | | 2 | 19 |
| PHASE I: MEDIA TEACHERS (Group III) | 1. School G1<br>2. School G2 | 1<br>1 | 1. School KZN1<br>2. School KZN2<br>3. School KZN3 | 1<br>1<br>1 | School WC1 | 1 | |
| **Total** | | 2 | | 3 | | 1 | 6 |
| PHASE II (Group IV) | School G1 | 48 | | | | | |
| **Total** | | 48 | | | | | 48 |

Key: P = Number of participants

From **Table 4.4** it can be seen that the total number of participants in Groups I and II (participants with hearing loss and teachers) are sufficient to be regarded as representative of the population, while the smaller number of participants in Group III (media teachers) reflect a relatively small total population.

It is now relevant to discuss the biographical and background information of the subjects of **Group I** as these variables may have an impact on the results of the study. The relevant factors include the gender and age of the participants, their *language*, the province where the school is situated, whether the participants with hearing loss are boarders or day scholars, how many years they have been in school, what their mode of communication is, and whether they use assistive devices.

#### 4.4.5.1 Gender and age of participants in Group I

The questionnaires were handed out to 326 respondents, of which 52.5% (*n*=171) were boys and 47.6% (*n*=155 ) were girls. **Table 4.5** gives an indication of how many adolescents with hearing loss were in the different age groups.

**Table 4.5: Age of adolescents with hearing loss**

| 11 to 14 years old | 15 to 20 years | 21 and older | Age not clearly Indicated | Total |
|---|---|---|---|---|
| 9% (*n*=30) | 70% (*n*=228) | 8% (*n*=27) | 13% (*n*=41) | 100% (*n*=326) |

It is generally expected that an adolescent is between the ages of 11 and 15 years. It is important to note that the participants with hearing loss in the selected special schools were older than the expected age of 11 to18 years, as can be seen in **Table 4.5.** There is a high percentage of adolescents with hearing loss between the ages of 15 and 20 years old. Research has shown that adolescents with hearing loss are delayed with regard to academic achievement (Position Statement: Principles and Guidelines for Early Hearing Detection and Intervention Programs, 2007:900-901,908, 910), but Morris and Blatt (1986:321-322) reported a lack of research regarding the relationship between cognitive development and academic achievement in adolescents with hearing loss, the reason being that cognitive tests are very difficult to apply to adolescents with hearing loss. Charlesworth, Charleslesworth, Raban and Rickards (2006:29-51) have indicated that adolescents with hearing loss have difficulty with all areas of academic achievement, especially with reading and mathematical concepts and that they

display lower reading levels than their hearing peers. From the results obtained from the study it became clear that hearing loss affects the participant with hearing loss' ability to learn language and to achieve academically. This view was also supported by De Conde Johnson, *et al*., (1997:230).

#### 4.4.5.2 Language used by participants

Of the 326 respondents, 89% (*n*=227) indicated that they were adept at using sign language, while 66% (n=152) reported that they were conversant with English and 58%, (*n*=104) with Afrikaans. Only 10% (*n*=27) of the participants indicated they used sign language poorly, 34% (*n*=78) spoke English poorly and 42% (*n= 75)* indicated they found Afrikaans difficult. Research also indicates that the participant with a hearing loss often find a second language difficult to master (Nowell & Marshak, 1994:30, 42; Braden, 1994:32).

#### 4.4.5.3 Provinces where the specials schools are located

The researcher went to three provinces in South Africa and handed out 326 questionnaires to respondents with hearing loss in special schools as shown in **Figure 4.4**.

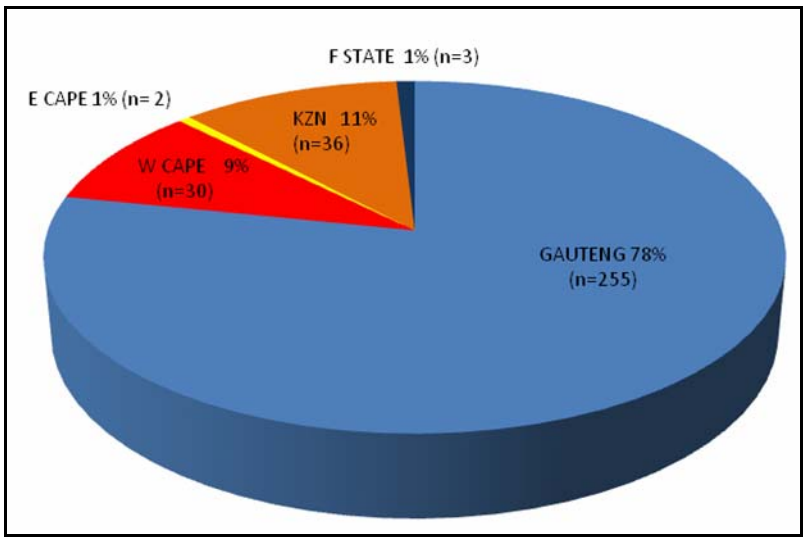



**Figure 4.4: Provinces where questionnaires were distributed**

From **Figure 4.4** it can be seen that the majority of respondents to the 326 questionnaires that the researcher handed out to adolescents with hearing loss,

came from Gauteng Province (78%, *n* =255), followed by KwaZulu Natal (11%, *n* =36), Western Cape (9%, *n* =30), Free State (1%, *n* =3) and Eastern Cape (1%, *n* =2). The reason for the higher percentage of respondents from Gauteng was that the researcher visited more schools in Gauteng than in the other provinces. Despite the random sampling, the results were therefore more representative of the adolescents with hearing loss in Gauteng Province, as is discussed in Chapter 4, due to logistic reasons (Kothari, 2005:60). .

#### 4.4.5.4 Boarders or day scholars

Participant data shows that 44.4% (*n* =143) of the adolescent participants were boarders at the special schools while 55.6% (*n* =179 ) were day scholars. This statistic can be important for teachers to know, because the boarders might need more assistance with regard to assignments or school work. Participants in the current study indicated that they did not have much help at the boarding school. This view is supported by the document "Special schools as resource centres" (2002:1). It seems obvious that these adolescents with hearing loss would need more assistance from teachers at school. This can be addressed by spending more time with adolescents with hearing loss, giving them more curriculum based homework and assignments and time to spend at the media centres, and encouraging teamwork amongst adolescents with hearing loss or group work.

#### 4.4.5.5 Years spent in school

The researcher added a question in the biographical section of the questionnaire to determine how long the subjects have been in school. From the results it became clear that adolescents with hearing loss typically spend longer than five years in secondary school, as can be seen in **Table 4.6.** This result is important as it reflects on the academic underachievement of adolescents with hearing loss in special schools. The expected number of years that an adolescent spends in school is usually five years and an adolescent usually leaves school at the age of sixteen. This view is supported by Powers (2003:60).

**Table 4.6: Years spent in School**

| Number of years spent in school | Percentage of participants |
|---|---|
| 3-5 years | 19% (*n* =55) |
| 6-10 years | 32% (*n* =104) |
| 10+ Years | 26% (n=79) |
| Response unclear (indeterminate) | 27% (n=88 |
| **Total** | 100% (*n*=326) |

