THE ROLE OF MUSIC IN SPEECH INTELLIGIBILITY OF LEARNERS WITH POST LINGUAL HEARING IMPAIRMENT IN SELECTED SPECIAL UNITS IN LUSAKA DISTRICT

BY
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A dissertation submitted to the University of Zambia in partial fulfillment of the requirements for the award of degree of Master of Education in Special Education

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DECLARATION

I Emily MwambaKatongodo hereby solemnly declare that this dissertation represents my own work. I further certify that the work has not previously been submitted for a degree to the University of Zambia or any other University.

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CERTIFICATE OF APPROVAL

This dissertation by Emily MwambaKatongo is approved as a partial fulfillment of the requirements for the award of the degree of Master of Education in Special Education of the University of Zambia.

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DEDICATION

I dedicate this work to Mum and Dad Mr. Luke KomboniKatongo and Mrs. MirriamChilesheKomboni for educating me. Without their input I would not have reached this far. May their souls rest in peace! I also dedicate this work to my husband Hastings BwalyaMporokoso for his great encouragement. Finally but not the least, I dedicate this book to my children Mutale, Lwanga and Kabwe. To you I say I have broken the limits. Go far beyond what I have done, not even the sky is the limit for you. May God bless you so mightily.

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ABSTRACT

This study sought to establish whether use of music in speech training could enhance speech intelligibility in learners with Post Lingual Hearing Impairment (PLHI). The main objectives were to establish the role of Music in speech intelligibility in learners with PLHI, to find out how teachers helped learners with PLHI enhance speech intelligibility and to investigate factors that led to poor speech intelligibility in learners with PLHI. The study used a descriptive research design. Qualitative and quantitative research methods were used. A total of 100 respondents participated in the study. Simple random and purposeful sampling procedures were used to select respondents. Data was collected through use of Semi structured questionnaires for teacher, focus group interviews for secondary school pupils, observation guide, observation checklist and an experiment for lower primary school pupils.

The study found out that there were several factors that contributed to poor speech intelligibility in learners with PLHI among which were lack of exposure to spoken language due to fear of stigma, poor speech training presentation due to lack of assistive devices, poor teacher education, poor learning environments, disease and onset of the disability, as well as severe level of hearing loss. The study also identified several techniques that teachers used to help learners acquire speech intelligibility and these included use of total communication, encouraging lip reading, use of amplification devices among other techniques. As regards the role of music in speech training, the study found that, music played a significant role in speech training by motivating learners, clearing the vocal cord, facilitating verbal memory, widening vocabulary, improving word pronunciation and sentence construction and intonation leading to speech intelligibility acquisition.

On the basis of the study findings, it was recommended that; teachers use music in speech training of learners with PLHI, the Ministry of Education Science Vocational training and Early Education (MOESVTEE) in collaboration with the Ministry of Health needs to establish Multi dimensional centers that would provide medical assessment, treatment and counseling services in all provinces. In addition the MOESVTEE needed to modify classrooms with acoustically

treated walls and fit amplification devices, speech mirrors and other necessary equipment specifically designed to meet educational needs for children with PLHI. Enrollment levels in classrooms should be reduced and placement of learners done according grade and levels of hearing impairment.

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ACRONYMS

AD	Assistive Devices
CG	Control Group
EG	Experiment group
HI	Hearing Impairment
IT	Intelligibility Test
MESVTE	Ministry of Education Science, Vocational Training Technology and Early Education.
PLHI	Post Lingual Hearing Impairment
SE	Signed English
SEN	Special educational Needs
SL	Sign Language
UTH	University Teaching Hospital

CHAPTER ONE
INTRODUCTION

Hearing impairments are believed by many to be the most devastating of the sensory handicaps (Levitt &Geffner, 1987; Ling, 1976; andMarkides, 1985). The loss or reduction of the sense of hearing impairs children's ability to hear speech and consequently to learn the intricacies of the spoken language of their environment.Spoken communication is uniquely human. Communication is the basis of our social and cognitive being. Without it we are cut off from the world. The majority of hearing impaired children is born to hearing parents. For these families, having a child with hearing loss may be a devastating situation. Children with Post Lingual Hearing Impairment (PLHI) develop spontaneous speech, but their pronunciation often suffers from distortions and lack of articulatory precision. The degree of intelligibility of their speech production is related to their hearing impairment. More impaired articulation accompanies higher hearing loss.Consequently, if early intervention does not occur within the first few months or years of hearing loss, even if mild, can be devastating to the development of spoken communication (www.ncb.nlm.nih.gov/books/NBK207837).

Many facts have to be taken into consideration when predicting the intelligibility of the speech of PLHI learners. The children may have been impaired at different ages, exposed to different educational methods, may have had different social and psychological backgrounds and may have used different hearing aids(www.divaportalorg/smash/get/dlwa2:1o486).These learners therefore should begiven speech training in order to learn a “survival speech” that makes it possible for them to give and understand simple messages in shops, street and in a hearing society. Therefore, the aim of speech therapy for learners withPLHI is to help them acquire new speech patterns and develop intelligible speech for the purpose of communication. Pronunciation training has often been neglected in the teaching of learners with PLHI. Traditionally, spoken language waspracticed in language lessons by “repeat-after-me” methods, the Audio lingua approach (Zambia Primary Course 1971). This type of training helpedin improving learners’ speech production. As regards speech training, it is reported that Music therapy cancontribute significantly to speech intelligibility enhancement (www.mtabc.com/page.php?61). It is also postulated thatmusic therapy procedures can effectively address a number of objectives in

auditory training (Darrow 1989). The problem of poor speech intelligibility in learners with PLHI is a concern in Zambian special units and this problem was particularly observed in Lusaka district yet Zambian libraries lack studies of this nature thus provoking the need to undertake this kind of study.

Overview

Chapter one presents background to the study on the role of music in speech intelligibility. The chapter further presents the statement of the problem under investigation, the purpose of the study, research objectives and research questions that directed the study. It also presents significance of the study, theoretical framework, research sites, and organization of the study, operational definitions and ends with the summary.

Background of the study

Hearing problems seem to be the most common sensory deficits in human populations, with hearing loss alone affecting more than 1250 million people worldwide (Mothers and Loncar 2006). The World Health Organization (2002) estimated hearing loss to be the 13th most frequent burden of disease in modern and high income countries and it is projected to become among the top ten (10) by the year 2030. Mothers and Loncar (2006) and Agraival, Platz and Niparko (2008) on the other hand revealed that most epidemical studies that were conducted reported figures of ten (10 %) to fifteen percent (15%) for hearing loss. According to the Zambia Ministry of Finance (2000) census report, there were about 256,000 disabled people in Zambia, out of which 6.2% were deaf. This translates into about 15,915 deaf people. Out of these figures, 12.4% were hard of hearing translating into about 31,830 hard of hearing people. Out of these estimates, no reference was made to people with Post Lingual Hearing Impairment (PLHI). However, the estimated number of deaf and hearing impaired people in Zambia in 2000 was 47,745.

Due to the escalating levels of hearing impairment, recent years are witnessing an increasing enrollment of learners with special needs in schools worldwide. For instance, Hallahan& Kauffman (1994) reported that over 4 million special needs learners were identified in various public schools of United States. By 2000, the number had risen to over 5.7 million (Heward,

2000). Similarly, Mothers and Loncar (2000) also postulated that the number of children with various special educational needs has steadily increased over the past few decades. Wakumelo and Miti (2010) reported that the Deaf people were one of the least educated people in Zambia and that there were 14,233 hearing impaired persons who were five years old and above in the year 2000. According to the Ministry of Finance (2000) only 28.1% (1,167.1) of the estimated number of these hearing impaired children had been to primary school and only 8.2% (3999.5) had reached secondary school. These figures show that only 4,675.5 hearing impaired learners were in school in 2000. However, just as has been reported in other countries, the enrolment of Hearing impaired learners has also increased in Zambian schools for an obvious reason that the educational policy emphasizes education for all regardless of one's disability. Through the 1996 policy document, the Ministry of Education Science, Vocational Training, and Early Education (MESVTEE) stress the need to ensure that there is equality of educational opportunities for children with special educational needs. The policy further emphasizes the need to provide education of particularly good quality to pupils with special educational needs (Ministry of Education 1996).

The MES**VT**EE also encourages integration of children with special educational needs to the greatest extent possible into the mainstream schools especially those with mild hearing impairment and with residual speech. Learners with Post Lingual Hearing Impairment (PLHI) have residual speech but it deteriorates with time because of the impairment. To this effect, Leybaert, (1998) stated that hearing loss had a negative impact on speech and language development. He explained that children with early onset deafness generally lagged significantly behind their normal hearing peers in all areas involving speech, speech perception and oral language development. Davis and Silverman (1995) pointed out that although learners with Post Lingual Hearing Impairment (PLHI) had residue spoken language, their speech deteriorated with time if no intervention to enhance it was put in place. Poor speech intelligibility was noted in their poor word pronunciation, unclear sentence articulation and intonation and poor sentence construction. Throughout this study therefore, poor word pronunciation, unclear sentence articulation and poor word and sentence intonation have been used as variables referring to poor speech intelligibility.The greater the extent of these patterns of errors, the poorer the speech

intelligibility and the less the hearing impaired speakers are understood by listeners unfamiliar with the child. Poor speech intelligibility was observed in most learners with Post Lingual Hearing Impairment (PLHI) inLusaka District.

Similarly, in a study conducted by Mulonda (2013), at Magwero in Chipata and at Saint Joseph in Kalulushi districts of Zambia, it was observed that most learners with hearing impairment had poor speech intelligibility and this made communication between them and teachers very difficult. To this effect, teachers communicated with hearing impaired children using either sign language or signed English. However, according to Davis and Silverman (1995), speech during the initial periods of hearing loss, required practicing abilities in children with PLHI because if these children are exposed to Sign language or Signed English at an early stage, they begin to use these manual languages at the expense of their residual spoken language. This leads to progressive loss of speech intelligibility. As a consequence, most hearing-impaired children must be taught the speech skills that normal-hearing children readily acquire during the first few years of life. For this reason, oral communication skills of hearing-impaired children have long been a concern to educators in Lusaka province.

Currently there is no literature in Zambia on how learners with PLHI are being helped to retain and enhance intelligible speech. Pezo (2013) in Mwinilunga district in Zambia evaluated instructional strategies used by pre-school teachers in presenting Reading Readiness Activities to pre-scholars and music was found to be one of the strategies used in helping learners master and pronounce difficulty words. This improved their speech intelligibility. However, this study was done on children with normal hearing and normal speech hence could not specifically fill up the knowledge gap related to learners with hearing impairment in Zambia. Never the less, there is still evidence to support use of Musical therapy as an effective treatment with individuals who have communication impairments resulting from brain injury or other neurological trauma. For example, Magee, Brumfitt, Freeman & Davidson, (2006) used Musical therapy to improve and sustain speech of clients who suffered left hemisphere brain damage. The researcher also noted that Darrow (1989) in Germany used music to train students with pre-lingual hearing loss in speech. Results showed that they were able to improve in word pronunciation and articulation

making their speech quite intelligible and wondered whether use of music in speech training of learners with PLHI would produce similar results hence this study.

1.2 Statement of the problem

It was noted that most learners with PLHI in Lusaka District deaf units had residual speech when they joined these units, but their speech deteriorated with time. This was noted in their poor wordpronunciation, unclear sentence construction and poor intonation. As such, their speech could not be clearly understood by listeners unfamiliar with deaf children's speech, and in some cases their own teachers since it lacked intelligibility. Poor speech intelligibility was a source of concern as poor speech did not only have a negative impact on their social life but on academic performance as well. To make matters worse, there was no literature in Zambian libraries on how speech intelligibility could be enhanced in learners with PLHI in Zambian schools. However, the researcher noted that Darrow (1989) used music to train students with pre-lingual hearing loss in speech in Germany. Results showed that they improved in word pronunciation, articulation and intonation thus making their speech quite intelligible. What was not known was whether use of music in speech training would enhance speech intelligibility in learners with PLHI in the selected special units for the deaf in Lusaka district. This study therefore sought to establish whether use of music in speech training enhanced speech intelligibility in learners with PLHI.

1.3 Purpose of the study

The purpose of this study was to establish the role of music in speech intelligibility of learners with PLHI.

1.4 Research objectives

The study was guided by the following objectives:

1. To establish the role of music in speech intelligibility of learners with PLHI in selected special units for the deaf in Lusaka district.

2. To find out strategies teachers used to help learners with PLHI enhance speech intelligibility in selected special units for the deaf in Lusaka district

3. To explore factors that contributed to poor speech intelligibility in learners with PLHI in selected special units for the deaf in Lusaka district.

1.5 Research questions:

In order to address the objectives listed above, the study was guided by the following research question:

1. What is the role of music in speech intelligibility of learners with PLHI in selected special units for the deaf in Lusaka district?

2. What strategies did teachers use to help learners with PLHI enhance speech intelligibility in selected special units for the deaf in Lusaka district?

3. What factors contributed to poor speech intelligibility in learners with PLHI in selected special units for the deaf in Lusaka district?

1.6 Significance of the study

It was hoped that the findings of this study may add to the body of knowledge on the role of music in speech intelligibility in learners with post lingual hearing impairment. It was also hoped that the findings of this study may stimulate further studies and provide empirical support for future research in the field of speech in learners with post lingual hearing impairment. Expected beneficiaries to this study might be learners with post lingual hearing impairment in that use of music in speech training may enhance their speech intelligibility and benefit from the New Break-Through to literacy (NBTL) which helps students to learn a second language (English) faster. These findings might also be of help to MOESVTEE in coming up with new speech interventional programmes in schools. The findings may also help Curriculum developers to develop musical materials likely to improve speech training of learners with post lingual hearing

impairments. Teachers too might benefit from this study because music might enhance speech intelligibility in learners with PLHI leading to improved communication and higher academic performance in learners.

1.7 Limitations of the study

The study sample used was small and lack of studies on the topic in Zambia presented another limitation in that most of the literature in the study was based on other countries and nothing to depict the Zambian scenario. However, these limitations may not in any way narrow the scope of the study or generalisability of the findings.

1.8 Delimitations of the study

Since this was a case study for schools in Lusaka district, the study only limited itself to teachers and learners in special units for the deaf in Lusaka district.

1.9 Theoretical framework

The study was guided by Audio lingualism theory propounded by Bloomfield (1933). The choice of this framework was based on the premise that it emphasizes on correct pronunciation of words for those learning a second language and it tries by all means possible to minimize learners' mistakes through repeated musical speech drills. The theory assumes that language and speech acquisition are a habit that a child comes to learn by imitation. In this method, oral language drills are emphasized while encouraging correct pronunciation, articulation and intonation of words and sentences. The level of complexity of the speech is graded so that beginning students are presented with only simple forms of words and develop to more complex structure as the learner becomes proficient. The natural order of skill presentation (listening, speaking, reading and writing) is adhered to. The oral/aural skills receive most of the attention to ensure that words are well pronounced and help given where necessary so that the speaker's speech is as intelligible as possible (Richard et al 1997).

Pronunciation is taught from the beginning to facilitate quick acquisition of it because wrong pronunciation of words affects speech intelligibility. The teaching techniques used in Audio

lingual among others are; memorization, backward build-up, repetition drills, chain drills, single-slot and multiple-slot drills. In this theory, use of music in speech drills is emphasized as a way of keeping learners alert and motivated. The Theory postulates that most people with speech problems do better in learning new words associated with distinct pitches, and melody than those being spoken in monotonous fashion. This musical element in word learning was felt to have a link with the topic under study.

Tape recorders and audiovisual equipment often have central role in Audio lingual course. A taped lesson may first present a dialogue for listening practice, allow for the student to repeat the sentences in the dialogue line by line and provide follow-up fluency drills on grammar or pronunciation (Larsen-Freeman 1986). It is believed that speech is a learned activity as such it can be learned well or learned poorly (Richard et al 1997) hence the emphasis on proper speech drilling.

Audio lingual theory was chosen for this study because it places value on pitch which is the musical element that enhances pronunciation of words and proper sentence intonation and articulation which in total facilitate intelligible speech. The theory also encourages imitation of role models through musical oral language drills which also lead to acquisition of intelligible speech. For this reason, it was felt that the teaching techniques in this theory may help in addressing the major concern in this study which was the enhancement of speech intelligibility in learners with PLHI.

1.10 Research sites

The study was carried out in five special Education Units in Lusaka District. These included: Lusaka Girls, Desai, Faith Baptist, University Teaching Hospital and Munali Girls Secondary School Deaf Units.

1.11. DEFINITION OF KEY TERMS

The key terms in this study are defined as follows:

Deaf Children: Children who get little help from sound, or do not hear anything at all. The "deafness" is often referred to as "severe" or "proound" (UNESCO, 2000).

Post lingual deafness: The condition of persons whose deafness occurred following the spontaneous acquisition of language (Moores, 1996).

Speech Training: Training in words and sentence production using speech production organs such as lips, tongue and teeth.

Speech Intelligibility: clear, quality and fluent speech production.

