FACTORS INFLUENCING LEARNERS WITH HEARING IMPAIRMENT
POOR PERFORMANCE IN MATHEMATICS IN KENYA CERTIFICATE OF
PRIMARY EDUCATION EXAMINATION IN MERU COUNTY, KENYA

By

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DECEMBER, 2016
DECLARATION

This thesis report is my original work and has not been presented for a degree in any other University.

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DEDICATION

I dedicate this study to my loving mother, Helen Kirugi.
ACKNOWLEDGEMENT

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<tr>
<td>BEFA/EFA</td>
<td>Basic Education for All</td>
</tr>
<tr>
<td>BERC</td>
<td>Basic Education Research Centre</td>
</tr>
<tr>
<td>CWD</td>
<td>Children with Disabilities</td>
</tr>
<tr>
<td>HI</td>
<td>Hearing Impairment</td>
</tr>
<tr>
<td>IDEA</td>
<td>Individuals with Disabilities Education Act</td>
</tr>
<tr>
<td>IEP</td>
<td>Individualized Education Plan</td>
</tr>
<tr>
<td>KCPE</td>
<td>Kenya Certificate of Primary Education</td>
</tr>
<tr>
<td>KISE</td>
<td>Kenya Institute of Special Education</td>
</tr>
<tr>
<td>KSL</td>
<td>Kenya sign language</td>
</tr>
<tr>
<td>MDG</td>
<td>Millennium Development Goals</td>
</tr>
<tr>
<td>MKO</td>
<td>More Knowledgeable Other</td>
</tr>
<tr>
<td>NACEOP</td>
<td>National Committee on Education Objectives and Policies</td>
</tr>
<tr>
<td>SNE</td>
<td>Special Needs Education</td>
</tr>
<tr>
<td>TIQUET</td>
<td>Totally Integrated Quality Education and Training</td>
</tr>
<tr>
<td>UNESCO</td>
<td>United Nations education Scientific and cultural Organization</td>
</tr>
<tr>
<td>UPE</td>
<td>Universal Primary Education</td>
</tr>
<tr>
<td>ZPD</td>
<td>Zone of Proximal Development</td>
</tr>
<tr>
<td>SMASE</td>
<td>Strengthening Mathematics and Science Education</td>
</tr>
<tr>
<td>INSET</td>
<td>In-Service Education and Training</td>
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The purpose of the study was to analyze the determinants of poor performance of learners with hearing impairment in mathematics in Kenya certificate of primary education examination in Meru County. Despite efforts made by the Ministry of Education to offer Education to the learners with hearing impairment, these learners continue to perform poorly in Mathematics in KCPE examination. The study specifically sought to; examine the teaching strategies used by teachers in the selected primary schools for Hearing Impaired; determine perceptions of teachers towards learners with hearing impairment and their education; establish the auxiliary services offered to learners with HI to be able to benefit from education in the selected schools; and lastly identify the resources available to facilitate education for learners with HI in the selected schools for learners with hearing impairment in Meru County. The study was carried out in the two primary schools for learners with hearing impairment. Through purposive sampling, respondents were selected to respond to the research instruments. The researcher administered questionnaires and interview guides. The data was analyzed using descriptive statistics which included frequencies, percentages, and categories. The study established that Mathematics teachers used a combination of more than three teaching strategies in implementing curriculum among learners with hearing impairment in primary schools for HI in Meru County. Some of these strategies included illustrations, demonstrations, group work and question and answers among others. It was also shown that most mathematics teachers had positive attitudes towards the learners with hearing impairment. Teachers cared about what the learners did at school and were very willing to help them both in academic work and general welfare matters. Provision of auxiliary services including hearing aids, sign language interpretation, speech therapy, and psychological and medical support was inadequate. Resources such as trained staff members who were conversant with sign language, school nurses, library, resource room, classrooms and assistive devices were inadequately provided. This study recommended that the government, NGOs, and other stakeholders should offer more to support SE systems through monetary and material support to ensure that learners with HI are well empowered by putting in place the necessary resources and facilities to better their learning.
CHAPTER ONE
INTRODUCTION

1.0. Background to the Study

According to the United Nations declaration of human rights assembly (1948) each and every individual has acquitted the right to education which must be free in the elementary and fundamental stages. Elementary education was made compulsory with the objective of attaining economic development and social justice, virtually all newly independent countries gave education, particularly primary education, top priority (Lockhead et al., 1991). Worldwide Special needs persons, and many others who faced difficulties have been traditionally marginalized within or excluded from schools (Ainscow and Memmenasha, 1998).

The 1990 World Declaration on Education for All and Framework for Action to Meet Basic Learning Needs, commonly known as the Jomtien Conference, pledged to achieve universal education by the year 2000. About Special Education, the session noted that the learning needs of challenged children demanded special attention and steps needed to be taken to provide equal access to education for every category of such challenged persons as an integral part of educational systems (United Nations, 1990). These categories of a Disabled person include children with hearing impairment, Visually impaired, mentally disabled children and physically challenged children, those with multiple problems, as well as, those with learning difficulties, among others.

The 164 countries at the 2000 Dakar EFA Forum committed themselves to achieving Universal Primary Education (UPE) by the year 2015. They also
committed themselves to eliminating gender disparities in primary education by 2005 (World Bank, 2002). One of the Millennium Development Goals (MDG’s) that grew out of the agreements and resolutions of world conferences organized by United Nations in the past decade is the Universal Primary Education. The World Bank (2002a) notes that these goals have been commonly accepted as a framework for measuring development progress. Kenya is a signatory to the recommendations of both conferences in Jomtein (1990) and Dakar (2000) and is, therefore, morally bound by the respective solutions passed (MoEST, 2003).

The Kenya education system has had general series of education commissions of inquiry in teaching learners with special needs in education. The Ominde Commission in 1964 addressed the issue of inclusive education. The teacher training colleges were to equip students with knowledge regarding disabilities and their effects on academic performance. Therefore it was very significant to establish whether or not such teachers are effectively handling children with disabilities, particularly those with hearing impairment, thus the need for undertaking this study.

Other commissions of inquiry in Kenya which attempted to discuss the education for children with disabilities included Gachathi Report (1976), based on the National Committee on Education Objectives and Policies (NACEOP). This one addressed the issue of assessment Centers and recommended the establishment of assessment Centre be in every District to assess various disabilities. The Koech Commission (1999) referred to as Totally Integrated Quality Education, and Training (TIQUET) addressed the issue of adequate staff for Special Needs
Education children. It suggested that the curriculum and examination should take into consideration the needs of children with special needs. Such suggestion could be implemented through special schools. Njia School and Kaaga School for the HI are such kind of schools that addresses such needs through teaching and vocational rehabilitation.

Despite the global efforts and the efforts by the Kenyan government through various education acts and commission to improve education for all, schools for the hearing impaired have continued to perform poorly, especially in Mathematics. Indimuli (1986) argues that Mathematics be one of the most useful subjects taught in schools, and while most people, including parents, teachers and children appreciate the essential role of mathematics in everyday activities, it remains one of the most disliked and poorly performed subjects in the nation. Insights discharged by the Southern and Eastern African Consortium for Monitoring Education Quality (SACMEQ), a UNESCO-backed think-tank on the status of education in 15 countries in Sub-Saharan Africa in the East Africa Standard of June 2011 reported that learning achievement in Kenya’s public schools had steadily dropped since the introduction of free primary education. There has been considerable concern over the declining performance in mathematics which has persisted in the last several years in Njia and Kaaga Schools for the HI. Table 1.1 shows a pattern of performance in the subject under study for the last few years.
Table 1.1: KCPE Mathematics Mean Scores in comparison to English and Sign Language

<table>
<thead>
<tr>
<th>YEAR</th>
<th>KAAGA</th>
<th>NJIA</th>
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<tr>
<td></td>
<td>Maths</td>
<td>English</td>
</tr>
<tr>
<td>2007</td>
<td>29.89</td>
<td>40.2</td>
</tr>
<tr>
<td>2008</td>
<td>31.72</td>
<td>43.5</td>
</tr>
<tr>
<td>2009</td>
<td>30.43</td>
<td>47.6</td>
</tr>
<tr>
<td>2010</td>
<td>28.5</td>
<td>39.70</td>
</tr>
<tr>
<td>2011</td>
<td>31.90</td>
<td>42.9</td>
</tr>
<tr>
<td>2012</td>
<td>26.00</td>
<td>45.35</td>
</tr>
<tr>
<td>2013</td>
<td>31.70</td>
<td>47.8</td>
</tr>
<tr>
<td>2014</td>
<td>29.8</td>
<td>44.90</td>
</tr>
</tbody>
</table>

Source: Meru County KCPE subjects analysis 2007 to 2014

Table 1.1 shows the trend of dismal performance in Mathematics subject in the schools for learners with hearing impairment. This indicates that the real issue in meeting needs of such children has not been systematically met. Consequently, the motivation behind this study was to analyze the factors influencing learner's performance in mathematics in Kenya Certificate of Primary Education Examination among learners with hearing impairment in Meru County.

1.1. Statement of the Problem

The problem of poor performance in Mathematics in Njia and Kaaga Schools for the HI in Meru County has been of concern (as shown in Table 1.1). The performance has persistently been low and below average as reflected in the national examination results of Kenya Certificate of Primary Education (KCPE) in
the last eight years. The Kenya government through the Ministry of Education in conjunction with the government of Japan came up with SMASE In-service Education and Training (INSET) project as a remedy to the problem of poor performance. Meru County had the opportunity to access the INSET program since 2010 when SMASE was introduced in primary schools in Kenya. The In-service training was intended to improve the response of the learners to the subjects and consequently improve final performance in KCPE. Observations made from schools in the study area reveal that classroom practices have significantly improved among teachers who had attended SMASE INSET, and teachers had also changed their attitudes towards teaching. However, how these changes have influenced the performance of learners with hearing impairment is yet to be investigated. The motivation behind this concentrate, along these lines, was to analyze the factors determining poor performance in mathematics Certificate of Primary Education Examination among learners within Kenya hearing impairment in Meru County.

1.2. **Purpose of the Study**

The purpose of the study was to analyze factors determining poor performance in mathematics in Kenya Certificate of Primary Education Examination among learners with hearing impairment in Meru County.

1.3. **Objectives of the Study**

The following objectives guided the study:

1. To examine teaching strategies used by mathematics teachers in primary schools for HI in Meru County
2. To determine the attitude of mathematics teachers towards hearing impaired learners and their education in primary schools for HI in Meru County.

3. To establish the auxiliary services offered to learners with HI to be able to benefit from education in primary schools for HI in Meru County

4. To identify the resources available to facilitate education for learners with HI in primary schools in Meru County.

1.4. Research Questions

This study looked to answer the accompanying objectives questions.

1. What are the teaching strategies used by mathematics teachers to implement curriculum among learners with hearing impairment in primary schools for HI in Meru County?

2. What are the attitudes & perceptions of mathematics teachers towards hearing impaired learners and their education in primary schools for HI in Meru County?

3. What auxiliary services are offered to learners with hearing impairment to be able to benefit from education in Meru County?