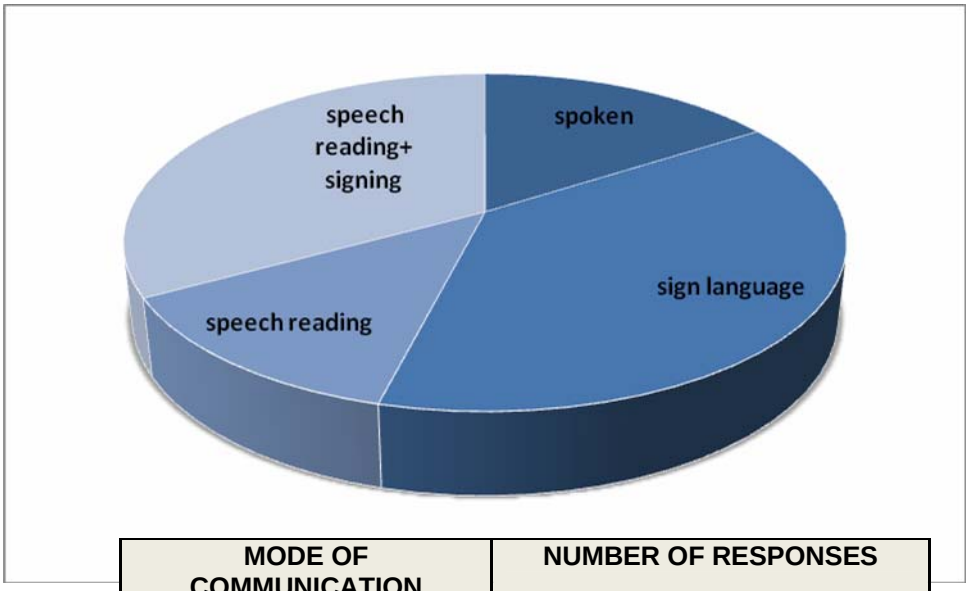
From **Table 4.6** it can be concluded that 26% (n=79) of the participants in the study spent longer than the expected five years in school. The results also revealed that 54% (*n* =169) of the subjects had a severe degree of hearing loss. This degree of hearing loss can influence the ability of an adolescent with hearing loss to achieve academically, and this is reflected in the extended period of school attendance (Moores, 2001:119 Powers, 2003:61; Charlesworth, Charleslesworth, Raban & Rickards, 2006:29-51; Katz, 2002: 510; Marschark, 2003: S41-S47).

The results also indicated that 46% (*n* =144) of the adolescents with hearing loss had a moderate degree of hearing loss, but even a moderate loss can influence level of academic achievement in the measure that it affects the ability to receive and aquire language.

#### 4.4.5.6 Mode of communication when talking to other people

Adolescents with hearing loss use different modes of communication when talking to other people such as oral (spoken) language, sign language, speech reading and a combination of speech reading and sign language. In the questionnaires the researcher included questions to determine which modes of communication the adolescents used most often. The results are displayed in **Figure 4.5.**

**Figure 4.5.** Some participants responded affirmatively to more than one option.




| MODE OF COMMUNICATION | NUMBER OF RESPONSES |
|---|---|
| spoken | *66* |
| sign language | *158* |
| speech reading | *54* |
| speech reading+ signing | *137* |

**Figure 4.5:** Mode of communication of participants with hearing loss

From the results displayed in **Figure 4.6** it is clear that sign language (158) and spoken language (66) were the two modes of communication that were used most in the special schools included in this study. Only 54 of the respondents responded positively with regard to speech reading, while a relatively larger number (137) of the respondents confirmed that they used both speech reading and sign language when speaking to other people. Adolescents with hearing loss as indicated by research such of Katz (2002:759) also often use a combination of speech, signing or cued speech in order to have information relayed to them as correctly as possible.

### 4.4.5.7 Mode of communication of people communicating with participants with hearing loss

The researcher also asked questions to determine the perception of the subjects with hearing loss concerning which modes of communication other people usually

use when talking to them. The results are displayed in **Table 4.7.** In this question the participants were allowed to select more than one option and therefore the results do not add up to 100%.

**Table 4.7: Mode of communication when talking to adolescents with hearing loss**

| MODE OF COMMUNICATION ADOPTED BY COMMUNICATION PARTNERS | NUMBER AND PERCENTAGE OF RESPONSES | PERCENTAGE OF PARTICIPANTS WHO PERCEIVED THEIR PARTNERS TO USE THIS MODE |
|---|---|---|
| Speaks orally | *n*=70 (18%) | 22% |
| Uses sign language | *n*=131 (34%) | 40% |
| Uses speech reading | *n*=82 (21%) | 25% |
| Uses both speech reading and sign language | *n*=107 (27%) | 33% |

From **Table 4.7** the conclusion can be drawn that sign language (40%, *n* = 131) was used most of the time, followed by speech reading and sign language (33%, n = 107), then speech reading only (25%, *n* = 82) whereas spoken language was used only 22% (*n* = 70). From these results, it was therefore clear that the subjects with hearing loss' perception were that sign language was used most of the time when other people spoke to them. This view was supported by Katz (2002:759 & Bench, 1992:9). Spoken language is expressive language whereas the typical receptive component is auditory (listening to spoken language). Speech reading is a receptive mode only, but can be used instead of listening to spoken language. The participants who responded affirmatively to speech reading only would presumably be those who paid no attention to auditory input, that is, they did not attempt to listen to spoken language, but only interpreted the visual clue. From the results displayed in **Table 4.7**, it is clear that more detailed enquiry is warranted to determine who these communication partners were, what their hearing status was, and whether the specific context of the communication made any difference. From both **Table 4.7** and **Figure 4.5** it became clear that sign language was the predominant mode of communication, followed by speech reading and sign language, then the oral method and last of all, speech reading. Signing as main communication mode may influence

an adolescent's with hearing loss ability to master reading and writing skills. Spencer *et al.* (2000:281) noted that sign language generally "…does not have widely accepted written forms", and this has the implication that adolescents with hearing loss cannot acquire literacy skills in their first language to transfer to the written form of a second (spoken) language. It is well documented that written language is difficult for hearing impaired children in special education settings to master, partly because the syntax of sign language differs from the syntax of written (and spoken) language (Geers & Moog, 1989:69; Nelson, 1998:10).

#### 4.4.5.8 Assistive devices

The question relating to assistive devices was not answered by all the participants. The term "hearing aids" appears to have been interpreted as referring to all types of assistive devices, including both traditional hearing aids and cochlear implants. On the questionnaire handed out to the participants with hearing loss, 48% (*n*=114) of the adolescents with hearing loss indicated that they wore hearing aids permanently, while 52% (*n*=122) indicated they wore hearing aids sometimes. Only 7% (*n*=21) of the adolescents with hearing loss indicated that they had a cochlear implant. This information is valuable, as assistive devices can help adolescents with hearing loss in the process of communication, in learning to learn, in developing literacy skills and to process information (Katz, 2002:547, 628, 768; Foster, 1993:245; Hugo, 1987:86).

## 4.5 MATERIAL AND DATA COLLECTION INSTRUMENTS OF PHASES I AND II

The material and data collection instruments of Phases I and II consisted of questionnaires and a survey assignment. This was necessary in order to answer the research question, namely: *do adolescents with hearing loss have the ability to access and use academic information in the special school?*

### 4.5.1 Introduction

The *questionnaires* and *survey assignment* together with an *observation form* (Leedy

& Ormrod, 2005) were the material and data collection instruments that were used for **Phase I** and **Phase II** of the study. The questionnaires aimed:

- To determine the perception of adolescents of their own ability to access and use academic information; and
- To determine the perception of regular and media teachers with regard to the ability of adolescents with hearing loss to access and use academic information.

An observation form was utilised by the researcher in order to observe the participants of the study completing a survey assignment in the media centre.

The above-mentioned data collection instruments were designed in order to answer the research question.

### 4.5.2 Format and design of data collection instruments for phases I and II

Questionnaires and observation forms are among the principle methods of collecting data in survey research in order to answer research questions. A research questionnaire can be defined as "a set of questions on a form which is completed by the respondent in respect of a research project" (New Dictionary of Social Work, 1995:51; Leedy & Ormrod, 2005:3). It is important that the format and design of data collection instruments be designed according to certain principles in such a manner that the criteria of reliability and validity can be ensured.