Hard-of-Hearing Children: Children who can rely on auditory perception. But, the terms "partially deaf" and "partially hearing" are sometimes used as well (UNESCO, 2000).

Hearing Impairment: Generic term indicating a hearing loss that may range in severity from mild to profound (Hallahan& Kauffman, 1988& 1991).

Hearing-Impaired Children: Both deaf and hard-of-hearing children. This term, used mainly in education, indicates a child who needs special services because of a hearing loss (Heward&Orlansky, 1988).

Integrated Classes: Classes where hearing-impaired children are placed in class of hearing children with special help and attention for the hearing-impaired (UNESCO, 2000).

Oral method: Method that children receive input through speech reading (lip reading) and the amplification of sound, and they express themselves through speech (Moores, 1996).

Pre-lingual deafness: The condition of persons whose deafness were present at birth or occurred prior to the development of spoken or signed language (Moores, 1996).

Sign languages: Languages produced by using positions and movements of the hands, face and body that can be used to express everything that spoken languages do and have their own grammar (Ahlgren&Hyltenstam, 1994)

Special Units: Classes (often called "units") of the deaf children attached to regular schools for hearing children. These are usually day schools (UNESCO, 2000).

Signed English: A manually coded system of communication where every word in English is signed

Repetition Drill: This is where pupils are asked to repeat the teacher's model as accurately and as quickly as possible.

Chain Drill: Where a teacher begins the chain by greeting a particular pupil or asking him/her a question. The pupil responds, then turns to the pupil next and greets or asks the same question. In turn the pupil asks the other one next to him/her the same question.

1.12. Organization of the study

The study is organized into six chapters. Chapter one presents the background to the study, statement of the problem, purpose of the study, objectives and research questions. The chapter also includes significance of the study, limitations, and research sites, definition of key terms, theoretical framework and summary.

Chapter two presents literature review based on the studies conducted by different researchers in different countries on factors that lead to poor speech intelligibility in learners with PLHI, measures that can enhance acquisition of intelligible speech and the role music can play in speech training to facilitate acquisition of intelligible speech in learners with PLHI. It ends with a summary.

Chapter three presents the methodology used in the study. It includes research design, study population, study sample, sampling procedure, research instruments, data collection procedure, data analysis, ethical considerations and a summary.

Chapter four presents the findings of the study. Chapter five discusses findings of the study while chapter six presents conclusion and recommendations of the study.

1.13. Summary

This chapter began by presenting the introduction to the study. It discussed the background to the study. The major issues raised were the increase in the prevalence of hearing impairment worldwide, the effect of hearing loss on speech intelligibility and how scantly this issue has been addressed. Thereafter, the chapter covered the research problem under investigation, the purpose and objectives of the study. It also covered specific research questions through which the study objectives were addressed. Another aspect covered in this study was the significance of the study. The chapter further presented theoretical frame work and research sites. This was followed by definition of operational terms and organization of the study.

CHAPTER TWO
LITERATURE REVIEW

Overview

This chapter presents a review of relevant literature on the role of music in speech intelligibility in learners with PLHI. The literature is presented under the following headings; the role of music in speech intelligibility in learners with PLHI, strategies teachers use to help learners with PLHI enhance speech intelligibility and factors that contribute to poor speech intelligibility, followed by a summary.

2.0 Speech intelligibility

Speech intelligibility does not seem to have a precise definition because different authors have their own special way of defining it. However, Abercrombie (1949:120) defined intelligible as a pronunciation which can be understood with little or no conscious effort on the part of the listener. Several pronunciation proponents have reaffirmed his view that as long as a listener is able to understand what the speaker is trying to convey, that speech is intelligible for example, Dalton &Seidlhofer (1994) shared this same view.

On the other hand, Kenworthy (1987:13) described comfortably intelligible as being understood by a listener at a given time in a given situation and equated it with 'understandability. In an operational definition, she elaborated that if a non national speaker (foreigner) substitutes a certain sound for another and the listener hears a different word or phrase than the speaker had intended to say, the result is unintelligibility. Thus, the more words the listener is able to accurately identify, the more intelligible the speaker is.

Although Kenworthy (1987: 14) claimed that intelligibility had as much to do with the listener, it may also have something to do with the speaker. Her notion of 'comfortably intelligible' focuses mostly on the listener. However, If the speaker pronounces words in such a way that the listener constantly needs to ask for repetition or clarification, listening becomes too laborious and the listener may become frustrated or irritated and lose interest in listening. Therefore, being

comfortably intelligible has to do with efficiency, where the listener can understand the speaker without difficulty or recourse to repetition. That is way there was need to have learners with PLHI retain their speech.

The idea of a 'threshold of intelligibility' is not new. Catford (1950) coined the term and Gimson (1980) spoke of Minimal General Intelligibility, that is, the lowest requirement for efficiently conveying a message from a native listener's standpoint. Unfortunately for people with hearing impairment, they cannot orally be understood by their hearing impaired fellow yet the majority of them are born from families where people have normal hearing. Hence for them to attain a threshold of intelligibility, then a speech intervention is apparent. Morley linked intelligibility with communication in terms of accent and its effect on listener perception. Yet Derwing and Munro (1997) had shown empirically that what was unintelligible was almost always judged to be heavily accented, whereas the opposite was not necessarily the case. To this effect, they argued that what was heavily accented may or may not be unintelligible. They therefore proposed the need to disassociate accent ratings and intelligibility in language assessment instruments, which often confound the two dimensions.

Derwing and Munro (1997) defined intelligibility as the amount of utterance that the listener understands. If speech intelligibility of learners with PLHI were to be judges from their accent, then it would almost be impossible to find one with intelligible speech. Therefore operational intelligibility which depends on the listener's understanding of what the speaker is conveying was found to be the appropriate measure of intelligibility in this study. For example, a deaf child who intends to say **mother** may pronounce it as ***maza, maja or matha*** but as long as the listener interprets it as mother, it means that the speaker's speech is intelligible. On the other hand, if the speaker substitutes a certain sound for another and the listener hears a different word or phrase other than the speaker's intended word or phrase, the result is unintelligibility. For example, if for the word **bible,** a speaker says ***babo*** and the listener interprets it as bubble it means that the speech is unintelligible because it did not convey the speaker's intended message. Therefore, the more words the listener is able to accurately identify, the more intelligible the speaker is (Derwing and Munro 1997).

2.1 THE ROLE OF MUSIC IN SPEECH INTELLIGIBILITY

Ho, Cheung and Chan (2003) in China investigated the connection between musical performance and brain activity by trying to establish the correlation between music training and verbal memory. They found out that music training affected the development of learners' brains in a specific pattern. They noted that individuals with music training tended to have enlarged left temporal lobes. To elaborate on this they pointed out that a portion of the brain was also thought to mediate verbal memory. To test the connection between music training and verbal memory, the researchers compared learners who had music training through formal vocal or instrumental instruction to learners at the same school who had no such music training. Both groups of learners were given a test called the HKLLT-Form One, which measured verbal learning and memory ability by asking participants to recall as many words as possible from lists of words presented orally. Results showed that learners with music training demonstrated better verbal memory according to this test than those without musical training. These results suggest that music training during childhood stimulated development of the area of the brain responsible for verbal memory and that the use of music training positively influence children's ability to retain verbal information.

Darrow, (19 95) conducted a study in Germany on the role singing and rhyming played in enhancing vocabulary in learners who were pre-lingually hard of hearing and discovered that music assisted in the development of vocabulary and provided experiences for the study of sentence structure and semantics. They further revealed that songwriting can fulfill many of these same goals and that songs also had the advantage of patterned drill without monotony. From these results it was clear that use of music in speech training facilitated speech intelligibility. However, this conclusion was based on learners with pre-lingual hearing impairment. Whether this applied to learners with PLHI, the study was yet to establish.

In addition to improving the quality of children's speech, Gilmore (1966) noted that music can be used to help learners who were hard of hearing improve their language by aiding the learning of new vocabulary. She explained that children can apply familiar rhythm patterns to the practice of pronouncing new words and phrases and that songs and poems can be used to practice and reinforce new vocabulary and concepts. However, since it was not established whether learners

with PLHI was among the hard of hearing, there was need to replicate this study by specifically using learners with PLHI.

Tallal and Gaab (2006) in their study on the importance of music in enhancing speech intelligibility in learners with pre lingual hearing impairment, they found out that to spark a child's response in kind, tickling or playful wrestling to encourage a laugh or giggle provided a connection of association based in sound. They pointed out that this can be very useful in developing the parts of the brain that made connections with sounds and produced sounds. They further went on to mention that there were other very useful sound based means to developing auditory memory and these included playing music, watching movies and music that a child liked. The repetitive watching and listening of a child's favorite movie or musical instruments would, in time, develop a child's recall of auditory memory. This study still did not involve learners with PLHI therefore results could not be generalize on all learners with hearing impairment hence the specific need to test learners with PLHI.

Peters (2000) and Cohen, (1994), conducted a study on the hard of hearing learners and discovered that instrument play, singing, and movement to music can be created to address goals such as language acquisition, social-communication skills, language concepts, oral motor skills, breath control, and using targeted phonemes/blends. Research by Staum, (1989), also found that music techniques promoted increased breath and muscle control, stimulated vocalization, developed receptive and expressive language skills and improved articulation skills (Miller, 1982).

Patel and Iverson (2007) conducted research in India on the effect music had on speech development in hard of hearing learners and concluded that musical experience influenced basic auditory sensory processing circuitry in the brain, which affected speech and language processing. Specifically, the authors studied the processing of pitch, which was highly structured. They also studied aspect of music as well as an important aspect of speech, recognizing and interpreting changes in pitch, or inflection in speech and discovered that pitch can be crucial to understanding the meaning or intention of a spoken message. The authors suggested that because music and speech shared common characteristics of fine distinctions in pitch, timbre (tone

quality) and duration, music training may positively impact these areas of speech development. Further, it was pointed out that exposure and practice discriminating differences in pitch and tone in music may positively impact learners' ability to understand speech and language by helping them become attuned to fine distinctions in the prosodic elements of spoken language that hold so much communicative meaning.

Tallal and Gaab, (2006) in their study conducted in England discovered that; like hearing parents with hearing children, the parents of learners with post lingual hearing loss were to sing and read stories, nursery rhymes and plays to children. In addition singing, reading stories and ryming, there was also need to provide other meaningful activities to stimulate the mind and develop auditory memory in children. They stated that music was very useful to developing the meaningful rhythms of sounds that were beneficial in the growth of auditory memory. They also indicate that consistent auditory stimulation was fundamental to the success of developing auditory/oral communication in an early developing child.

Another important auditory skill involves memory and sequencing. Darrow (1985) explained that the structure of language and the meanings we can perceive from that structure required us to retain acoustical information in our memories in the correct sequence over a period of time. Musical activities such as vocal or rhythm imitations, singing the words in simple songs, and recalling instruments heard in succession all helped to develop sequential memory. These in turn positively affected the ability of learners who were deaf and hard of hearing to receive auditory information and process it in a way that was meaningful.

While the benefits of music instruction can be seen in areas specific to speech, language, and auditory skill development, the impact of involvement in a music program can also reach broader contexts such as emotional well-being and social skill development (Atkins & Donovan, (1984). Darrow and Starmer (1986) studied the effect of vocal training on the fundamental frequency, frequency range, and speech rate of hearing impaired learners' speech. Hearing impaired speakers tended to have a higher fundamental frequency and varied less in pitch. They produced problems in speech intelligibility. The results of this study showed that specific vocal training

and singing songs in appropriately lower keys may help modify the fundamental frequency and frequency range of hearing impaired client's speech. Another study conducted by Darrow (1984) recommended music therapy in training rhythmic responsiveness, thereby refining responsiveness to rhythmic elements of speech.

Staum (1987) also successfully used music notation in Finland to improve speech prosody in hearing impaired learners. She employed a visual notation system devised to help learners to match familiar and unfamiliar words or word sounds with the appropriate rhythmic and inflectional structure. Significant positive results were found for improved speech prosody as well as significant generalization and transfer of learning. Similarly, Bergeson and Pisoni (2004) explained that, for children who were learning to use audition, listening skill development could be made with visual association. When a loud plane flies overheads, pointing out the source of the sound can develop that association and help the child learn to distinguish one sound from another. When a telephone rings, an observation is made that the source of the sound is the telephone. When a bird sings, pointing out the bird will develop that association for the child. These activities helped the child develop the skill to associate sound with meaning. This skill to associate sound with meaning later became the foundation upon which the child developed complex listening and spoken language skills (Bergeson &Pisoni, 2004).

Robbins & Robbins (1980), after extensive work with hearing impaired learners in England suggested that the potential contribution of music therapy should be evident in the reinforcement and/or quickening of the individual's overall learning and use of speech. They further pointed out that greater vocal/verbal spontaneity and confidence, improved voice quality, and facilitated a freer use of intonation and rhythmic principles. Bruford (1989) found that music therapy helped a child to establish a good breath stream upon which the voice flowed out. The active organs were lips, tongue, teeth, lower jaw and the roof of the mouth.

Fix (2008) pointed out that spending time in playful activities such as musical activities therefore developed the learner’s attachment and self esteem as well developing communication skills. He further stated that it was important to plan speech exercises with the whole learner in mind, and teach English pronunciation by making oral speech and correct pronunciation meaningful for the

learner. He recommended learning about the learner's personal interests in oral speech and motivation to learn pronunciation before beginning speech instruction and evaluating the learner's oral-motor skills. He further acknowledged that the sounds the learner was physically able to produce with his or her mouth to gauge speech exercises would be the most realistic and instructive for the hearing impaired learners, and suggested to begin with the learner's strongest oral-motor skills in order to build additional pronunciation abilities.

Darrow, (1989) conducted a study in Spain on the use of music in speech training and argued that music did not only improve motivation but it also provided a multisensory approach to learning. This was likely to help the client to internalize the meaning of new words. Singing, for example, offered an opportunity for intensive listening and vocal activity. He concluded that learning songs can stimulate practice in auditory discrimination, differentiating and integrating letter sounds, syllabication, and pronunciation. Sulemani, Snick and Schreuder (1997) in a similar study in India discovered that working with hearing impaired students on communication skills was an enterprise that included listening, speaking, signing and reading, and which incorporated all of a learner's senses in order to gather and understand information. He further stated that while certain speech exercises can help parents and tutors better learn how to teach English pronunciation to learners with hearing impairment, the expertise of a trained speech therapist was usually necessary to help learners with post lingual hearing impairment fully participate and engage in a mainstream classroom or social environment.

Participation in music activities can provide children with an environment in which they feel comfortable and free to express themselves. Hummel (1971) stated that music was particularly valuable in the realm of self-realization. Activities such as therapeutic movement, social dancing and singing, and playing musical instruments can all bring pleasure to learners who are deaf and hard of hearing and help them develop self-confidence and self-assurance.

Music programs also presented children who were deaf and hard of hearing with a valuable opportunity to interact with their hearing peers. Walczyk (1993) believed that one of the goals of mainstreaming, or the immersion of a learner who was deaf or hard of hearing into a regular education setting, increased interaction between that learner and his or her hearing peers. The

objective of increased socialization can be accomplished through shared participation in a music program (Darrow, 1985; Walczyk, 1993). Darrow (1985) noted that learners who were deaf and hard of hearing can often be excluded from their hearing peers due to language or communication barriers.

Anvari, Crawford and Deness (2002) administered a battery of tests to a group of four and five year-old learners to assess musical ability as related to pre-reading and reading skills. Phonemic awareness skills included rhyme generation, blending phonemes to make words, and identifying, segmenting, deleting, and recombining syllables and sounds in a word. The Wide Range Achievement Test-3 (WRAT-3) was administered to test letter identification and the ability to read words. Musical ability was evaluated by testing the children's ability to discriminate rhythms, melodies, and chords, as well as their ability to reproduce rhythms that were presented to them. Findings revealed that musical ability was correlated with phonemic awareness as well as reading ability.

Musical ability can also be connected to phonemic and phonological awareness and early reading ability in young children. Anvari, Crawford and Deness (2002) also discovered that some auditory skills necessary for music perception, such as rhythmic, melodic, and harmonic discrimination, may also be used in the processing of language, in the form of auditory analysis skills such as blending and segmenting sounds. The ability to discriminate pitch, which has been shown to be strengthened by musical activity, was significantly correlated with phonemic awareness, which in turn correlated with simple reading ability. Pitch perception skills as related to music, therefore, may reflect a learner's ability to internalize important sound structures in his or her environment, that is, sound structures that are associated with early reading activities.

Anvari, Crawford and Deness (2002) explained that the relationship between music perception and phonemic awareness in this study supported the idea that they shared some of the same auditory mechanisms, such as segmenting speech and streams of tones into relevant units and recognizing compositions across variations in pitch, tempo, speaker or performer, and context. Practicing different musical rhythms can help transform a learner's spoken language skills from

unintelligible, forced, or monotone speech to naturally flowing, rhythmic speech that more closely approximates that of their hearing peers (McDermott, (1971).

