

**IMPACT OF KENYAN SIGN LANGUAGE INSTRUCTIONAL MEDIUM ON
ACADEMIC PERFORMANCE OF LEARNERS WITH HEARING IMPAIRMENT IN
SPECIAL PRIMARY SCHOOLS IN KENYA**

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DECLARATION

I confirm that this research thesis is my original work and has not been presented in any other university/institution. The thesis has been complemented by referenced works duly acknowledged. Where text, data, graphics, pictures, or tables have been borrowed from other works- including the internet, the sources are specifically accredited through referencing in accordance with anti-plagiarism regulations.

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DEDICATION

This work is dedicated to my beloved family; my dear husband James and children: Winnie, Ken, Damaris, Phil, Chemu, Totoo, Collo and Kurui. I am grateful for your great support and encouragement. Thank you and may our good God bless you all.

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ABBREVIATIONS AND ACRONYMS

ASL	American Sign Language
GDC	Global Deaf Connection
GOK	Government of Kenya
HI	Hearing Impairment
KCPE	Kenya Certificate of Primary Education
KCSE	Kenya Certificate of Secondary Education
KICD	Kenya Institute of Curriculum Development
KIE	Kenya Institute of Education
KNEC	Kenya National Examinations Council
KSL	Kenyan Sign Language
MoE	Ministry of Education
MOEST	Ministry of Education, Science and Technology
ROK	Republic of Kenya
TC	Total Communication
SASL	South African Sign Language
UNESCO	United Nation's Education Scientific and Cultural Organization

ABSTRACT

The purpose of this study was to establish the impact of Kenyan Sign Language as an instructional medium on the academic performance of learners with hearing impairment since it was officially recognized in 2004 as the medium of instruction in special primary schools. This study was carried out in five selected special primary schools across five counties in Kenya. The objectives of the study included: to assess the academic performance of learners with hearing impairment, impact of the Kenyan Sign Language, teachers' competence in Kenyan Sign Language, teachers'/learners' opinions, and teaching/ learning resources. The Universal Grammar theory by Chomsky (1965) formed the theoretical framework for this study. Various literature were reviewed, based on the objectives of the study. The research methodology included descriptive survey design, and mixed method approach (quantitative and qualitative). The study targeted a population of three hundred and sixty nine: five head teachers, one hundred and eleven teachers, and two hundred and fifty three learners. A sample size of one hundred and twelve respondents was selected: five head teachers, fifty seven teachers, and fifty learners. Purposive sampling was applied to select counties, schools, head teachers and learners, while a simple random sampling procedure was applied to select teachers in each school. The instruments used for data collection included questionnaires, interview guides, observation schedules, and document analysis guides. To ascertain the validity and reliability of the instruments, independent judges were used to review them, a test and re-test were done and a pilot study was conducted. Data obtained from questionnaires were analysed quantitatively, using descriptive statistics. Data collected using interviews and observations were coded, quantified, categorized and analysed following themes derived from the research objectives. Both data were integrated to get the findings of the study. The study found that the use of Kenyan Sign Language to instruct learners with hearing impairment had led to an improvement in their academic performance. Head teachers and teachers felt that learners' performance after the official introduction of KSL was better compared to performance prior to that. While KSL as a subject was found to be the best performed, the scores in certain subjects, such as Social Studies were very low and performance of learners with hearing impairment was still below average as compared to their hearing counterparts. The study found that KSL helped learners understand and comprehend concepts better. However, abstract concepts lacked appropriate signs and this made learning difficult for the learners. Findings on teachers' competence in KSL skills revealed that teachers still lack adequate skills in use of KSL. On teaching/ learning resources the findings showed that these were also inadequate. The main visual resources available were KSL text books and KSL dictionaries. KICD video tapes were the major technological resources available in schools. The study recommends that more signs be developed to keep up with the current and emerging trends in the education of learners with hearing impairment and that teachers be given specialized and comprehensive KSL training courses. This study also recommends the development of teaching/learning resources that are relevant and appropriate and can be used to meet the needs of learners with hearing impairment. The research findings therefore, may be useful to curriculum developers and policy makers, and may provide information that can be used to enhance and promote the education of learners with hearing impairment; which may lead to improved academic performance, consequently resulting in better transitions.

CHAPTER ONE

INTRODUCTION AND CONTEXT OF THE STUDY

1.1 Introduction

This chapter presents; an introduction to the study background, statement of the problem, purpose of the study, research objectives and questions, significance of the study, limitations and delimitations, assumptions, as well as the theoretical and conceptual frameworks. Finally, the chapter provides operational definitions of terms used in the study.

1.2 Background to the Study

Sign language is a visual-gestural language among Deaf persons which combines hand, body, and facial movements, rather than individual letters, to convey meaning of words and concepts. It is a fully-fledged language with its own vocabulary, syntax, and grammar. American Sign Language (ASL) is currently the most widely used sign language among adults who are deaf, mainly because it is easy to master and has, historically, been their preferred mode of communication (Turnbull, Turnbull & Wehmeyer, 2010). The use of ASL in a school setting has been strongly recommended by some advocates of deaf people because it is considered their natural language (National Institute on Deafness and Other Communication Disorders, 2009a).

Students who are deaf have considerable difficulty succeeding in an education system that primarily depends on use of spoken or written language to transmit knowledge (Hardman, Drew & Egan, 2013). Their performance in national examinations is below average as compared to their hearing counterparts. Only a small percentage of these learners who acquire primary education proceed for further education at secondary school and university levels (Ministry of Education Science and Technology (MOEST), 2005b).

The poor academic performance can be attributed to lack of proper mode of communication, and teacher's lack of competence in the language of instruction (Adoyo, 2004).

In countries that have adopted the use of national sign languages as the medium of instruction in schools for the deaf, an unprecedented success has been achieved in the education of the deaf (Mweri, 2014). The French Sign Language (FSL), for example, is used both as a medium of instruction (learning academic content) and as a medium of learning other languages in France, an approach that is very beneficial to deaf children because they get to learn other subjects as well as other languages (Mweri, 2014).

In Sweden, the Swedish Sign Language became the language of instruction as well as a teaching subject in 1995 (Chupina, 2006). Since then, special schools as well as mainstream schools use the same curriculum, which includes sign language as a subject. Deaf students in schools study the sign language as well as lessons conducted in written Swedish. This has helped improve the academic performance of the students. In Zambia, Sign Language is primarily taught as a communication mode to facilitate the teaching of English language and other academic subjects (Wakumelo, 2009).

The Framework of Action accompanying UNESCO'S Salamanca Statement on Special Needs Education (1994) states that; "The importance of sign language as medium of communication among the deaf... should be recognized and provision made to ensure all deaf persons have access to education in their natural language". If reading is taught visually or by use of a manual method (such as American Sign Language or finger spelling), children who are deaf are able to learn how to read, write and use appropriate language forms, such as tense, questions and logical prepositions (Trezek, Wang, Woods, Gampp & Paul, 2007).

The use of sign language in education is also supported by Article 24, paragraph 3, of the United Nations Convention on the Rights of Persons with Disabilities, which states that countries should "ensure" that the education of all, and in particular children who are Deaf,

is delivered in languages, modes and communication formats that are most appropriate for the individual, and this should be done in environments which maximize academic and social development (UNCPRD, 2006).

Within Kenya, over the years, many changes have been made to policies surrounding language of instruction in schools for the Deaf. In 1988, a pilot study was conducted in Machakos School for the Deaf on the use of Total Communication (TC) method in teaching learners with hearing impairment (HI). TC encompasses use of sign language, speech, gestures, body language among other modes of communication in teaching learners with HI. Findings from the study revealed that, as a teaching method, TC enabled faster learning. The findings also showed that the method was more effective for cognitive growth and development when incorporated at earlier ages, rather than in later ages (Ministry of Education (MoE), 1988).