#### 4.5.2.1 Principles of the format and design of the data collection instruments

The *observation form* was designed in such a manner that the researcher could adequately observe the participants in the media centre. Before the researcher utilised the data collection instruments for the main study, a thorough literature

research was conducted with regard to research methodology. A set of guidelines were established and followed.

a) Aim and justification for the use of a questionnaire

The researcher aimed to obtain an accurate and broad overview of a representative sample of a large population, namely adolescents with hearing loss in special schools and did this by means of submitting a questionnaire to participants at selected special schools. Questionnaires are widely used in survey research (Mouton, 2001:152; Leedy & Ormrod, 2005:184-185).

b) Length

Regarding the length of questionnaires, Oppenheim (1966:35) remarked "…concerning the length, much would seem to depend on personal involvement: the more interested people are in the subject of the questionnaire, the more they are likely to fill in and return even quite lengthy questionnaires". Leedy and Ormrod (2001:156) are of the opinion that a questionnaire should be brief, including only the necessary questions to collect the relevant information, but also long enough to include all the essential questions in order to ensure that a situation does not later occur where information might be missing. It is generally agreed, however, that respondents must communicate as much information as possible in the shortest possible time span.

c) Instructions

- In order for participants to complete the pilot study and main study questionnaires, the instructions had to be clearly stated in written form (Babbie, 1992:157; Leedy & Ormrod, 2005:190). For the purpose of this study, at the beginning of all the questionnaires, the respondents were asked to complete the questionnaire in all honesty. Clear, precise instructions were provided on the questionnaires, requesting the respondents to mark the appropriate box with a cross. A clear

explanation of the type of expected answer was supplied, forming part of the formulation of each question.

d) Language

A questionnaire has to be in a language that the participants in the study can understand. For this study, the data collection instruments were presented in both Afrikaans and English depending on the language medium of the selected school. The researcher asked the participants in which language they preferred to complete the questionnaires and survey assignment (Leedy, 2001: 37-42; Mouton, 2001:102).

e) Formulation of questions

The formulation of questions is important in order to reach the main and sub-goal of the study. Questions in the questionnaire aim to understand and determine every detail of the whole process of the study undertaken by the researcher (Leedy & Ormrod, 2005:54).

- Questions were constructed according to certain principles and the questions were tested beforehand by means of the pilot study. The researcher found that the questions were appropriate for the purpose of the study (Leedy & Ormrod, 2005:110).
- The sentences were specific, brief, short and clear;
- the respondents understood the vocabulary, style and sentence order;
- the question and response alternatives were clear and did not reflect the bias of the researcher;
- the questions were unambiguous and precise;
- negative questions were avoided;
- leading questions that force a specific response were omitted;
- every question was relevant to the purpose of the questionnaire;
- only one thought or item was reflected per question;
- abstract questions were avoided and

- questions were presented in general, non-threatening terms and more sensitive, personal questions followed later in the sequence of questions.

f) Types of questions

Questions in a questionnaire can be either *open* or *closed* questions (De Vos, 2001:160; Neuman, 2000:260). In the current study, the questionnaires consisted of both types. *Open* questions are questions in which response categories are not specified and where the participant can freely give his/her own response. *Closed* questions are those in which the respondents select one of the specific response choices provided by the researcher. The advantage of the latter type of question is that responses can be easily coded. O*pen q*uestions were included in the teacher and media teacher questionnaires as well as the assignment, and consisted of a blank space that had to be completed by the respondent. The rest of the questions were closed questions where the respondents could select an appropriate answer from a list. The designs of the different questionnaires, the survey assignment and the observation form are described separately.

#### 4.5.2.2 Design of Questionnaires 1 to 3, survey assignment, and observation form

The design of the questionnaires, survey assignment, and observation form required careful consideration in order to ensure optimal data collection.

#### 4.5.2.3 Phase I: Design of Questionnaires 1, 2 and 3 (Appendix D to F)

Phase I consisted of three questionnaires, namely one for the adolescents with hearing loss (see **Appendix D**), one for the teachers in the special school ( see **Appendix E**) and one for the media centre teachers ( see **Appendix F**). All the questionnaires had the same number of questions and the same format. The questionnaires were divided into three subcategories. The categorizing of the questionnaires provided structure to the observation process and simplified the data

analysis. Questionnaire 1 was presented in both Afrikaans and English and consisted of four categories namely:

- Category 1: Demographic section
- Category 2: Biographic section
- Category 3: Academic information section
- Category 4: Media centre section

This questionnaire, described in **Table 4.8,** was used to establish the perception of the adolescents with hearing loss of their own ability to access and use academic information**.**

**Table 4.8: Description of Questionnaire 1**

| DIVISION OF QUESTIONS | NATURE OF CATEGORY | REASON FOR INCLUSION | FORMAT OF QUESTIONS |
|---|---|---|---|
| *Category 1:* | Demographic information | To obtain demographic information and to determine whether the participant complied with the selection criteria. | A closed-ended question was used to determine the location of the participant's school. The participant had to tick off the province where his/her school was located. |
| *Category 2:* Questions: 1-10 | Biographical and background section: | Provided background of the participants in this study. | *Closed-ended* questions were used to obtain relevant information of the participants. *Open-ended* questions were asked and the respondents had to give a written answer, while a *close-ended* question only requested that an answer be selected. The questions were easy and non-threatening in order to |

| DIVISION OF QUESTIONS | NATURE OF CATEGORY | REASON FOR INCLUSION | FORMAT OF QUESTIONS |
|---|---|---|---|
| | | | let the respondents feel free to complete the rest of the questionnaire (De Vos, 2001:160-161). |
| *Category 3*: Questions 11-18 | Academic information section | To determine when academic information was accessed; how, how often, where; what the purpose of the information was; understanding; degree of difficulty; assistance; and the locality of the information. | The format for these questions consisted of one *open-ended question* (question 18) and the remainder of the questions were closed-ended questions. |
| *Category 4:* Questions 19-20 | Media Centre section | To determine whether the participants - visited the media centre, - used computers and audio-visual methods. | The questions were *closed-ended* |

**Questionnaire 1** consisted of 20 questions. Using this questionnaire the researcher attempted to answer questions pertaining to the adolescents' background as well as their perception with regard to their ability to access and use academic information. This was done by asking questions that elicited the following information.

- Where their school is;
- What their gender is;
- Their age;
- Their mode of communication with other people as well as how other people talk to them;
- Whether they are at boarding school or day scholars;
- How long they have been at this school;
- Their degree of hearing loss;
- Whether they wear any assistive devices or have a cochlear implant;

- Which type of academic information they use;
- How often, and at what time they access and use academic information;
- The exact location where they access and use academic information;
- The level of perceived difficulty of the various types of academic information;
- Who the various people were that helped them to find academic information and to understand it;
- The purpose of using and accessing academic information;
- If the adolescents with hearing loss went to the media centre and if they used computers.

These questions can be seen in **Questionnaire 1** in **Appendix D**. All the questions were closed-ended and the participants only had to tick off the relevant boxes in response to the questions that were posed to them.

**Questionnaires 2** and **3** that applied to the teachers and media teachers were submitted in English only, as it was assumed that they could understand English well and because the reporting language of the research study was English. **Questionnaires 2** and **3** are described in **Table 4.9** and consisted of five categories, namely:

- Category 1: Demographic section
- Category 2: Biographical and background section
- Category 3: Academic information section
- Category 4: Teachers' perceptions of factors influencing the ability of adolescents with hearing loss to access and use academic information
- Category 5: Teachers' perceptions with regard to available academic information in their respective schools and perception of the adolescents' ability to access and use academic information.

**Questionnaires 2** and **3** consisted of 18 questions each. These questions addressed the same issues as those in **Questionnaire 1,** except that now the researcher wanted to determine the teachers' and media teachers' perception of the ability of adolescents with hearing loss to access and use academic information.

The open-ended questions that were posed to the teachers investigated which factors they considered to influence the adolescent's use of academic information, if there were opportunities to use academic information, and whether there was a correlation between available information and the curriculum. The teachers could give their opinion on each aspect (De Vos, 2001:160). The questionnaires for the teachers and media teachers were designed in the same manner and had the same questions, as can be seen in **Appendices E** and **F**.

**Questionnaire 3** aimed to determine the media teacher's perception of the ability of adolescents with hearing loss to access and use academic information. The questions aimed to determine:

- if academic information was available;
- the amount or quantity of academic information, in other words, if there was enough available academic information for the adolescents with hearing loss to access and use (from this question it could be deduced if there was a lack of enough available or lack of academic material)
- the purpose of visiting the media centre;
- whether assistance was available if needed and asked for;
- which academic information sources were used frequently; and
- if the adolescents with hearing loss could work independently.