In addition to improving their speech and language skills, music instruction can also be used to develop the auditory skills of learners who are deaf and hard of hearing. For children who are deaf and hard of hearing, listening was often a skill that did not come naturally rather, listening skills must be learned. Darrow (1985) noted that music offered a medium through which listening can be practiced. He further pointed out that learners must be taught to become aware of sounds as a means of obtaining information from their environment.

Darrow (1985) also noted that Musical stimuli often provided learners who are deaf and hard of hearing with the motivation to attend to and interpret meaning from sounds. He went on to say that traditional auditory training methods can become highly structured and repetitive, so music can provide an enjoyable alternative to more traditional methods while still allowing learners to practice listening skills. Darrow (1985) further described how various musical instruments can be used to develop the auditory skill of timbre recognition that is, the ability to recognize different pitches. He also explained that attending to different tones played on instruments can positively impact children's ability to discriminate and gain meaning from different pitches in speech sounds.

Darrow (1985) pointed out that it was evident through historical records and empirical data that exposure to music programs can greatly impact the success of learners who are deaf and hard of hearing in virtually all aspects of their lives. Speech, language, and auditory skills can benefit from music activities such as rhythmic and vocal training and instrumental instruction. Most learners like to sing, but may be shy to sing on their own. Singing created a joyful atmosphere and was a good way of creating unity, harmony and self-confidence in learners. The effect of song remained with the person long after the class was finished and the values that are in the lyrics remained in the learner's consciousness for a long time. Benefits of group singing include: promoting health breathing, creating harmony and co-operation, strengthening the memory, it brought joy in the class room and helped build good character.

From the literature above, it is clear that music in speech therapy was mainly used on learners with pre-lingual hearing loss and learners with hearing impairment in general but there were no specific references to learners with post lingual hearing impairment. It was therefore hoped that this study would fill up this knowledge gap.

2.2 STRATEGIES TEACHERS USED TO HELP LEARNERS WITH PLHIIMPROVE SPEECH INTELLIGIBILITY

Different scholars conducted studies on measures of helping learners with post lingual hearing impairment acquire intelligible speech. Relevant literature recorded that Ling (1976) discovered that for several centuries, teachers had attempted to convey information on their speech by encouraging their pupils to use the sense of touch, while Green (1983) reported that Braidwood encouraged his children to see and feel the movements and effects of his speech. Abbe del'Epee (1984) in America worked with his pupil's finger always in his mouth. He discovered that with time the child started to imitate the movements of his tongue to pronounce certain words and this slowly improved speech intelligibility in the child.

Similarly, Arrow (1972) in his study in Chicago required the child occasionally to feel the movements of the tongue during speech training and found out that in rare cases, a child would imitate his pronunciation. Story (1992) on the other hand advocated that the child should be allowed to touch the teacher's face and larynx but warned against the teacher touching the child. His point was that the drive to speak should come from the child, not be imposed by the teacher.
Branon (1964) in California worked with twenty (20) children selected from a large day school. He used amplification devices such as hearing aids and spoke through a microphone in an acoustically treated room. The children were meant to imitate his pronunciations of words. He discovered that 20 to 25 per cent of their words in their practical speech were intelligible to listeners who were unfamiliar with hearing impaired child's diction. Markides (1970) conducted a similar study in America made on 58 hearing impaired children with residual speech who were 7 and 9 years old. After using amplification devices he found that about 31% of their words were intelligible to their teachers and 19% were intelligible to listeners unfamiliar with a deaf child's speech.

Stone, (1997) in his study in United kingdom on the impact of amplification devices on speech acquisition in learners with post lingual hearing impairment found out that use of hearing technology such as hearing aids, cochlear implants, and/or Frequency Modulation system helped to develop auditory memory and spoken language in these learners. He observed that learners exposed to auditory communication learnt to sustain auditory attention and developed auditory memory in order to associate meaning with the spoken language. He said that even if a family chose to use simultaneous sign and spoken language, learners with post lingual hearing impairments became keenly attentive to the spoken language to be successful in developing listening skills and spoken language. He explained that they learnt to focus their attention on the language being spoken and the object being discussed to develop meaning of the sounds in spoken language. In addition he explained that, to begin the process of learning to attend to spoken language, parents of learners with post lingual hearing loss became active in providing the child with the sights, sounds and stimuli that bring meaning to sounds and spoken language. He said that to this effect children wore their hearing aids or cochlear implants at all times during working hours.

It was however noted that not all post lingual hearing impaired learners were successful with auditory/oral communication. But those children that were given early interventional measures and used hearing technologies and oral teaching approaches had a good chance to develop listening and speaking skills at par with their hearing peers.

John (1994) reported about an initial project known as Speech Training Aid Research (STAR). He stated that this program was initiated by Hereford and Worcester Country Council (HWCC) Education Department in the United Kingdom. STAR was prompted by HWCC's awareness of requirement by teachers for a computerized speech training aid tool to assist children in the development of a range of communication and language skills. The computer-based system was meant to enable teachers distinguish between good and poor pronunciations of a word spoken by a learner in response to a textual, pictorial or verbal prompt from a 1000 word children's vocabulary. This program was said to have gained ground and was spreading to other countries.

Having conducted a study, Oster (1989) observed that work on speech viewer II with deaf children up to 10 years of age had proved to be successful, worthwhile and very efficient, especially in the instruction phase of training. Two post lingual deaf learners with difficulties in producing certain phonological contrasts in Sweden were trained systematically with the system during eight weeks in order to evaluate its efficacy. One of the children (child I) was a 15 year old deaf boy with some residue hearing in the low frequencies. He had difficulties in producing quantity differences between phonologically long and short vowels. The child did not contrast between long and short /o/ before training. His realization of short /a/ and /u/ were always produced long. In some cases he did not control the vowel quality. It was not the intention to train vowel quality in the study but in some cases the pronunciation improved or became more stable after durational training. To this effect it was concluded the work with the Speech Viewer showed that computer-aided speech training may well be used as a valuable expansion of traditional speech training of severely hard-of- hearing children. However, it was pointed out that even the best computer program could never replace a therapist but only assisted in his/her work. Computer-based speech training was a complement to traditional methods and was a powerful tool for those therapists who in addition to mastering the technique were competent in articulation and acoustic phonetics.

Albrecht & Miller, (2001) studied language development in hard of hearing learners in England. They observed that in order to acquire language, learners required language models. They argued that during the life of a child with hearing loss, whether pre-lingually deaf or with post lingual hearing impairment, there were many people who provided this experience. They explained that providing language models was done by developing imitation models for language. Adult models for example, demonstrated what they wanted the learner to say orally. As with visual communication development, imitation was an important skill too. In addition, Albrecht and Miller (2001) explained that learners who were learning to listen and speak, usually imitated the language of parents or significant others.

Fix, (2008) found that parents of children with post lingual hearing impairment also needed support from service providers on how to become effective facilitators of their child's listening

and spoken language development. In his study of language development in learners with post lingual hearing impairment, it was noted that service providers who collaborated with parents and professionals to develop goals, objectives, and strategies for achieving the natural developmental of all aspects of visual or auditory communication so that they could make effective speech models facilitated speech intelligibility in these learners. However, Fix (2008) observed that the spoken language, or oral, approach seemed to be more successful with learners who had late onset hearing losses and those who had mild to moderate hearing losses after amplification or after having cochlear implants (CIs). He observed that when using models in an oral approach, the child who was post lingual Hearing impaired could look at the speaker's face, read lips, and watch natural gestures like pointing, in addition to their residual hearing. He realized that this was done by learners in order to get the information and likewise imitate the model speaker (ibid).

Bergeson &Pisoni, (2004), stated that activities around the skill of listening were essential in developing the auditory memory necessary for auditory/oral communication. They stated that for children who were learning to use audition, listening skill development could be made with visual association. Further, they gave an illustration that when a loud plane flew overheads, pointing out the source of the sound can develop that association and help the learner to learn to distinguish one sound from another. In addition they explained that when a telephone rings, an observation is made that the source of the sound is the telephone. When a bird sings, pointing out the bird would develop that association for the learner. They further explained that these activities helped learners to develop the skill to associate sound with meaning. This skill to associate sound with meaning later became the foundation upon which the learner developed complex listening and spoken language skills.

Vermeulen. Bon, Schreuder, Knoors and Snik (2007) conducted a study on eight children in Finland on reading and expressive skills. They began with speech exercises for pronouncing individual phonemes, or units of sound, and used a checklist of all individual vowel and consonant sounds to move through the basic elements of speech. The teachers also practiced blends and clusters of consonant and vowel sounds with the hearing impaired learners and once the phonemes were mastered, they moved from clusters to complete words and then multiple

words. They discovered that guiding hearing impaired learners in reading aloud improved their English pronunciation. Essentially, beginning with small elements of words and working towards complete sentences worked well for the learners in improving speech intelligibility. To this effect, they postulated that reading involved active development of receptive and expressive skills in spoken language.

Masataka, (1996) conducted a study in the United Kingdom on language development in the hard of hearing infants and discovered that infants paid attention to certain types of child-directed language. He realized that child-directed talk or language, like infant directed signs attracted and held babies' attention more than adult-directed talk or signs. In a similar study in America Volterra and Erting (2002) identified specific behaviors in mothers who were deaf using child-directed signing, such as a slower rate of sign; using the child's direct line of vision to sign or placing an object in front of a child when signing the name; repeating signs and exaggerating facial expressions; and using touch and vision like signing on the child's body or tapping the child to get attention. To this effect it was realized that both child directed talk and signing facilitated language development in pre-lingually hearing impaired learners and learners with post lingual hearing impairment respectively.

Moeller (2000) conducted several studies in the United Kingdom on the role of parents and significant others on speech development in learners with hearing impairment. Findings showed that parental involvement was one of the pivotal features in present-day early intervention in speech programs. In addition to his own findings over the past several years, he discovered that other researchers too found that family involvement strongly influenced parent and child outcomes for learners who were deaf or hard of hearing. Calderon (2000) in another study in Finland noted that Parental involvement in speech training produced better parental communication with learners and it facilitated more advanced language outcomes in kindergarten- aged learners and later in educational development. They further found out that mothers' communication skills, rather than direct parental involvement in their children's speech education programs, related significantly to their children's language development and early reading skills. Hoff-Ginsberg (1997), in a similar study pointed out that the way in which parents were involved was also important for children's speech development and language learning. He

further elaborated that young children learnt new words in the contexts of their daily experiences and, particularly, through interactions with their caregivers.

The Guidelines in Division of Early Childhood (DEC) (1998) Recommended speech practices in early intervention and emphasized parental responsiveness to children's linguistic attempts for facilitating optimal speech and language development. Girolametto, Weitzman, Wiigs and Pearce (1999), postulated that facilitative language techniques, such as imitation and expansion, enhanced language learning in young children at the single-word stage of language development.

From the available literature relating to music and speech intelligibility, it was noted that the majority of the researchers presented how music enhanced speech intelligibility in learners with pre-lingual hearing loss and hard of hearing, yet no specific reference was made on how music can enhance speech intelligibility in learners with post lingual hearing impairment thus leaving a knowledge gap.

2.3 FACTORS THAT CONTRIBUTE TO POOR SPEECH INTELLIGIBILITY

Studies have alluded to onset of hearing loss as one of the factors that determined speech intelligibility in learners with Post Lingual Hearing Impairment. To this effect, John, Albert and Owen (1967) conducted a study in America on 120 learners who were post lingual hearing impaired with ages ranging from 6 to 15 years. Findings showed that learners who acquired hearing loss at a tender age had poorer speech intelligibility as compared to those who acquired it later in age. Thus the most single important distinction for delineating person with hearing disability was between pre lingual and post lingual occurrences of hearing loss. Pre lingual hearing loss refers to lose of hearing prior to acquisition of language. It is also referred to as congenital hearing loss (Calvert and Silverman 1983). Learners who lost their hearing after developing spoken language are referred to as post lingual hearing impaired (Story 2000).

According to John, Albert and Owen (1967), the former could not naturally acquire speech as the hearing people did. The latter however, having developed speech before sustaining hearing loss could use speech subsequently for learning and social purposes. In addition, it was discovered

that the type of hearing loss too, contributed to speech intelligibility. As such, those with profound hearing loss had poorer speech intelligibility than those with residual hearing.

Severity of hearing loss was also among factors that determined speech intelligibility in learners with hearing impairments. Gordon-Brannan and Hodson (2000) carried out an investigation of pre-school learner's speech intelligibility by comparing the scores obtained for a range of severity and intelligibility measures. The learners ranged in phonological proficiency from those with adult-like speech to those with severe difficulties. They suggested that any child above the age of four years with a speech intelligibility score of less than 66% that is less than two thirds of utterances understood by unfamiliar listeners should be considered a candidate for intervention.
Similarly, Denes, and Pinson, (1992) conducted a study on speech development in learners with post lingual hearing impairment in California and found that the more severe the hearing loss of a learner, the poorer the speech. It was also observed that the later the hearing loss was detected in a learner, and the later the intervention in the impairment, the poorer the speech of the learner.
Several studies allude to identification and intervention as factors that were likely to contribute to poor speech intelligibility in learners with hearing impairments. For instance Crawford (1995) reported that late identification and intervention contributed to poor speech development. This indeed may prove to be a major problem in that most hearing impaired children remained unidentified for long periods of time especially in developing countries due to lack of medical facilities. As such, most of the hearing impaired learners tended to miss on early auditory-oral intervention and arrived at school with little speech or speech patterns that required intense remediation (Duplessis and Naude'2003). In addition, Dodd, McIntosh and Woodhouse, (1998) conducted a study on individuals with post lingual hearing impairments in America. Findings showed there were a number of interrelated factors that accounted for the range of complexity of the articulation and phonological disorders. These included methods and quality of early intervention programme, age at initiation of intervention and parental ability to cope with involvement in early education.

On the other hand, Alexander, (2002) conducted a study in South Africa on the factors contributing to poor speech intelligibility in learners with post lingual hearing impairment.

Findings indicated that most teachers in speech lacked training which contributed to problems in lesson delivery. Young, (1995) stated that educators lacked language awareness and sensitivity about how different environmental contexts such as home, community, and school affected hearing impaired learners develop speech. In the South African context educators needed training in bilingualism, second language acquisition and learning in a second language before they could present speech lessons to children with hearing impairment.

O'Connor, (2003) in a study with 23 participants at six primary schools in Cape Town, discovered that lack of educator training impacted negatively on speech training as this was a key issue in supporting proper implementation of the speech and language-in-education policy in a multilingual approach to education. Du Plessis &Louw (2008) conducted a study in Kenya on factors that influenced speech development in hard of hearing learner who had residue speech. It was found that, their spoken communication abilities reflected the influence of different educational philosophies and approaches of which poor teaching methodologies had a negative impact on speech development.

DuPlessis and Naudé (2003) conducted a study with 32 participants working with pre-school learners in Gauteng Province of South Africa. Their findings showed that lack of helpful strategies on speech training hampered acquisition of intelligible speech in learners with post lingual hearing impairment. They also found that lack of partnership teaching among special education teachers and lack of involvement of mainstream learners as well as educators in speech training programs contributed to poor speech intelligibility among learners with post lingual hearing impairment. Ngidi&Qwabe (2006) attributed limited success of speech programs to none involvement of educators in curriculum development and planning.

A survey of hearing aid users conducted by Rhoades & Powell (2002) in Pakistan found that only 16% of children had any hearing aids. Fox, McManus, and Reichman (2002) after conducting a similar study in America reported that only 7% of the most commonly sold private health insurance plans offered hearing aid coverage. More than half of the hearing impaired learners in the United States were covered by Medicaid, which generally provided coverage for

hearing aids. Unfortunately, re- imbursement rates were so low that most learners did not obtain the type of hearing aids they needed. McManus et al. (2004) reported a study in 15 states in United States in which they found that average Medicaid fees for hearing aids and other auditory audiology services were only 38% of those paid by private health insurers. Consequently, analog aids, rather than digital aids, were often provided to learners despite clear evidence that digital aids were more beneficial.

Fletcher, Dagenais, and Critz-Crosby, (1991) in South Africa conducted a study on Educational Provisions in Special Schools and found that most schools lacked Assistive Technology which was one of the means by which children experiencing communication difficulties could be helped. They argued out that along with the evolving technology already in use for example hearing aids, cochlear implants and computer speech software, technological advancements can potentially provide learners who are hearing impaired with some of the help they need to perceive and speak more intelligibly. Unfortunately, these were lacking in schools especially in developing countries. Berg and Botha (2007) further pointed out that in spite of the consensus among professionals about the importance of fitting hearing aids as early as possible, it was quite difficult for many children with hearing impairment especially in developing countries to obtain hearing aids and other assistive devices.

Poor placement of learners was discovered to be yet another hindrance to speech intelligibility acquisition in learners with hearing impairment. Bakare, (1988) observed that prelingual and post lingual hearing-disabled learners were placed in the same classrooms and taught together even though these two groups possessed differing potentials and opportunities to learn just as they required different teaching methods, curricular and facilities. To this effect, Bakare (1988) reported that placing and instructing learners of different hearing levels contributed to learners' poor speech intelligibility. He further pointed out that having learners with post lingual and learners with pre lingual hearing loss learning in the same class violated the principle of individualization of instruction. He noted that consequently while one group would experience relative success in school learning the other would experience some degree of frustration.