Kenya Institute of Curriculum Development (KICD), however, noted that during the pilot study, learners who are Deaf emphasized Kenya Sign Language (KSL) as the preferred mode of communication. Subsequently, further research was to be carried out to examine the relevance and development of KSL as a medium of instruction (MoE, 1988). These views were supported by the 1988 Kamunge Report, which suggested that there was need for research to be conducted and the research evidence used to develop the most appropriate sign language for Kenyan learners with hearing impairment (Republic of Kenya (RoK), 1988). The Kenyan Sign Language curriculum was then gradually developed by KICD in conjunction with Deaf adults (Ndurumo, 2008). Since 2004, KSL has been recognized as an effective medium of communication and official language of instruction for learners who are hearing impaired (HI) once they join schools (MoE, 2009a).

According to MoE (2004), the use of KSL as a mode of instruction allows learners with HI to acquire expressive, receptive, and written signing skills. This enables them to communicate

effectively across the curriculum. Zarchy (2008) asserts that a good background in sign language amongst learners with HI enhances acquisition of English language and further argues that if native ASL signers learn English as a second language at a young age, they perform just as well as hearing children who learn English as a second language at the same age. Zarchy (2008) also points out that early exposure to sign language can improve their literacy abilities, supporting findings from the 1988 MoE study aforementioned.

More recently, Imbiti, Bunyasi, and Kwena (2014), found that KSL was the most widely used medium of instruction, employed to clarify concepts in all subjects. In their findings, they revealed that KSL was fully used for instructions during KSL subject lessons and that it was a learner-centered approach that enhances understanding.

Despite these positive developments over the years, the Kenya National Commission on Human Rights (2014) has reported the challenges faced by deaf learners, including the lack of proficient teachers, the lack of resources in schools and the lack of sign language interpretation when accessing public services and information. This is despite the recognition by the Kenyan Constitution of the role of the state in promoting and developing the use of indigenous languages, including KSL (Kenyan Constitution, 2010).

In addition, while the studies highlighted above have shown the positive effects of KSL, there is still need for further research to examine the impacts the medium of instruction has on learners, as has been previously pointed out by Owiko (2009) and Wanjau (2005), who had emphasised the need for more research.

This study, therefore, sought to fill the gap by producing evidence on the impacts of KSL as a medium of instruction. In particular, it focused on assessing the impacts of KSL on the academic performance of learners with HI in some selected special primary schools in Kenya.

1.3 Statement of the Problem

Over the years, there has been debate on the mode of communication that is most suitable for the education of learners with hearing impairment. These learners have considerable difficulties succeeding in an education system that depends mainly on spoken or written language to transmit knowledge. Their academic performance is below average as compared to those of their hearing counterparts. The poor academic performance has been attributed to lack of a proper mode of communication and the inability (or incompetence) of teachers to use proper language of instruction. In cognizance of this, the government of Kenya has, since 2004, officially recognized the use of KSL as a medium of instructing/teaching HI learners in special schools. This was done after other modes were tried out and failed to cater for learners' communication needs (MoE, 2009a). There is not much evidence on the extent to which KSL, as a medium of instruction, has influenced the academic performance of learners who are hearing impaired. This study, therefore, was carried out to assess the impact of KSL on academic performance of these learners who study in some selected primary special schools in the country.

1.4 Purpose of the Study

The main purpose of the study was to assess the impact of Kenyan Sign Language as an instructional medium on academic performance of learners with hearing impairment in some selected special primary schools in Kenya.

1.5 Objectives of the study

The objectives of the study were:

1. To assess the academic performance of learners with hearing impairment since introduction of KSL as a medium of instruction in schools.
2. To establish how teachers' use of KSL during instruction affects the learner's academic performance.
3. To find out teachers' competence skills in use of KSL in class.
4. To identify teaching/learning resources used to facilitate KSL when instructing learners with hearing impairment in schools.
5. To establish teachers'/learners' opinions towards KSL as a medium of instruction.

1.6 Research Questions

These included:

1. How is the academic performance of learners with hearing impairment since the introduction of KSL as a medium of instruction in schools?
2. How does the use of KSL as a medium of instruction affect the academic performance of learners with hearing impairment?
3. How competent are teachers in the use of KSL in class?
4. What teaching/learning resources are used to facilitate KSL when instructing learners with hearing impairment in schools?
5. What are the teachers'/ learners' opinions towards KSL as a mode of instruction?

1.7 Significance of the Study

Findings from this research may be particularly relevant to teachers, learners, curriculum developers and other stakeholders, and may provide evidence that may be used to enhance

and improve the education of learners with hearing impairment. Findings could be used to support advanced training for teachers who may not be skilled in the use of KSL; thus may be resulting in more effective teaching learners who are hearing impaired. The study may be useful to curriculum developers and other stakeholders, who may use the findings to formulate appropriate education policies for deaf pupils, as well as develop adequate and appropriate teaching and learning resources that may be used to enhance the teaching of KSL to hearing impaired. This may in turn help improve the quality and standard of education, and improve education outcomes amongst learners with hearing impairment in Kenya.

1.8 Limitations of the Study

Clark (2009) describes limitations as challenges faced by the researchers beyond their control, which may affect the results of the study or how the results are interpreted. This study focused on five selected special primary schools in five counties in Kenya. The results of the study, therefore, cannot be interpreted as representative of the entire country. In order to draw conclusions based on the entire country, a more comprehensive study involving a nationally representative sample of all special primary schools with learners with HI, ought to have been done. This was, however, not possible in this study due to limitations of financial resources and other logistical constraints such as distance and lack of study leave.

The sampled schools included in the study were scattered and far apart, causing the researcher to transverse from one county to another. The respondents interviewed did not accept the use of audio tapes and instead preferred that their responses to be written down by the researcher. In addition, some questionnaires returned had some questions not responded to and the researcher treated them as no response during data analysis. Another difficulty faced was the lack of cooperation by some teachers in some of the schools, who, complained that researchers often went to collect data from their schools but they (the teachers) did not

benefit from the studies. In that circumstance, the researcher reiterated the purpose of the study to the teachers and convinced them that the findings of the study would be disseminated to the public.

1.9 Delimitations of the Study

The study mainly focused on views and experiences of five selected special primary schools: Nyangoma, Mumias, Machakos, Ngala, and St. Kizito. Since their establishment, these five special schools have used sign language as a medium of instruction. Furthermore, the respondents included in the sample were those in session in their respective schools when the study was carried out. There were other issues affecting the education of learners with hearing impairment, but this study looked at the impact of KSL as a medium of instruction on academic performance of the learners, teachers' competence in the use of KSL, their opinions and learning resources used. This study utilized questionnaires, interviews, observation and document analysis guides to collect data. Findings were presented using descriptive statistics.

1.10 Assumptions

The basic assumptions underlying the study included: Kenyan Sign Language was being used to teach/instruct deaf learners, schools had access to adequate KSL resources, teachers had undergone some training in KSL, and that the respondents were ready to participate in the study.