4. What resources are available to facilitate the education for learners with HI in the selected schools Meru County?

1.5. Significance of the Study

The discoveries of this study might be valuable to the curriculum developers, implementers, policy makers and other interested groups in making them aware of the constraints in teaching mathematics among children with Hearing Impairment and find ways of overcoming these challenges. The information gathered in the
study may contribute to the enrichment of the existing knowledge on the educational needs and programs of children with hearing impairment in Kenya. The study sought views from recipients and implementers of this education, and this has provided insights into the challenges encountered in Education for Hearing Impaired programs and the actual needs of the recipients. The study may open a new area for further research on the use of sign language in curriculum implementation for learners with hearing impairment. It may also provide useful information on which important decisions on implementation or curriculum reforms can be based. It may also contribute to the existing literature.

1.6. Limitations and Delimitations of the Study

1.6.1. Limitations of the Study

Because of the study design used in this study, the findings of the study may only apply to the schools where the research was carried out and may not be generalized to other special schools. Time and resources scheduled for this study were limited, although efforts were made to use the available time and resources wisely. There were constraints of relevant literature since not much has been written on special needs in education. The researcher used the available literature from foreign countries to enrich the available literature in various libraries in Kenya especially from the Ministry of Education.

1.6.2. Delimitations of the Study

The study was carried out in only two special schools Njia and Kaaga Schools for the HI. The two schools were chosen as the research site because they are the only
two schools in the county that handle children with HI and the target group could be easily accessed.

1.7. Assumptions

The study was guided by the assumptions that the recipients of the education would respond positively and that the language (sign Language) would not be a barrier to the research. That there were underlying factors that made it difficult for learners with hearing impairment perform well in Mathematics. Further, the study assumed that respondents would give accurate information.

1.8. Theoretical and Conceptual Framework

1.8.1. Theoretical Framework

The theoretical framework of this study was based on the Vygotsky’s Social Constructivist theory of cognitive development. This theory focuses on social interactions that play a fundamental role in the development of cognition. Vygotsky (1978) wrote; ‘every function in the child’s cultural development appears twice: first on the social level and later, on the individual level; first among people (inter-psychological) and then inside the child (intra-psychological). This applies equally to deliberate consideration, to legitimate memory, and to the arrangement of ideas. All the higher capacities start as the real relationship between people.

The potential for cognitive development depends on upon two principles; the Zone of Proximal Development (ZPD) and More Knowledgeable Other (MKO). ZPD is the difference between what learners can do without help. It is the distance
between the 'actual development levels as determined by independent problem solving and the level potential development determined through problem-solving under adult guidance and for that matter is the preschool teacher. Full development of the ZPD depends on upon social interaction in that; the range skills can be developed with social guidance or collaboration thus it often exceeds what can be attained alone. The suggestion is that the MKO is an educator or an old adult. Taken together, the two form the basis of a scaffolding component of the cognitive apprenticeship model of instruction. For Vygotsky, development and learning are not the same; they are dynamic processes that result to these gaps of development level that must be addressed through social cooperation and interaction with the most capable peers and adults. Special needs teachers are among the most important persons in children’s inter-psychological (interpersonal) relationships.

Relevant strategies should, therefore, be geared towards improving teacher characteristics and providing a child-friendly environment. The level of academic teacher qualification, training, experience and teacher’s attitude towards mathematics are likely to influence children’s achievement in the subject. Reversing it is possible to result in teachers becoming effective in stimulating and nurturing children, responding sensitively to their needs, encouraging them and using few disciplinary actions. Consequently, teachers would achieve the ultimate psychosocial developmental goals in children: the development of high cognitive and language skills, positive emotional adjustment, and social competence. The relationship between these variables is conceptualized below.
1.8.2. Conceptual Framework

The conceptual framework for the study is based on the basis that mathematics teacher is the key to success or failure of curriculum implementation process which is measured by children achievement in mathematics. Figure 1.1 shows the schematic presentation of the study:

![Conceptual Framework Diagram]

**Figure 1.1: Conceptual Framework**

**Source:** Researcher, 2016

The conceptual framework of this study was based on the concept that the teacher handling mathematics was the key to the success of a curriculum process. The study perceived mathematics achievement by learners as a function of teacher characteristics and available teaching and learning resources. The teacher
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**Figure 1.1: Conceptual Framework**

*Source: Researcher, 2016*

The conceptual framework of this study was based on the concept that the teacher handling mathematics was the key to the success of a curriculum process. The study perceived mathematics achievement by learners as a function of teacher characteristics and available teaching and learning resources. The teacher
characteristics include teaching strategies and methodologies. The teacher utilized his or her academic ability to understand, internalize and construct knowledge. She/he used his/her training and teaching experience to come up with the appropriate methodology for imparting mathematics concepts. His/her attitude towards the subject affected the organization and interpretation of learning experiences. This eventually influences the whole learning process culminating to either successful learning outcome or non-successful learning outcome gauged by learners’ achievement in mathematics. Auxiliary services offered to learners with HI and resources available to facilitate education for HI is also very important in influencing learning outcomes of learners with HI. Provision of auxiliary service (for example speech therapy, articulation correction, speech training, auditory training, medical treatment, guidance and counseling, social workers services, advisory teachers, general practitioners and psychiatrist services) reduce the handicaps that may impede an individual’s full participation in education. Thus improving their ability to handle and manipulate the environment and to draw as much benefit from it as possible.
1.9. Operational Definitions of Terms

Deaf Person: One whose hearing disability precludes successful processing of information with or without a hearing aid.

Disability: This is the loss or reduction of the functional ability of an individual due to physical, sensory, neurological, intellectual or emotional impairment. It is a reduction of function or as impairment of function.

Decibel: Units for measuring hearing loss

Hearing impairment: is a nonspecific term demonstrating listening to incapacity that may run in seriousness from mellow to significant.

Method: A particular procedure for accomplishing or approaching something, especially a systematic or established one.

Special education: this is a part of general education that assumes responsibility for individuals who do not fit into the regular system that is children who differ from the norm or standard. It refers to the provision of education to children with special education needs in either integrated, mainstream education or segregated in special schools.

Special Needs: These are conditions or factors that hinder learning and the development of an individual.

Special Schools: Special schools are residential schools designed for the children with HI.

Sign Language: A manual system of communication used by people who are deaf and those who are dumb, system of communicating a true language with its grammar.

Strategy: A plan of action designed to achieve a long-term or overall aim.
CHAPTER TWO
LITERATURE REVIEW

2.0 Introduction

In this chapter, the researcher presents a review of literature related to hearing impairment and factors influencing the performance of mathematics among learners with hearing impairment.

2.1 Teaching Strategies Used by Mathematics Teachers.

Being successful in mathematics involves the ability to understand one’s current state of knowledge, build on it, improve it, and make changes or decisions in the face of conflicts. To do this requires problem-solving, abstracting, inventing, and proving (Romberg, 1983). These are fundamental cognitive operations that learners need to develop and use in mathematics classes. Therefore, instructional strategies and methods that provide learners with learning situations where they can develop and apply higher-order operations are critical for mathematics achievement.

For learners to accomplish learning, teachers should provide meaningful and authentic learning activities to enable learners to build their comprehension and learning of this subject space (Wilson, 1996). Likewise, it is underlined that instructional procedures where learners actively participate in their learning are critical for success (Bloom, 1976).

Many studies report that what teachers know and believe about mathematics is directly connected to their instructional choices and procedures (Brophy, 1990; Brown, 1985; National Council of Teachers of Mathematics, 1989; Thompson,
1992; Wilson, 1990). Geliert (1999) additionally reported that in science training research, it is by all accounts undisputed that the educator's reasoning of arithmetic affects the structure of math classes. Teachers need to have skills and knowledge to apply their philosophy of teaching and instructional decisions (Darling-Hammond, 1997).

Awareness of Teachers not only need knowledge of a particular subject matter, but also need to have pedagogical knowledge and knowledge of their learners (Bransford, Brown, & Cocking, 2006). Teacher competency in these areas is closely linked to student thinking, understanding, and learning in mathematics education. There is no doubt that learner achievement in math education requires teachers to have a firm knowledge of the subject domain and the epistemology that guides mathematics education (Ball, 1993; Grossman, Wilson, & Shulman, 1989; Rosebery, Warren, & Conant, 1992) and also a similarly careful comprehension of various types of instructional exercises that advanced learner achievement. Competent math teachers provide a roadmap to guide students to an organized understanding of mathematical concepts, to reflective learning, to critical thinking, and ultimately to mathematical achievement.

There are various teaching-learning methods that are applicable in a classroom setting each with specific teaching-learning strategies. Lecture method, which involves the teacher either talking throughout the lesson without the use of teaching aids, demonstrating a concept in front of the whole class, using small groups or individual students. It also includes illustrations using teaching aids such as charts, chalkboard, textbooks, real objects and models. During demonstrations,
the teacher performs an instructional activity or a process as learners observe. The aim of the demonstration is to provide learners with a concrete illustration of what they are expected to do, how they can best do it and how they can tell when they have used the skill or ability correctly. Demonstrations should be followed by giving learners an opportunity to practice the skill either individually or in groups.

Other methods involved in a classroom set up include question and answer, class discussion, group work, pair discussion and peer teaching. Question and answer are defined by Mtunda and Safuli (1997) as a method both for teaching and oral testing based on the use of the questions to be answered by the learners. The pacing of questions is important and learners should be given enough time to think about a response. The questions should come rapidly enough to keep the pace of the class lively. It is, therefore, necessary that teachers also formulate higher order questions which require the learners to apply, synthesize and evaluate knowledge or information. Robert (2003) describes a class discussion method as one that permits open interaction between learner and learner as well as between teacher and learner. It involves free flowing conversation, giving learners an opportunity to express their opinions and ideas, hear those of their peers and the educator. The educator does not play the authority part. Rather, He/she participates as a member of the groups. Moreover, everyone adheres to the guidelines for specified acceptable discussion behavior. If properly planned and structured, the discussion method involves learners in higher order cognitive skills such as analysis, synthesis, and evaluation.
Another teaching-learning method is group work. Amid a lesson, the class can break into gatherings to talk about particular inquiries or issues. One member of each group, later on, reports its findings to the whole class. Group work can be in pairs, trios or more, depending on the activity. While working in groups, learners can exchange ideas drawn from their collective abilities, knowledge, and experiences (Robert, 2003). According to Puchner (2003), peer teaching can be described as any activity carried out by a learner or learners that involve learners taking on a teaching role in the school setting. All the strategies mentioned above involved in most of these methods include learners’ activities.