In other studies biological make up such as sex was found to be having a negative effect on speech development. To this effect Abiodun (2006) reported that male children usually developed speech at a lower rate than girls. He conducted a study on male and female toddlers in Califonia and identified that female children always develop verbal skills faster and better than male children. He also identified that by age eleven male children would catch up with their female counterparts in language skills. Similarly Okoye, (1987) observed that various biological differences in human make up such as are differently inherent in male and female students may be responsible for some disparities in language use and school performance of the two groups. He further argued that since no two human beings are the same in physical and intellectual attributes, then one should not expect both male and female students to perform uniformly in language.

2.4 Summary

This chapter has presented a review of the available literature that was considered to be of direct relevance to the present study. Literature showed that use of music in speech training facilitated speech intelligibility in learners with hearing loss. However, no study on how music facilitated speech intelligibility specifically in learners with PLHI was conducted thus creating a knowledge gap.

It was also found out that there were several measures of improving speech in learners with hearing impairments. These included use of assistive devices, use of speech models, auditory training, use of computers, using learners' direct talk, to mention only a few. However, no studies were available on how these measures helped learners with PLHI develop intelligible speech hence a knowledge gap still remains. From this review it was also observed that different factors contributed to poor speech intelligibility in learners with PLHI. These among others include; disease, late identification and intervention, poor teacher training, lack of assistive devices and placing learners with different hearing levels in the same classroom. Since most of these factors were based on studies conducted abroad, there was knowledge gap concerning learners with PLHI in Zambia.

CHAPTER THREE

METHODOLOGY

Overview

This chapter presents the methodology employed in the study. It outlines the study design, population, sample, sampling procedure and instruments for data collection. It further outlines procedure on how data were collected and analyzed. Further it explains how reliability and validity in the study were enhanced. In addition, it explains the ethical considerations that were put in place during the study and ends with a summary.

3.1 Research design

Berg (2001) refers to a research design as a road map used for planning when undertaking a research study. He points out that it aims at visualizing and imagining how the research will be undertaken, the type of data to be collected and how it will be collected. This study employed a descriptive research design in order to facilitate an in-depth analysis of variables and elements of the population as observed in their natural settings. Quantitative and qualitative research methods were used to collect data. McGraw (2002) defines a qualitative research method as the collection and analysis of non-numerical data for the purpose of gaining insights into a phenomenon of interest and qualitative research as a method that allows the researcher to discuss and make interpretations of the observations and statistical data. The two research paradigms were chosen because of their complementary roles.

3.2 Study population

According to Kambo and Tromp (2006) population is a group of individuals from which samples are taken for measurement. The study population was composed of all Lower Primary grades (grade one to four), junior secondary grades (grade eight and nine) with PLHI and specialist teachers in selected special units in Lusaka district. Lower primary school learners were selected because most of them suffered early onset hearing impairment. Use of these children was justified by Leybaert, et al (1998)'s statement that children with early onset hearing loss generally lagged significantly behind their normally hearing peers in all areas involving speech and speech perception. Junior secondary school pupils were also chosen because the probability

of finding learners with late onset of hearing loss was higher as compared to learners in lower grades. Learners with late onset of hearing loss had some level of speech intelligibility and understanding them was quite apparent making it easier to obtain the required information from them (Leybaert, et al 1998). To this effect secondary school learners became key informants on what was obtaining in their classrooms and other necessary information required.

3.3 Study Sample

A sample is a subset of the population that is selected for a study (Burns & Grove, 2007). Sampling is the process of selecting a group of people, events, behaviours or other elements that are representative of the population being studied (Kambo& Tromp, 2006). One hundred (100) participants formed the sample of this study. Twenty (20) of these were teachers. Teachers were chosen to participate in the study because of their direct involvement in educating learners with SEN. Below is a distribution table of teachers by gender who took part in the study.

Table 1: Distribution of Teachers by gender (n = 20)

Gender	**Frequency**	**Percentage**
Male	3	**15%**
Female	17	**85%**
Total	**20**	**100%**

The sample also consisted of sixty (60) learners from Lower primary and twenty (20) from junior secondary grades. Table 2 shows the distribution of learners by grade and gender

Table 2: Distribution of Learners by Grade and Gender (n = 80)

Grade	Gender	Number of pupils	Percent
Lower primary (1-40	**Male** **Female**	**28** **32**	**47%** **53%**
Total		**60**	**100**
Junior Secondary (8-9)	**Male** **Female**	**07** **13**	**35%** **65%**
Total		**20**	**100**

3.4 Sampling Procedure

Simple random sampling procedure was used to select lower primary schools. This technique was chosen because it provided each element in the population an equal chance to be selected. (Cohen and Manion 2000). To this effect, all Primary Schools with Special Education Units for the Deaf in Lusaka District were written down and numbered. The same numbers were written on small pieces of paper and put in a sampling frame which was shaken vigorously to mix them up. The researcher picked 4 pieces of paper from it and schools whose numbers were picked became participants in the study. One secondary school was purposefully picked because it was the only secondary school with the desired elements for the study.

To select learners, a purposeful sampling procedure was used because it allowed the researcher to select learners that had some level of residue speech and were willing to use oral communication. Therefore purposeful sampling technique helped in meeting the targeted individuals and numbers of participants, since learners with PLHI were few in the selected schools. The same sampling procedure was used to select specialist teachers because they were the only key informants and not too many in these schools.

To pick the control and experimental groups, a simple random sampling procedure was used. This was done in order to give all the selected schools an equal opportunity of belonging either to the experimental or control group. To do this, a sampling frame was used. The researcher cut four pieces of paper and wrote the word ‘control on two of them and ‘experiment’ on the other

two. The two schools that picked the word 'control' became the control group and other, the experimental group. Details are in table 3.

Table 3: Distribution of learners to experiment and control groups by gender (n = 60)

Schools	Group	Gender	Number of pupils	Percent
FaithBaptistSchool for the Deaf Lusaka girls deaf unit	Experiment	Male Female	10 20	33% 67%
Total			**30**	**100**
DesaiPrimary School University Teaching Hospital (SpSch)	Control	Male Female	16 14	53% 47%
Total			**30**	**100**

3.5 Research instruments

Several instruments were used to collect data in this study and these included:

- **Questionnaire**

One set of semi structured questionnaires was designed to collect data from teachers. Each section had a variety of questions related to study objectives. Questionnaire was chosen as an instrument of data collection because it was possible to present it to each respondent in exactly the same way, which minimized work and biases of the researcher. Likert scale was used in the questionnaire for questions intended to measure attitudes. Likert scale was chosen because it was suitable in attitude measurement since it allowed respondents to indicate the degree of agreement or disagreement. The questionnaire has been appended to this report.

- **Observation Guides**

Non participant observation guides were used in the study. A checklist was used to tick whatever was observed being done by teachers which was in line with the checklist and cross out what was contrally to the checklist during speech lesson observations. The checklist was after wards used to compare the desired requirements of a speech lesson with what was obtaining in the classroom. This enabled the researcher to establish factors supporting or limiting acquisition of

speech intelligibility in learners with PLHI. The intended use of non participant observations was in consistence with Descombe (1993) who pointed out that non participant observations were one of the most effective means of validating data collected by questionnaires. Observations also gave the researcher an opportunity to triangulate the information in order to determine whether there was link between expressed opinions and reality.

- **Interview guide**

Interview schedule was used to obtain necessary data from junior Secondary School pupils. Interview guide was used as it was described as one way of learning about things that cannot directly be observed (Descombe 1993).

- **Lesson plan schedule**

A lesson plan schedule adapted from MoE (1986) with slight modification to suit the study was used to collect data during speech training of learners. The instrument has been appended to this report.

3.6 Data Collection Procedure

Questionnaire distribution and familiarization: The researcher started by distributing questionnaires to the respondents who were expected to complete and submit them within three days. The researcher mingled with the learners and teachers to get familiar with them and explained what was going to be done by the researcher and what was expected of learners and teachers in the study.

Observations of speech lessons: On the second day, the researcher observed how speech lessons were conducted in classrooms, prepared speech therapy materials and assigned pupils to their respective groups.

Pre-tests: Before commencement of the speech intervention, learners were given two tests, one in single word pronunciation intelligibility test and another in short sentence construction intelligibility test. These tests were done in order to establish the baseline performance of pupils before the intervention.

Speech Training: Speech training started on the third day. To train pupils in speech, lesson contents were derived from a song 'Jesus loves me' which the deaf were able to sing in sign language, and a rhyme 'Old Mother Herbert' derived from Anita (1997) which was taught to learners with HI in sign language at lower primary.

Training the experiment group: The researcher drilled learners in singing the song, and rhyming the words orally until they gained competence, then song words were randomly selected and written on the board. Pupils were then dilled in oral word pronunciations and sentence construction.

Training the control group: The same song and rhyme words were used. Without singing these words, the researcher orally drilled learners in word pronunciation, intonation and sentence construction. Repetition, substitution, and Chain drills derived from Audio lingualism theory (Bloomfield 1933) were used in training both groups.

In a chain drill, the researcher said a word to a pupil. The pupil responded by repeating the same word and turned to the pupil next to him/her and said the same word. This pupil turned to the other one and the chain continued up to the last person in the group. In the repetition drill, learners repeated words and sentences after the researcher. The researcher acted as a role model speaker. In a substitution drill, the researcher wrote a sentence on the board with one word next to the sentence written in brackets. Learners then substituted the last word in the sentence with the word in brackets for example; **"*Mother Herbert went to the market*"** (cupboard!), learner then substituted the word *market* with **cupboard** i.e.; *"Mother Herbert went to the cupboard"*.

Every speech session took sixty minutes (1 hour). Each group was drilled for three weeks, two days and the remaining three days were used for assess the learners and this made one full month for each group. Pupils were assessed in single word pronunciation and sentence construction using Wilcox and Morris (1999)'s Shadow Technique. This assessment approach was used because it is said to be accurate and reliable. In addition, it is mostly used as an interventional approach in children with speech disorders (Dodd and Bradford (2000).

Measuring speech intelligibility

After the intervention (speech training) came to an end, the researcher gave learners two tests, one in single word pronunciation and the other in short sentence construction. In the single word pronunciation test, the following ten (10) words were presented to individual learners who read them orally as instructed while they were being recorded by the researcher in the cellular phone memory card. Two cellular phones were used, one for each group and the each pupil, recorded voice was assigned a number (e.g pupil 1,2,3 up to 30 pupils in each group) Words tested on were; ***Jesus, strong, weak, mother, Herbert, love, bible, cupboard, belong and wanted.*** Listeners unfamiliar with the speech of the deaf helped in assessing learners by listening to the recorded speeches and scoring intelligible or unintelligible speech on score sheets of learners. This made the researcher independent of the assessment process to avoid biases. Different listeners were used at a time and they were not even exposed to the word and sentence lists before listening to the recorded speech. This was done to prevent them from getting familiar with the words and sentences which might influence their perceptions lead to guess work thus affect the genuineness of results.

Listeners were to write the verbatim of the pupil's recorded speech as they heard it and say what the pupil was communicating. If the speaker mentioned the word a child was tested to speak, then that the pupil was intelligible and scored a mark. Learners who for example pronounced the word 'Jesus' as *jijash, jijaji, or jithas*, scored a mark because listeners were able to grasp what the learner was communicating. For those who pronounced the word as jita, jijo, jeje, listeners were unable to grasp sense, so no score was given to such learners because mispronunciations distorted the meaning of the word. For the word 'strong', learners who pronounced it as ***situlong,sitrongu, sitilong and sitrong*** scored a mark because the listeners were able to tell what the learner intended to say. Those who completely diverted from the normal word, for example, ***strin, solong, sitring***and other sounds, scored no mark and the process continued. Every learner's number of words pronounced intelligibly was recorded and results compiled. Out of ten words, any learner who spoke five (50%) words and above intelligibly, passed the test while anyone who pronounced four (40%) and below failed. Below is an example of the score sheet of a pupil in one of the groups and how speech was coded.

Score sheet

Pupil: One

S/N	Word read and pronounced as:	Understood as:	Unintelligible	Score
1	Jijus	Jesus		1
2	stong		√	0
3	weakii	Weak		1
4	Maza	Mother		
5	ebe		√	0
6	Laavuu	Love		1
Total				**03**

(b) Sentence construction test

Sentences for this test were derived from the rhyme and song words in which learners were drilled. These short sentences were:

(1) Dog and food

(2) They are weak

(3) The bible says so

(4) Cupboard was bare

(5) When she went there

(6) Little ones belong to him

(7) Jesus loves me

(8) Old Mother Herbert went to the cupboard

Each learner was asked to read each of the above sentences aloud and they were recorded. The listeners (assessors) listened to recorded speech and wrote down the sentence as it was heard being spoken. If the listener wrote down a correct sentence, the learner scored a mark for reading the sentence intelligibly. A learner, who slightly mispronounced the word, scored a mark as long as the meaning of the sentence was not distorted. For example, learners who said ***old Maza***, ***old Maja***instead of *old mother* and***zey are weak'*** or ***'jey are weak'*** instead of *they are weak* were also considered intelligible because listeners were able to understand the message being communicated. However any one who said a sentence which listeners could not grasp sense out of scored no mark and the system continued. Any learners who said five sentences and above intelligibly passed the test while any pupil who got below this mark failed.

3.7 Reliability and validity

Reliability refers to how consistent a measuring device is. A measurement is said to be reliable or consistent if the measurement can produce similar results when used again in similar circumstances (Nueman, 2000). To ensure that the instruments were reliable questionnaires were presented to University of Zambia Special Education Department to evaluate their validity in obtaining accurate and appropriate results. Necessary corrections were made before the final administration of the questionnaires on the respondents. The researcher also performed pilot studies to examine the reliability of the instruments. In addition, an experiment was conducted with two representative groups before conducting it on the actual learners. The questionnaires were sampled out with other specialist teachers before finally giving them out to the actual respondents. This enabled the researcher to find out whether the questions were measuring what they were supposed to measure, the questions were interpreted in the same way by a respondent and that there was no research bias.

Validity is concerned with measuring what you are supposed to measure (Achola and Bless 1983). To enhance validity of the findings, blind folding was used during assessment of learners' speech intelligibility. Independent research assistants were used to listen to learners' speech and scoring their intelligibility. This was done to avoid research biases. The researcher also used triangulation in cross-checking teachers' and learners' responses. For example, data collected by questionnaire from teachers was cross-checked with learners' focus group interview guide as well as observation guide and notes taken during the observations. In addition, an experiment was conducted on learners. This was done in order to compare consistence in the information obtained from different research instruments. Respondent validation was also done by relating the findings with the evidence from the available literature.

3.8 Data analysis and interpretation

Data analysis and interpretation is a process by which data is processed and converted into meaningful statements (Sarantos 1995). The purpose of data analysis is to process raw data for interpretation. Quantitative data was analyzed using Statistical Package for Social Science

(SPSS) in order to generate frequencies and percentages while qualitative data was analyzed using thematic analysis.

3.9 Ethical considerations

Measures were taken to ensure compliance with ethical issues and these included: keeping identity of respondents confidential, views of respondents were respected and their responses were not interfered with or contested by the researcher. Permission was obtained from respondents' relevant authorities in research sites and all respondents were given equal treatment. The purpose of the study was explained. This allowed respondents a chance to decide whether to participate in the study or not.

3.10. Summary

This chapter presented the methodology used in the study. A descriptive design was used to explain the role of music in speech training to enhance speech intelligibility in pupils with post lingual hearing impairment, factors that contribute to poor speech intelligibility and interventional measures that enhance Speech Intelligibility in learners with post lingual hearing impairment. A quantitative research design was used to present statistical data. The study population was composed of learners and teachers in selected Special Units in Lusaka province. A total number of one hundred (100) participants were used for a sample which was selected using a simple random sample to pick learners and a purposive sampling procedure to pick teachers. Data collection instruments used included the semi structured questionnaires, semi structured interview schedule, non participant observation guides and the experiment schedule. Data collected were analyzed both qualitative and quantitatively. Ethical issues were also considered.

CHAPTER FOUR
PRESENTATION OF THE FINDINGS

Overview

This chapter presents the findings of the study. The results have been presented under headings derived from objectives of the study which include; the role of music in speech intelligibility in learners with PLHI, strategies teachers used to help learners with PLHI enhance speech intelligibility and factors that contribute to poor speech intelligibility in learners with PLHI,

4.1 THE ROLE OF MUSIC IN SPECH INTELLIGIBILITY IN LEARNERS WITH PLHI

The researcher sought to investigate whether use of music in speech training enhanced speech in learners with PLHI.