The questionnaires also attempted to investigate which strategies were used in the process of trying to locate the relevant academic information.

It must be noted that generally *questionnaire surveys* can have some *disadvantages* such as cases of sampling error, high refusal rates, respondent effects (the lack of someone present to clarify questions posed by respondents) (Mouton, 2001:153), and lack of depth (respondents might not understand the questions) (De Vos, 2001:153-154). The pilot study addressed these aspects (section **4.6.2**). **Table 4.9** explains the different sections of questions that were used in the questionnaires, as well as the reason for including the questions and the format that was applied in each case.

**Table 4.9: Description of Questionnaires 2 and 3**

| DIVISION OF QUESTIONS | NATURE OF CATEGORY | REASON FOR INCLUSION | FORMAT OF QUESTIONS |
|---|---|---|---|
| *Category 1:* | Demographic information | To determine the location of the teacher's school | *Closed-ended* question to determine the location of the teacher's school. The teacher had to tick off the province where his/her school was located |
| *Category 2: Questions 1 to 4* | Biographical and background section | Provides background of the teachers at the special schools | *Closed-ended* questions were used to determine the background such as the teacher's qualification and experience of working with adolescents with hearing loss, collaborating with the media centre and determining if the existence of a media centre was important. |
| *Category 3*: Questions 1-10 | Academic information section | To determine the teacher's perception of the ability of adolescents with hearing loss to access and use academic information and to arrive at a close approximate indication of the true situation. | Question 1 to 8(a); 9 & 10 were closed-ended. Teachers ticked the relevant boxes. Question 8(b) was open-ended as it aimed to determine the teacher's perception of the reason why some adolescents found academic information difficult to use. |
| | | Use of information; sources and purposes of information; regularity of use; | |

| DIVISION OF QUESTIONS | NATURE OF CATEGORY | REASON FOR INCLUSION | FORMAT OF QUESTIONS |
|---|---|---|---|
| | | computer use to access information and audio visual materials; the degree of difficulty encountered by adolescent with hearing loss regarding specific sources of academic information and assistance given to adolescent with hearing loss. | |
| Category 4: Question 11 | Teachers' perception of factors influencing the ability of adolescent with hearing loss to access and use academic information | Teacher's perception with regards to which factors relevant to this study existed that might have influenced the adolescents' use of academic information, as well as the importance of these factors. The teacher is in daily contact with the adolescent and knows how, why and when the adolescent uses academic information, and if applicable, the teacher also knows about the necessity and/or lack of academic information in the resource centres. | The questions were closed-ended. The teachers had to tick the relevant boxes. |

| DIVISION OF QUESTIONS | NATURE OF CATEGORY | REASON FOR INCLUSION | FORMAT OF QUESTIONS |
|---|---|---|---|
| *Category 5*: Questions 12-14 | Teachers' perceptions regarding available academic information in their respective schools and perception of the adolescents' access and use of academic information | How the *available academic information* correlated with the *curriculum* as prescribed by the Department of Education, and how *many opportunities* existed for the adolescents to access academic information. Without sufficient academic information, the curriculum cannot fulfil its purpose. Through this item, the lack or sufficiency of information was determined in the resource centres. | Questions 12 (a); 13 (a) were *closed-ended*. The teachers had to tick the relevant boxes. Questions 12(b) and 13(b) were *open-ended* questions in order to allow teachers to give a written account of their opinions with regard to availability of academic information in their schools and their view with regard to the quality and quantity of academic information that was available in the media centre. |

A survey assignment was designed for **Phase II** and was given to adolescents in the media centre to complete.

#### 4.5.2.4 Phase II: Design of media survey assignment

The researcher gave an assignment (included as **Questionnaire 4** in **Appendix G1** (Afrikaans) **and G2** (English) to a selected group of adolescent participants from **Phase I** in order to evaluate the quantity of academic material available (i.e. whether enough material was at hand) and quality of use of academic information. It aimed to evaluate, by means of a practical task or assignment, their ability to access and use academic information in the media centre. The task was given to the adolescents with hearing loss in order to determine if they were aware of the different academic sources in the media centre and to determine if they knew how to

search, locate and apply the relevant academic matter, and if they needed assistance in locating and using such information. The survey assignment also attempted to find out if the adolescents with hearing loss could work independently, whether there was sufficient time to complete the assignment, whether they were computer literate, and if they knew how to access the media centre computer and the Internet sources. **Table 4.10** illustrates the task assignment to be completed by the selected adolescents with hearing loss, its sections and questions, the reason for inclusion of each item, as well as the format of the assignment. The survey assignment also had *open-ended* as well as *closed-ended* questions. The questionnaire utilised in the assignment fulfilled the sub-aims of the study and is described in **Table 4.10.**

**Table 4.10: Description of the media survey assignment for adolescents with hearing loss**

| SECTION | TASK AND PROCESS | REASON FOR TASK ASSIGNMENT |
|---|---|---|
| Section 1:<br>(a-c) | The participant was asked to decide on a topic and to write it down, and asked which method he/she usually followed in order to find information on his/her subject. | It was necessary to determine which subject the participant selected and to determine which process he/she followed to find information on the chosen subject. |
| Section 2<br>(a-e) | The participant had to go to the card catalogue to find relevant information on his/her chosen topic. | The use of the card catalogue gave an indication that the participant knew how to read and knew that the information was indicated on cards in the catalogue system. It determined the quantity and quality of participants' use of academic information. The questions were *open-* |

| SECTION | TASK AND PROCESS | REASON FOR TASK ASSIGNMENT |
|---|---|---|
| | | *ended* because participants had to indicate whether they understood the contents. The teacher did not take into account if the participant made *spelling or grammar/structure* mistakes. |
| Section 2<br>(f-l) | This section aimed to determine if the participant knew how to go to the correct shelf. | Going to the shelf indicated whether the participant knew *where* to find the information - whether it was indicated on the shelf according to author, title and subject. |
| Section 3<br>(a-b) | This section aimed to determine if the participant knew where to go and look for encyclopaedias in the media centre | To see if the participant knew where the reference section was, where to find the encyclopaedias, and how to look for his/her specific information. |
| Section 4<br>(a-b) | This section aimed to determine if the participant knew where to go and look for dictionaries in the media centre | To see if the participant knew where the reference section was, where to find the dictionaries, and how to look for his/her specific information. |
| Section 5<br>(a-f) | This section wanted to determine if the participant knew where the library computer was. | It indicated whether the participant understood the questions, knew where and how to access the library computer. This involved the searching process according to author; title |

| SECTION | TASK AND PROCESS | REASON FOR TASK ASSIGNMENT |
|---|---|---|
| | | and/or subject. |
| Section 6<br>(a-j) | This section aimed to determine if the participant could perform certain tasks on the library computer, especially with regard to accessing and using the Internet. | It indicated the participant's grasp of how to utilise a computer, the Internet, the different methods of looking for information, filling in the subject box, typing in a web address, and accessing more than one article at a time. |

**Table 4.10** portrays the process that the adolescents with hearing loss followed in the media centre after having received the assignment that they had to complete. While the adolescents with hearing loss completed the survey assignment, the researcher completed an observation form while observing each participant.

Observation form of researcher

The researcher used an observation form (**Appendix H**) to note the process that the participants followed in the media centre to see if they were able to complete the assignment.

An observation form is designed in such a manner that it guides the researcher in the process of collecting, analysing, and interpreting observations. It was relevant to the research problem and necessary in order to draw conclusions. The observation form also indicated whether questions posed to the participants were reliable and sustainable. The observation form (**Appendix H**) consisted of the following questions:

- What process do the adolescents with hearing loss follow when looking for academic information?
- Do the adolescents with hearing loss write down any information

- when going to the shelf?
- when going to the card catalogue?
- when going to the library computer?
- Do the adolescents with hearing loss take the book to the table?
- At the table, do adolescents with hearing loss glance through the book?
- Do adolescents with hearing loss make any notes after looking through the book?
- What processes do the adolescents with hearing loss follow at the computer?
- Do they make any notes on a piece of paper?
- What do they write down?
- Do they know how to go online?
- Do they know how to access the Internet?
- Do they open the Internet button on the computer?
- Do they type in an Internet address?
- Do they select a search engine?
- After having found the article, do adolescents with hearing loss know how to open the relevant document?
- Do adolescents with hearing loss read the document?