1.11 Theoretical and Conceptual Framework

1.11.1 Theoretical Framework

The study was guided by the Universal Grammar theory of Noam Chomsky on language acquisition (1965). Chomsky argued that children would never be able to acquire the tools needed to process an infinite number of sentences if the language acquisition mechanism was

dependant on the language input alone. Consequently, he proposed the theory of Universal Grammar (UG), an idea of innate, biological grammatical categories, such as a noun category and a verb category that facilitate the entire language development in children, and overall language processing in adults. UG is considered to contain all the grammatical information needed to combine nouns and verbs into phrases. The child's only task is to learn the words of his/her language (Ambridge & Lieven, 2011). The theory argues that the child is aware of a set of principles that apply to all languages, and the parameters that vary from one language to another. The Kenyan Sign Language embodies some of aspects contained in the UG theory, in that it has a clearly organized internal structure and a set of rules through which units of information are composed. It is a complex linguistic system based on the visual/manual code of communication. In the same way as hearing children do, deaf children, although deprived of language, acquire skills to communicate.

Chomsky's theory has implications on the acquisition, development and teaching of learners with HI using KSL. Like their hearing counterparts, hearing impaired learners learn their first language (KSL) in similar stages (Imbiti et al., 2014). In addition, the use of KSL as stated by Okombo (2004) enables learners to master content, become bilingual and participate in complex discourse in both KSL and written English, hence achieving better academic performances.

1.11.2 Conceptual Framework

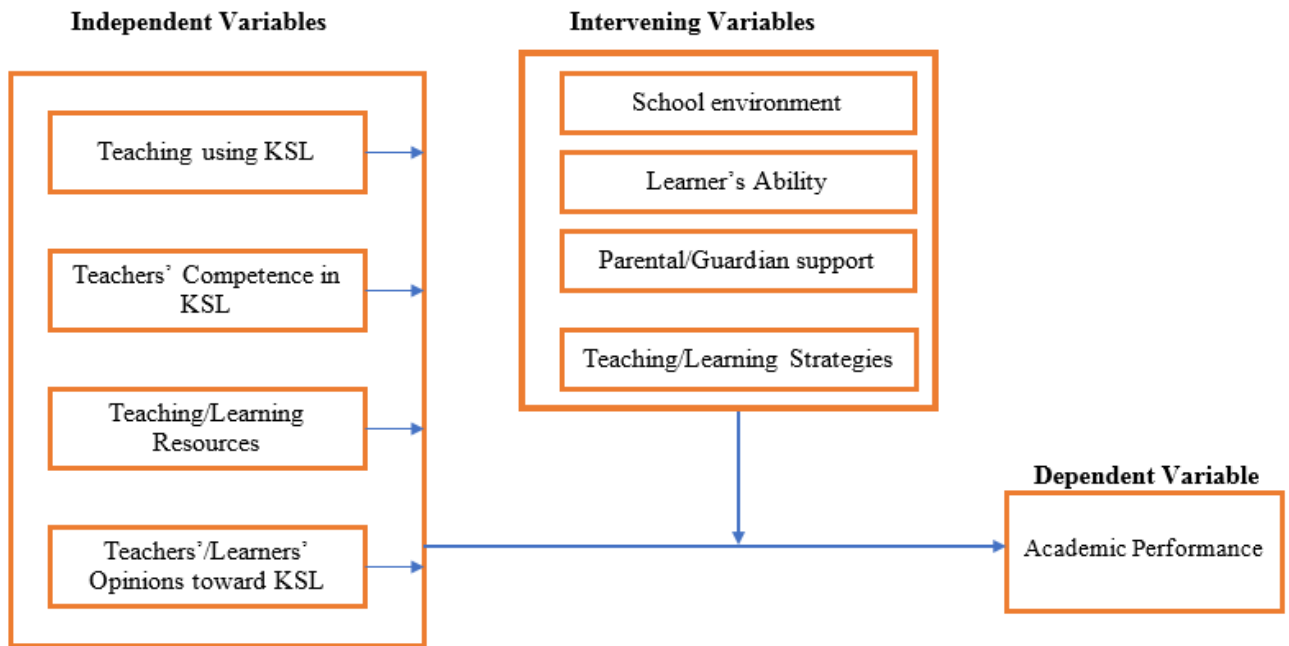


Figure 1.1: Conceptual Framework: Impact of Kenyan Sign Language on Academic Performance

Source: Researcher's adaptation (2017)

Figure 1.1 explains how various variables are interlinked. The use of KSL as a medium of instruction is hypothesised to have a significant impact on the academic performance of learners with hearing impairment. The use of KSL, however, in learning implies that teachers are proficient in it and that adequate and appropriate teaching/learning materials are availed to facilitate effective learning of KSL, resulting in improved academic performance of learners with hearing impairment. Additionally, positive teachers'/learners' opinions towards KSL promotes effective teaching/learning, thus, leading to increased transition to the next level of education among learners who are hearing impaired.

1.12 Operational Definition of Terms

Academic Performance –This includes achievement in academic subjects offered in the school.

American Sign Language– The language used by deaf persons in United States of America (Turnbull, Turnbull, & Wehmeyer, 2010).

Deaf–refers to a learner with profound hearing loss or complete inability to hear (Heward, 2006).

Hard of Hearing–refers to a learner with residual hearing and can process linguistic information if amplification or hearing aids are provided (Hardman, Drew, & Egan, 2013).

Hearing Impairment–A general term used to refer hearing loss which ranges from mild to profound (Friend, 2008).

Impact–effects of KSL on academic performance of learners with hearing impairment.

Kenyan Sign Language– The language used to instruct learners with hearing impairment in Kenya (Adoyo, 2007).

Medium of Instruction– The media used to facilitate teaching among learners who are deaf.

Sign Language –A visual-gestural language that uses manual symbols and signs to represent ideas and concepts (Hardman, Drew, & Egan, 2013).

Special Schools–residential schools designed specifically for learners with hearing impairment.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter presents a review of literature underlying the objectives of the study. It starts with literature surrounding the academic performance of learners with HI, followed by a review of studies on the use of Kenyan Sign Language as a medium of instruction, the KSL structure, and teachers' competence in the use of KSL. Finally, the chapter presents studies that have looked at teaching/learning resources and teachers'/learners' opinions towards KSL.

2.2 An overview of Academic performance of Learners with HI

As previously mentioned in Chapter 1, students who are deaf have considerable difficulty succeeding in an education system that depends primarily on the spoken word and written language to transmit knowledge (Hardman, Drew & Egan, 2013). Studies assessing the academic performance of learners with hearing impairment have routinely found them to lag far behind their hearing peers, and the gap in achievement usually widens as they get older (ASHA, 2001a). Various other studies have found that low achievement is a characteristic of learners who are deaf (Heine & Slone, 2008; Marschark, Lang, & Albertini, 2002); they average 3-4 years below their age-appropriate grade levels. In United States of America, approximately 30% of deaf students were found to be functionally illiterate when they left school, compared to less than 1% of hearing students (Heward, 2006). In India, a 2005 study conducted by the National Association of the Deaf (NAD) found that education for the Deaf was characterized by hearing impaired students lagging behind their hearing age mates substantially in all measures of achievement (Denmark, 2013).

Research on the performance of the students who are deaf or hard of hearing, which has used standardized reading comprehension tests suggests that on average, the learners encounter great difficulty in processing standard English that is in print (Friend, 2008). This was also seen in a study conducted by Anita, Jones, Reed, and Kreimeyer (2009) who looked at deaf students' school achievement. Over a 5-year period, scores on standardized assessments of reading, language, and mathematics, as well as demographic and communication data were obtained from 197 Deaf and Hard of Hearing (DHH) students enrolled in mainstream classrooms for at least 2 hours daily. The results indicated that over that period, many students achieved average or above average levels. Of the students followed, 48–68% achieved average or above average levels in reading, 55–77% in language/writing, and 71–79% in mathematics.