4.1.1 Teacher and learners' views

The study showed that the 15(75%) of the teachers and all the pupils felt that music helped learners with PLHI enhance speech intelligibility. The study further showed how music helped in facilitating speech intelligibility as stipulated below;

(i) Music motivates learners

The study reported that learners with PLHI were able to hear musical vibrations as well as follow the beat in the musical instruments. Essentially this helped learners in regulating their speech patterns. It was also reported that learners with residual hearing were able to mimic singers, even singing with others by observing their lip movements. In this way, they improved speech. It was further explained that use of music in speech training motivated learners to use their speech organs in that, as they labored to sing, their speech organs vibrated and loosened up, thus quickened sound production. Besides, repeated singing was a speech drill in itself.

(ii) Music facilitates verbal memory

In addition, the study shed light that 'music speaks' and words sung stuck in learners' minds. This helped learners to remember words as they listened to a song repeatedly. Because of this, it

was easy for learners to retain vocabulary in the song and use it intelligibly in their daily speech. Thus one teacher explained;

"Music helps learners to remember words because it is easy to master words in a song. That is why when people are asked to memorize a passage or a verse in the scriptures, they usually compose a song using the same words so that as they continue singing, the words are sticking in the mind"

The study revealed that even learners felt that music helped them in remembering song words. To this effect, fifteen (75%) of the 30 learners interviewed, felt that music helped them to remember and master words in a song and one learner therefore explained,

"I find it easy to learn words in a song. When I sing, I don't forget words in the song and I can speak all of them."

(iii) Music helps in clearing vocal fold

The study also reported that singing helped learners to clear the vocal fold and it allowed the inflow of air into these speech organs. To add on, findings showed that in flow of air helped in producing explosive and fricative sounds. The flow of music also gave exercise to these organs for example; singing induced the sound box into vibrations. In cross checking teacher's views, learners were also asked if music helped them clear their vocal cords. The study reported that all the learners felt that singing helped them to clear their voices. One of them said,

"I like singing because when I sing my voice improves and opens up. I can talk and no problems with voice"

(IV) Music widens vocabulary

Study findings added that music widened learners' vocabulary because as learners listened to more music more often, they learnt more and more words. To this effect one of them said;

"*Music contains vocabulary hence constant listening to it widens learners' vocabulary ."*

(v) Music improves voice quality

The study indicated that due to exercises given to the vocal cords and speech organs while singing, music improved the quality of the voice. One teacher said that;

"Before singing learners are usually asked to cough. This clears the throat and

exercises the vocal muscles which allows the sound box to produce good sound."

(VI)) Music enhances auditory training

The study also indicated that music was very useful in auditory training because it helped learners to differentiate sounds and this was very important in speech acquisition. In effect, the study revealed that learners needed to differentiate between sounds for them to produce intelligible speech.

(vii) Music improved word pronunciation, intonation and sentence construction

The study highlighted that music improved speech intelligibility by improving word pronunciation, sentence construction and intonation. The beat, temple and pitch in musical instruments helped learners in regulating their voices and intonating their speech. In addition, it was revealed that as learners tried to imitate singers of native languages, they ended up developing good accent. Therefore one of the teachers said that;

> "*As children mimic musicians, it helps them improve word pronunciation.*
> *That is why most children who mimic musicians have good accents."*

Another teacher also explained that;

> *"No doubt singing improves sentence construction and intonation in learners.*
> *This is why our teachers long ago used to tell us to sing 'di da di di da.'*
> *Although we did not really like it, I think it improved our accent."*

In order to establish whether music in speech training enhanced word pronunciation and sentence construction intelligibility in learners with PLHI, the researcher used triangulation by performing an experiment in which two groups were used. The researcher used music to train the experiment group in speech and no music in training the control group (ref 3.6). To establish the baseline threshold of the number of words learners could speak intelligibly from the song words, a pre-test was given to both the experimental and control group. A learner was considered intelligible if what he/she said was interpreted by the listener according to the actual word being tested. For example the word ***mother,*** a learner who pronounced it as ***maza, mathamoza*** scored a mark as long as the listener got to interpret it as ***mother.*** The base line score was five (5) words, meaning

that a learner was considered intelligible only if he/she orally spoke five (5) words and above intelligibly.

Results show that basically, there was one (3.3%) learner inthe experimental group and two (6.7%) in the control group out of thirty (30) learners in each group who orally spoke five (5) words before speech therapy intervention. Details are in the tables below.

Table 4: Single Word Intelligibility
Pre-tests

Group	Number of Words read intelligibly	Frequency	Percent	Valid Percent	Cumulative Percent
Experimental	1	8	26.7	26.7	26.7
	2	10	33.3	33.3	60.0
	3	8	26.7	26.7	86.7
	4	3	10.0	10.0	96.7
	5	**1**	3.3	3.3	100.0
	Total	**30**	**100.0**	**100.0**	
Control	1	4	13.3	13.3	13.3
	2	6	20.0	20.0	33.3
	3	15	50.0	50.0	83.3
	4	3	10.0	10.0	93.3
	5	**2**	6.7	6.7	100.0
	Total	**30**	**100.0**	**100.0**	

Results in table 4 are further summarised in figure 1 below.

Figure 1: Results of Single Word Pronunciation Intelligibility Pre-test

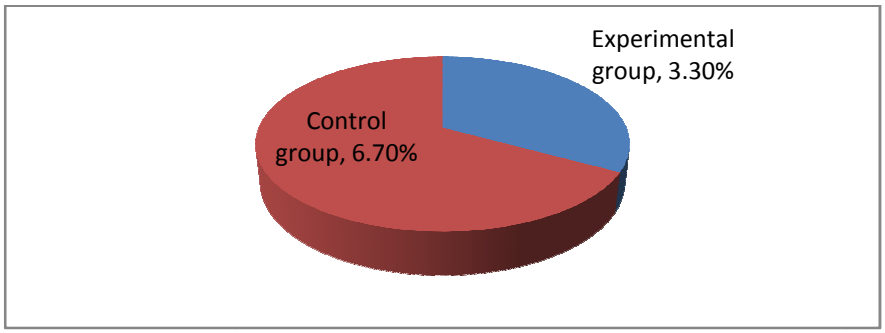
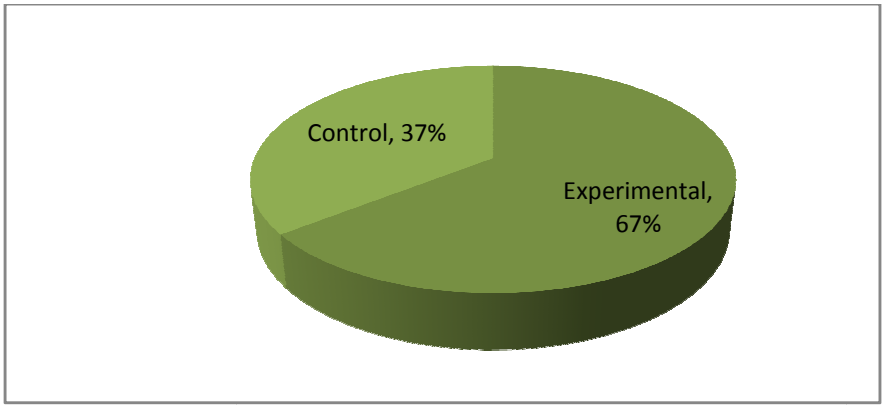


Figure 1, shows that though at a lower level of performance for both groups, there were more intelligible learners in the controlthan the experimental group before learners were subjected to speech therapy.

After the pre-test, both groups received speech training. The experimental group was given musical treatment in speech drills while the control group was not. A post-test was conducted and results show that 20 (67%) out of 30 Learners in the experimental groupwere intelligible as opposed 11 (37%) out of 30 learners in the control group. Results are summarized in figure 2 below.

Figure 2: Single Word Speech Intelligibility post-test Results



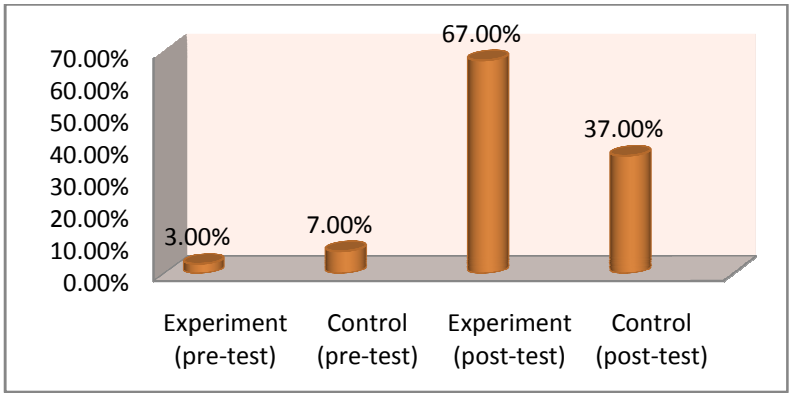
Details of the frequencies are in table 5.

Table 5: Single Word Pronunciation Intelligibility Test
Post-tests

Group	Number of Words spoken intelligibly	Frequency	Marginal Percentage
Experimental	2	2	6.7%
	3	3	10.0%
	4	5	16.7%
	5	**10**	33.3%
	6	**6**	20.0%
	7	**3**	10.0%
	8	**1**	3.3%
Valid		**30**	**100%**
Missing		**0**	
Total		**30**	
Control	1	1	3.3%
	2	3	10.0%
	3	5	16.7%
	4	10	33.3%
	5	**9**	30.0%
	6	**2**	6.7%
Valid		**30**	**100.0%**
Missing		**0**	
Total		**30**	

Figure 3 which is below is a comparative summary of learners' performances in both the experimental and control groups during the pre-test and post test.

Figure 3: Pre-test and Post-test Summary



Average performance in both groups was establishedusing a t-test. The mean for the control group was 2.7 and 2.3 for experimental group in the pre-test. As regards the post-test, the mean for the experimental group was 4.9 and 3.7 in the control group. The mean difference in the pre-test between the control and experimental group was 0.4 and 1.2 in the post test. In the pre-test the control group had a higher mean while the experimental group had a higher mean in the post-test. Details are in table 6.

Table 6: Pre-test and Post-test Single Word Intelligibility Test
Paired Samples Statistics

group		N	Minimum	Maximum	Mean	Std. Deviation
Experimental	**Pre-test**	30	1.00	5.00	2.3000	1.08755
Control	**Pre-test**	30	2.00	5.00	2.7667	1.04000
Experimental	**Post-test**	30	2.00	8.00	4.9333	1.46059
Control	**Post-test**	30	1.00	5.00	3.7000	1.17884

Table 7 shows that the average performance between the experimental and control group was statistically significant (p<.000).

Table 7: Single Word Paired Samples Correlations

Group	N	Correlation	Sig.
Experimental & Control group	30	.949	.000

As regards sentence construction test, the threshold score for a child to be considered intelligible was four (4) out of eight (8) sentences. Results show that one (1) out of thirty (30) learners in each of the groups (experimental and control) was intelligible in short sentence construction pre-test.Table 8 shows details.

Table 8: Short Sentence Construction Intelligibility

Group	Number of sentences read intelligibly	Frequency	Marginal Percentage
Experimental	1	19	63.3%
	2	9	30.0%
	3	1	3.3%
	4	1	3.3%
Total		**30**	100%
Control	1	18	60.0%
	2	7	23.3%
	3	4	13.3%
	4	1	3.3%
Valid		**30**	100.0%
Missing		**0**	
Total		**30**	

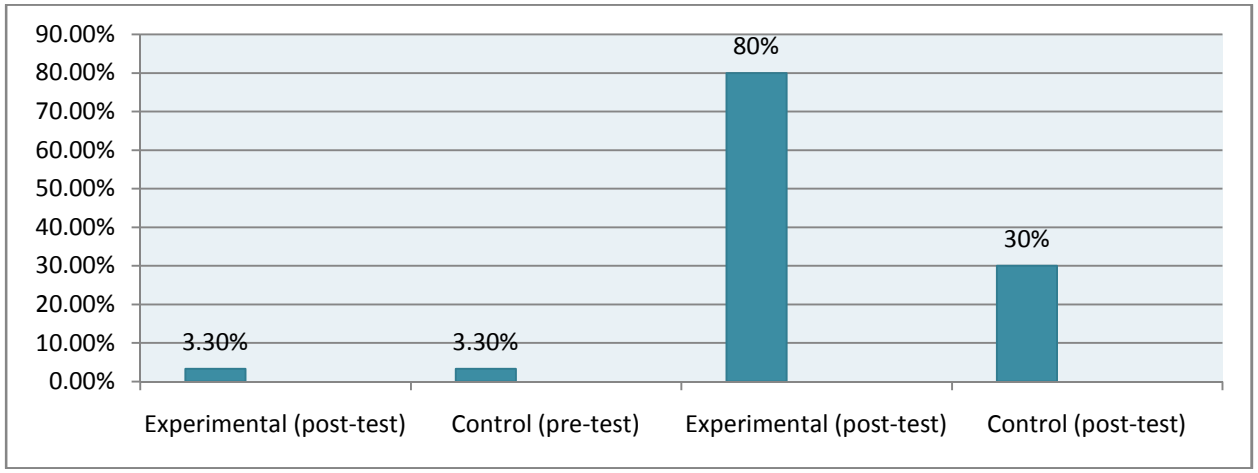
The post-test results show that twenty four (80%) learners in the experimental group read four (4) and above sentences intelligibly as opposed nine (30%) learners in the control group. Table 9 shows the details.

Table 9: Short Sentence Construction Intelligibility
Post-test

Group	Number of sentences read intelligibly	Frequency	Marginal Percentage
Experimental	1	1	3.3%
	2	1	3.3%
	3	4	13.3%
	4	10	33.3%
	5	8	26.7%
	6	4	13.3%
	7	1	3.3%
	8	1	3.3%
Valid		**30**	
Missing		**0**	100%
Total		**30**	
Control	1	7	23.3%
	2	8	26.7%
	3	6	20.0%
	4	7	23.3%
	5	2	6.7%
Valid		**30**	100.0%
Missing		**0**	
Total		**30**	

Figure 4is a comparative summary of learners' performances in short sentence construction during the pre-test and post-test. The control and experimental group were at par in the pre-test but the experimental group outperformed the control group in the post-test.

Figure 4: Performance Comparison of Experimental and Control group In Short Sentence Construction test



In order to establish the difference in performances between the experimental and the control group, a t-test was done and the finding of the study shows that the difference was statistically significant. Table 10 shows that the average performance of learners in the experimental group was 4.5 as opposed to 2.6 of the learners in the control group. The difference in the average performance was 1.9 higher in the experimental group than the control group.

Using a t-test means were established between the two groups in both the pre-test and post-test. Results show that for both groups, the mean was1.6 in the pre-test and 4.5 and 2.6 in the experimental and control group respectively in the post-test. The experimental group had a higher mean as opposed the control group. Details are in table 10.

Table 10: Average performances in Short Sentence Construction

Group	Test	N	Minimum number of sentences read	Maximum number of sentences read	Mean	Std. Deviation
Experimental	**Pre-test**	30	1.00	4.00	1.6000	.85501
Control	**Pre-test**	30	1.00	4.00	1.6000	.85501
Experimental	**Post-test**	30	1.00	8.00	4.4667	1.43198
Control	**Post-test**	30	1.00	5.00	2.6333	1.27261
Valid N (listwise)		30				

A t-test was used in comparing the difference in performance between the experimental and the control group in short sentence construction test after speech intervention. Results in the post-test show that the difference in performance between the experimental and control group was statistically significant (p<.000). The experimental group again outperformed the control group.Table 11 shows the details

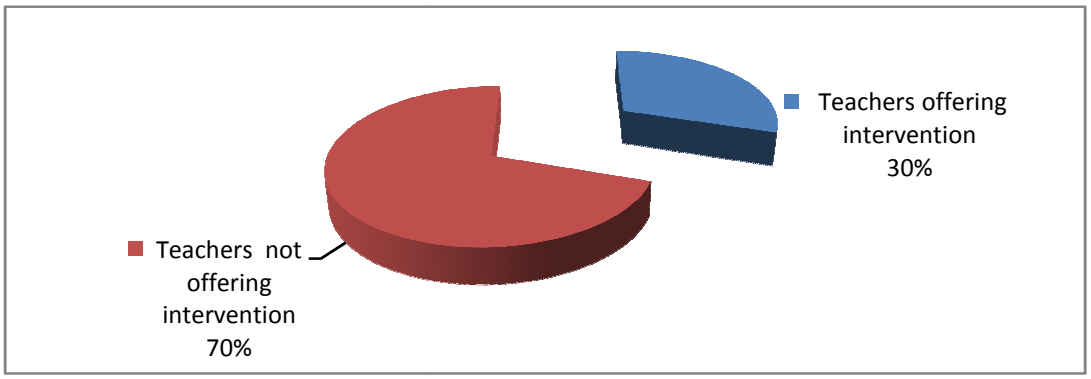
Table 11: Short Sentences Construction Paired Samples Correlations

Group	N	Correlation	Sig.
Experimental & Control	30	.911	.000

4.2STRATEGIESTEACERS USED TO HELP LEARNERS ENHANCE SPEECH INTELLIGIBILITY

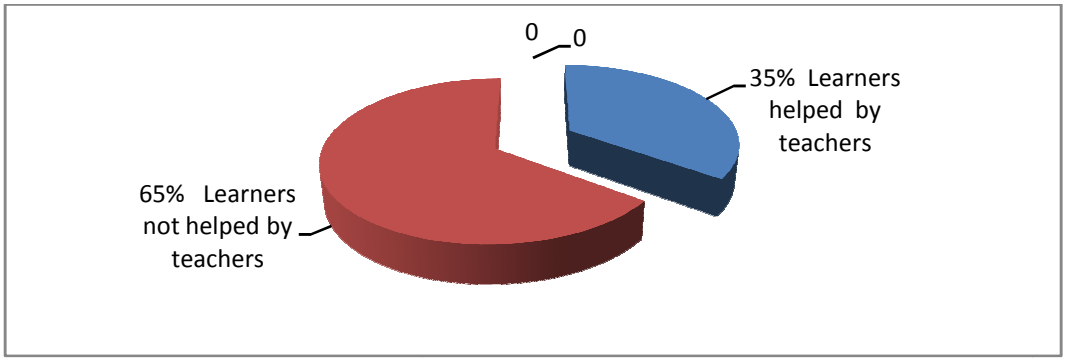
The researcher sought to investigate whether teachers helped learners with PLHI to improve and sustain their residue speech. Results of the study show that, of the twenty teachers who participated in the study, only six (30%) helped learners with PLHI to improve speech by encouraging total communication, lip-reading and oral role play The rest (70%) did not bother encouraging learners to use oral language. Details are in figure 4 below.