The observation form was a useful tool for observing users of a media centre, enabling the observer to note their behaviour regarding accessing and using of media centre materials and services.

## 4.6 PROCEDURES OF PHASE I AND PHASE II

The researcher conducted the study in an ethical manner, upholding and defending the principles of the social science approach. These ethical considerations are described as supported by De Vos (2002:62-75).

### 4.6.1 Ethical considerations

Ethical considerations are a set of moral values and principles that are widely accepted by scientists conducting research. It provides guidelines on correct

conduct regarding the social science approach to respondents and other participants. For the purpose of this study, the ethical considerations involved the following:

- Ensuring confidentiality of the participants (De Vos, 2002: 67; Leedy & Ormrod, 2005:102). The participants were not asked to fill in their names and/or surnames on the questionnaires, and the names of schools were not indicated in the results.
- No harm was done to participants, emotionally or physically. The researcher also attempted to ensure the physical safety of respondents (De Vos, 2002:64; Leedy & Ormrod, 2005:101-102). During the pilot study, it was clear that no harm was done to the participants.
- No deceptions occurred. There was no deliberate misrepresentation of facts, or of the purpose of study, to the respondents. The questions in the questionnaires were presented in a clear, precise and unambiguously manner (De Vos, 2002:64; Leedy & Ormrod, 2005:102) as could be seen in the pilot study.
- Violation of privacy was avoided. The participants were ensured in a letter (**Appendix A**) that no person other than the researcher and supervisors will observe the findings or answers of specific respondents (De Vos, 2002:67; Leedy & Ormrod, 2005:102).
- Letters requesting consent were sent to participating selected schools (**Appendix M**).
- The findings will be released and made available to the reading public in written form as a scientific research report (De Vos, 2002:71). This was also explained in the letter of informed consent (**Appendix M**). Results will be published in a thesis and at least two articles will be published in an academic journal.
- All the data will also be archived for at least 15 years.

After ethical clearance was obtained from the Research Committee of the Faculty of Humanities at the University of Pretoria (**Appendix I**), the researcher conducted a pilot study.

### 4.6.2 Pilot study

The pilot study formed an integral part of the research process because it aimed to confirm the "exact formulation of the research problems and a tentative planning of the modus operandi and the range of investigation" (De Vos, 2002:210). According to De Vos (2002:211), the Dictionary of Social Work defines a pilot study as "…the process whereby the research design for a prospective survey is tested". The value of the pilot study was that it enabled the researcher to make the necessary adaptations to the data gathering instruments in order to execute the main study in a more reliable manner. The pilot study was conducted with a selected group of the participants of the study, namely the adolescents with hearing loss in special schools, the teachers and media teachers of **Phase I** and **Phase II**. The procedures for data collection and recording were described after the results of the pilot study. The pilot study for this study aimed to ensure that

- the questionnaires contained all the information that was necessary for the completion of the main study;
- the participants were able to understand and complete all the sections of the questionnaires presented in the main study; and
- the questionnaires and survey assignment were evaluated to ease the process of administration of the questions, as it would indicate the deficiencies of the questionnaires and survey assignment in order for the researcher to make the necessary adaptations for the main study.

#### 4.6.2.1 Aim, objectives, and procedure of the pilot study

The aim of the pilot study was to pre-test the data collection instruments that were used in the main study, in order to obtain accurate and reliable data. All social research requires careful planning. The pilot test was used by the researcher to ensure that the method of collecting data would be time, cost, and goal effective. In order to carry out scientific research on a particular problem, the researcher should have comprehensive knowledge about it (De Vos, 2001:178; Leedy & Ormrod,

2005:110). The researcher aimed to determine if the protocol was valid and sufficient to answer the research question and the aim of the study. A pilot study would increase the reliability and validity of the main study that had to be undertaken (De Vos, 2002:166). It aimed to ensure that all the information was included that is necessary to complete the study, and that the respondents would be able to understand and complete all the sections of the questionnaires. The pilot study also aimed to evaluate the ease of administration and duration of the investigation (De Vos, 2001:178).

The pilot study afforded the researcher valuable insight in various ways (De Vos, 2002:11; Leedy & Ormrod, 2005:110):

- It broadened the researcher's perspective;
- It prepared the researcher for data collection to conduct the used in the main study (De Vos, 2002:211);
- It gave the researcher an indication of the kind of response that might help to answer the research question (Leedy & Ormrod, 2005:192-193);
- It helped the researcher to foresee some problems that might occur during the main investigation;
- It helped the researcher to evaluate the questions (De Vos, 2002:211). It aided the researcher in making adaptations to the data collection instruments, i.e. the questionnaires and survey assignment (**Appendix D-G**), to be used in the main study.

The pilot study was found to be a valuable tool for identifying aspects of the data collection instruments needing refinement for the main study. It was concluded that the methodology applied was the most suitable and that the researcher could continue with the main study and to gather data to proceed. **Table 4.11** illustrates the aims and objectives of the pilot study and the procedure that were followed in order to reach these aims and objectives.

**Table 4.11: Aims, objectives, and procedures of the pilot study (De Vos 2002:11; Leedy & Ormrod, 2005:110; 192; Neuman, 2000:253-272; Babbie & Mouton, 2002:233-249)**

| AIMS AND OBJECTIVES OF THE PILOT STUDY | PROCEDURES FOLLOWED DURING THE PILOT STUDY |
|---|---|
| 1. To ensure all the necessary information was included to answer the research question | 1. The researcher viewed the questionnaires on completion to determine whether any questions had been omitted. After the respondents completed the questionnaires, the researcher discussed the questionnaires with the respondents in order to establish the reasons why certain questions were omitted. |
| 2. To evaluate the clarity and level of understanding of the terminology used in the questionnaires | 2. The researcher handed out the questionnaires to be completed to Pilot Groups I to III. After completion of the questionnaires, the respondents were asked if they understood the terminology that was used in the questionnaires. |
| 3. To determine the appropriateness and relevancy of the choice of words | 3. The researcher discussed the questionnaires on completion in order to determine if they were satisfied with the choice of words that were used. |
| 4. To determine whether questions were too invasive or of a sensitive nature | 4. After the respondents completed the questionnaires, the researcher asked them if they considered some questions to be too invasive or too sensitive in nature. |
| 5. To test the unambiguousness of the individual questions in the questionnaire | 5. After the questionnaires had been completed, the researcher asked the respondents if the questions were clear or if they were confusing. |
| 6.To determine the appropriateness and relevance of the content of questions | 6. On completion of the questionnaires, the researcher asked the respondents to state whether they found the content of the questions appropriate and relevant. |
| 7. To test the level of understanding of the instructions in the questionnaire | 7. On completion of the questionnaires, the researcher asked the respondents if they found the questions to be too difficult to understand. |
| 8. To test the ease and convenience of coding of the instructions in the questionnaire | 8. The researcher checked if the coding correlated with all the possible answers after the respondents had handed in the questionnaires. |
| 9. To determine the duration of completion of the questionnaires and survey assignment | 9. The participants completed the questionnaires while the researcher noted the time the respondents took to complete the questionnaires. On completion the subjects had to indicate if the allocated time was sufficient. |
| 10. To evaluate the strategies proposed for data analysis | 10. The researcher took notes of the discussion with the subjects and made notes in order ton analyse the questions and to answer the main and sub-goals of the study. |

| AIMS AND OBJECTIVES OF THE PILOT STUDY | PROCEDURES FOLLOWED DURING THE PILOT STUDY |
|---|---|
| 11. To test the method and observation of the assignment | 11. The researcher checked if the method and interpretation/analysis of the questionnaires correlated with the main and sub-goals of the study. The researcher also aimed to determine if the meaning and implications of research results within the study were clear and if it could be compared to the demands and expectations of theory, which served the additional purpose of verification. |

From **Table 4.11** it is clear that the aims, objectives, and procedures of the pilot study were such that the researcher was able to make the necessary adjustments to the main study. There were four participants with hearing loss in Group I who completed **Questionnaire 1**; two teachers of Group II that completed **Questionnaire 2** and one media teacher of Group III who completed **Questionnaire 3** and four of **Group IV** who completed a **survey assignment.** The researcher analysed the results of the pilot study, and subsequently made the necessary adaptations to the instruments to be used in the main study.