Marschark, Sapere, Convertino, Mayer, Wauters and Sarchet (2009) showed that students who do not perform as well as peers in language arts, reading and writing have a disadvantage and lack both knowledge and experience with formal and informal language. Although the majority of learners who are deaf or hard of hearing struggle to become fluent readers, some learners have been found to perform far much better (in terms of grades achieved) compared to their hearing peers (Erickson, 1987; Geers & Moog, 1989). The factors found to explain those students' success include the quality and quantity of interactions with significant others, parents participation in their education, supportive early educational environments, and high quality education programs (Marschark, Convertina, & LaRock, 2006). Studies, however, still document and persistently report that deaf students find the learning of English quite difficult and generally lag behind their hearing peers (Luckner & Handley, 2008; Morenzo-Perez & Rodriguez-Qrtiz, 2015; Wilbur, 2000). In general, students who have hearing impairment achieve better grades in Mathematics than in reading or writing (Friend, 2008).

Like in many other countries, learners who are deaf in Kenya have consistently trailed behind their hearing counterparts in academic performance (Omutsani, 2012). According to MOEST (2005b) report, academic performance in national examinations like KCPE, continues to be an indicator of the quality of education for learners with hearing impairment. Majority of these learners rarely score above 250 (out of a possible 500) marks, and their pass mark to join secondary schools of their choice is usually lowered to 130 marks or below. Only a small percentage of these learners in Kenya who acquire primary education proceed for further education at secondary schools and university levels (MOEST, 2005b). The report further reveals that deaf learners performed better in Mathematics and English and worst in Kiswahili resulting in a drastic drop in the overall performance. Inquiries conducted pointed out to teachers' lack of competence in the language of instruction as one of the major obstacles to their academic development (Adoyo, 2004).

To address this, the government of Kenya has officially adopted the use of KSL as a medium of instruction for hearing impaired learners after the use of various other modes failed to meet the communication needs of the learners (MOEST, 2004d). There are very few studies that have assessed the effects of KSL, as a mode of instruction, and this study sought to fill that gap by examining the impact of the language on the academic performance of Kenyan learners who are hearing impaired.

2.3 Kenyan Sign Language as a Medium of Instruction

The Kenyan Sign Language has visual gestures and follows distinct rules and grammar to present ideas and concepts, using a visual mode of communication, to instruct hearing impaired learners and other deaf persons (Kimani, 2012). The language is believed to have originated in the first schools for deaf, Nyangoma and Mumias, in the early 1960s in Western Kenya (Adoyo, 2007). Like other sign languages, KSL has evolved largely through social

interactions of the deaf. The language has connections to American Sign Language (ASL) and British Sign Language (BSL).

In Sweden, the Swedish Sign Language became the language of instruction as well as a taught subject itself in 1995 (Chupina, 2006). Since then, special schools and mainstream schools use the same curriculum which includes sign language as a subject. Deaf students in school study sign language along with lessons in written Swedish. This has helped improve learners' academic performance. Sign language effectively fulfils the same social and mental functions as spoken language and it can even be simultaneously interpreted into and from spoken languages in real time (Sandler & Lillo-Martin, 2009).

In Africa, a study by Dixon (2005) in Liberia indicates that education for the deaf students in countries, like Liberia, Ghana, Nigeria, Kenya and South Africa have common similarities. In all the countries, the use of sign language is common with a combination of teaching methods, lip reading and sign language. Schools in all countries face a shortage of funds and teachers (Dixon, 2005).

Effective instruction and subsequent academic achievement for learners with HI requires appropriate language (MoE, 2009a). Curriculum objectives are well understood by learners if they are delivered in the respective learner's first language (Enns, 2007). Studies have shown that deaf students who have higher levels of sign language proficiency also have better results in reading and writing literacy tests and perform better in cognitive tasks (Enns, 2007 & Zarchy, 2008). In his view, Zarchy (2008) asserts that a good background in sign language among learners with hearing impairment enhances acquisition of English language and concludes that early exposure to sign language for children with hearing impairment can improve their literacy abilities.

In a more recent study that examined the relationship between KSL and English literacy, Aura, Venville and Marais (2016) reported that mastery of sign language was associated with better English literacy skills. High scores in KSL correlated with high scores in English and vice versa, while low scores in KSL paired with low scores in English literacy.

The fluent use of sign language in explaining scientific concepts, for example, has led to active learner classroom engagement, participation in continuous exploration and innovativeness among deaf children (Lang, McKee & Conner, 1993). Also, findings emerging from studies on reading, writing and academic achievement indicate that deaf children of deaf parents are more successful academically than deaf children with hearing parents (Gregory, 1996).

Heslinga (2012) advocated adding signing in learning as a way to keep challenges high while lessening stress. Using sign language allows learners to adapt to content via a preferred modality, to provide support through blends of action, symbols, and speaking. Signing encourages exploration, reinforcement, and comprehension.

In a study in United States, that sought to determine how well deaf students understood science concepts, Albertini and Lang (2001) employing inductive analysis approach analysed a sample of 228 written concepts in science literacy for learners in grade 6 through 11 and the subsequent reflective comments from their teachers. The teachers' views were that the mode of communication (verbal or non-verbal) well acquainted to the learners who are deaf or hard of hearing, had an impact on their scientific content understanding and writing. Santau, Secada, Maerten-Rivera, Cone, and Lee (2010) examined and described the need for science teachers to know their subject, vary practices that promote understanding, advance scientific inquiry, and use supportive practices for English Language Learners (ELLs) and also Sign Language Learners (SLLs).

The integration of ASL into science and other content areas creates many openings for vocabulary development and enhancement in elementary classrooms. Using ASL in the content areas further supports the varying learning styles of students and continues to build connections among peers who perhaps had difficulties communicating and connecting with one another. Content areas provide more opportunities in which the entire class participated together, allowing for the building of camaraderie, communication, and meaningful connections.

The use of deaf learner's primary language in teaching other school subjects like mathematics and science could provide an ideal platform to learn a second language through connecting learner's experiences to new content vocabularies and concepts (Kluwin & Stewart, 2001). Learning a first language, such as Kenyan sign language, with consistent exposure to proficient primary language models has been identified as one of the best practices that can be used to support literacy development among learners with HI (Easterbrooks & Stephenson, 2006).

The use of sign language, however, in teaching science to learners who are deaf faces challenges. A study by Lang, Huppa, Monte, Brown, Babb and Scheifele (2006), for example, confirmed that about 60% of the words that are considered fundamental in science curriculum have no sign representation. Teachers for learners who are deaf, therefore, work hand-in-hand with their learners in exploring possible signs that could be used to communicate scientific concepts without compromising the content quality. Research on sign language convention or standardization as a dimension of communication in pedagogy may enhance learning in all content areas of the curriculum (Lang et al., 2006).

In Kenya, KSL was adopted in 2004 as a medium of instruction for learners with HI after various modes were tested out but failed to fulfil the communication needs of the learners (MoE, 2004). According to MoE (2004), KSL allows hearing impaired learners to acquire

expressive, receptive and written signing skills which enable them to communicate effectively across the curriculum. Adoyo (2002) argues that lack of access to KSL learning can adversely affect the language development of some deaf children and so impede their subsequent learning.

Imbiti, Awori and Kwena (2014) carried out a study to investigate strategies facilitating KSL progress in primary schools for learners with hearing impairment in Western Province of Kenya. The target population was 100 teachers, and descriptive survey design was used in the study. Findings revealed that KSL is widely used as a medium of instruction to clarify concepts in all subjects. The study further revealed that as a subject, KSL enhances understanding and is also learner-centered. Their study did not, however, examine the impacts of KSL on academic performance of the learners, something that this research aimed to establish.