It is for this reason that Hunt and Marshall (2002); Mastropieri and Scruggs (2000) suggest various strategies facilitate learning by learners with HI. These include the use of technology for instruction, the use of visual aids and reiterating major points. Used to bolster both educating and learning, innovation implants classrooms with advanced learning instruments, for example, PCs and handheld devices; expands course offerings, experiences, and learning materials; increases learner engagement and motivation, and accelerates learning. Use of Visual Aids is necessary for triggering learners’ motivation in learning. Others are facilitating classroom discussion, physical environment for students who are deaf and asking questions and spending time periodically with them to ensure that they follow instructions. Whether this happens at Njia and Kaaga School for the learners with HI, is subject to exploration through a systematic study; Hence the need for this study.
Research in Ghana among learners with special needs raised several concerns including limited knowledge and skills to provide instructional adaptations towards meeting the needs of the learners (Kuyini, 1998; Ofori-Addo, Worgbeyi, & Tay, 1999 & O'Toole, Hofstett, Bupuru, Ofori-Addo, & Kotoku, 1996). Over the past number of years, educators have been using a number of strategies to meet the needs of students with disabilities within the neighborhood school, including: collaborative consultation with a special educator, Teacher Assistance Teams (TAT), technological backings, separated direction, support from an educator right hand, and the utilization of Individualized Education Plans (IEPs) (Friend, 2007).

Collaborative consultation is viewed as a specialized curriculum instructor serving in a consultative part of a center substance embraced educator who conveys the essential obligation regarding guideline. The model permits a specialized curriculum, instructor to join forces with different general training educators without being physically present in the same classroom in the meantime. Instructor help groups are intended to bolster the general training educator who needs systems and backing for learners who display scholarly, enthusiastic, or behavioral challenges. The objective of the TAT is to expand the learner's achievement in the customary instruction, a classroom in this way diminishing the likelihood that an understudy will allude to a custom curriculum. The TAT is a complete methodology that uses an interdisciplinary group comprising of instructors, therapists, social laborers, pros, folks, and advocates to issue explanations for enhancing understudies' scholarly work and behavioral results. The TAT colleagues meet, conceptualize systems to meet recognized objectives, and build up an action plan that incorporates a period to reconvene to check the learners'
progress and evaluate the plan. The TAT meets regularly to assist classroom teachers in planning and implementing strategies that are designed to produce success for the learner with difficulties (Friend, 2007).

Technological support is vital in teaching and learning of learners with hearing impairment. It is, therefore, essential that teachers and learners have regular access to technologies that support and advance subject sense making, reasoning, problem-solving, and communication. Effective teachers optimize the potential of technology to develop learners’ understanding, stimulate their interest, and increase their proficiency in the subjects they are teaching. At the point when educators use technology deliberately, they can give more noteworthy access to teaching and learning for all learners (Friend, 2007). It is important to remember that each child has unique needs and that decisions regarding instructional strategies should be based on current and accurate information about the child’s sensory functioning and team input. Separated guideline is, in this manner, a showing hypothesis in light of the reason that instructional approaches should vary and be adapted about individual and diverse classrooms (Hall, 2003). IEP characterizes the individualized goals of a tyke who has been found with an incapacity, as characterized by government regulations. The IEP is planned to help learners accomplish enlightening destinations more viable than they by and large would.

In all cases, the IEP must be custom-made to the individual learners' needs as distinguished by the IEP assessment prepared, and should particularly help educators and related administration suppliers comprehend the understudy's
handicap and how the inability influences the learning process. The IEP depicts how the learner realizes, how the learner best shows that realizing and what educators and administration suppliers will do to help the learner take in more adequately (Fiend, 2007).

In team teaching, members may assist by planning together, teaching, evaluating the results and modifying the learning goals regularly together. Teaching learners with hearing problems can only be achieved when there is good communication. The use of hearing aids does not mean that the learners with hearing impairment will hear all the information. For this reason, other additional or alternative communication strategies will need to be employed. A combination of all modes of communication is used. This is known as total communication, which is a philosophy that advocates for the utilization of all available means of communication to understand and be understood (Kilei, 2002).

2.2 Attitudes and Perceptions of Mathematics Teachers

According to Shiundu and Omulando (1992) the school climate, the attitudes of teachers, the attitudes of the learners, and the relationship between them could exert significant influence on the curriculum. The task of curriculum implementation could be said to involve two main processes, changing attitudes of people, policy makers, administrators, teachers, teacher trainers, school supervisors, parents, the lay public and ultimately the learners themselves. If the attitude of these were negative, the implementation process would not succeed.
Teachers can influence the outcome of learners with disabilities by actively involving the parents and giving routine information about the child’s and a school’s progress through effective communication. In the United States, a few studies have been led to assess general education teachers’ attitudes towards learners with special needs. According to Avramidis et al., (2000), one of the main challenges in academic achievement among learners with exceptional needs has been distinguished as educators' dispositions. This was a study attempted into the states of mind of understudy educators toward the incorporation of kids with exceptional needs in the conventional school in the United Kingdom. The sample was contained 135 understudies who were completing their teacher instructional classes at a School of Education. The examination revealed that the respondents held elevating perspectives toward the general thought of fuse, yet their evident capacity dropped in a general sense as demonstrated by the reality of children's needs as perceived by the UK "Code of Practice went for the Identification and Assessment of Special Educational Needs." Moreover, kids with behavioral difficulties were seen as potentially bringing on more concern and extent than those with various sorts of extraordinary needs.

Most studies carried out on the attitudes of school teachers towards mathematics reveal that attitude towards mathematics grow and is acquired gradually through the learner's interaction with the learning process and the curriculum. Teachers attitude are believed to be an important factor in determining the teaching and learning of mathematics. If the teacher's attitude is negative towards mathematics, it may, in turn, affect learners learning and hence their performance. Cockcroft (1982) noted that there is no area of knowledge where a teacher has more influence
over attitudes as well as an understanding of his learners than he does in mathematics. Amid his expert life, an instructor of arithmetic may impact for good the attitudes towards mathematics of several thousand young people and decisively affect many of their career choices. This indicates that teachers attitude towards mathematics has a great impact on mathematics' performance than any other area of knowledge.

In a study by Waihenya (2000), the teachers' attitude was blamed for failure in mathematics and sciences. This was a study done in Kenya to examine the Mathematics syllabus and how this was impacting on performance. The study targeted 368 primary school teachers and 568 primary school learners in Nairobi. It was established that one student is quoted as saying that teachers identify those who like the subject and concentrate their efforts on them. They never try to change the perception of learners who have a negative attitude towards mathematics and who eventually fail. Teachers were also accused of not marking the books of the weak students and not punishing those who missed the lessons, which was like “institutionalizing” the students' dislike of the subject. Ryan and Cooper (1984) affirm the same when they talk about situations where teachers dislike particular students while having an obvious fondness for others.

The teacher must like mathematics, enjoy the subject because without enthusiasm for the subject it would be easy for the students to get bored of the hard facts flatly delivered (Ryan & Cooper, 1984). Pleasure in learning and teaching is the common ground necessary to sustain excellent teaching (Eble, 1988). If teachers like and value their subjects, this positive attitude will show through and will have a
powerful influence on the motivation of students. What the teacher values, students begin to value and that way, motivation takes root. If the teacher, therefore, feels little enthusiasm or interest, this too shows through, and the students slow down. The Positive disposition of the educator towards the subject plays an active role in causing the students to learn the subject efficiently and thus achieve good grades in the subject.

Because all these studies targeted the regular primary and the secondary school teachers, it has been worth to undertake the same research among learners with hearing impairment unearth the discrepancy since teaching staff's attitude towards mathematics is an important factor in learning mathematics.

2.3 Auxiliary Services Offered to Learners with Hearing Impairment

Learners with hearing impairments require various levels of support from professionals depending on the severity of their loss to adjust to the demands of the hearing world. Learners with hearing impairments need assistive innovation in the classroom and their ears (i.e. amplifiers) with a specific end goal to augment scholastic and behavioral achievement. The housing can incorporate sound intensification situated in the classroom that increases teachers' and learners' voices to make words and expectations audible for hearing impaired learners. Availability and suitability of such facilities are key to improving the academic performance of learners with hearing impairment. It should be emphasized that support services to teachers of learners with hearing impairment be vital for quality teaching and learning. Teachers can use technology and media in classrooms to support their presentations.
Lack of such essential facilities such as sound amplifications that amplifies the teachers’ and learners’ voices to make words and expectations audible for hearing impaired learners, proves to be an impediment to teaching learners with HI and may consequently result in their poor academic performance. According to Hasselbring (1994) instructional opportunities can be enhanced with media, basing the approach on learning theory about the enhancement of listening comprehension. Any visual information presented by the teacher to accompany the lesson can support the major points presented, maintain attention, and improve comprehension. Graphics, actual scenes or dioramas, pictures, and large text fonts can facilitate understanding and comprehension, as well as help, holds attention.

School setting and its offices could be an imperative component in understudy accomplishment. Truth be told, distinguishing elements identified with the school environment has turned into an examination center among instructive specialists. Case in point, the research proposes that understudy accomplishment is connected with a protected and efficient school atmosphere (Reyonds et al.,1996). Scientists additionally found a negative effect on understudy achievement where insufficiencies of school components or parts, for instance, heat, lighting, and age exist. In a research by Harner (1974), temperatures above 23° C (74° F) antagonistically influence mathematics skills. Regarding the condition of school building, Cash (1993) found student achievement scores in standard buildings to be lower than the scores of students in above-standard buildings. Also, Rivera-Batiz and Marti (1995) conducted a multiple regression statistical analysis to examine the relationship between overcrowded school buildings and student achievement. In a study of overcrowded schools in New York City, It was found that students in
crowded schools scored essentially Low grades on both science and other exams than they than those learning in uncrowded schools. Also, when asked, understudies and educators in stuffed schools concurred that congestion adversely influenced both classroom exercises and instructional methods. The findings indicated that a high population of students had a negative effect on student achievement.

2.4 Resources Available to Facilitate Education for Learners with HI

According to Common Wealth Education Partnership (2009), finance, particularly, costs are one of the least researched but potentially most contestable aspects of providing education to learners with disabilities. In developing countries, despite substantial investment in education, only a small portion of people with disabilities is currently receiving educational services. This significant loss in human capital could be prevented by investment in an educational program whose benefits to society exceed its cost (Hammerman & Maikowski, 1981).

The World Bank (2002) notes that out of every five children in developing countries – equivalent to 113 million children lack access to schooling and one out of every four children who enter school, drops out before completing five years of primary education or acquiring sustainable literacy’. Africa accounts for 40 million or 37% of the world’s total of 115.4 million children out of school (UNESCO, 2003). This depicts the great challenge of financing special education around the world.
In Namibia for example, the budget for the Directorate of Special Education, which is charged with special education provision, comes from both the government and some slight donor funding (Hammerman & Maikowski, 1981). In Tanzania, special education is funded by the government and non-governmental organizations (NGO’s). The funding is done through the MoE and Culture. The government pays salaries to specialist teachers, running costs, and the purchase of textbooks while the NGO’s facilitate the process by providing transport, building, technical equipment and materials (Hammerman & Maikowski, 1981).

In Uganda, a policy of decentralization of services has been developed and provides empowerment to District authorities to fund and run services such as paying salaries to teachers teaching in special schools, buying technical equipment and materials and development funds. Each decentralized District provides funding to special education. In Zambia, funds for special education come from the central government and donor agencies. The funds from central government go towards recurrent expenditure while those from donor agencies assist in the establishment of capital projects.