Figure 5: Teachers helping pupils to improve Speech Intelligibility.



The researcher also tried to find out from learners whether teachers helped them in improving their speech. Correspondingly results show that, thirteen (65%) of the 20 learners expressed that teachers did not help them in improving speech. Details are in figure 5

Figure 6: Learners helped by teachers in improving speech intelligibility



The study brought to light that teachers used all or one of the following methods.

(i) Amplification devices

It was reported that teachers used hearing aids because they amplified sound and this enabled learners to pick speech sounds from their immediate environment. As such learners were able to imitate role model speakers. Findings also revealed that most learners acknowledged the importance of hearing aids. To this effect, one learner said,

> "*Teacher encourage wearing hearing aids and it is good. Others refuse to wear them which is a bad thing. If I wear hearing aids I hear a bit and I answer well when teacher is talking to Me. But without hearing aids I don't hear and I fail to answer when teacher is talking to me."*

(ii) Lip reading

The study highlighted that teachers encouraged learners with PLHI to lip read because they lost sense of hearing after developing speech. For this reason, it was easy for them to understand a speaker by following lip movements. It was also possible for them to imitate that speaker, and constant imitation enhanced speech acquisition.

(iii) Total communication

In addition, the study revealed that teachers also encouraged use of total communication (i.e. speaking and using sign language at the same time) as it was felt that speaking and signing concurrently facilitated constant speech practice and this helped learners to develop intelligible speech. Likewise, the study revealed that learners felt that teachers helped them to improve speech intelligibility by encouraging them to talk and sign at the same time and further announced that teachers discouraged them from signing without speech. Therefore, one of the learners explained,

> *"Teacher encourage us always to talk and sign same time she refuse us signing alone. She says you can talk, so talk tMe, why like signing? That's why you speak poor."*

4.2.1 Other measures used to improve speech intelligibility

The study revealed that teachers helped learners with PLHI improve speech intelligibility by integrating them into the mainstream during extracurricular activities such as preventive maintenance, clubs and sports. As they mixed with the hearing peers they were forced to use their residue speech hence acquired some level of intelligibility. They also encouraged learners to imitate their teacher, parents and significant others as their speech role models. Some of the teachers used oral role plays and oral narrations of the stories using walls pictures.

4.2.4 Learners' views

Learners outlined ways in which they felt they may be helped by teachers to improve speech including;

(i) Not using sign language when talking to them.

The study found out that, learners with PLHI did not know which language to use between sign language and signed English; because some of the teachers demanded use of sign language while others encouraged use of signed English. This was found to be confusing. Therefore learners thought that, it was better for those who were able to speak to use oral language as this may foster speech intelligibility.

(ii) Train them separately from the profound deaf

The study further reported that learners with residual hearing must be separated from the profound deaf, so that they can learn speech while those who cannot speak can also learn sign language in place of speech. They argued that this can be done just like they were separated when learning optional subjects.

(iii) ***Teachers should find them friends amongst hearing learners***

Further, the study found out that most of the learners that it would be better if teachers helped them to find friends among hearing learners, who may be interested in the hearing impaired so that they can be playing games such as netball, football as well as drama together. It was further felt helpful to have hearing learners work with HI learners during preventive maintenance and

belong to the same clubs. In this way learners with PLHI would make friends with the hearing peers, get used to them and open up to use of oral language instead of feeling shy to talk as was currently the case.

4.3. FACTORS THAT CONTRIBUTE TO POOR SPEECH INTELLIGIBILITY

Teachers and learners presented factors they felt contributed to poor speech intelligibility in learners with PLHI.

4.3.1 Teachers and learners' views

Similar views of teachers and learners were presented concurrently to avoid repetition of same ideas. Learners used spoken sign language which follows a different grammatical pattern from English language and most of this verbatim is incorporated in the paper as direct speech.Factors alluded to were presented under the following themes; gender, diseases and onset, social, apathy, lack of assistive devices, poor teacher education, lack of teacher preparedness, over enrollment levels and poor learning environments.

(i) Gender

The findings of the study revealed that gender of learners with PLHI affected speech development. Six (6) out of twenty (20) teachers indicated that, girls acquired speech faster than boys and spoke more intelligibly than boys. To elaborate this point, one teacher said,

> "*Boys have problems with learning how to talk. In most cases girls acquire speech faster than boys. I hear most mothers saying that girls learn language faster than boys and I concur with them because language contains speech."*

(ii) Diseases and its onset

The study further revealed that prolonged illness and diseases such as meningitis, cerebral malaria, and rapture of the eardrum, tinnitus, meniere's disease, otosclerosis, acoustic neuroma and otitis media caused hearing impairment and this resulted in loss of intelligible speech in learners. In addition, the study found that the earlier in life a child acquired hearing impairment, the poorer the intelligibility. One teacher endorsed these findings by saying,

> S*ince children learn how to talk by hearing their caregivers and significant*

others talk, sense of hearing is cardinal in speech development, meaning that hearing loss inhibits them from hearing correct speech sounds leading to loss of intelligible speech."

The study further more showed that even learners shared the same view with teachers that disease and its onset contributed to hearing loss and consequently led to speech impairment. To this effect, one learner said,

"When young, hearing ok. Then seven years old me sick meningitis then I stop hearing and my voice became bad. So I talk not very good."

In addition, the study found out that the type of hearing loss, the level of hearing loss and late intervention contributed to poor speech intelligibility. It was reported that the more severe the hearing loss a learner suffered, the poorer his/her speech. It was also expressed that the level of hearing loss determined the quality of speech, while learners born with profound hearing loss developed no speech at all.

(iii) Social Factors

The study also observed that poor speech intelligibility in learners with PLHI was a result of lack of exposure to spoken language, isolation due to lack of self esteem, inferiority complex, fear of stigma and lack of socialization. To this effect, findings showed that parents, siblings and significant others used signs instead of oral language, when communicating with the hearing impaired children. Attributed to this trend was parents and significant others' fear of societal rejection, stigma and embarrassment because of the child's distorted speech. In fact, parents hindered their own children from speech practice, and hampered speech intelligibility acquisition. Likewise, learners highlighted that parents communicated with them in sign language. They added that people both at home, and school always laughed and made fun of their poor speech, hence they opted to use sign language or simply keep quiet. One pupil explained,

"*Me better quiet not speak because people laugh too much and say me not know talking and I talk like small baby. So better sign because me know sign language better than talkin*g."

The study further highlighted that most learners with PLHI felt shy, and embarrassed to talk to hearing peers because these colleagues had better speech than them. Therefore, one of the learners said,

"*Me I feel shy talking because me not know very much talking.I fear people laughing me when talking because my Talking very poor hearing people talk well very much.*"

The study also revealed that most parents hid their deaf children in the house, hence prevented them from socializing with peers. Eight(8) out of twenty (20) teachers indicated that some of the parents of hearing impaired learners did not expose their children to the public for fear of stigma thus worsening the speech challenges of their children. Furthermore, learners posited that their parents seemed not comfortable with their speech because they did not allow them to talk to visitors. One learner complained saying;

"Each time visitor come home, mother tell me bedroom go sit there If come out I beat you. But others she allows to talk to visitor. When visitor go she call me. I feel very bad."

Furthermore, it was exposed in the study that learners with PLHI cut off speech for fear of being stigmatized and intimidated by peers that were unable to use oral communications, especially learners with profound hearing loss. Besides, it was discovered that learners with profound deafness hated to see other deaf learners speak and usually harassed them and threatened to chase them away from the unit so that they can join hearing peers in regular classes. For this reason, one teacher remarked,

"Pupils with post lingual hearing impairment who are usually a minority in deaf units lock up their speech for fear of being chased from the unit by the Profoundly deaf children. Otherwise with practice these learners can speak quite intelligibly."

However, fifteen (75%) of the learners with PLHI confirmed that they could not practice speech because the profound deaf learners always threatened to chase them from the unit each time they saw them talking. Therefore in order to maintain peace, and be accepted by profound deaf peers, they chose to use sign language rather than speech. To this effect one girl complained saying,

"*When us talk, our friends who can't talk feel bad and say go join your friends who talk. We will beat you if we see you talking."*

(iv) Apathy towards speech

It was also reported that learners had apathy towards spoken language. Consequently, this negatively affected speech development. Out of twenty (20) learners interviewed, five (25%) of them expressed having no interest in talking, indicating that signing was their own language. They said that no one should force them to speak because they never forced the hearing to use sign language. They further added that they did not want to look foolish in front of people, who talked since their speech was distorted. Thus one learner said,

> "*Sign language my language and good. Talking is for hearing people, I not interest in talking. Why force me talk? Us not force Hearing people to sign."*

In support of the colleague, another learner explained;

> *"Me talking I can but I want just not because I love sign Language It is language for us deaf and we proud should. Teachers should stop talking to us and should teach us sign language. Most flend of us sign poor because teachers not silious with sign language. Most Deaf can't talk so don't force us."*

In contrast, the majority of the learners felt that mixing with hearing peers was good as long as they had interest in them.

(v)Lack of Assistive devices

The study found out that special units lacked assistive devices such as loop system, speech mirrors, recording devices, video system and musical instruments considered helpful in speech therapy. As such, most teachers abandoned teaching speech thus hindering learners from improving speech. Never the less, it was explained that the loop system was very vital in audibly connecting a teacher to the entire class. With the loop system, every learner with hearing aids was able to hear the teacher through the central microphone.

Teachers remarked that assistive devices were either lacking or completely damaged in classrooms for the deaf which limited learners with residual hearing from getting correct speech sounds from model speakers. Although Speech Mirrors were reported to play a vital role in learners, considering that they helped to monitor their speech organs, they were also not available. This too hampered speech progress, yet promoted speech deterioration. Because of

lack of teaching aids, it was noticed that few teachers endured their struggle to teach speech while the majority abandoned it.

In triangulation, the researcher observed some of the speech lessons. A checklist was specifically designed to help the researcher establish what obtained in the speech lessons. It was found out that classrooms did not have learning/teaching materials necessary for speech lessons. Table 12 below presents a checklist on the non availability of teaching/learning aids in classrooms in all the units.

Table 12: Availability of Teaching Aids in Classrooms

S/No.	Teaching Aids	Yes	%	No	%
1	Does the class have speech mirrors?			√	
2	Does the class have amplification system?			√	
3	Does the class have charts on speech organs?			√	
4	Does the classroom have recording devices?			√	
5	Does the class have video system?			√	
Total		**0**	**0%**	**5**	**100%**

(vi)Teachers were not trained in special Education

The other factors revealed in the study as contributing to poor speech intelligibility were lack of trained personnel and inadequate teacher training. These compromised quality in speech training. In addition, some of the teachers were deaf. It was thus posited that some of the teachers teaching in special units had no qualifications in this area. To make matters worse, some of these teachers were reported to be deaf hence disadvantaged learners. It was alleged that untrained teachers had no skills to teach deaf learners. Statistically, seven (35%) teachers in special units had no qualifications in special education. Details are in table 13.

Table 13: Qualifications of Teachers Teaching Hearing Impaired Learners

	Teacher qualifications in special education	Frequency	Percentage
1	Certificate in special education	7	35%
2	Diploma in special education	4	20%
3	Degree in special education	2	10%
5	Teacher's certificate but not trained in special education	7	35%
Total		**20**	**100%**

To this effect, one of the teachers commented;

"It is really unrealistic to have teachers who have no qualification in special education teaching the already disadvantaged children. Teachers need to have special skills in teaching speech to children with hearing loss. The Ministry of Education should ensure that only teachers with special education qualifications are posted to deaf units, after all most of them are just teaching in the main stream wasting their special qualifications."

In addition, it was revealed that teachers with hearing impairments had no speech hence it was not possible for them to train learners in speech. Likewise, one of the hearing impaired teachers remarked,

"How can I teach speech to pupils when I have no speech myself?it is impossible I only use sign language to them because I only know sign language."

The study further highlighted that even specially trained teachers were unable to offer speech training to learners because they too were inadequately trained in speech methodologies and this contributed to poor teacher performance in speech therapy. The Likert scale below clearly presents the in table 14 below.

Table 14: The adequacy of Teacher Training in Speech

Do you think the training in speech that you obtained at college was adequate enough to help you tech speech effectively?		**Frequency**	**%**
1	Very much so	0	**0%**
2	quite much	0	**0%**
3	not so much	15	**75%**
4	not at all	5	**15%**
5	**Total**	**20**	**100%**

(vii) Over enrollment of learners in special classes

The study revealed that enrollment figures in SEN classrooms were enormous considering that one pupil in a special classroom was equivalent to 10 in an ordinary classroom. It was noticed that there were close to 40 learners in one classroom and these learners were of heterogeneous abilities in terms of hearing level, age, and grade. As a consequence, auditory training could not be conducted for fear of disturbing other learner in the same classroom. This prevented teachers from meeting individual learner's educational needs in speech. Therefore one teacher announced;

"My class is too big and it is a mixture of learners with different hearing levels. So how can one meet individual needs? It is difficult to teach speech adequately to too many learners with different learning needs It would have been better if pupils with post lingual hearing loss were separated from the profound deaf pupils who can hardly learn speech. When we advance such complaints the response is that there is no accommodation. So how else can we help these learners?"

(viii) Poor Learning Environment

In addition, it was noted that poor classroom lighting system, dilapidated classrooms, unacoustically treated rooms and other unfavorable learning conditions which learners were exposed to, affected learning outcomes negatively. As a matter of fact, this prevented learners from seeing speech organ movements of teachers during lessons and they could not lip-read or imitate their teachers properly. This de-motivated both learners and teachers as it impacted negatively on learners' speech development. Apparently, un acoustically treated walls resulted in outside noise infiltrating inside the classrooms and interfering with the desired speech sounds thus limiting acquisition of intelligible speech in learners with PLHI.

(ix) No lesson Preparation

The study further observed that teacher unpreparedness was so prominent in SEN classrooms and this undoubtedly contributed to learners' poor performance. From the researcher's observations, it was noted that all the teachers teaching speech did not have lesson plans. It was also observed that teachers did not take most of the necessary steps that made learners ready for speech training such as; speech organs exercises, hearing aids adjustments and voice clearing. However auditory training was done. Details are in table 15 below.

Table 15: Checklist to Determine Teacher Preparations for Speech Training Lessons

Preparations of lesson		**Yes**	**%**	**No**	**%**
1	Did teachers prepare teaching notes for speech training?			√	
2	Did teachers check all amplification devices before beginning of the lesson			√	
3	Did lessons begin with speech organs exercises?			√	
4	Did teacher do auditory training before speech training?	√			
Total		**1**	**25%**	**3**	**75%**

4.4 Summary

This chapter has presented the findings of the study that was directed by objectives tailored at finding out whether use of music in speech training enhanced speech intelligibility in the post lingual hearing impaired pupils, exploring interventional measures that teachers used to enhance speech intelligibility in pupils with post lingual hearing impairment and establishing factors that contributed to poor speech intelligibility in post lingual hearing impaired pupils. From the findings of the study, it was found that use of music in speech training enhanced speech intelligibility in learners with post lingual hearing impairment. It has also been established that music motivates learners in speech lessons. It has also been revealed that singing helps learners to clear the vocal canal leading to clear word production. Music improves pronunciation of words and intonation in the speaker. In addition, music widens learners' vocabulary and facilitated quick acquisition of speech intelligibility.

CHAPTER FIVE
DISCUSSION OF RESEARCH FINDINGS

Overview

This chapter focuses its discussions on the findings of the study. The order of the discussions follows the order in which the findings have been presented in the previous chapters namely: the role of music in speech intelligibility of learners with PLHI, how teachers helped learners with PLHI enhanced speech intelligibility and factors that contributed to poor speech intelligibility in learners with post lingual hearing impairment.