2.3.1 Kenyan Sign Language Structure

Kenyan Sign Language consists of a large vocabulary of arbitrary signs, together with a set of rules, or grammar, that govern the formation of individual units, their modification and combination into phrases and sentences (Adoyo, 2004). Its written form is in English although its structure is significantly different from that of the English language. It uses a Subject-Object-Verb (S-O-V) sentence pattern (Kimani, 2012). A KSL sentence is glossed because each “word” represents a sign and not a word as in English.

Signs are composed of several clearly defined characteristics: hand shape, place of articulation, movement, and whether one or two hands are used (Marschark, Lang & Albertini, 2002). Any change in one of these characteristics normally changes the meaning of a sign, but signs can be modified or inflected to indicate number, tense, or mood, just as English words can be inflected by adding certain beginnings or endings to words (for

example, dog becomes dogs, jump becomes jumped, and others) (Marschark et al., 2002). In the case of KSL, DOGS may be signed by signing DOG more than once, and JUMPED can either be signed by adding the past tense marker, FINISH, to the sentence or by letting context specify the past (Kimani, 2012). In addition, signs are inflected by the use of non-manual markers, such as the raising or lowering of the eyebrows and shaking the head. Also, fingerspelling is used when there are no conventional signs for particular words, or where the signs are unknown (Marschark et al., 2002).

Lozanova and Savtcher (2009), however, state that sign languages have a grammar and syntax that is quite different from that of spoken languages, which can confuse learners with hearing impairment. Roald (2002) notes that schools would be better placed in creating signs that suit the concepts that teachers encounter in curriculum and, gradually, the same signs would be adopted for future. Teachers, therefore, need to clearly explain content vocabularies and work with their students in deciding which sign to use for content words that have no equivalent (Easterbrooks & Stephenson, 2006). Additionally, teacher mastery of the signed content vocabulary assists the learners in the comprehension of the material as well as the assessment and evaluation of the material (Roald, 2002).

Ogada (2014) carried out a descriptive survey study on languages used in teaching and writing English composition among learners with hearing impairment in Nyanza Province, Kenya. The target population comprised of 71 class seven pupils and 5 class seven teachers of English. The findings revealed that KSL influenced English composition writing to a very large extent and that sentences observed had KSL structure rather than English language structure.

Using KSL as a mode of teaching and learning dictates that a lot more needs to be learned beyond mastering the vocabulary (signs). The learners are expected to be able to write sentences and essays using KSL sentence structure with English vocabulary (Kimani, 2012).

Kenyan Sign Language is signed together with the mouthing of English words and the same English words are used in written form of KSL. The question remains on whether or not KSL is developed enough, both in expressing all the concepts used in education and in teaching other subjects. Since some concepts are abstract, what options do teachers and learners have in the event that they encounter terminology or an idea that is difficult to express in KSL? For this reason, Owiko (2009) and Wanjau (2005) suggest that there is need for research to assess the use of KSL as a mode of teaching in schools for learners with hearing impairment.

2.4 Teacher's Competence in Kenyan Sign Language

Effective communication with learners who are deaf is the basis for the acquisition of literacy skills as well as other academic, personal and social skills (Marschark et al., 2002). Like hearing learners, deaf learners also believe that it is important for teachers to be warm, friendly and caring. Deaf learners who use sign language have preference for teachers who can communicate directly and clearly with them (Lang et al., 1994). An analysis of experiences of deaf teachers who use sign language in teaching confirmed classroom engagement, active participation, and peak performances for learners who are deaf (Roald, 2002).

Smith and Ramsey (2004) described the classroom practices of a deaf teacher who had thirty five years of experience. The teacher used ASL as the medium of instruction in a fifth-grade classroom in a residential school. An analysis of three lessons illustrated the use of ASL linguistic features to encourage student participation. Their analysis confirmed that teachers' sign language fluency and experience interacted to yield an effective strategy for increasing student involvement. These findings are consistent with the views expressed by other studies on the same topic (Albertini & Lang, 2001). Muiti (2010) on hindrances to effective learning of pupils with hearing impairment, shows that learners with HI learn and understand better

through use of KSL, suggesting that teachers need to be proficient in using it in order to pass on the knowledge and skills to these learners.

Despite the clear benefits of the use of sign language in teaching hearing impaired students, most teachers of the deaf are not very competent in sign language for various reasons, one of which is the lack of adequate training. In addition to this, and due to limited sign language skills in content specific vocabularies, most teachers prefer to write notes on the classroom blackboard and offer minimum explanation (Global Deaf Connection (GDC), 2010). Students then copy all the notes on notebooks and are expected to read them during their free time. Wakumelo (2009) and Imbiti et al. (2014) show that the few teachers who are familiar with sign language only know basic sign language and are not able to sign technical concepts.

A study conducted by USAID (2006) in Zambia, Kenya, Ghana, Tanzania, Uganda, Malawi, Namibia and Democratic Republic of Congo found that since most teachers working in schools for students with hearing impairment are hearing people, they received traditional teacher training but did not receive any specialized training in sign language or teaching methods that are critical for pupils with hearing loss. This study revealed that teachers were not prepared to facilitate language development in their hearing impaired pupils. Bunyasi (2010) also showed that teachers' proficiency in KSL was inadequate. In the study, she cites one principal's remarks that, "teachers were not good at KSL hence they needed constant refresher courses in it because as a language it grows gradually".

Okombo (2004) also reports that lack of sign language experts in schools emanates from problems in the teacher training institutions, most of which lack qualified sign language lecturers. He further cites the lack of interest by the teachers in using sign language to teach. In Zambia, however, there has been a positive change of attitude towards Sign Language; more and more teachers want to learn sign language as part of in-service training but they

cannot do so due to lack of lecturers who teach the language at the in-service college (Mulonda, 2013).

Another study that showed inadequacy of teachers was Kihingi's (2011) that examined the factors hindering teaching and learning activities for deaf learners. The study employed a descriptive design to assess views of 148 learners and 46 teachers. The findings of this study revealed that even though learners who are deaf prefer using KSL in learning and communication, only 7.7% of teachers in deaf schools had the required skills needed to use KSL for teaching in their respective subjects. Moreover, only 15.4% of teachers had received the required training in deaf education. This study by Kahingi (2011) urged the government to employ teachers who have specific training in education of deaf, integrate sign language training in teacher preparation, encourage use of available assistive technologies and urged KIE to initiate studies that would support the harmonization of KSL to facilitate consistency in curriculum.

In addition, poor communication skills among teachers working with deaf learners have been observed to negatively impact teaching and learning in all subjects (Crumel, Moran, & Sheikh, 2001). Lang, Dowliby, and Anderson (1994) conducted a study on critical teaching incidents by interviewing 56 deaf students. The deaf students were asked to reflect on their learning experiences and describe the incidents that motivated them to learn in the classroom. The study also categorized and analysed 839 teaching incidents. Findings from the study revealed that a teacher's ability to communicate clearly in sign language was not only a characteristic unique to deaf learners, but also the most frequently occurring characteristic of effective teaching (Lang et al., 1994).

A report by Global Deaf Connection (2010), however, reveals that most teachers in schools for deaf learners in Kenya use pointing to introduce new vocabularies to their students due to either lack of knowledge for equivalent KSL signs or absence of signs for abstract scientific

content vocabulary. Imbiti and others (2014) on the preferred methods of teaching deaf learners observed eight teachers during lesson presentations. Their findings reveal that discussion and demonstration were the most preferred methods used in teaching these learners.

Muiti (2010) recommends that government should initiate training for teachers in sign language and provide specialized learning materials for effective learning of learners with HI. Similarly, Kihingi (2011) suggests that the government should employ teachers who have special training in deaf education and integrate sign language training in teacher preparation.