In a study on cost and financing of SNE in Kenya, Karugu, Mbithi, Kang’ethe, and Ngaba, (1995) proposed that "it will be important to extend use on a custom curriculum to accomplish openness, value, and quality. This should be possible through re-portion of existing assets, empowering the foundation of different wellsprings of income and decreasing unit costs by enhancing the productivity of the custom curriculum projects, for example, incorporating disabled learners however much as could reasonably be expected inside the standard". The
combination of impaired learners into the normal schools is less costly than running isolated establishments and with legitimate arranging, with all resources provided, would enhance accessibility, equity, and quality of learning for the disabled. The principle of integration is strongly advocated by all concerned in reaction to the segregation practice in the past (Karugu et al., 1995).

A general perception is that nations budget allocations contain little on financing projections and spending plans on the extra unit cost included in teaching incapacitated learners. Some identified spending plan lines for unique schools and other extraordinary procurements. Kenya's arrangement dedicated to additional installments in future to both customary and uncommon schools to buy books and materials for kids with unique needs. Training in Canada is freely subsidized through 'Ontario's Equity and Inclusive instruction procedure' which is intended to bolster an openly supported instruction framework that gives all understudies the chance to achieve their most elevated potential, including those young men and young ladies with a custom curriculum needs, this technique was propelled in 2009.

2.5 Empirical Studies on Influencing Performance in Mathematics of Learners with Hearing Impairment

The Warnock Report (DES, 1978) in England considered that aims and practices should be clear to provide the framework within which flexible curriculum arrangements could be made for individual children. From this report, a reality to be faced when considering the teacher resources for curriculum for special needs is the low percentage of special training among the teachers who must develop and
operate the curriculum. Even in special schools for blind and deaf children where specialized training within three years is a requirement for continued employment, only 57% of teachers of the blind learners and 67% of these teaching the deaf have completed specialized further training of all teachers (DES, 1978). In special schools in England and Wales, only 22% have additional training, with the figure for Scotland 50%. The Warnock Report considered the general position of training for special educational needs unsatisfactory, particularly given a proposal to educate more learners with these needs in ordinary schools.

Quimbo (2010) in a study conducted in the Philippines mentions many variables in the low achievement of learners: First is teacher factor, which composes of mastery of the subject matter, instructional techniques and strategies, classroom management, communication skills, and personality. Second is student factor which includes study habits, time management, attitude and interests towards mathematics. The third is an environmental factor such as parents’ values/attitudes, classroom settings, and peer group. In another investigation of Quimbo (2010) recommend that by successfully giving materials in school can enhance accomplishment in science and the home learning environment, for example, parental training huge affect understudies' execution. The basic proximity of learning materials, for instance, books, charts, visual aids and others impact the learning results. Another cause is their home as the learning environment. Understudies whose people are exceedingly taught out-performed their associates whose people had the low informational achievement. The effect of the people in the meta-subjective get ready like study affinities, achievement weight, can be considered as components of school execution (Quimbo, 2010).
Kamere (2004) in her study on the development of special education for physically disabled children in Kenya taking a case study of Kiambu, concluded that special education had not been well developed. Her study was a descriptive survey among vocational training institutions in Kiambu. Her study established that special education in Kenya was not well developed and that there was a need to carry out a study showing different vocational training programs available for the various groups of individuals with disabilities, their viability, furthermore, their suitability in addressing the necessities of a cutting edge economy.

She also suggests that there is a need to carry out specific studies on other special needs groups including those who are mentally retarded, visually impaired, hearing impaired or multiply handicapped individuals prompting the researcher to establish the vocational education and group reconciliation of youthful grown-ups with scholarly inabilities in Kiambu County. The provision of this education has taken the second stage after the education for able children. The policies governing special education are undefined and stated in words excellent sounding statements that however, mean very little to the planners or implementers. The aims of special education are also not defined. These are only stated in policy documents and left to the readers to translate and implement according to their understanding.

Odero (2004) in his study – identification of curriculum barriers to successful inclusion of students with visual impairments in Kenya Polytechnic- found that negative and stereotypic attitudes, of unqualified personnel, lack of suitable resources and special equipment, lack of funds, lack of clear guidelines to
stimulate and support education of learners with special needs in the institution affected learners with visual impairments.

His study was assigned to distinguish educational modules boundaries to adequate consideration of outwardly debilitated persons in Kenya Polytechnic. Center was set on dispositions, assets, hardware, emotionally supportive networks, educating learning methodologies, program substance, and availability. Information was gathered through surveys, meeting timetable and perception agendas. A top executive in the interest of the foremost, 4 heads of divisions, 20 addresses, and 100 understudies took an interest in the study.

Information was broken down utilizing a subjective methodology given the exploration questions. A portion of the significant discoveries was that lion's share of speakers, understudies, head of offices and a top director bolstered the incorporation of outwardly debilitated learners in the organization. In any case, a unique number of their populace felt that outwardly weakened persons ought to stay in professional recovery habitats for the visually impaired. Members demonstrated that the condition of the physical environment, instructing learning assets, and gear in the establishment could not bolster portability and compelling learning for outwardly weakened understudies.

It was in this way presumed different educational modules boundaries exist to the incorporation of outwardly disabled learners in Kenya Polytechnic running from the absence of qualified faculty, unfavorable physical environment, the absence of extraordinary gear and absence of a strategy to bolster confirmation of outwardly
hindered understudies. From the prior discoveries and determinations, various proposals were made including foundation of a comprehensive affirmation approach, in overhauling of staff as well as enlisting staff to bolster incorporation of outwardly debilitating learners and the establishment connecting with associations and bodies which provide food for requirements of outwardly disabled learners.

2.6 Summary and Research Gap

The Warnock Report (DES, 1978) considered the general position of training for educational needs unsatisfactory but did not say anything about its effects on the education of learners with disabilities. This study addressed itself to that. Burn (1975) looks at the effect of stereotyping in the general teaching and training of the disabled in Britain, and this study looked at it in a Kenyan context.

Kamere (2004) in her study on the development of special education, dealt specifically with the education for physically handicapped and this study will deal specifically with the education for learners with hearing impairments. Odero (2004) in his study identification of curriculum barriers to successful inclusion of students with visual impairments in Kenya Polytechnic focuses his study on learners with visual impairment, and this study focused on learners with hearing impairment. While there is a noticeable lack of in-depth empirical and academic research on academic performance in Mathematics among learners with hearing impairment in Kenya, this can also be seen as reflecting the preliminary stage such discussions are at in this context and the room for the development of a constructive discourse with further research. This absence of information suggests
that there is a dire need for more research into this area. There are gaps in the hard-
to-access research, both qualitative and quantitative. None of the studies done in
Kenya included learners with hearing impairments. This study was therefore
designed to find out the factors that influence performance in mathematics in
KCPE for learners with hearing impairment.
CHAPTER THREE
RESEARCH METHODOLOGY

3.0. Introduction

This chapter covers the research design, variables, location of study, sampling techniques and sample size. It covers research instruments, pilot study, validity, reliability, data collection techniques, logistical and ethical consideration and data analysis as well as the techniques used in the presentation of the analyzed data.

3.1. Research Design

A descriptive survey design was used to enable the researcher to have a systematic collection and presentation of data to give a clear picture of factors influencing performance in Mathematics in K.C.P.E for learners with HI in Meru County. Descriptive survey is the method of collecting information by interviewing or administering a questionnaire to a sample of individuals. Here, the researcher simply describes the distribution of a Marvel or the result of a system (Orodho, 2004). According to Orodho (2004), research outline is a plan or plan that is utilized to create answers to research issues. Kothari (2004) characterizes it as the diagram for the accumulation, estimation, and investigation of information. An exploration configuration is a system to manage the specialist in gathering, dissecting and translating watched actualities (Orodho, 2004).

3.2 Study Variables

The independent variables of the study mainly comprised of factors influencing learners’ performance in mathematics in Kenya Certificate of Primary Education Examination among learners with hearing impairment. This included: teaching
strategies, attitudes of teachers, auxiliary services and resources. These variables were not manipulated to affect the dependent variable. The dependent variable for this study was the performance in mathematics in K.C.P.E of learners with HI. This performance could also be affected by another variable beyond the scope of this study which is referred to as the intervening variable. For this study, the intervening variables were Government policies and the school environment.

3.3. Location of Study

The study was done in Meru County, which is one of the forty-seven counties in Kenya. It is centrally located in the map of Kenya. It is about two hundred and forty kilometers from Nairobi. The county comprises of nine sub-counties these are Buuri, Meru Central, Imenti South, Imenti North, Igembe South, Igembe Central, Igembe North, Tigania East and Tigania West. The study was carried out in two of these sub-counties. These were Imenti North and Igembe South sub-counties. These were the only sub counties which had the two schools for the learners with HI.

3.4. Target Population

The study population comprised of mathematics teachers, school head teachers, and learners with HI from the two schools for the HI giving a total of 244 respondents. The schools were Kaaga and Njia schools for the HI. Table 3.1 summarizes the target population.
Table 3.1: Target Population

<table>
<thead>
<tr>
<th>Respondent</th>
<th>KAAGA</th>
<th>NJIA</th>
<th>Target Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>Head teachers</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Mathematics Teachers</td>
<td>18</td>
<td>16</td>
<td>34</td>
</tr>
<tr>
<td>Nursery learners</td>
<td>11</td>
<td>10</td>
<td>21</td>
</tr>
<tr>
<td>Class 1 learners</td>
<td>12</td>
<td>10</td>
<td>22</td>
</tr>
<tr>
<td>Class 2 learners</td>
<td>11</td>
<td>11</td>
<td>22</td>
</tr>
<tr>
<td>Class 3 learners</td>
<td>13</td>
<td>12</td>
<td>25</td>
</tr>
<tr>
<td>Class 4 learners</td>
<td>10</td>
<td>11</td>
<td>21</td>
</tr>
<tr>
<td>Class 5 learners</td>
<td>12</td>
<td>12</td>
<td>24</td>
</tr>
<tr>
<td>Class 6 learners</td>
<td>12</td>
<td>11</td>
<td>23</td>
</tr>
<tr>
<td>Class 7 learners</td>
<td>12</td>
<td>10</td>
<td>22</td>
</tr>
<tr>
<td>Class 8 learners</td>
<td>15</td>
<td>13</td>
<td>28</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>127</strong></td>
<td><strong>117</strong></td>
<td><strong>244</strong></td>
</tr>
</tbody>
</table>

3.5. Sampling Technique and Sample Size

3.5.1 Sampling Technique

Purposive sampling technique was utilized to sample the respondents to the study. This is selecting subjects whom the researcher thinks will give the information that she requires. The main goal of purposive sampling was to focus on particular characteristics of a population that was of interest, which best enabled the researcher to answer her research questions. Since the learners with hearing impairments are recipients of special education, they and their teachers would provide quality information about the study.
3.5.2 Sample Size

Both Headteachers, all mathematics teachers and class seven and eight learners with HI were selected to participate in the study. Class seven and eight learners were involved in the study because they had stayed longer in the school than the lower classes and would provide better information. The sample size, therefore, was 86 respondents as shown in Table 3.2.