5.1 The Role of Music in Speech Intelligibility in Learners with PLHI.

The study sought to find out whether music in speech training enhanced speech intelligibility in learners with PLHI. Results of the study showed that the majority 15 (75%) of the teachers felt that music did help learners with PLHI acquire intelligible speech. To this effect, teachers outlined and explained the roles they felt music played in enhancing speech intelligibility in learners with PLHI.

The study found out that music in speech training motivated learners and further revealed that HI learners were able to hear musical vibrations, thus the beat in the instruments stimulated them. Since learners with PLHI were reported to have low self esteem due to speech distortion, it may not be easy to encourage them to talk. Therefore use of music in speech training may help since music evoked emotions and mirrored the main characteristics of emotional behaviour, speech and thought (Lewis et al 2008). To this effect, Allen (1990) postulated that music extended beyond sound, and into the realm of arousal that had specific quantifiable role in speech.

The study also discovered that the beat in singing helped learners in regulating their speech patterns. Music helped learners in this way, most likely because speech was musical since it had rhythmic patterns and pitch, all which may be noted in intonation, stress and articulation. To this effect, Calvert (1989) reported that music may regulate and improve sentence production because it was known to have a pattern of movements similar to speech. Singing followed a rhythm and had pitch. Pitch may be high or low. Similarly speech was not just a flat sound. It

had its own rhythm and singing helped in improving speech rhythm and in making speech variations. Most hearing impaired learners had no speech rhythm and this prevented listeners from understanding them. Therefore singing may help learners with PLHI acquire rhythmic speech patterns. Supporting this view is Geffner, (1980) who reported that rhythm and pitch patterns can assist a client in learning articulation and pronunciation of words and improve speech rhythms, accents, and sentence phrasing.

Study findings also revealed that learners with residual hearing were able to mimic singers. The researcher therefore felt that if learners can mimic good singers who are good speakers, they too may produce and develop good speech. Moreover learning a language through music was easy. People easily learnt songs in foreign languages (Bordern, 1980). In addition, Levitin (2001) reported that it seemed that everyone was an expert musical listener, able to make subtle determinations of what they liked and didn't like. In other words, everyone understood music despite lack of declarative knowledge about it.

The study highlighted that 'music speaks' and words sung stuck in learners' minds as they listened to a song repeatedly. The study also reported that learners felt that music helped them to remember and master words in a song. Considering that most HI learners suffered from short memory span (Gold 1990), teachers and learners may be right since Levitin (2006) reported that multiple reinforcing cues of a good song, rhythm, melody and contour caused music to stick in learners' heads. Thus music formed a tool for activation of specific thoughts. Perhaps this was the major reason teachers used music to teach certain concepts. For example, the *'ABCD'* song was used to teach learners letters of the alphabet, '*one man and a dog*' song to teach the concept of addition and subtraction and the *'Sunday Monday* 'song to teach about days of the week. These songs helped in mastering these concepts. Consistent with this, Wolf and Horn (1997) reported that music was a mnemonic device which was usually used to remember formulas.

The study revealed that singing helped learners to clear the vocal fold and it allowed the inflow of air into speech organs and elaborated further that air helped in producing explosive and fricative sounds. The studies highlighted that the flow of music also gave exercise to speech organs, for example; singing induced the sound box into vibrations. This finding is in consistent

with a report by Gregg (2002) that in humans, the vocal fold was adjustable in length, tension and shape, thus singing gave the human larynx the honors for vocal versatility that helped in appreciating the musicality in every day speech. The study reported that learners felt that singing helped them to clear their voices which improved speech production. The finding is in tandem with Robbins & Robbins (1980) who found that music reinforced vocal spontaneity, improved voice quality, and gave a freer use of rhythmic principles.

Findings also revealed that music widened learners' vocabulary because as learners listened more and more to music, they learnt more words. This finding is in line with Gfeller, & Darrow, (1987) who reported that music assisted in the development of vocabulary and had the advantage of patterned drill without monotony. Since singing had a repetitive nature it acted as a drill in which learners learnt speech through the song words. This may be real in that music contained tempo whose speed typically generated excitement, energy and action. Its sudden change also captured attention of listeners and produced maximum suspense during which a teacher may introduce a concept requiring maximum attention.

The study alsoreported that music was very useful in auditory training because it helped learners to differentiate sounds. In this way, they were able to acquire speech. Teachers said that sound awareness and differentiation facilitated production of intelligible speech. This finding is in consistence with Darrow (1985) who reported that music offered a medium through which listening can be practiced. He further stated that children must be taught to become aware of sounds as a means of obtaining information from their environment. He also explained that musical stimuli often provided children who were deaf and hard of hearing with the motivation to attend to and interpret meaning from sounds. To this effect, the researcher also felt that sound discrimination did not only facilitate speech acquisition but also reading. Learners with PLHI mainly depend on visual communication and reading was one of them. Speech can be enhanced through reading. This may be done by writing down words intended for speech training. These words may be chanted or rhymed and later on used for teaching stress, articulation and intonation. HI students learnt well with visual cues than abstract. Teacher may even introduce music to teach stresses as was rightly put by Gilbert (1990) that tapping, clapping, or playing simple rhythm instruments helped learners to be aware that unstressed syllables had weak beats

and that to their vowels beat needed to be reduced. He therefore advised to give a strong beat to the stressed syllable and weak beats to the others by clapping, tapping on the desk, or playing simple rhythm instruments like tambourines or toy hammers.

Teachers also indicated that music improved speech intelligibility as it helped in word pronunciation, sentence construction and intonation. This finding was in line with Robbins & Robbins (1980), who reported that among other benefits, the potential contribution of music therapy was evident in the quickening of the individual's overall learning of pronunciation and intonation. The finding seemed to indicate that singing was a tool that facilitated speech probably because of its movement quality, likely to evoke movement of the larynx, jaw, tongue and lip leading to proper speech production.

Since most of the findings on the role of music in speech intelligibility were field based (mainly from teachers' and pupils' responses) and lacked empirical evidence, the study found it necessary to triangulate by conducting an experiment on two groups of learners of which one group was given musical treatment while the other was not (ref 3.6).

Results showed that learners in the experimental group out performed learners in the control group in both, single word pronunciation and short sentence construction intelligibility tests. 20 (67%) learners in the experimental group performed well in the single word intelligibility test while only 11 (37%) performed well in the control group. Coming to short sentence construction test, 24(80%) learners in the experimental group performed well while only 9 (30%) learners in the control group performed well. Their mean differences were so evident (1.2) in single word pronunciation intelligibility test and (3.2) in short sentence construction while paired samples correlations for both single word pronunciation and short sentence construction intelligibility tests the difference was statistically significant ($p<..000$) implying that music had a positive influence in enhancing speech intelligibility in learners with post lingual hearing impairment. The short sentence construction results were quite interesting. While generally learners were expected to perform far much better in a single word pronunciation test than in the short sentence construction test, the opposite happened. It may be assumed that in the first test, learners may have been nervous because they were being assessed by teachers they did not know. However, in

the second test, learners may have gained confidence in themselves hence this better performance.

The findings of this study therefore seem to provide empirical evidence to several studies in the available literature that alluded to the positive contributions music made towards speech intelligibility enhancement in learners with speech and hearing impairments. The findings of this study therefore may empirically support Allen (1990) who postulated that music extended beyond sound, and into the realm of arousal that had specific quantifiable role in speech and Gfeller, & Darrow, (1987) who found out that music assisted in the development of vocabulary and had the advantage of patterned drill without monotony. The findings of this study also backup Robbins (1980), who revealed that among other benefits, the potential contribution of music therapy was evident in the quickening of the individual's overall learning of pronunciation and intonation among others.

From study findings, it seemed that, music played several effective roles in enhancing speech intelligibility in learners with post lingual hearing impairment. Findings of the study also seem to suggest that music and speech played complimentary roles. In as much as speech facilitated singing, singing too facilitated speech. The study has also shown that music had some elements that emotionally evoked speech and these were; rhythm, tempo melody and contour. However, the fact that participants in this study were not assessed in hearing levels of hearing impairment, and that mixed abilities were used, there was more need for replication of the study where the external variables may be taken care of.

5.2 Strategies Teachers used to Help Learners with PLHI enhance Speech Intelligibility

The study found out that teachers used amplification devices, lip reading, total communication and a combination of these to enhance speech intelligibility. The study noted that teachers encouraged lip reading because most of these learners lost the sense of hearing after developing speech, so it was easy for them to perceive what someone was saying by following lip movements. This method was encouraged because it was the initial process for learning speech and language since babies learnt speech by observing the lip of their caregivers. Supporting this view are Lewkowicz et al (http://www.pnas.org/content/early/2013) who discovered that between ages of six to eight months, during the "babbling" stage of language acquisition, babies

focused on the mouth of the speaker and they continued lip reading until about 10 months of age, at which they switched their attention back to the eyes.

However, much as this method may be popularly considered adequate, it had its own limitations. For instance, sounds whose places of articulation were deep inside the mouth or throat were not detectable, for example, glottal consonants and most gestures of the tongue. Voiced and unvoiced pairs looked identical, such as [p] and [b], [k] and [g], [t] and [d], [f] and [v], and [s] and [z]; likewise for nasalisation (e.g. [m] vs. [b]. It has been estimated that only 30% to 40% of sounds in the English language were distinguishable from sight alone (http://www.pnas.org/content/early/2013).

In addition the study found out that other teachers encouraged total communication indicating that speaking and signing at the same time helped learners to develop intelligible speech, since this method facilitated constant speech practice. Educators, even parents may favor total communication probably because it is a 'catch-all' that ensured that a deaf child had access to some means of communication. For example, a deaf child who cannot communicate well orally got the additional support of sign language, and vice versa. However depending entirely on this method of communication posed a risk as signing may be more prominent than speech and this may result in less developed speech skills as was rightly noted in a study done by Oconner et al (2000) in an oral program. The study found that the students in the oral programs developed more intelligible speech than the total communication students.

The study discovered that integrating learners in the mainstream for extracurricular activities such as preventive maintenance, clubs and sports facilitated socialization and helped learners with PLHI acquire speech intelligibility. This view is consistent with Walczyk (1993) who reported that mainstreaming of an HI learner into a regular education setting, increased interaction between that learner and hearing peers. This also increased socialization through shared participation in various school programs. From this finding, it may be taken that mixing learners with HI was a natural way learners may acquire speech faster because during peer interaction, HI learners may struggle to speak in an effort to be understood by hearing peers and in the end develop some vocal skills.

The study reported that teachers encouraged learners to imitate parents and teachers as they were considered to be speech role models. This finding is consistent with Girolametto et al, (1999) who reported that facilitative language technique, such as imitation and expansion, enhanced language learning in young children at the single-word stage of language development. Naturally, parents were the first teachers of speech because children started learning speech by imitating parents. However, this method may not be always reliable because as children grew up, they often drifted away from parents in preference of peers who too may be deaf in this case.
In addition, the study reported that teachers felt that role play in classrooms of learners with PLHI needed to be encouraged as it may help learners to use residual speech. In addition, findings show that teachers felt that, using wall pictures in story telling may help learners improve speech as this encouraged oral narration of the story in the picture. By so doing learners may develop confidence in oral communication. To this effect correct placement was paramount to avoid confusion in classrooms. Learners needed to be placed according to grade and level of impairment failure to which learners who cannot speak may be discouraged if they learnt in the same classrooms.

The study highlighted that learners felt confused not knowing which language to follow between sign language and signed English. To this effect, the findings revealed that PLHI preferred using oral language to sign language. Therefore they felt it was better to separate them from the profoundly deaf learners so that they may concentrate on speech while the profoundly deaf learners concentrated on sign language. They pointed out that if this was possible with optional subjects it would equally work out for speech and sign language lessons. The researcher felt this was feasible, helpful and might even prevent wrangles that existed between the profoundly deaf and learners with PLHI.

5.3 Factors that Contributed to Poor Speech Intelligibility in Learners with PLHI

Teachers and learners mentioned and explained a number of factors they felt contributed to poor speech intelligibility in learners with PLHI.

5.3.1 Views of teachers and learners

The study found out that gender of learners affected speech development. The same results observed that most of the boys with post lingual hearing impairment had no intelligible speech as compared to girls. Since selection of participants was dependent on how one was willing to use oral communication, there is a possibility that girls in the study sites were more willing to use speech than boys, and this may be an indication that there were more girls with intelligible speech than boys in special units that took part in the study. To this effect, results of the study show that girls (45) outnumbered boys (35). This finding is consistent with Abiodun (2006) who reported that female children always developed verbal skills faster and better than male children. Similarly, Okoye, (1987) observed that various biological differences inherent in male and female students were responsible for some disparities in speech and language use.

Concerning disease it was reported that diseases and onset of the hearing impairment contributed to poor speech intelligibility. The study revealed that the earlier the onset of the disease and hearing impairment, the poorer the speech. To this effect, Leybaert, et al (1998) reported that children with early onset hearing loss generally lagged significantly behind their normally hearing peers in all areas involving speech and speech perception. Generally, children developed speech around the age of two and some level of intelligibility by the age of three. Speech is acquired by hearing and imitating parents and significant others. Therefore losing hearing at a tender age before speech is fully developed hampers speech intelligibility development. Consequently a person who loses the sense of hearing before speech is fully development might grow on with infant-like speech. This therefore may explain why the majority of Hearing Impaired learners expressed themselves in telegraphic, usually unintelligible speech. In tandem with this finding therefore, John et al (1997) reported that children who acquired hearing loss at a tender age had poorer speech intelligibility as compared to those who acquired it later in age.

In addition, the study found out that late intervention of disease s such as otitis media, tinnitus and other ear canal infections led to hearing impairment which had a negative effect on speech development and resulted into poor speech intelligibility in learners with PLHI. Consistent with this finding is a report by Crawford (1995) that while early identification, assessment and intervention were cardinal in speech development, most hearing impaired children remained

unidentified for long periods of time hence they entered school with little speech or speech patterns that required intense remediation. The fact that children suffered prolonged illness before the impairment, late intervention cannot be ruled out hence the researcher may concur with the study findings. It is purported that most parents found it very difficult to accept the impairment of a child. As such they went 'window shopping' for alternative solutions overlooking the medical diagnosis and advice. This obviously contributed to delayed intervention which most likely was embarked on after deterioration of residue speech.

Just like Denes, and Pinson, (1992), the study also revealed that the more severe the hearing loss, the poorer the speech intelligibility. This may imply that, the more severe the hearing loss, the less likely a person was able to pick intelligible speech sounds from significant others and the less likely such an individual developed intelligible speech. On the other hand, people with mild hearing impairment were more likely to express intelligible speech and their hearing was likely to improve with the help of hearing aids. However, learners in this study were not assessed to ascertain their hearing levels which may limit the argument for or against this finding. However, the possibility of this being equally the case was apparent.

The study further discovered that learners lacked exposure to spoken language at home because parents, siblings and significant others communicated with them using signs instead of speech to safeguard themselves against societal stigma, rejection and embarrassment due to the child's distorted speech. On the other hand, Calderon et al (1998) reported that parents played a role in developing speech in children with mild hearing loss. Likewise, Moeller (2000) reported that parental involvement played a pivotal role in present-day early intervention speech programs. The finding of this study was not in consistent with the relevant literature but this does not mean that the attitude of parents was binding for all parents as may be deduced from Moeller's findings.

From the finding of the study, it is clear that parents safeguarded their social acceptability at the expense of their children's speech.

The study also reported that learners withdrew from hearing peers because they felt inferior to them. This finding is consistent with Meadow-Orlans (1995) who reported that persons with hearing loss often express feelings of depression, withdrawal and isolation. This finding seemed to highlight the reason why despite the Educational Policy of Mainstreaming (Ministry of Education1996), hearing impaired learners continued to learn in isolation. Learners felt that learning in isolation was better probably because they felt socially accepted when they associated with their fellow deaf learners. Similarly, Linton, (1998) reported that persons with profound hearing impairments usually identified with other profound deaf people in order to maintain a sense of self worth. Although this attitude may seem realist and justified as a human right, it created spoken language apathy and it deprived them of the rehabilitative impact socialization played on speech and language acquisition.

In relation to assistive devices, the study revealed that SEN classrooms lacked assistive devices such as loop system, speech mirrors, recording devices, video system and other learning/teaching aids to help them offer speech lessons. The finding is consistent with Fletcher, Dagenais, and Critz-Crosby, (1991) who too noted that most schools lacked assistive devices to help learners with communication difficulties. All the mentioned devices were necessary in speech training, For instance, the loop system helped in audibly connecting the entire class to the teacher's speech thus allowing each learner to pick correct speech from the model speaker and it also allowed the teacher to listen to each and every child's speech making it easy for the teacher to correct a learner as per need. Mirrors too were strong self-correction tools for students to modify, imitate sounds or do peer-correction or self-correction while approaching some problematic sounds. Therefore lack of these speech training devices compromised speech training thus limiting acquisition of intelligible speech.