Furthermore, strategies that support deaf students in learning KSL, or any other sign language, prior to the introduction of English/spoken language are considered respectful to deaf culture and foster ownership, helping students develop and identify in their deaf-hood (Enns, 2007). Deaf students primarily learn through the sense of vision. Studies have shown that multimedia approaches enhance factual recall as compared to traditional lecture formats. The combined effects of clear signing, use of media, structured lesson material and the involvement of deaf students through the use of adjunct questions throughout the lessons have been found particularly important in terms of performance in post-tests for deaf learners (Lang, 2005).

Mweri (2014) argues that all teachers in the schools for the deaf must become fluent in KSL. This may seem to be a difficult task to achieve. However, through deliberate in-service programs for teachers where emphasis will be on KSL specifically, it can be achieved. Teachers in schools for deaf are already experts in their teaching subjects. They, therefore, only need to learn signs that can facilitate imparting the knowledge they have in a language that is understood by deaf learners; that is, KSL (Mweri, 2014). It should be noted that the teacher's role in the lives of deaf learners is central and the same need not be

overemphasized. Teachers need to be equipped with KSL skills in order to deliver content effectively.

2.5 Teaching /Learning Resources used in Teaching Kenyan Sign Language

Teaching and learning resources, such as visual aids and technology among many others, provide an opportunity for learners to manipulate and interact effectively with resources; hence making learning meaningful. In this section, a review of some literature on use of visual resources and technology in teaching of KSL is given.

2.5.1 Visual Resources

These include strategies that are used to represent thoughts, ideas, or concepts graphically. Information is presented visually to learners as an alternative way of looking at the same information (Easterbrooks & Stoner, 2006). Since visual teaching resources can be more permanent, they can be used to help students focus on important information, see how concepts are connected, and integrate prior knowledge with new knowledge (Friend, 2008). Examples of visual aids that can be used include classroom rule charts, transitions time cards and charts, daily schedules, task organizer and the internet (Luckner, Bowen, & Carter, 2001). These visuals teaching techniques allow teachers to omit extraneous information and instead place emphasis on important concepts and demonstrate their connections to each other. These visual representations of information are also easier for students to remember, compared to extended text (Friend, 2008).

The use of visual resources such as concept maps, graphs, charts, and visual maps in explaining scientific concepts have been successful in enhancing the understanding of science content among deaf learners (Kluwin & Stewart, 2001). However, a study by Dixon (2005) in Liberia showed that the system of education for hearing impaired students faced challenges

around limited resources such as funds, qualified personnel and limited facilities. The adequacy of the learning resources often determines the ability and capacity to assist the learners in understanding concepts.

In Kenya, studies have found that the use of such visual aids is limited. Okombo (2004) emphasized the need for the development of a wide range of materials that include: materials for teaching other subjects using KSL, materials that would provide learners with an opportunity to enjoy stories told in KSL and reference materials such as charts, maps, textbooks and dictionaries with KSL illustrations. A study by Lumumba (2009) found that schools for hearing impaired learners lack necessary equipment for teaching and learning resulting in poor performance in national examinations. In a 2014 study, Imbiti and others who examined strategies used to facilitate KSL progress in schools for learners with hearing impairment, also found that instructional materials for teaching KSL are limited and inadequate which means that learners are not exposed to them.

2.5.2 Use of Technology

Information and Communication Technology (ICT) plays a crucial role in transforming communication and education. This is the case for the linguistic and cultural minority, the Deaf community, in terms of technology-assisted communication and education. On the one hand, to break down communication barrier with their peers and hearing people who have no knowledge of sign languages, Deaf people tend to resort more to Computer-Mediated Communication (CMC) (Garberoglio, Dickson, Cawthon & Bond, 2015), such as email, blog, instant message and text. On the other hand, technology-assisted teaching and learning enhances Deaf learners' information and knowledge processing and retention (Sadoski & Paivio, 2004) through a combination of visual and verbal information; motivates Deaf

learners (Beal-Alvarez & Cannon, 2015); and improves their learning outcomes (Beal-Alvarez & Easterbrooks, 2013; Cannon, Fredrick & Easterbooks, 2010; Cannon et al., 2011).

The use of technology in teaching involves creating, integrating and managing technological resources with the aim of facilitating learning and improving performance (Januszewski & Molenda, 2008). A good technological fit between the learning needs of specific students and the capacities of teachers provides exposure and diversity that supports curriculum delivery (Lopez, 2007). Technology, such as computers, CDs and internet when well mediated by teachers, may provide learners with experiences that facilitate content mastery, decrease learning time, and increase chances to learn by discovery (Lopez, 2007).

In their study on television literacy, Lewis and Jackson (2001) found that deaf students comprehend more from scripts that were accompanied by video than they did by reading the scripts alone. This finding suggests that visual stimuli provide essential information that deaf viewers can use to improve their comprehension. Lewis and Jackson also suggest that acquiring “television literacy” (through the use of captioned videos in the classroom) could advance the reading skills of deaf students by exposing them to English vocabulary and syntax. Additionally, visual examples have been found to provide a multisensory learning experience (Marschark et al., 2002).

To counter difficulties experienced by learners using conventional reading materials, specialized instructional programs have been developed for students with hearing loss (Marschark & Spencer, 2003; McNally, Rose & Quigley, 2004). High-speed computers make it possible to combine print, videos, sounds, and signs to help a deaf student to understand instructions (Kirk, Gallagher, Coleman, & Anastasiow, 2012). Multimedia programs are also available that contain video dictionaries of sign language. The computers enable the students with severe hearing losses to practice signed and written English (Kirk et al., 2012).

Computers can also provide an opportunity for learners with HI to conduct internet searches on sites that contain information on KSL. Learners with HI could also insert CDs, DVDs into the computers and televisions and watch KSL speeches, plays, poems, and other activities (Imbiti et al., 2014).

Studies on use of technology in teaching reveal positive results in supporting both language and cognitive development among deaf learners. The use of internet combined with sign language and classroom adoptive such as FM systems and hearing aids, has been confirmed to support and improve delivery of scientific content to learners who are deaf (Egelston-Dodd & Ting, 2007). High internet accessibility can also provide multiple channels through which deaf learners are exposed to scientific content online (i.e. video print, signed content, pictures and other options) that are plausible to the visual learning strengths and needs of learners who are deaf (Egelston-Dodd & Ting, 2007).

Nyarangi (2010) conducted a descriptive research study on the effect of caption TV programming on learning in Kenya. The study involved 204 participants from the Karen Technical Training Institute for the Deaf. Learners. Opinions were captured using interviews, questionnaires and observations. The study found that the use of captioning helped to increase accessibility to content and support learning among deaf learners.

With evidence of positive results from the use of technology in teaching learners who are deaf, it is paramount to develop teachers` capacities on the use of technology in teaching and equip schools with sufficient technological resources (Kakiri, 2012).

The use of technology should therefore not be viewed as an end to itself but as a means for helping deaf students to be aware of their own ideas, and engage in activities that will lead them to search for answers, make connections, see patterns and become independent learners.

2.6 Teacher's/Learner's Opinions towards Kenyan Sign Language

Teachers of learners who are deaf have an important role to play in making sure that the learners are competent in KSL, so as to enable them learn other languages and academic content. Ideally, KSL should be used not only as a medium of communication, but also throughout the school day in instructing other subjects (Mweri, 2014).

The teacher is the most indispensable factor in the effective administration of an education system. The attitude of teachers toward learners with HI will be reflected in the manner in which they communicate with them (Kalee, 2014). It can be argued, to some extent, that the characteristics of the teachers and their experiences and behaviours in the classrooms, contribute to the learning environment of their students, which in turn will have an effect on student outcomes. Research has demonstrated that when teachers become knowledgeable about the needs of deaf learners, their attitudes, and expectations are generally more positive, leading to better outcomes for the learners (Sari, 2007).