Table 3.2: Sample Size

<table>
<thead>
<tr>
<th>Respondent</th>
<th>KAAGA</th>
<th>NJIA</th>
<th>Sample Size</th>
</tr>
</thead>
<tbody>
<tr>
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<tr>
<td>Mathematics Teachers</td>
<td>18</td>
<td>16</td>
<td>34</td>
</tr>
<tr>
<td>Class 7 learners</td>
<td>12</td>
<td>10</td>
<td>22</td>
</tr>
<tr>
<td>Class 8 learners</td>
<td>15</td>
<td>13</td>
<td>28</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>46</strong></td>
<td><strong>40</strong></td>
<td><strong>86</strong></td>
</tr>
</tbody>
</table>

3.6 Research Instruments

The study employed three empirical methods of data collection. These included the use of observation schedules, semi-structured interviews, and questionnaires. Semi-structured interviews were used among the learners. Observation schedules contained a list of physical facilities and other resources and support services available in the schools. Observation schedule was used to record observations on how lessons were conducted. Teacher questionnaire was divided into two sections. Section I contained questions on general or background information, Section II contained simple, clear questions to test their attitude towards their HI learners, strategies used in teaching mathematics, auxiliary services offered and resources available for teaching and learning mathematics. Questionnaire for the head
teacher contained questions covering various aspects of the school e.g. qualification and experience of teaching staff, learners performance in mathematics in K.C.P.E Examination, physical facilities in the school among other key areas.

3.7 Pilot Study

This refers to trying out the questionnaire. The researcher carried out pilot testing for the questionnaires and interview schedule once they were finalized. This helped the researcher to get some ideas about how long the questionnaires would be and how much time would be required to answer the questions. The questionnaires was pretested on a selected sample from Isiolo Primary School for learners with hearing impairment. This selected sample had similar characteristics to the actual sample that the researcher intended to use in the study. The purpose of this pretesting was to ensure that the items in the instrument were stated clearly and had same meaning to all respondents (Mugenda & Mugenda, 1999). This helped the researcher to assess the clarity of the instruments (Mugenda & Mugenda, 1999). The procedures used in pretesting of the questionnaires were identical to those which were used during the actual data collection to help the researcher make important observations. After going through the instruments, the researcher wrote letters to the schools, where data was collected. The researcher went there personally and identified one teacher whom she trained and later assisted in administering the questionnaires by interpreting the content of interview schedule and assisting the learners to fill them. After finalizing with the questionnaires and interview schedule, the researcher analyzed the data.
3.7.1. Validity

Validity alludes to the extent to which an instrument measures exactly what it purports to measure. For the tool to meet the validity aspect, expert judgment is essential. Therefore, to measure validity the researcher sought for professional counsel from university supervisors and course lecturers. Different tools of data collection were used which included observation, questionnaires, and interviews. This ensured that the actual information required was obtained.

3.7.2 Reliability

Reliability refers to the degree of internal consistency of a measuring instruments. The reliability of the instrument was established by use of test – retest technique. Here, the questionnaire was administered twice to the same group of subjects during the pilot study. There was a time lapse of two weeks between the 1st and 2nd test. The researcher first selected an appropriate sample from Isiolo primary school for learners with HI. The researcher administered the instruments to the subjects. After this, all conditions were kept constant, and the same instruments were administered again after waiting for two weeks. The researcher correlated the scores from both testing periods. Research obtained 95% coefficient on the results confirming the instrument reliability.

3.8. Data Collection Techniques

Participant observation method was used to minimize Hawthorn effect. The researcher resided at the schools throughout the study period to provide supervision. The researcher participated in the school’s day-to-day activities and
continued completing observation sheets. The arrangement was made by the head teachers of the most convenient time for respondents to fill questionnaires.

**3.9. Data Analysis**

According to Mugenda and Mugenda (1999), data analysis means categorizing, coding, ordering and manipulating of data to obtain answers to research questions. After all, data had been collected; the researcher conducted data cleaning to remove outliers or unfilled questionnaires and categorized data manually according to the questionnaire items and then the data was coded. Qualitative data, such as finding out the views of respondents on a certain issue is not always computable by arithmetic relations: The responses can be categorized into various classes which are called categorical variables. The analysis varies with the purpose of the research, the complexity of the research design and the extent to which conclusion can be reached easily (Orodho & Kombo, 2002). Data was analyzed utilizing content analysis of implications and suggestions exuding from respondents' data. The expressive story then reported the outcomes. As saw by Gay (2004), subjective information gives rich depictions and clarifications that show the ordered stream of occasions and also regularly prompting fortunate (chance) discoveries. The scientist at long last utilized the outcomes from information examination to draw clarifications, conclusions, and suggestions for the study.

**3.10 Logistical and Ethical Considerations**

Once the proposal was developed, the researcher obtained an introduction letter from the postgraduate school of Kenyatta University. This introduction letter was used to obtain a research permit from MOE. Letters were also obtained from local administration and head teachers of selected schools. The researcher paid a visit to
the selected school and arranged with the administrators (head teachers) and their
deputies when it would be most appropriate to administer the questionnaires to the
students and teachers and also the time for interviews. The researcher discussed
with them the ethics of research that participation was voluntary, and one could
withdraw at his or her will. The researcher assured them that the information given
would be held in confidence and that there was no psychological or physical harm
that could be caused by the study. Mien and decorum were observed, questions
about research were answered.
CHAPTER FOUR
DATA ANALYSIS AND PRESENTATION

4.1 Introduction
This chapter presents the research findings, discussions, and interpretation of the findings. The purpose of this study was to analyze factors influencing performance in Mathematics in Kenya Certificate for Primary Education Examination among learners with hearing impairment in Meru County. The chapter is organized around the research objectives: teaching strategies used by mathematics teachers, attitudes & perceptions of mathematics teachers, auxiliary services offered to learners with HI to be able to benefit from education and identification of the resources available to facilitate education for HI in primary schools for HI. Presented below are key findings of the study. Out of 86 questionnaires and interview, guides responded to, 86 were accepted for analysis representing a response rate of 100.0% which was statistically acceptable.

4.2 Demographic Characteristics of the Study Population
There were only two schools in the County that had learners with hearing impairment. Of the two Headteachers who manage these schools, one was a male and the other a female. Both were aged above 40 years. A smaller proportion of the Mathematics Teachers 15(44%) were males with majority 19(56%) being female teachers. All the teachers were aged above 30 while most of them were aged between 40 and 50. This is a good age at which these teachers have the necessary nurturing abilities required to attend to any human with special needs. As such they were deemed the right persons to handle learners with hearing impairment.
On the other hand, the youngest learner was found to be 14 years old while the oldest was 23. This age is a cause for alarm because a person who does not have special needs would be at the post-secondary education level by age 23. Thus, a mechanism needs to be devised that will reduce this time difference and take care of the capability differences among the HI learners helping them progress effectively with their education. This will help them reach higher levels of education in a timely manner thus encouraging them to be even more aggressive in life. This study revealed that most learners with hearing impairment wished to pursue education beyond secondary school.

4.3 Teaching Strategies Used by Mathematics Teachers in Primary Schools for HI in Meru County

Teaching strategies are a major tool that determines the performance of learners in any particular subject under instruction. Appropriate and good teaching strategies should ensure that learners with hearing impairment perform well in Mathematics. Nonetheless, learners with hearing impairment from the two schools under study performed below average; 29.8 and 45.7 percent in KCPE examination. Most of the learners interviewed during the study indicated that they wished to get a post-secondary education. However, 18(36%) of them found difficulties in coping with the day to day school program while 30(60%) had problems coping with the school work. Most frequently, communication was mentioned as the greatest challenge followed by the difficulties in understanding and interpreting sign language and Mathematical concepts and formulae used. Accordingly, became a hindrance to the learners’ good performance not only in mathematics but also in the overall
performance across all subjects. The study uncovered that more than half of the learners 28(56%) admitted that their performance was below average (Figure 4.1).

![](image)

**Figure 4.1 : Learners' Performance**

Despite this learners' admission that their performance was below average, Figure 4.2 shows that 72% of the learners agreed that the strategies employed by their teachers were good, and learners were satisfied with the strategy. These strategies are however dissatisfied at least 10%. The results are shown in Figure 4.2
Most of the teachers including the Headteachers had at least received some training on special needs. Some teachers had training in the area of HI, others in special needs while 18(53%) hold a diploma in SNE. The two heads of these special schools were at least University graduates; one of them held a post-graduate degree. Furthermore, they both had to train in special needs and were knowledgeable in sign language. As a result, these teachers should be able to deliver the mathematics curriculum effectively to learners thus resulting in good performances.

In this study, it was observed that none of the teachers used a single strategy in teaching Mathematics. A combination of the possible strategies which included lecturing, demonstration, illustration, question and answer, class discussions, group work, pair discussions, peer teaching, co-teaching, collaborative teaching and I.E.P were in most cases used to ensure that learners understood the subject content well.
This is in agreement with Hunt and Marshall (2002); Mastropieri and Scruggs (2000) who suggested that combination of various strategies to facilitate learning by learners with HI was highly effective in content delivery for learners with HI. ‘Total communication’ emerged to be another strategy used in class teaching. This finding is in agreement with Kilei (2002) who found out that total communication was a philosophy that advocated for the utilization of all available media to understand and be understood. In this context, total communication entails sign language, body language, writing, reading, dramatization, mimicry, pantomime (actions without words) and finger spelling. Table 1 summarizes the learning strategies used by teachers.

Table 4.1: Commonly Used Learning Strategies

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demonstration</td>
<td>6</td>
<td>17.6</td>
</tr>
<tr>
<td>Question and answer</td>
<td>12</td>
<td>35.3</td>
</tr>
<tr>
<td>Group work</td>
<td>8</td>
<td>23.5</td>
</tr>
<tr>
<td>I.E.P</td>
<td>6</td>
<td>17.6</td>
</tr>
<tr>
<td>Total communication</td>
<td>2</td>
<td>5.9</td>
</tr>
<tr>
<td>Total</td>
<td>34</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Findings in Table 1 show that the most commonly used strategy was Question and answer 12(35.3%) of the teachers had adopted it. This practice was in line with Bloom (1976) who found out that question answer was an instructional strategy where learners actively participate in their learning as a critical tool to success (Bloom, 1976). Mtunda et al., (1997) who further upholds the finding which
demonstrated that question and the answer was a technique both for educating and oral testing taking into account the utilization of the inquiries to be replied by the learners that are a basic part of instructing and learning. No less than 8(23.5%) of the instructors showed that they usually utilized gathering work technique while I.E.P and exhibit systems were similarly used by 6(17.6%) of the educators. Group work involves discussion, and this is supported by Robert (2003) who describes class discussion method as one that permits open interaction between learner and learner as well as between teacher and learner. Robert (2003) shows that if appropriately arranged and organized, the examination strategy included learners with higher intellectual abilities, for example, investigation, combination, and assessment. Teachers spice up their teaching strategies by use of teaching aids. Results of this study indicated that 34(100%) of the teachers used aids to better their learners’ understanding in Mathematics.