Furthermore, the study reported that some of the teachers in special units were unqualified, in addition some of these teachers were hearing impaired. To this effect, it was obvious that teaching was compromised. Interestingly even teachers themselves were aware of the fact that it was impossible for them to teach speech. Therefore one of the deaf teachers said,

"How can I teach speech to pupils when I have no speechmyself? It is Impossible! I only sign for them because I only know sign language."

This finding is in line with Alexander, (2002) who reported that most speech therapists lacked training, which contributed to problems in lesson delivery. Similarly the study reported that, even specially qualified teachers were inadequately trained in speech methodology and this compromised their lesson delivery. The finding is similar with O'Connor, (2003) who reported that lack of educator training impacted negatively on speech training. Since teacher training was cardinal in supporting proper implementation of speech and language in education policy, inadequate teacher training did not only hamper speech intelligibility in learners but also enhancement of education for all policy. Proper speech acquisition helped individuals to leave independent lives since intelligible speech lead to effective communication skills. Therefore if learners graduated from school without proper speech it meant that would not be able to communicate effectively and they may not be accepted by the society.

The same study observed that there was over enrollment in SEN classrooms and learners of different age, grades and hearing levels were lamped in one classroom. This prevented teachers from doing certain activities required in speech training for fear of disturbing other learners learning in the same classroom. Considering that children in lower primary had poorer speech, they needed more speech training. Mixing these learners with higher grades limited their level of concentration. It was difficult to concentrate on one teacher while there were several other teachers speaking at the same time. Moreover this may even be confusing. It may also be very difficult for teachers to attend to learners' particular needs. To this effect, Bakare (1988) reported that placing and instructing learners with post lingual and learners with pre lingual hearing loss in the same class violated the principle of individualization of instruction. From this finding therefore it may be asserted that while learners in higher grades in these classrooms experienced relative success in school, the lower grades experienced some degree of frustration, which had a negative impact on the overall performance of a learner. As a result of this, Bakare (1988) posited that, as a principle, learners with pre-lingual and post lingual hearing impairment should be distinctly placed and taught. To this effect, the researcher felt that speech training may be successful only when learners are trained according to their abilities.

In relation to learning environments, the study revealed poor classroom acoustics. The study observed that classrooms of learners with HI were not acoustically treated resulting in outside noise interfering with the desired speech sounds. This finding is in line with the report by Ross et al (1991) that most schools with hearing impaired learners had not addressed environmental noise in classrooms despite research revealing classroom acoustics as a problem (Davis 9177, Baker, 1990 and Antony 191997). It was also observed that HI learners were usually given small isolated classrooms that were usually dilapidated with poor lighting system. Considering that HI learners depended on visual communication, placing learners in blared lit classrooms prevented them from following oral communications through lip-reading and seeing necessary learning materials in the classroom especially that some of the learners may have multiple impairments including visual impairments. Therefore, Marc Marschark et al (2002) reported that schools for HI learners needed to ensure that there was good lighting so that visual aids can be clearly seen as well as lip movements.

The study observed that all the teachers teaching speech did not have lesson plans and never did the necessary initial steps before speech lessons such as; voice clearing, breathing exercises and probably many others. This was contrally to Fix (2008) who reported that it was important to plan speech exercises with the whole learner in mind, and teach English pronunciation by making oral speech and correct pronunciation meaningful for the learner. Therefore teachers needed to plan speech activities before hand if they were to successfully present speech therapy. Teacher preparation was a key to successful teaching hence it made one wonder whether teacher evaluation was a priority in the education system.

5.4 Summary

This chapter has presented the discussions of the study that was directed by objectives tailored at finding out whether use of music in speech training enhanced speech intelligibility in learners with PLHI, exploring interventional measures that teachers used to enhance speech intelligibility and establishing factors that contributed to poor speech intelligibility in learners with post lingual hearing impairments. From the findings of the study, it was significant that use of music in speech training enhanced speech intelligibility in learners with post lingual hearing impairment. It was also established that music motivated learners in speech lessons, cleared the vocal canal

leading to clear word production, and improved pronunciation of words and intonation in the speaker among others. The study also revealed that the majority of the teachers were not teaching speech to learners as an intervention to enhancing speech intelligibility in learners with Post Lingual Hearing Impairment. The few that did used total communication, lip reading, encouraged use of hearing aids while others used a combination of all the mentioned measures. The study also found out that several factors contributed to poor speech intelligibility in learners with Post Lingual Hearing Impairment. These factors included; lack of exposure of learners to spoken language both at school and home, use of sign language in school as opposed to speech, fear of stigma, fear of being laughed at, just to mention a few.

CHAPTER SIX
CONCLUSION AND RECOMMENDATIONS

Overview

This Chapter concludes the findings of the study and makes recommendations based on the findings. The conclusion is closely aligned with the purpose of the study which sought to find out whether use of music in speech training enhanced speech intelligibility in learners with Post Lingual Hearing Impairment.

6.1. Conclusion

From the study, it was evident that learners with Post lingual hearing impairment progressively suffered from loss of intelligible speech emanating from various factors most of which were diseases, lack of educational devices, inadequate teacher education, poor or lack of lesson preparations, learner apathy and over enrollment levels, lumping learners of varying degrees of hearing impairment in the same classroom, poor learning environments and many social factors.

It was also clear from the study that most of the teachers neglected speech training for learners with PLHI due to overwhelming lack of educational provisions. Worse still was the fact that very few teachers showed interest in even using methods that did not demand special devices to enhance speech intelligibility such as total communication and lip reading. Only few teachers made this initiative. Most of these measures indicated limitations of their own kind which further stimulated the study to test music by doing an experiment on learners. From these findings therefore it may be realized that teachers needed to explore many creative interventions that would facilitate intelligible speech in learners even when special devices were lacking in classrooms.

Even though throughout the study it was apparent that learners with post lingual hearing impairment experienced speech problems it was also very evident that these learners had the potential to retain, improve and sustain intelligible speech. From this study, it was significant that speech intelligibility could be improved and sustained in learners with post lingual hearing impairment if all the parents and community could be supportive of these learners and if teachers could put up special interventions in school of which speech training was one of them. Unfortunately very few teachers showed interest in enhancing learners' speech. The few teachers

that were interested in learners' speech did not offer speech training but used methods that did not drill learners in speech such as lip reading, total communication and use of amplification devices. This made learners feel supported in speech but did not help much in improving and sustaining intelligible speech.

Despite mentioning several methods that may help learners improve speech, teachers did not use music in speech training even though some of them were of the view that it played a significant role in enhancing speech intelligibility and were even aware of these roles. However, having used music in the study to train learners in speech, it was significant that learners who received musical treatment in speech training out performed those who did not. This was established through the pre-test and post-tests as well as the t-tests which helped in statistically establishing the difference in performance of learners that received musical treatment in speech training and those that did not. To this effect it was discovered that music played a significant role in improving word pronunciation, sentence construction and intonation thus making speech intelligible to listeners. From these findings therefore, the study concludes that among other methods that may be used in speech training, use of music facilitated quicker acquisition of intelligible speech. The repetitive nature of singing provided speech practice, verbal memory and cleared vocal folds leading to improved voice production which all lead to speech intelligibility.

6.2 Recommendations

On the basis of study findings, the following recommendations to Ministry of Education, teachers, parents and learners were necessary.

1. Music should be used in speech training of learners with post lingual hearing impairment to enhance speech intelligibility

2. The Ministry of Education Science Vocation Technology and Early Education in collaboration with the Ministry of Health needs to establish Multi dimensional centers that would provide medical assessment, treatment and counseling services in all provinces. This will help to place

learners correctly and allow parents to access all necessary services in one place rather than moving from place to place.

3. Ministry of Education Science Vocation Technology and Early Education need to build classrooms specifically designed to meet educational needs of the hearing impaired learners. Classroom walls should be acoustically treated and ought to be fitted with amplification devices, speech mirrors, musical instruments and other necessary equipment to enhance speech training sessions and facilitate faster acquisition of intelligible speech in learners with post lingual hearing impairment.

3. Enrollment levels in classrooms should be reduced and placement of learners should be according to levels of hearing impairment and according to grade.

4.Teachers should always be creative and plan their work, as this is the only way they can come up with ideas and methodologies that are likely to meet learners' individual needs for example use of music, use of role play and wall picture story telling in enhancing speech intelligibility in learners with PLHI.

5.Teachers need to counsel parents and sensitize them on their special role in speech development of their children. In addition, there should be teacher parent collaboration so that what teachers teach is monitored and encouraged by parents at home.

6.Parents need to be proud of their children despite their distorted speech. They should always encourage spoken communication and never use discouraging remarks.

6.3 Further research

Further studies could be undertaken to:

1. Replicate this study using a larger sample
2. Investigate the role of Music in language development in hard of hearing learners
3 Establish the effect of poor speech intelligibility on Literacy Skills in Learners with Post Lingual Hearing Impairment.

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APPENDICES

APPENDIX (I)

THE UNIVERSITY OF ZAMBIA

SCHOOL OF EDUCATION

DEPARTMENT OF EDUCATIONAL PSYCHOLOGY, SOCIOLOGY AND SPECIAL EDUCATION

Dear ……..

I am a student pursuing a master's degree in Special education at the University of Zambia and it is my pleasure to inform you that you have been selected to take part in the study which is investigating the role of music in speech intelligibility. Speech intelligibility refers to the ability of one's spoken language being understood clearly by others. Pupils with post lingual hearing loss (HL) have residue speech which is usually lost as may be observes in their poor word pronunciation and articulation as well as poor sentence production and intonation. The researcher therefore seeks to explore whether music may play an interventional role in speech intelligibility.

Be assured that the information that will be obtained from you is purely for academic purpose and your identity will be treated with high confidentiality. Thanking you in anticipation.

Yours faithfully,

Emily Katongo.

APPENDIX (II)

QUESTIONNAIRE FOR SPECIAL EDUCATION TEACHERS

BIO DATA

Tick the response the represents your opinion

(i) Gender: Female ☐ Male ☐

(ii)Number of years in service under special education:

3- 5 years ☐ 5-10years ☐ 10- 15 years ☐ 15-20 years ☐ 20 years and above ☐

(iii) Highest qualifications in special education: Certificate ☐ Diploma ☐ Degree ☐ Masters ☐

A. Coming to the role of music in enhancing speech intelligibility of the pupils with post lingual Hearing Loss (HI)

1. Do you agree that use of music in speech training can improve speech intelligibility in pupils with post lingual hearing loss? I agree ☐ I strongly agree ☐ I disagree ☐ I strongly disagree ☐

2. What role does music play to enhance speech intelligibility in learners with post lingual HI?

……

……

……

B. Coming to interventional measures to speech intelligibility in pupils with post lingual hearing loss

3. Do you offer speech training to pupils with post lingual hearing loss with residue speech in this class?

Yes ☐ No ☐

4. What interventional measures do you use to improve speech in pupils with post lingual hearing loss? Tick your response in the box

A Use of amplification and speech ☐ **B** Lip reading ☐ **C** Total communication ☐ **D** Cued speech ☐

Any other, please specify: ..……...

5. Which amplification devices are mostly used by pupils to enhance speech intelligibility in your

school?.....

.....

C. Coming to factors that contribute to poor speech intelligibility in pupils with post lingual HI

6. What challenges do you encounter in speech training programs that may contribute to poor speech?

A Lack of provision of learning materials ☐ **B** Pupils have apathy towards spoken language ☐

C Classrooms are not caustically treated ☐ **D** All the above ☐

Are there any other? Please specify

……

……

7. What other factors do you think limit special education teachers in offering speech training to pupils with post lingual hearing loss? ……

……

……

8. Do you think the training in speech that you obtained at college was adequate enough to help you teach speech effectively? Very much so ☐ quite much ☐ not so much ☐ not at all ☐

Thank you God bless!

APPENDIX III
Learners' interview schedule

General information

1. Self introduction by name and grade

2. When did you come to this school?

3. Do you like this school?

A. The role of music in enhancing speech intelligibility in learners with post lingual hearing loss

1. Do you like music? 2. Are you able to sing? 3. Do you thing music is important in learning speech?

4. Please explain how you feel music helps you to improve speech

B. Intervention measures teachers use in enhancing speech intelligibility in learners with post lingual HI

1. Are you able to speak? 2. Do teachers train you in speech?

3. How do you feel teachers encourage you to improve on you speech?

(b) Explain how you feel teachers help you in improving speech or why you feel they do not

4. Do you have hearing aids? 5 Do you wear hearing aids? (b) Explain why you do not.

6 Do you think wearing hearing aids is helpful? (b) Explain why you feel hearing aids are important in improving your speech.

C. Factors that contribute to poor speech intelligibility in learners with post lingual HI

1. At what age did you lose your sense of hearing? 2. How did you become deaf?

3. Why do you think your speech is somehow distorted? 4. What factors do you feel prevent you from improving your speech?

APPENDIX (iv)
SPEECH TRAINING SCHEDULE

WEEK	DAY	ACTIVITY	METHODOLOGY	RESEARCHER'S COMMENT
1	1	**Learning a song** Jesus loves me this I know For the bible tells me so Little ones to him belong They are weak but he is strong Chorus Yes Jesus loves me, yes I know Yes Jesus loves me	Imitation, repetition drill, chain drill, substitution drills etc.	
	2	**Word list** Jesus Love Strong Know Bible Tells For Weak Belong Me This Is But Him The Yes Little They	Imitation, repetition drill, chain drill, substitution drills etc.	
	3	**Sentence construction** 1. Yes Jesus 2. I love Jesus 3. I know Jesus loves 4. Little ones belong to Jesus 5. Jesus loves me for the bible tells me. 6. Jesus loves the little ones so the bible tells 7. I belong to Jesus, this I know	Imitation, repetition drill, chain drill, substitution drills etc.	

	4 & 5	and I love him 8. The bible tells me Jesus loves me so	Imitation, repetition drill, chain drill, substitution drills etc.	
2	**1**	Go through lessons 1, 2 and 3 for Consolidation **Rhyme** Old mother Herbert Went to the cupboard	Rhyming, Imitation, repetition drill, chain drill, substitution drills etc.	
	2	Because her dog, wanted some food But when she went there, the cupboard was bare And so her dog didn't get any food	Imitation, repetition drill, chain drill, substitution drills etc.	
	3	**Word list** Mother cupboard because food Herbert went wanted some When old didn't there Dog bare was she **Sentence construction**		

		1. Mother Herbert 2. The cupboard was bare 3. Mother Herbert went 4. Old mother Herbert went to the cupboard 5. Because the cupboard was bare dog didn't Get food 6. When he went there the cupboard was bare 7. Old mother Herbert went to the cupboard to Get dog food 8. The dog didn't get any food because the cup Board was bare.		

SINGLE WORD PRONUCIATION INTELLIGIBILITY TEST

INSTRUCTIONS

Read these words allowed to the teacher

1. Jesus
2. Strong
3. Weak
4. Mother
5. Herbert
6. Love
7. Bible
8. Cupboard
9. Belong
10. Wanted

SHORT SENTENCE CONSTRUCTION INTELLIGIBILITY TEST

INSTRUCTIONS

Read these words to the teacher allowed

(1) Old Mother

(2) Jesus loves me

(3) Dog and food

(4) They are weak

(5) The bible says so

(6) Cupboard was bare

(7) When she went there

(8) Little ones belong to him

TEST SCORE SHEETS

SINGLE WORD PRONUCIATION INTELLIGIBILITY PRE-TEST (Experiment group)

Pupil----------

S/N	Word read and pronounced as:	Understood as:	Unintelligible	Score

SCORE SHEET
SINGLE WORD PRONUCIATION INTELLIGIBILITY PRE-TEST (Control group)
Pupil----------

S/N	Word read and pronounced as:	Understood as:	Unintelligible	Score

SCORE SHEET
SINGLE WORD PRONUCIATION INTELLIGIBILITYAFTER TREATMENT (Experiment group)
Pupil----------

S/N	Word read and pronounced as:	Understood as:	Unintelligible	Score

SCORE SHEET
SINGLE WORD PRONUCIATION INTELLIGIBILITY AFTER TREATMENT (Control group)
Pupil----------

S/N	Word read and pronounced as:	Understood as:	Unintelligible	Score

SCORE SHEET
SHORT SENTENCE CONSTRUCTION INTELLIGIBILITY AFTER TREATMENT (Experiment group)
Pupil----------

S/N	Word read and pronounced as:	Understood as:	Unintelligible	Score

SCORE SHEET
SHORT SENTENCE CONSTRUCTION INTELLIGIBILITYAFTER TREATMENT (Control group)

Pupil----------

S/N	Word read and pronounced as:	Understood as:	Unintelligible	Score

SCORE SHEET
SHORT SENTENCE CONSTRUCTION INTELLIGIBILITY PRE-TEST (Experiment group)
Pupil----------

S/N	Word read and pronounced as:	Understood as:	Unintelligible	Score

SCORE SHEET
SHORT SENTENCE CONSTRUCTION INTELLIGIBILITY PRE-TEST (Control group)
Pupil----------

S/N	Word read and pronounced as:	Understood as:	Unintelligible	Score