Teachers' abilities and attitudes can be major contributors to learners' academic performance (Lieberman & Houston-Wilson, 2009). Imbiti and others (2014), who used a five point Likert scale in their study that sought teachers' opinions toward use of KSL as a medium of instructing and teaching deaf learners, found that teachers had a positive attitude on use of KSL in instructing these learners.

Akach (2010), in a study on application of South African Sign Language (SASL), found that teachers had a positive attitude towards the deaf pupils they taught their language (signed language) and level of expectation in view of education. Approximately 94% of the teachers agreed that SASL was a deaf learner's first language and suggested that parents ought to be encouraged to learn and use SASL in order to support their hearing impaired children in their learning. Teachers' positive attitude leads to appropriate medium of instruction, appropriate

teaching methods and appropriate use of teaching/learning resources hence better performance in academics. Adoyo (2007) argues that if a teacher has low expectations towards deaf learners then the learner will unlikely receive satisfactory education in deaf schools.

2.7 Summary and Gap Identification

This chapter has examined literature on the academic performance of learners with hearing impairment, the use of KSL in teaching, teachers' competence, teaching/learning resources and teachers'/learners' opinions. The literature reviewed shows that learners with hearing impairment still perform below average as compared to their hearing counterparts, with various studies attributing the poor performance to inadequate resources in schools and teachers' lack of competence in language of instruction. Owiko (2009) and Wanjau (2005) pointed out the need for more research to examine the effects of KSL as a mode of teaching, particularly in schools for hearing impaired learners. There are some studies which have since been carried out to examine different aspects of KSL. For example, Bunyasi (2010) conducted a study which concentrated on teacher's proficiency in KSL which was found to be inadequate. Another study, Imbiti et al. (2014), examined the strategies employed to facilitate the use of KSL and found widespread use of KSL to instruct learners with hearing impairment. The same study also found that teachers' attitude towards its use (KSL) was positive. However, the study (like others conducted in Kenya) did not look at how KSL influenced the academic performance of learners with HI. In general, majority of studies reviewed have examined KSL as a medium of instruction and its structure, but these studies have limited information on the impact of the sign language on the academic performance of learners with HI.

Drawing on some of the literature reviewed, as well as theory, this study was carried out to assess the impact of KSL as a medium of instruction on the academic performance of hearing impaired learners in some selected special schools in Kenya.

CHAPTER THREE

RESEARCH DESIGN AND METHODOLOGY

3.1 Introduction

This chapter presents a description of the research design, research variables and locale, the target population, sampling techniques and sample size determination, research instruments, data collection techniques and data analysis.

3.2 Research Design

To analyse the impact of KSL on the academic performance of learners, the study employed descriptive survey design and mixed method research approach. Descriptive survey design allows the researcher to collect information by interviewing or administering a questionnaire to a sample of individuals (McMillan & Schumacher, 2010). Mixed method approach is an aspect of using both quantitative and qualitative procedures to provide a more complete investigation. In this approach, the researcher combines two approaches into a single study as an attempt to legitimate the use of multiple approaches in answering research questions (Harwell, 2011). The approach also makes use of descriptive statistics themes to analyze information (Fraenkel & Wallen, 2009). The advantage of this approach is that it presents the results and explains why it was obtained (McMillan & Schumacher, 2010). This design was especially valuable for this study because it capitalizes on the respective strengths of both quantitative and qualitative research (Curry, Ingrid, Nembhard, Elizabeth & Bradley, 2009).

Questionnaires and document analysis guides were utilized to collect quantitative data and the findings were presented using descriptive numerical representations. Qualitative methods were applied during data collection through the use of interviews and observation guides. This approach was selected because it is naturalistic, interactive and descriptive, and enables a researcher to gain a holistic understanding of each phenomenon studied (Creswell, 2014).

Data collected using the different approaches was combined to realize dependability and trustworthiness of the study findings.

3.3 Research Variables

According to Cherry (2009), a variable is a characteristic of interest that a researcher would like to handle, observe or manipulate in the research. An independent variable is one that influences or causes change in another variable, while a dependent variable is one that is influenced or changed by one or more variables (Mugenda & Mugenda, 2012). An intervening variable “stands between” the independent and dependent variables and mediates the effects of the independent variable on the dependent variable (Creswell, 2014). Since the independent variable is the presumed cause of the dependent variable, the researcher selected the following independent variables for the study: KSL as a medium of instruction, teacher’s competence in KSL, teaching/learning resources, and teachers’/learners’ opinions. The dependent variable was the academic performance of learners while teaching/learning strategies was the intervening variable of the study.

3.4 Study Location

The researcher selected five primary special schools for learners with HI in Kenya. These were: St. Martins Mumias in Kakamega, Nyangoma in Siaya, Machakos in Machakos, Ngala in Nakuru and St.Kizito in Kericho. These schools were specifically selected for several reasons. First, Nyangoma and Mumias, were among the earliest special schools to be established and they specifically used sign language to instruct learners with hearing impairment (Adoyo, 2007). In 1986, Machakos School for the deaf was established by Ministry of Education as a pilot school for the study on the use of Total Communication (TC) to teach/instruct learners with HI in class. The results of the study revealed that sign language was the most preferred mode of instruction (MoE, 1988). Ngala and St. Kizito schools were

established later after the pilot study (MoE, 1988) had been carried out. The two schools would give in-depth information on KSL as a medium of instruction, and its impact on academic performance of learners with hearing impairment

3.5 Population

This study targeted all head teachers, teachers and learners in standard 7 and 8 from five schools for deaf learners. The schools are found in 5 selected counties in Kenya, that is; Kakamega, Siaya, Machakos, Nakuru and Kericho. The population comprised of 5 head teachers, 111 teachers and 253 learners in standard seven and eight getting a total of 369 respondents. It is from this population that the sample of the study was drawn as presented in Table 3.1. Head teachers were included in the study as they coordinate and supervise all activities in schools, including teaching/learning. The teachers were selected for the study since they deliver the content and education curriculum, and use KSL when teaching and during interactions with the deaf pupils. The learners (with HI) were targeted because they are the consumers of knowledge and their opinions on KSL were vital for this study.

3.6 Sampling Techniques and Sample Size

3.6.1 Sampling Techniques

Sampling techniques refer to the techniques or procedures the researcher adopts in selecting items for the sample (Kothari, 2004). Sampling may as well lay down the number of items to be included in the sample, that is, the size of the sample.

Purposive and simple random sampling techniques were utilized in this study. In purposive sampling method, the researcher purposively targets a group of people believed to be relevant for the study (Orodho, 2009). The power of purposive sampling lies in selecting information rich in cases for in-depth analysis related to the central issues being studied. Researchers

handpick the cases to be included in the sample on the basis of their judgement of their typicality. In this way, they build up a sample that is satisfactory to their specific needs (Creswell, 2014). This technique, therefore, was appropriate for this study, as detailed information about use of KSL as a mode of teaching/learning was collected from these schools.

Purposive sampling was employed to select the five counties, the five schools, five head teachers and the fifty learners from these schools that were included in the study. Ten learners were purposively selected from classes seven and eight from each of the schools included in the study. From each class, five learners; three boys and two girls, were selected based on a criteria on their academic performance as given by the class teachers. The best top performing learners in class were picked for the study. KCPE results analysis from 2001-2017, as shown in Appendix 1, was also analysed and included in the study. The study only analysed the results for these particular years (2001-2017) because KSL as a medium of instruction was implemented in 2004 and was first examined as a subject nationally in 2010 KCPE (MoE, 2009a).