#### 4.6.2.2 Results of the pilot study and ensuing adaptations

The pilot study was conducted with regard to both Phase I and Phase II. Due to practical reasons, it was impossible to include a total sample frame of adolescents with hearing loss in all the selected special schools. A sample of the population of the adolescents in the secondary special schools was selected, namely **t**wo adolescents with hearing loss from School G1 and two from School G2. Two teachers and two media teachers from special schools were also selected for the pilot study. These selected participants used for the pilot study were excluded from the main study. The first set of results to be discussed is that of Group I of Phase I, which consisted of participants with hearing loss in special schools. After the questionnaire had been completed, the researcher had a discussion with the participants and recorded their comments regarding the instructions on the questionnaires, the phrasing of sentences, terminology used, content, and time that was allowed for completion of the questionnaire. This was done in order to make the necessary adaptations for the main study. The researcher noted certain problems that were encountered when completing the questionnaire.

#### 4.6.2.3 Results and adaptations: Group I

The results from Group I are described in **Table 4.12**. The table indicates which instructions were not clear, and also the adaptations that were implemented.

**Table 4.12: Aims, objectives, and procedures of the pilot study (De Vos 2002:11; Leedy & Ormrod, 2005:110; 192; Neuman, 2000:253-272; Babbie & Mouton, 2002:233-249)**

| AIMS AND OBJECTIVES OF THE PILOT STUDY | PROCEDURES FOLLOWED DURING THE PILOT STUDY |
|---|---|
| 1. To ensure all the necessary information was included to answer that research question. | 1. The researcher viewed the questionnaires on completion to determine whether any questions had been omitted. After the respondents completed the questionnaires, the researcher discussed the questionnaires with the respondents in order to establish the reasons why certain questions were omitted. |
| 2. To evaluate the clarity and level of understanding of the terminology used in the questionnaires. | 2. The researcher handed out the questionnaires to be completed to Pilot Groups I to III. On completion of the questionnaires, the respondents were asked if they understood the terminology that was used in the questionnaires. |
| 3. To determine the appropriateness and relevancy of the choice of words. | 3. The researcher discussed the questionnaires on completion in order to determine if they were satisfied with the choice of words that were used. |
| 4. To determine whether questions were too invasive or of a sensitive nature. | 4. After the respondents completed the questionnaires, the researcher asked them if they considered some questions to be too invasive or too sensitive in nature. |
| 5. To test the unambiguousness of the individual questions in the questionnaire. | 5. After the questionnaires had been completed, the researcher asked the respondents if the questions were clear or if they were confusing. |
| 6.To determine the appropriateness and relevance of the content of questions. | 6. On completion of the questionnaires, the researcher asked the respondents to state whether they found the content of the questions appropriate and relevant. |
| 7. To test the level of understanding of the instructions in the questionnaire. | 7. On completion of the questionnaires, the researcher asked the respondents if they found the questions to be too difficult to understand. |
| 8. To test the ease and convenience of coding of the instructions in the questionnaire. | 8. The researcher checked if the coding correlated with all the possible answers after the respondents had handed in the questionnaires. |

| AIMS AND OBJECTIVES OF THE PILOT STUDY | PROCEDURES FOLLOWED DURING THE PILOT STUDY |
|---|---|
| 9. To determine the duration of completion of the questionnaires and survey assignment. | 9. The participants completed the questionnaires while the researcher noted the time the respondents took to complete the questionnaires. On completion the subjects had to indicate if the allocated time was sufficient. |
| 10. To evaluate the strategies proposed for data analysis. | 10. The researcher took notes of the discussion with the subjects and made notes in order to analyse the questions and to answer the main and sub-goals of the study. |
| 11. To test the method and observation of the assignment. | 11. The researcher checked if the method and interpretation/analysis of the questionnaires correlated with the main and sub-goals of the study. The researcher also aimed to determine if the meaning and implications of research results within the study were clear and if it could be compared to the demands and expectations of theory, which served the additional purpose of verification. |

From **Table 4.12** it can be seen that the pilot study enabled the researcher to make the necessary adaptations to ensure that the participants in the main study could answer the questionnaire appropriately. It was also clear that the coding of responses was completed without difficulty. The respondents completed the questionnaire and the researcher noted the time the respondents took to complete the questionnaire. The respondents were asked if they considered the time to complete the questionnaire too long or whether the time was reasonable. It was established that it took approximately one hour to complete the questionnaire in the case of the adolescent with hearing loss whose communication mode is oral. In the case of the adolescent with hearing loss who uses sign language, it took one and a half hour to complete the questionnaire.

Strategies employed for data analysis seemed appropriate. The strategy for testing the method and observation of the assignment proved to be too long for the researcher to complete. According to Leedy and Ormrod (2002:289), the sampling method, measurement instruments, and data collection procedures of a pilot study should be described with great precision. The next results to be discussed are that of Group II and Group III of Phase I of the pilot study.

#### 4.6.2.4 Results of the pilot study and ensuing adaptations

As in the case of Questionnaire 1 (Group I), the pilot study involved two participant teachers from two schools for Questionnaire 2. One media teacher participated in the pilot study for Questionnaire 3. After the questionnaires had been completed, the researcher made the necessary adaptations to the questionnaires before implementing them in the main study. **Table 4.13** describes the questionnaire items that were queried, followed by the comments or suggestions made by the teachers and media teacher and the adaptations made by the researcher.

**Table 4.13: Results of pilot study, comments/suggestions and adaptations regarding Questionnaires B and C.**

| **Results of Group II and Group III (Questionnaires B and C)** | **Comments/suggestions made by teachers and media teacher** | **Adaptations of the questionnaire items** |
|---|---|---|
| All the questions referring to school information were changed, that is, questions 11 to18 and question 20. | It was considered that the terminology might confuse the participants with hearing loss. | The researcher changed "school information" to "academic information". This was done in order to ensure that the participants would know it referred to school information. |
| The type of information referred to as *films, slides* | The teachers found these items were not necessary as these information types were no longer being used in the curriculum. | The researcher changed the words to *educational videos* in order to prevent confusion of type of information sources. |

As can be deduced from **Table 4.13**, the researcher had discussions with the teachers at the special schools with regard to their perceptions of the content of the questionnaire that was used, the terminology, the clarity, time allocated, and possible questions that were omitted. This was necessary in order to make adaptations for the main study. From the results it became clear that the participants found the level and understanding of the terminology used in the questionnaire to be clear. The participants did not find the questions to be of an invasive or sensitive nature. The participants considered the level of understanding comprehensive and sufficient. All the participants considered the content of questions to be appropriate and relevant. It was established that it took approximately 20 minutes for these participants to complete the questionnaire.

#### 4.6.2.5 Results and adaptations: survey assignment

Two adolescents with hearing loss were selected from School G1 and two from School G2 to complete the survey assignment in the media centre. Before the commencement of the survey assignment, the participants were informed of the aim and purpose of the questionnaire. Their results are described in **Table 4.14**.