This perhaps was based on the large number 21(61.76%) of the teachers who believed that learners with HI could not perform as well as those without this condition. Teachers indicated that learners with HI could not be compared with normal students in academic performance because learners with HI were slow learners and took much time to grasp and process information considering the difficult-to-understand sign language supposed to be used in class work. Some teachers suggested that there was a significant communication challenge which hampered effective teacher-learner communication thus retarding the learning process for learners with HI.
Consequently, the teachers were unable to cover the syllabus adequately, and the learners were not well prepared to face the national examinations. On the contrary, 13 (38.24%) of the special school teachers believe that learners with HI performed just like the learners without this impairment. This proportion of the teachers explained that hearing impairment was the natural imbalance between these two categories of learners that need to be addressed by developing suitable curriculum and communication strategies that will better the learning pace of the learners with HI thus getting them on par with the learners in ordinary schools.

Several modes of communication used by mathematics teachers were identified as shown in Figure 4.3. Sign language was used broadly by most 20 (58.82%) teachers in communicating with their learners while total communication was least used 2 (5.88%). Teachers also used oral 3 (8.82%) and written 9 (26.47%) mode of communication to better their communication strategies (Figure 4.3).

This section identifies well-blended teaching strategies used by special school teachers to deliver subject contents to their learners. The combination of several of these strategies and communication mediums ensures that needs of each and every learner were well taken care of and should result in good performances. However, the study also unveiled the complexity and challenging nature of the languages and subject content that learners are supposed to learn, understand and take examinations on. Learners expressed that they had difficulties coping with this and recommended better and simpler instruction languages and subject contents. This finding was supported by teachers who agreed that learners with HI could perform
like other hearing learners only if simpler communication languages were put in place and all learning resources that suit them provided.

![Mediums of Communication](image)

**Figure 4.3: Medium Of Communication**

**4.4 Attitudes and Perceptions of Mathematics Teachers towards Learners with Hearing Impaired**

Attitudes of the teachers of learners with HI revealed to a very great degree the nature of the relationship between the two parties. A positive relationship triggered by a positive and supportive attitude by teachers to their needy learners had a definite positive effect on the interaction between the teacher and learners. It ensures that learners are eager and motivated to learn from that particular teacher and are free of intimidation to raise questions in incidences where they do not understand (Kilei, 2003). A negative attitude will put off learners against their teacher, and as a result, they would never learn to excel in whatever subject that teacher would be handling. On the other hand, perceptions influence how the teachers handle their learners.
In a case where teachers perceive their learners as failures and unable to pass, rest assured that these teachers will be less concerned in concerting their efforts to better their learners’ performances. Learners will also detect whether their teachers view them positively or negatively (Odero, 2004). Teachers’ attitudes and perceptions were in one dimension examined by learners’ questionnaires and on the other hand by teacher questionnaires.

When teachers were requested to respond to the question on whether most teachers of the learners with HI cared what the learners with HI did in school, this study established that a large number of teachers 16(47.06%) did not care about what learners with HI did at school. This could denote negative or poor teacher attitudes towards learners with HI, which could affect their performance in Mathematics. These findings were in line with a study by Waihenya (2000) who established that the teachers’ attitude was to blame for failure in mathematics and sciences.

However, 18(52.94%) were concerned about these learners and 24(70.59%) were always very willing to assist such children because they had realized the need of education for them. Therefore, they took good care of them regarding mentorship, academic support and welfare matters just like the non-HI learners (Figure 4). Despite this finding, Head-teachers expressed that some of the teachers regarded these learners as low achievers and felt burdened while working with them. This is further evidence that teachers had negative attitudes towards learners with HI, which would ultimately affect their academic performance in mathematics.
This finding was also supported by findings from Burden et al., (2000) who identified one of the main challenges in academic achievement among learners with special needs to be teachers' attitudes. This is further supported by Shiundu & Omulando (1992). According to Shiundu & Omulando (1992) the school climate, the attitudes of teachers, the attitudes of the learners, and the relationship between them could exert significant influence on the curriculum.

**Figure 4.4: Whether Teachers Take Good Care Of Learners With HI**

Most of the teachers expressed their satisfaction with the education they offered to the children with hearing impairment. This finding should not say that they offered the best learning option for these learners as best should be reflected by good performance and consistently improving performance trend. Few of the teachers 5(14.71%) indicated that they were not satisfied by the education they offered to the learners with HI. This small proportion could probably be the section of the teachers who had identified the urge to better the mode of teaching and the quality
and quantity of the subject contents to be delivered to the learners bearing in mind their needs and capabilities as in prior findings of this study. Therefore, each day they interact with these children yearn for a better way of communication and better examination results.

**Table 4.2 : Teachers' Attitudes And Perceptions**

<table>
<thead>
<tr>
<th>Attitude</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Like</td>
<td>33</td>
<td>66.0</td>
</tr>
<tr>
<td>Not sure</td>
<td>2</td>
<td>4.0</td>
</tr>
<tr>
<td>Dislike</td>
<td>15</td>
<td>30.0</td>
</tr>
<tr>
<td>Total</td>
<td>50</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Information from learners depicted that more than half of the learners 33(66%) were satisfied by their teachers’ attitudes and perceptions. They thus liked their teachers. As a measure of whether teachers in these schools liked and treated their learners well, then this study reveals that teachers in special schools in Meru County cared about their learners with HI, they liked helping them in most affairs and were satisfied by the nature of education they offered to them.

**4.5 Auxiliary Services Offered to Learners with Hearing Impairment**

Auxiliary services for learners with HI are the specially tailored provisions regarding service delivery and various levels of support from professionals depending on the severity of their loss that help them to adjust to and cope with the demands of the hearing world. Learners with hearing impairments need assistive technology in the classroom and in their ears which include hearing aids maximize their academic and behavioral success. This section was designed to investigate the
extent to which teachers used technology and media in classrooms to support their presentations and on learners to aid smooth learning.

**Quality of Auxiliary services received by learners with HI**

The findings in the figure below show the quality of auxiliary service received by learners with HI.

![Quality of Auxiliary Services received by HI learners](image)

**Figure 4.5: Auxiliary Services Offered To learners with HI**

Based on the assumption that learners with HI clearly understood what auxiliary services were, 11(22%) of them said that they receive good services while 13(26%) indicated that these services were fair (Figure 5). On the contrary, most of the needy learners 26 (52%) did not receive any auxiliary services that would better their chances to good performance. Mathematics Teachers 34(100%) agreed that learners with HI required special facilities and support personnel to learn effectively and perform well. Particularly, the teachers highlighted hearing aids,
speech training units, and sign language interpreters as some of the most necessary assistive devices that were lacking thus derailing the learning process for learners with HI.

The findings are in agreement with Reyonds (1996) who indicated that learner achievement is associated with a safe and orderly school climate. Half of them reported that their classes did not have such facilities. Teachers added that the capability difference between the learners with HI and the hearings coupled with the lack of adequate supportive and assistive devices made it tough to understand mathematical concepts and translate that understanding into answers in an examination setting.

The school heads indicated that their schools lacked adequate facilities to support learners with hearing impairment. Besides, the schools were understaffed, and only one of them got aid from Compassion (an international NGO implementing several projects in Meru County) to supplement the inadequate government funding. There was a general outcry for hearing aids among other learning assistive devices which could negatively affect the performance of learners with HI. These findings are in line with Hasselbring (1994). According to Hasselbring (1994) instructional opportunities can be enhanced with media, basing the approach on learning theory about the enhancement of listening comprehension.

Additionally, teachers proposed a learner-need-tailored curriculum for the HI learners that would fit in the long durations HI learners needed to internalize concepts. This agreed with a study by Odero (2004) who identified curriculum
barriers to successful inclusion of students with visual impairments in Kenya Polytechnic. Odero found out those negative and stereotypic attitudes of certain personnel, lack of suitable resources and special equipment, lack of funds, lack of clear guidelines to stimulate and support the education of learners with special needs in the institution affected learners with visual impairments. His study focused on attitudes, resources, equipment, support systems, teaching-learning strategies, program content, and accessibility.

4.6 Resources Available to Facilitate Education for learners with HI in Primary Schools

This component sought to identify the resources available for special needs schools that would make the learning environment conducive for the learners with hearing challenges. Capital and human resource from the major resource base for providing quality education to learners with hearing impairment. There was a need for facilities, suitable technology, teachers and support expertise that include psychologists, therapists, and nurses who collaboratively manage the learners to create a sustainable, healthy environment to facilitate good performance.

One of the two schools studied received support from an NGO called Compassion while the other didn’t. This implies that the government funding was not sufficient to finance the operations of these schools and acquisition of the necessary equipment to make learning accessible and affordable to the hearing impaired learners. These are in line with a study by UNESCO (2003) which found out that African accounts for 40 million or 37% of the world’s total of 115.4 million children out of school (UNESCO, 2003). This showed that the significant
challenges of financing special education around the world. The schools lacked adequate facilities to support learners with HI.

A study by World Bank (2002) established that out of every five children in developing countries – equivalent to 113 million children lack access to schooling and one out of every four children who enter school, drops out before finishing five years of essential training or acquiring sustainable literacy. Information obtained from the Headteachers revealed that most physical facilities were either inadequately available or not available at all for use by learners with HI. One of the schools had a Library, a resource room and hearing devices for their learners.

The other school had acoustic painted classrooms, a library, and a resource Centre. However, these facilities were not adequate. Some of the facilities lacked included radio hearing aid, television adaptor, and telephone with amplified headset. Furthermore, the schools stand understaffed lacking sufficient access to vital services of support staff including speech therapists, clinical and educational psychologists, advisory teachers and teacher aide. This study showed that some classes did not have sign language interpreters. The schools, however, had a nurse. The majority of the learners 31(62%) indicated that the resources available in their schools and particularly in their classes were inadequate (Table 4.3).
Table 4.3: Availability of Resources

<table>
<thead>
<tr>
<th>Availability and adequacy of resources</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adequate</td>
<td>19</td>
<td>38.0</td>
</tr>
<tr>
<td>Inadequate</td>
<td>31</td>
<td>62.0</td>
</tr>
<tr>
<td>Total</td>
<td>50</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Observational information indicated that 43 (86%) of the classrooms were not crowded with learners thus were of a manageable size. However, these classrooms were not noise proof with 43 (86%) of them sufficiently lit. The study established that the learners sitting arrangement were conducive to learning. Through observation, the researcher also reached a confirmatory finding to the prior findings of this study that some classes did not have a sign language interpreter. Nonetheless, 35 (70%) of the classes had such personnel. In most classes, there was no audio technician while no classroom had a single computer. Besides, they also completely lacked projectors. All school classes had trained staff to handle learners with HI. Moreover, these staff members were conversant with sign language. 43 (86%) of the classes did not have a trained counselor in special needs while 7 (14%) had. Audiometer was not available in 21 (43%) of the classes were available in only 7 (14%) of the classes assessed.

Individual hearing aids and battery, ear molds, speech training units and auditory training units also lacked in most classes. Sign language curriculum was available for all the schools while sign language dictionaries were available in most of the classes. More than half of the classes did not get the services of a social worker.
4.7 Challenges Faced by Educators in SNE from this Study

These are some of the drawbacks that educators in SNE have to address before a sufficient education system can be realized for the learners with special needs. The major challenge in SNE was a lack of adequate facilities/equipment to support the learners in their struggle to excel in education just like the learners who do not have special needs which resulted to slow learning process and hence syllabus under coverage. The two schools were understaffed and lacked most specialized personnel required to maintain the learners’ health and attitudes towards education.

There was a need to address the issue of attitudes and perceptions of a few teachers who perceived the learners negatively through seminars and workshops on educational needs and education as a right for all. Teachers should view learners with HI and other needs as being capable of good performances and not as low achievers who are just in the education system (Hammond, 1997). Communication channels and materials currently under use have not yielded satisfying results and therefore, need a check in their efficacy. Most learners raised concern on the difficulties they face while coping with subject contents and language interpretation and use (Hall et al., 2003).
CHAPTER FIVE
SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

5.1. Introduction
This section presented the conclusion drawn from the results and the recommendations by the researcher. The purpose of this study was to analyze factors influencing performance in mathematics in Kenya Certificate of Primary Education Examination among learners with hearing impairment in Meru County. The specific objectives were; to examine teaching strategies used by mathematics teachers in primary schools for HI in Meru County; determine perceptions of mathematics teachers towards hearing impaired learners and their education in primary schools for HI in Meru County; to establish the auxiliary services offered to learners with HI to be able to benefit from education in primary schools for HI in Meru County; and identify the resources available to facilitate education for HI in primary schools for HI in Meru County.

5.2. Summary
There were only two schools in the County that had learners with hearing impairment. Of the two, Headteachers who manage these schools, one was a male and the other a female. Both were aged above 40 years. A smaller proportion of the Mathematics Teachers 15(44%) were males with majority 19(56%) being female teachers. All the teachers were aged above 30 while most of them were aged between 40 and 50. On the other hand, the youngest learner was found to be 14 years old while the oldest was 23. This study revealed that most learners with hearing impairment wished to pursue education beyond secondary school.
5.2.1. Teaching Strategies used by Mathematics Teachers in Primary Schools for HI

Study findings showed that none of the teachers used a single strategy in teaching Mathematics. A combination of the possible strategies which included lecturing, demonstration, illustration, question and answer, class discussions, group work, pair discussions, peer teaching, co-teaching, collaborative teaching and I.E.P were in most cases used to ensure that learners understood the subject content well. ‘Total communication’ emerged to be another strategy used in class teaching. In this context, total communication entailed: sign language, body language, writing, reading, dramatization, mime, parody (actions without words) and finger spelling. The most commonly used strategy was Question and answer 12(35.3%) of the teachers had adopted it. At least 8(23.5%) of the teachers indicated that they commonly used group work strategy while I.E.P and demonstration strategies were equally used by 6(17.6%) of the teachers. Teachers spiced up their teaching strategies by use of teaching aids.

Several mediums of communication used by mathematics teachers included sign language 20(58.82%) and total communication 2(5.88%). Teachers also used oral 3(8.82%) and written 9(26.47%) ways of communication to better their communication strategies.

5.2.2. Attitudes and Perceptions of Mathematics Teachers towards Hearing Impaired Learners

This study established that a significant number of teachers 16(47.06%) did not care about what learners with HI did at school. According to the head-teachers, some of the teachers regarded these learners as low achievers and felt burdened
while working with them. Most of the teachers expressed their satisfaction with the education they offered to the children with hearing impairment. Information from learners depicted that more than half of the learners 33(66%) were satisfied by their teachers' attitudes and perceptions. They thus liked their teachers. As a measure of whether teachers in these schools liked and treated their learners well, then this study reveals that teachers in special schools in Meru County cared about their HI learners, they liked helping them in most affairs and were satisfied by the nature of education they offered to them.

5.2.3. Auxiliary Services Offered to Learners with Hearing Impairment

The school heads indicated that their schools lacked adequate facilities to support learners with hearing impairment. Besides, the schools were understaffed, and only one of them got aid from Compassion (an international NGO implementing several projects in Meru County) to supplement the inadequate government funding. There was a general outcry for hearing aids among other learning assistive devices.

Based on the assumption that learners with HI clearly understood what auxiliary services were, 11(22%) of them said that they received excellent services while 13(26%) indicated that these services were fair. On the contrary, most of the needy learners 26(52%) did not receive any auxiliary services that would better their chances to good performance. Mathematics Teachers 34(100%) agreed that learners with HI required special facilities and support personnel to learn effectively and perform well. Particularly, the teachers highlighted hearing aids, speech training units, and sign language interpreters as some of the most necessary assistive devices that were lacking thus derailing the learning process for learners
with HI. Half of them 17(50%) indicated that their classes did not have such facilities. Teachers added that the capability difference between the learners with HI and the hearings coupled with the lack of adequate supportive and assistive devices made it tough to understand mathematical concepts and translate that understanding into answers in an examination setting.

5.2.4. Resources Available to Facilitate Education for HI in Primary Schools for HI

One of the two schools studied received support from an NGO called Compassion while the other didn’t. This implies that the government funding was not sufficient to finance the operations of these schools and acquisition of the necessary equipment to make learning accessible and affordable to the hearing impaired learners. The schools lacked adequate facilities to support learners with HI. Information obtained from the Headteachers revealed that most physical facilities were either insufficiently available or not available at all for use by HI learners. One of the schools had a Library, a resource room and hearing devices for their learners. The other school had acoustic painted classrooms, a library, and a resource center. However, these facilities were not as adequate. Some of the facilities lackings included radio hearing aid, television adaptor, and telephone with amplified headset. Furthermore, the schools were understaffed lacking sufficient access to vital services of support staff including speech therapists, clinical and educational psychologists, advisory teachers and teacher aide.

This study showed that some classes did not have sign language interpreters. The majority of the learners 31(62%) indicated that the resources available in their schools and particularly in their classes were inadequate. In most classes, there was
no audio technician while no classroom had a single computer. Besides, they also completely lacked projectors. At least 43(86%) of the classes did not have a trained counselor in special needs. Audiometer was not available in 21(43%) of the classes. Individual hearing aids and battery, ear molds, speech training units and auditory training units also lacked in most classes. Sign language curriculum was available for all the schools while sign language dictionaries were available in most of the categories. More than half of the classes did not get the services of a social worker.

5.3. Conclusion

Guided by the findings of this study as discussed in chapter four, the following conclusions were made;

i). All teachers in special education schools in Meru County had attained some training on special education and were conversant with sign language.

ii). Mathematics teachers used a combination of more than three teaching strategies in implementing curriculum among learners with hearing impairment in primary schools for HI in Meru County. Some of these strategies included illustrations, demonstrations, group work and question and answers among others. The most commonly used strategy was question and answer followed by group work both of which encouraged comprehensive learner participation hence likely to impact positively on their performance.

iii). Most mathematics teachers had good perception and positive attitudes towards the learners with hearing impairment. Teachers cared about what the learners did at school and were very willing to help them both in academic work and general welfare matters. However, few teachers viewed these
learners as low performers and a burden to them. They thus did not dedicate enough effort to help them better their academic abilities.

iv). Learners with hearing impairment require special facilities and supportive devices/services to enable them to learn effectively. Some of the auxiliary services offered include hearing aids, sign language interpretation, speech therapy, and psychological and medical support. In most classes, these services were not adequately available.

v). There were several facilities and resources available to facilitate education for learners with HI in Meru County. These resources included; trained staff members who are conversant with sign language and were available to handle learners with hearing impairment, school nurses, library, resource room, classrooms and assistive devices. However, some of these resources were not adequate while others were not in the form required. Additionally, some resources including radio hearing aid, telephone with amplified headset, television adaptor, sign language interpreter, therapists, and psychologists were not available.

vi). There were several challenges faced by educators in SE, which included lack of some critical resources, operation finances, communication difficulties, teacher to learners’ perceptions and others.

5.4. Recommendations

Based on the research findings in the previous chapter, the accompanying recommendations were proposed.

i. The government, NGOs and other stakeholders should offer more to support SE systems through monetary and material aid to ensure that
learners with HI are well empowered by putting in place the necessary resources and facilities to better their learning.

ii. Campaign on attitude change should be intensified through mass media and Chiefs’ barasa to change teachers who have negative attitudes and perceptions towards the learners with HI. This could also better learners’ appreciation of themselves as academically worthy individuals in the society capable of leading vibrant lives just like those without such impairments.

iii. The sign language curriculum should be moderated to suit the intellectual capabilities of learners with HI and more dictionaries provided. Mathematics subject content should be of the requirement that these learners can learn, understand and rephrase into their language.

iv. The responsible organs should address the issue of understaffing and further seek to mitigate the challenges faced by educators in the SE.

5.5. Further Research

The researcher suggests that further research is required with other forms of disabilities or impairments since this study dealt with only hearing impairment.
REFERENCES


APPENDICES

APPENDIX A: QUESTIONNAIRE FOR HEADTEACHER

The information given will be treated with total confidentiality. It is only required for research purpose. You may not write your name on this questionnaire to ensure confidentiality. Thank you for taking your time to fill this questionnaire. Either tick and/or give information in the spaces provided.

1. Gender
   Male [ ]
   Female [ ]

2. Age
   21-30 [ ] 31-40 [ ] 41-50 [ ] 51 and above [ ]

3. Highest academic qualification
   EACE/KCE/KCSE [ ]
   KACE [ ]
   Any other [ ]
   specify ____________________________

4. Highest professional qualification attained?
   P1 [ ] S1 [ ] ATS [ ] Diploma [ ] graduate [ ]
   Post Graduate [ ]

5. Do you have any training in special needs education even if it is a seminar or workshop?
   Yes [ ] No [ ]
   If Yes, please specify ____________________________

6. Do you have any knowledge of sign language?
   Yes [ ] No [ ]
7. From the enrolments and the number of teachers in the School, do you feel the School is

Understaffed ☐
Overstaffed ☐

Support your argument

8. Apart from the support from the government does the school have any other sponsor?

Yes ☐
No ☐

If Yes, who and what support?

9. Do you have adequate facilities to support learners with HI?

Yes ☐
No ☐

If No, what is lacking

10. Do you feel that learners with HI are capable of learning like hearing learner?

Yes ☐
No ☐
11. Please tick where applicable

<table>
<thead>
<tr>
<th>Physical facilities in the school</th>
<th>Available</th>
<th>Not available</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Classrooms acoustic treated</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. Library</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. Resource Room</td>
<td></td>
<td></td>
</tr>
<tr>
<td>d. Radio hearing aid</td>
<td></td>
<td></td>
</tr>
<tr>
<td>e. Television adaptor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>f. Telephone with amplified headset</td>
<td></td>
<td></td>
</tr>
<tr>
<td>g. Assistive devices are/hearing aids that are functioning.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Please give general comments on the above

__________________________________________________________________________

__________________________________________________________________________

12. a) What was the school’s mean grade in KCPE in the year 2014?

__________________________________________________________________________

b) What was the mean grade in mathematics in the year 2014?

__________________________________________________________________________

13. As a special needs education advisor what comments can you give regarding the provision of education to learners with HI concerning the following:
a) Resources available in school

b) i) Attitudes of teachers

ii) Attitudes of learners

c) Teaching strategies

SECTION B

14. What medical services, other than the usual health care and treatment services does the School offer?

15. As a major player in SE, what do you see as the main challenges faced by educators in the area of SE?
16. Please tick where applicable.