**Table 4.14: Results and adaptations of Group IV of the pilot study of Phase II**

| RESULTS OF GROUP IV OF PHASE II OF THE PILOT STUDY | ADAPTATIONS |
|---|---|
| In the case of the participants with hearing loss who used an oral mode of communication, the terminology was found to be clear and concise. | In the case of participants with hearing loss who used sign language and did not understood the questions, it had to be explained by the teacher or by an interpreter if there was one present (Katz, 2002:759). |
| The participants with hearing loss with oral mode of communication found the words appropriate and relevant, but not the adolescent with hearing loss who used sign language. They did not understand the discussion afterwards with the researcher. | The researcher had to simplify the questions in order for the participants to understand the questions better as in the case of Questionnaire 1 in Phase I |
| The participants did not have sufficient tasks to complete in the media centre to be able to answer the research aim. | The researcher changed the format and the content of the questions to categories and sub-sections. This was done in order to ensure that the participants could understand the questionnaire better and that most of the academic sources could be accessed and used. |
| It was established that it took approximately 1 hour to complete the | In the case of the participants with hearing loss who used sign language, it |

| RESULTS OF GROUP IV OF PHASE II OF THE PILOT STUDY | ADAPTATIONS |
|---|---|
| questionnaire in the case of the participants with hearing loss whose communication mode is oral | took one and a half hour to complete the questionnaire survey. |

In **Table 4.14** adaptations in the same table described the survey assignment of **Phase II** that was concerned with the *process* of how academic information is described. The *researcher observed the adolescent with hearing loss* in the media centre by providing a survey assignment, which had to be completed by four selected adolescents with hearing loss in a special school. A selected group of adolescents (**Group IV** of **Phase II**) completed a survey assignment from which the researcher could also note the deficiencies that could be corrected in order for the main study to be more accurate and reliable. These findings were very important as the researcher obtained valuable information regarding the design of the survey assignment that lacked in reaching the objectives of the study.

In the case of the participant with hearing loss who used oral communication skills, the duration of the survey assignment took 30 minutes each but in the case of adolescent with hearing loss using sign language the survey assignment took up to an hour, or even longer. On completion of the survey assignment, the researcher took notes of the participant's behaviour and following of procedures. This was done by means of an observation form with tick-boxes (See **Appendix H**). On completion of the survey assignment, the participants were thanked for their co-operation, time and contribution towards the research project. The coding of responses was completed without difficulty by the researcher. Strategies employed for analysis of data seemed appropriate.

The *data collection procedures* for **Phases I** and **II** are described in the following section.

## 4.7 DATA COLLECTION PROCEDURES FOR PHASE I AND PHASE II

Certain steps had to be taken before the researcher could commence with data collection for **Phase I** and **Phase II** of the main study.

### 4.7.1 Preparation for the study

The preparatory procedures comprise activities relating to application forms; the research proposal; consulting the Department of Special Education; phone calls and faxes; and sending out letters of consent and a cover letter (Neuman, 2000:269). The course of action, aims, and content of these procedures are described below.

Two institutions received *application forms* requesting permission to conduct this study (Levitz, 1991:199). The first application form was sent to the Research and Ethics Committee of Humanities of the University of Pretoria, applying to do a post-graduate study at the University. The letter from the Committee granting permission appears in (**Appendix J**). The researcher also had to submit a research proposal to the University of Pretoria. The second application form (**Appendix K**) was sent to the Office of the Senior Manager for the Strategic Policy Development of the Gauteng Department of Special Education requesting permission to conduct a study at selected specials schools. The researcher had to explain the purpose and value of the study. After permission was granted, the researcher visited the Department of Special Education in Pretoria to obtain the particulars of special schools for the study.

#### 4.7.1.1 Consulting the Department of Special Education

The researcher went to the Department of Special Education in Pretoria and requested an interview with Dr Naicker, Director of Special Education, and asked him for a list of special schools that provided education for adolescents with hearing loss. Dr Naicker supplied the researcher with a list of all the special schools (**Appendix P**). From this list, the researcher contacted possible schools by making *phone calls* and sending *faxes*.

#### 4.7.1.2 Phone calls and faxes

After obtaining the list of special schools from Dr Naicker, the Director of Special Education in Gauteng, the researcher made phone calls to several schools in all the Provinces, explaining the purpose and aim of the study and asking permission to send faxes regarding the study. The researcher informed the schools that the Gauteng Department of Special Education had been contacted. An application form was sent to the headmasters of the special schools who indicated that they were willing to participate in the study. A copy of the fax can be seen in **Appendix L**. The fax requested the following information: Name of school, the number of adolescents with hearing loss in each grade from Grade 7 to Grade 12; whether the adolescent with hearing loss used an assistive device or a cochlear implant; and what the mode of communication was. The fax also asked if the school had a *media centre*. Determining the number of possible participants in each grade was important in order for the researcher to have enough questionnaires and survey assignments when visiting the special schools. After the faxes were returned, the researcher decided which schools to include in the study and sent out *letters of informed consent* (**Appendix M**) to the selected schools. The researcher selected only certain special schools that were logistically practical to visit. The special schools that were not selected for the study were contacted by phone and thanked for replying, and it was explained that, due to logistical reasons, they could not be included in the study.

Schools that indicated they were interested in participating in the study but failed to return the fax with the requested information with regard to number of adolescents with hearing loss in every grade, were again contacted by phone and fax after a period of three months. They were reminded to complete and return the fax with their necessary information, to ensure a higher return rate (Leedy & Ormrod, 2005:192-193).

#### 4.7.1.3 Consent form and letters of informed consent

- 
- The researcher sent letters of informed consent (Appendices A-C & M-N) that contained a detailed outline of the project indicating the researcher's

actions and explaining the purpose of the research and the questionnaire; the procedures that would be followed; and the possible advantages of the study. These letters indicated the researcher's competence to undertake the study (De Vos, 2002:65; Leedy & Ormrod, 2005:102). Letters of consent were sent to principals of the selected schools, the teachers and media teachers, the parents and the adolescents with hearing loss at the special schools.

- The letters of informed consent ensured the schools, the teachers and media teachers, the parents, and the adolescent participants that their personal particulars as well as any given information would remain confidential. These letters were signed by all who were willing to participate in this study. It was assumed that they acknowledged the purpose and procedure of the project that would be undertaken by the researcher (De Vos, 2002:65; Leedy & Ormrod, 2005:101). Respondents were also given the option and right to terminate their participation in the study at any time should they wish to do so (De Vos, 2002:65; Leedy & Ormrod, 2005:102). The following documents were submitted:
- An informed consent form (**Appendix M**) was sent to the principals of the participating schools. The purpose of the study was explained and permission was requested for adolescents from Grade 7 to 12 to participate in the study in the questionnaires and survey assignment. The letter asked the principal if he/she could inform the teachers of the intended study. The researcher also asked if the school principal could supply an interpreter if deemed necessary in the case of subjects with hearing loss who used signing as a mode of communication (De Vos, 2001:25; Katz, 2002:759). The letter also gave an indication regarding the time that the participants would need to complete the questionnaire, namely 30 minutes to an hour, especially in the case of the assignment to be completed in the media centre. However, longer time was suggested for subjects with hearing loss using sign language and who required interpreters to assist them in understanding the questions posed to them.
- Informed consent forms (Appendices B and C) were sent to the teachers and media teachers at participating schools requesting their consent to

complete the questionnaire and permission to conduct the survey assignment.

- An informed consent form (**Appendix N**) was sent to a group of parents of the adolescent participants. Only one school asked for this letter of consent to be sent to the parents of participating adolescents with hearing loss, because the principals of the other schools made the decision on behalf of the parents that the adolescents with hearing loss were allowed to participate in the study.
- An informed consent form (**Appendix A**) was sent to the adolescents with hearing loss requesting his/her voluntary participation in the study. The researcher requested the participants to complete the questionnaire in all honesty and informed them that if they wanted to withdraw from the study, they could do so at any time.
- A cover letter (**Appendix O**) accompanied the letters of informed consent sent to the principals of the selected special schools.

#### 4.7.1.4 Cover letter (Appendix O)

A cover letter was attached to the letter of informed consent. This was done to acquaint the principal of the selected school with the researcher. The letter of consent was to inform the principal of the aim, purpose, and motivation of the study. This was done in order to encourage participation and cooperation (Baker, 1988:172).

### 4.7.2 Procedure for gathering of data for Phases I and II

The researcher followed different procedures for gathering data for Phases I and II.

#### 4.7.2.1 Procedure for gathering data from Group I of Phase I

Group I of Phase I consisted of adolescents with hearing loss. The participants were seated at tables in the media centre. The researcher handed out the questionnaires to them. The researcher asked the participants if they had pens to use for

completing the questionnaires. The researcher told the participants that they were to follow the instructions on the questionnaire and to complete the questionnaire. They were also told that they could take their time to complete the questionnaire. The participants were encouraged to work on their own and after the participants had completed the questionnaires, the questionnaires were handed in. This ensured a 100% return rate (De Vos, 2001:154-156).

#### 4.7.2.2 Procedure for gathering data from Group II of Phase I

Group II of Phase I consisted of teachers at special schools. The researcher handed out the questionnaires to the teachers, who had assembled in a designated classroom. They were requested to follow the instructions on the questionnaires and to take their time to complete the questionnaires. The questionnaires were handed in after they had been completed. This ensured a 100% return rate (De Vos, 2001:154-156).

#### 4.7.2.3 Procedure for gathering data from Group III of Phase I

Group III of Phase I comprised of the media teachers from all the schools. As each participant was visited individually, this group consisted of only one participant in each setting. The participant was requested to follow the instructions on the questionnaires and to take his/her time to complete the questionnaire and to hand it in after completing it in order to ensure a 100% return rate (De Vos, 2001:154-156). Each participant completed the questionnaire in the media centre and had sufficient time to complete the questionnaire**.**

#### 4.7.2.4 Procedure for gathering data from Group IV of Phase II

**Group IV of Phase II** comprised selected adolescents from Group I of Phase I who completed an assignment in the media centre. The researcher handed out the survey assignment to the participants. The participants had to tick the answers and/or write down some answers in open spaces on the questionnaire (**Appendix G).**

The researcher noted whether participants were able to fill in the answers in writing and by making tick marks in the relevant boxes. The researcher used an observation/evaluation form (**Appendix H**) for recording her observations. Applying a survey assignment was very important as it related to the research question being investigated, namely *"…do adolescents with hearing loss have the ability to access and use academic information in the special school?"*

The researcher confirmed the number of participants from the selected schools per fax and noted that 326 participants completed the questionnaires. A return rate of 100% was therefore achieved and the researcher came to the conclusion that the participants represented three provinces that have schools for adolescents with hearing loss in South Africa. The data recording procedures of **Phase I** and **Phase II** are now discussed separately.

## 4.8 DATA RECORDING PROCEDURES

The data recording procedures for Questionnaires 1 to 3 of Phase I differed from the data recording procedures for the survey assignment of Phase II. These procedures are described separately.

### 4.8.1 Phase I: Questionnaires 1 to 3

On **Questionnaires 1** to **3**, a column was provided where the participants' responses could be coded. This was done in order to avoid the possibility of inter-coder discrepancy. By doing this, the dependability of results was increased (Leedy & Ormrod, 2005:158). A data-transfer typist of the University of Pretoria typed the raw coding onto spreadsheets. Computer software was applied to analyse these data. The researcher verified that the data-transfer typist transferred the raw data correctly by means of random examination of the data.

The researcher used a form in order to organise the answers of the open-ended questions. This was done in order to facilitate later analysis and to divide the

responses into main categories of content (**Appendices B** to **D**). The data recording procedure for the survey assignment is described in the following section.

### 4.8.2 Phase II: Survey assignment

The researcher recorded the data into main categories of content on a form, as can be seen in **Appendix H**. This was done in order to determine the processes that the participants followed to access and use academic information in the media centre. The next data recording instrument that the researcher applied was an observation form.

### 4.8.3 Observation form of researcher (Appendix H)

The researcher compiled an observation form by making notes while observing the participants while they completed the survey assignment in the media centre. There is no generally accepted definition. Participant observation involves direct involvement where the researcher is involved in the participant process; in this case, however, the researcher had to stay in the background (Leedy & Ormrod, 2005:146 & 179) in order not to influence the participants in any way (De Vos, 2001:153). The process of observation therefore refers to the data-collecting method or post-test design used most often by researchers working according to the qualitative approach (De Vos, 2001:90).

The observation form was a successful data recording procedure of documentation in order to determine whether the adolescents with hearing loss completed the questionnaire and to take notes of the procedures that they followed. It was, however, difficult to determine beforehand how long such an observation period would take (De Vos, 2001:281; Leedy & Ormrod, 2005:179), especially for adolescents with hearing loss who used sign language and/or an interpreter in order to understand the questions posed to them (Katz, 2002:759). The observation form (**Appendix H**) was in the form of a checklist completed by the researcher to document the observation process (De Vos, 2001:285). The following questions were asked during the process of observation: “who?” “what?”, “where?”, “how?” and

"which procedures?". Physical observation methods aimed to determine the following:

- When going to the shelf, did the participants look for the book according to the author/title and/or subject? When the participants with hearing loss found the book, they were expected to evaluate their own methods of accessing and using information use for their specific assignment.
- When the participants with hearing loss went to the *catalogue*, the researcher observed whether they looked at the card relating to the author; title, and/or subject card and whether they wrote down the information and classification number. The participants were observed in order to determine whether they had succeeded in finding the relevant information and were able to go their table to complete the questionnaire.
- The researcher noted if, in using the *library computer*, the participants with hearing loss were able to look for the author, title, subject, and/or classification number, and whether they marked it off on a tick-box. Once again, as in the case of going to the catalogue, the researcher observed if the participants were successful.
- The researcher also noted whether the participant asked the *media teacher* for assistance. The media teacher (by pre-arrangement with the researcher) told the participants that no assistance could be provided and that they had to work independently.
- If the participants with hearing loss used the computer to look for an article on the Internet, this process was also observed by the researcher in order to determine the level of skill (i.e., whether they knew how to use a computer correctly and were able to use the various Internet search engines).

The observation form can be seen in **Appendix H.** The data obtained during the different phases of the study were analysed as follows:

## 4.9 DATA ANALYSIS

The researcher applied different methods of data analysis for the information that was gathered from Phase I and Phase II. Processing was done at the University of Pretoria. The different data analysis methods are described below. Analysis of data was performed in *Excel* for Windows XP.

### 4.9.1 Data analysis for Questionnaires 1 to 2

In order to determine percentages and frequencies of responses, analysis of the questionnaire included quantitative analysis especially where detailed responses occurred. Descriptive statistical procedures were applied to describe and summarise the data obtained from the questionnaire survey to determine the collection of scores obtained (Leedy & Ormrod, 2005:252). In this way, large amounts of data could be reduced and conclusions were drawn from this. The researcher summarised the responses to open-ended questions into main ideas, in order to categorise the information into more manageable units (De Vos, 2002:179).

### 4.9.2 Data analysis for the survey assignment of Phase II

The researcher applied quantitative analysis where percentages and frequencies of responses had to be determined, especially where detailed responses occurred. The use of descriptive statistics physically reduces large amounts of data and facilitates the drawing of conclusions. The data was analysed using SAS (Sas Procedures Guide, Version 9, 1999). Chi-square tests were used to test for relations between certain variables. The chi-square test was used with a 5% level of significance. The procedures of the study, the data collection methods, recording methods and analysis of the data led the researcher to certain conclusions.

## 4.10 SUMMARY AND CONCLUSION OF CHAPTER 4

To the best knowledge of the current researcher, no research regarding access and use of information by adolescents in special schools has been published to date.

Therefore, research on this topic is of utmost importance and can provide valuable information to schools, teachers, educators and information specialists. The research was also done in order to develop an information educational system for use within the planned inclusive educational system in South Africa that is based upon sound scientific findings.

The empirical research was described in this chapter. Attention was given to the justification for doing this research project and descriptions followed regarding the research aims and different approaches that were investigated. The researcher described the participants of Phase I and Phase II with their respective selection criteria and gave attention to the variables that were considered in the criteria selection. The description of participants in Phases I and II (Group I, II and III) followed.

The researcher discussed the material and data collection instruments, the format and design, the principles of the different questionnaires that were utilised as well as the assignment that was completed and the concomitant observation form completed by the researcher.

Before the procedures of Phases I and II were undertaken, the ethical considerations were taken into consideration and the pilot study was undertaken. The data collection procedures consisted of procedures before conducting the study and the procedures for gathering the data for Phases I and II. Thereafter the data recording procedures and data analysis followed. The chapter concludes with a brief summary.