<table>
<thead>
<tr>
<th>Support staff in the School</th>
<th>Available</th>
<th>Not available</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teacher aide</td>
<td></td>
<td></td>
</tr>
<tr>
<td>School nurse</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Speech therapist</td>
<td></td>
<td></td>
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<tr>
<td>Clinical psychologists</td>
<td></td>
<td></td>
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<tr>
<td>Interpreter (sign language)</td>
<td></td>
<td></td>
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<tr>
<td>Educational psychologist</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Advisory teachers</td>
<td></td>
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</tr>
</tbody>
</table>

17. Generally, what do you think should be done to improve the performance of learners with HI in mathematics in your school?

______________________________________________________________________

______________________________________________________________________

______________________________________________________________________

______________________________________________________________________

Thank you
APPENDIX B: QUESTIONNAIRE FOR MATHEMATICS TEACHERS

The information given will be treated with total confidentiality. It is only required for research purpose. You may not write your name on this questionnaire to ensure confidentiality. Thank you for taking your time to fill this questionnaire. Either tick and/or give information in the spaces provided.

1  Gender
   Male   
   Female 

2  Age
   21-30  
   31-40  
   41-50  
   51 and above 

3  Have you ever received any training in special needs education even if it is a seminar or workshop?
   Yes   
   No    
   If yes, please specify______________________________

4  Does your class have enough facilities and equipment needed for the subject you teach?  
   Yes   
   No    

5  Which teaching/learning strategies (methods) do you use in class? (tick all that apply)

   Lecture method   
   Demonstration   
   Illustration   
   Question and answers   
   Class discussions   
   Group work   
   Pair discussion   
   Peer teaching   
   Co-teaching   
   Collaborative teaching   
   I.E.P
Please specify the method frequently used? 

6 Do you use teaching/learning aids in your lessons?  
Yes [ ] No [ ]

7 In your opinion can learners with hearing impairments perform the same as hearing learners?  
Yes [ ] No [ ]
Please explain your response.

8 a) In your opinion do students with hearing impairments require special facilities/support services?  
Yes [ ] No [ ]

b) If Yes, mention some.

c) Does your class have them?

9 What medium of communication do you usually use in class?  
Oral [ ] Written [ ] any other please specify.

10 Make any recommendations/comments or observation concerning teaching mathematics for learners with hearing impairment in your school.

Part B: Answer Yes or No (indicate by a tick) in the following statements.

1. Most teachers of HI children do not care what children with HI do at school.  
Yes [ ] No [ ]
2. Teachers handling children with hearing impairment are very willing to assist such children because they have realized the value of educating them.

Yes  [ ]  No  [ ]

3. Children with hearing impairment are well taken care of by their teachers just like the non-disabled children

Yes  [ ]  No  [ ]

4. Teachers are satisfied with the type of education they give to the children with hearing impairment.

Yes  [ ]  No  [ ]

5. Give some difficulties that teachers of special education experience in this school in the provision of the education.

_________________________________________________________________
_________________________________________________________________
_________________________________________________________________
_________________________________________________________________
_________________________________________________________________

THANK YOU
APPENDIX C: INTERVIEW FOR LEARNERS

The information given will be treated with total confidentiality. It is only required for research purpose. You may not write your name on this paper to ensure confidentiality. Give as honest information as possible

1. How old are you? _______________

2. How far do you hope to go in your education
   a. Class 8
   b. Form four
   c. Certificate course in the village polytechnic
   d. Diploma in National polytechnic
   e. Degree in the University

3. Are you able to cope with day to day activities in school without any difficulties?
   Yes □ No □
   If Yes, which one________________________________________
   How can they be solved____________________________________

4. Are you able to cope with school work without difficulties?
   Yes □ No □
   If No, state difficulty______________________________________
   How could these problems be solved___________________________
5. What would you say about your performance in Mathematics?

6. What would you say about the teaching strategies used by mathematics teachers in primary schools for HI in Meru County?

7. What would you say about attitudes and perceptions of mathematics teachers towards hearing impaired learners in this school?

8. Comment on the auxiliary services offered to learners with HI to be able to benefit from education so as to perform much better in Mathematics/
9. Comment on the availability of resources in your school to facilitate teaching and learning of Mathematics for learners with HI in your school.


10. Suggest some of the things you would like to see being done in your school to make your education and learning (especially in Mathematics) better.


APPENDIX D: OBSERVATION CHECKLIST

(PHYSICAL FACILITIES AND OTHER RESOURCES)

(A) Physical facilities

(i) Classroom
   - Crowded [ ]
   - Not crowded [ ]

(ii) State of buildings
   - Noise proof [ ]
   - Not noise proof [ ]

(iii) Lighting
   - Sufficient lighting [ ]
   - Insufficient lighting [ ]

(iv) Seating arrangement
   a) Conducive for learners with hearing impairment [ ]
   b) Not conducive for learners with hearing impairment [ ]

(B)

<table>
<thead>
<tr>
<th>Equipment resources/support services</th>
<th>Available</th>
<th>Not available</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sign language interpreter</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Audio technician</td>
<td></td>
<td></td>
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<tr>
<td>Computers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Projectors</td>
<td></td>
<td></td>
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<tr>
<td>Trained staff in handling hearing impaired learners</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Staff conversant with sign language</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trained counselor in special needs education</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resource room</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Equipment resources/support services</td>
<td>Available</td>
<td>Not available</td>
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<td>----------------------------------------------</td>
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<tr>
<td>Audiometer</td>
<td></td>
<td></td>
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<tr>
<td>Tympanometer</td>
<td></td>
<td></td>
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<tr>
<td>Individual hearing aids &amp; battery</td>
<td></td>
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<tr>
<td>ear moulds</td>
<td></td>
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<tr>
<td>Speech training units</td>
<td></td>
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<tr>
<td>Auditory training unit</td>
<td></td>
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<tr>
<td>Sign language curriculum</td>
<td></td>
<td></td>
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<tr>
<td>Sign language dictionaries</td>
<td></td>
<td></td>
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<tr>
<td>Teacher aides</td>
<td></td>
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<tr>
<td>Social worker</td>
<td></td>
<td></td>
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<tr>
<td>Nurse</td>
<td></td>
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<tr>
<td>Group hearing aid</td>
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<td></td>
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<tr>
<td>Room acoustic</td>
<td></td>
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</tbody>
</table>

(C) LESSON OBSERVATION

<table>
<thead>
<tr>
<th>Teaching-learning strategies used</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Medium of communication used</td>
<td></td>
</tr>
<tr>
<td>Mode of content delivery to students</td>
<td></td>
</tr>
<tr>
<td>Nature of teaching (theory, practical)</td>
<td></td>
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<tr>
<td>Teaching sessions-length of sessions</td>
<td></td>
</tr>
<tr>
<td>Use of teaching aids in lesson presentation</td>
<td></td>
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<tr>
<td></td>
<td>YES</td>
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<tr>
<td>--------------------------------</td>
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<tr>
<td>Teacher using lesson plan</td>
<td></td>
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<tr>
<td>Having adequate lesson notes</td>
<td></td>
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<tr>
<td>Coverage of syllabus</td>
<td></td>
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<tr>
<td>Communication problem</td>
<td></td>
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<tr>
<td>Good mastery of subject matter</td>
<td></td>
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<tr>
<td>Giving of assignments</td>
<td></td>
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<tr>
<td>Use of I.E.Ps</td>
<td></td>
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</tbody>
</table>
APPENDIX E: MERU COUNTY MAP

Density people per Km Squared

168 171 179 200 261 272

Urban centres with population of more than 2000 people.

Source: Google Maps
Internal Memo

FROM: Dean, Graduate School

TO: Grace K. Muguongo
C/o Special Needs Education Dept.

SUBJECT: APPROVAL OF RESEARCH PROPOSAL

We acknowledge receipt of your revised Research Proposal as per our recommendations raised by the Graduate School Board of 29th July, 2015.

You may now proceed with your Data Collection, subject to clearance with Director General, National Commission for Science, Technology and Innovation.

As you embark on your data collection, please note that you will be required to submit to Graduate School completed Supervision Tracking Forms per semester. The form has been developed to replace the Progress Report Forms. The Supervision Tracking Forms are available at the University's Website under Graduate School webpage downloads.

Thank you.

ANNBELL MWANIKI
FOR: DEAN, GRADUATE SCHOOL

cc: Chairman, Department of Special Needs Education

Supervisors:

1. Dr. Beatrice Bunyasi Awori
   C/o Department of Special Needs Education
   Kenyatta University

2. Dr. Madrine King'endo
   C/o Department of Special Needs Education
   Kenyatta University
APPENDIX G: AUTHORIZATION LETTER FROM NACOSTI

NACOSTI
NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY AND INNOVATION

Telephone: +254-20-2213471, 2241349, 310571, 2219420
Fax: +254-20-318245, 318249
Email: secretary@nacosti.go.ke
Website: www.nacosti.go.ke
When replying please quote
Ref: No. NACOSTI/P/15/65376/8766

Date: 9th December, 2015

Grace Karwirwa Muguongo
Kenyatta University
P.O. Box 43844-00100
NAIROBI.

RE: RESEARCH AUTHORIZATION

Following your application for authority to carry out research on “Influencing performance in Mathematics in Kenya Certificate of Primary Education among learners with hearing impairment in Meru County, Kenya,” I am pleased to inform you that you have been authorized to undertake research in Meru County for a period ending 7th December, 2016.

You are advised to report to the County Commissioner and the County Director of Education, Meru County before embarking on the research project.

On completion of the research, you are expected to submit two hard copies and one soft copy in pdf of the research report/thesis to our office.

DR. S. K. LANGAT, OGW
FOR: DIRECTOR GENERAL/CEO

Copy to:
The County Commissioner
Meru County.

The County Director of Education
Meru County.
APPENDIX H: APPROVAL FROM NACOSTI

CONDITIONS

1. You must report to the County Commissioner and the County Education Officer of the area before embarking on your research. Failure to do that may lead to the cancellation of your permit.

2. Government Officers will not be interviewed without prior appointment.

3. No questionnaire will be used unless it has been approved.

4. Excavation, filming and collection of biological specimens are subject to further permission from the relevant Government Ministries.

5. You are required to submit at least two (2) hard copies and one (1) soft copy of your final report.

6. The Government of Kenya reserves the right to modify the conditions of this permit including its cancellation without notice.

RESEARCH CLEARANCE PERMIT

Serial No. A 7464

CONDITIONS: see back page

THIS IS TO CERTIFY THAT:

MS. GRACE KARWIRWA MUGUONGO of KENYATTA UNIVERSITY, 46-60200 Meru, has been permitted to conduct research in Meru County on the topic: INFLUENCING PERFORMANCE IN MATHEMATICS IN KENYA CERTIFICATE OF PRIMARY EDUCATION AMONG LEARNERS WITH HEARING IMPAIRMENT IN MERU COUNTY, KENYA

for the period ending: 7th December, 2016

Applicant's Signature

Date of Issue: 9th December, 2015

Fee Received: Ksh 1,000

Director General
National Commission for Science, Technology & Innovation