Simple random sampling was utilized to select the fifty-seven teachers included in the study. In simple random sampling, respondents were selected from the population in a manner that allowed all members to have the same probability of being selected (McMillan & Schumacher, 2010). The method involves selecting at random from a list of the population (sample frame) the required number of subjects for the sample. The simple random sampling technique used in the study was a lottery method whereby ballot papers of equal sizes, same colours and texture were cut. The study targeted fifty percent of the teachers in every school, hence fifty percent of the ballot papers were labelled “*Yes*” while the rest were not labelled. These were then placed in a container, mixed well and teachers requested to pick a ballot

paper each, one at a time. Those teachers who picked a labelled ballot paper were automatically selected for the study.

3.6.2 Sample Size Determination

Sample size determination is the technique of electing the number of observations to include in the sample (Singh & Masuku, 2014). According to Yount (2006), researchers should use a sample that is as large as possible as the larger the sample is, the better it represents the population. He suggested that researchers with large sizes of study populations between 101 and 1000 should have a sample of 10%, while those with small percentages should have a sample of 20% as minimum. However, Yount (2006) in his ruling on “the rule of thumb” argued that the minimum number of subjects needed for a study depends on several factors; accuracy, homogeneity of the study population, cost, type of population and the kind of study. He thus advised that the researcher should be left to weigh the above factors and determine the best sample for his/her study.

Singh and Masuku, (2014) also pointed out that the sample used in a study is determined based on the cost of data collection and sufficient statistical power. This study, therefore, used “the rule of thumb” by Yount (2006) to determine the sample size for the study. The study population was 369 participants and the sample size was 112 participants which was 30% of the target population.

3.6.3 Sample Size

The sample size was 112 respondents comprising of 5 head teachers, 57 teachers and 50 learners. This is summarized as shown in Table 3.1.

Table 3.1: Target Population and Sample Size

SCHOOL:	TARGET POPULATION				SAMPLE SIZE			
	Head teachers	Teachers	Learners in class 7&8	TOTAL	Head teachers	Teachers (50%)	Learners in class 7&8	TOTAL
Nyangoma	1	18	41	60	1	9	10	20
Mumias	1	31	94	126	1	16	10	27
Machakos	1	20	68	89	1	10	10	21
Ngala	1	23	25	49	1	12	10	23
St. Kizito	1	19	25	45	1	10	10	21
TOTAL	5	111	253	369	5	57	50	112

3.7 Research Instruments

Questionnaires, interview guides, observation schedules and document analysis guides were used in this study. The use of all these instruments together was for them to complement each other and to remove any biases resulting from one method. Triangulation of data from these instruments was also done; this important process made it possible to obtain detailed information essential for the study.

Questionnaires

When a questionnaire is used, the respondent provides answers to the questions by writing or more commonly by marking an answer sheet (McMillan & Schumacher, 2010). Kothari (2004) commends the suitability of questionnaires in data collection: they are relatively cheap to administer, bias-free and enable respondents to provide answers at their own pace.

The use of a questionnaire was considered appropriate for this study because it allowed the researcher to give a set of standard questions to all the respondents. The questionnaires were developed and administered to the teachers of learners with HI. Open and closed ended questions, designed based on the objectives of the study, were constructed by researcher. The questionnaires comprised of Section A and B. Section A was on demographic information and had three items; gender, professional qualification and working experience. Section B had four major areas with items; impact of KSL, teachers' competence in KSL skills, teaching/learning resources and a Likert scale that captured the opinion of teachers on the use of KSL to teach learners with hearing impairment.

Interviews

Interviews are considered effective tools that give a human face to research problems (Creswell, 2014). McMillan and Schumacher (2010) point out that interviews offer an opportunity for participants, who are considered the experts, to express their views. In this case the interviewer is considered the student. Additionally, the use of interview makes it possible to obtain the data required to meet the specific objectives of the study (McMillan & Schumacher, 2010).

Interviews were administered to the head teachers and learners. Two sets of structured and semi-structured interview schedules were designed: one set to collect data from head teachers and another one to collect data from the learners. Head teacher's interview schedule had nine items on demographic information, number of trained teachers in KSL, types of teaching/learning resources, school performance and impact of KSL. Learners' interview schedule had six items on; KSL as a mode of instruction and academic performance.

Observation Checklist

An observation checklist was also used. Structured and semi-structured questions were designed that were then used for observing learning in the classroom situation. This checklist was designed to cover the following areas; use of KSL when teaching and teaching/learning resources utilised in the classroom. Non-participatory type of observation was used in this study. This type of observation technique enabled the researcher to get data from the live situation. According to Creswell (2014), observations provide first-hand information that may not be provided by questionnaires and interviews. Observation also enables the researcher to collect information which depicts what is currently happening in the real situation.

Document Analysis

The researcher also employed the use of a document analysis guide to record KCPE results from 2001 to 2017, for each subject across the five schools. This was done to ascertain the performance in each subject and the general performance of learners with hearing impairment before and after the introduction of KSL as a mode of instruction in 2004 and later (since 2010) as an examinable subject. Document analysis guides were used due to the fact that they store information which can be referred to when required (Creswell, 2014). They are more cost effective in terms of time and respondents.

The use of questionnaires, interviews, observation and documents combined together generated data that provided in-depth information to inform the objectives of study.

3.8 Pilot Study

The researcher carried out a pilot study at the Eldoret School for Learners with HI, a school with similar characteristics as those from the schools selected for the study. The pilot study purposively sampled a total of 23 respondents: 1 head teacher, 12 teachers and 10 learners. The procedure that was used in piloting was the same as that used in the actual study. Data

was collected using questionnaires, interviews, observation schedules and a document analysis guide. The aim of the pilot study was to identify any weaknesses and/or ambiguities in the data collection instruments and find out if the anticipated data analysis techniques were appropriate. Piloting was also useful in conducting a validity test on the instruments, and improve their reliability. The findings from the pilot study allowed the researcher to reorganize and rework on the research instruments in areas of inconsistencies; typographic errors, language used and ambiguities were removed in order to make them more easily understood by the respondents. The findings of the pilot study were also used to aid the full scale research processes.

3.8.1 Validity

Validity is the degree to which a test measures what it is intended to measure (Kothari, 2004). In this study, content validity was tested to ascertain whether or not the items in the instruments were suitable and relevant for their task. Consultations with colleagues at Moi University, who are experts in the area of Special Needs Education (HI), and supervisors were conducted and based on these (the consultations), the data collection instruments were modified and redesigned accordingly to make them relevant. Questions that created confusion or misunderstanding amongst respondents were identified and modified to ensure that they were more clearly understood. Difficult questions were also reframed using appropriate language that could easily be understood by respondents.

3.8.2 Reliability

An instrument is said to be reliable if it consistently yields similar results when tested and re-tested with similar respondents (Mugenda, 2003; Orodho, 2009). The reliability of the instruments for the study was determined by test-retest method on the pilot study sample.

This method involves administering the same test twice to the same group after a certain time of interval has elapsed. A reliability coefficient is then calculated to indicate the relationship between the two sets of scores that have been obtained (Fraenkel & Wallen, 2009). The questionnaires were administered to the respondents selected for piloting who did not form part of the main study. The respondents filled the questionnaires and their responses were scored. After two weeks, the same questionnaires were again administered to the same respondents. A reliability coefficient was then calculated using Pearson's product-moment correlation coefficient between the two sets of scores. The results gave a positive correlation of 0.836, indicating strong evidence of reliability. The instruments were, therefore, found to be reliable for data collection process.

3.9 Data Collection

The researcher booked appointments with head teachers prior to visiting their respective schools and requested permission to carry out the research study. The head teachers responded positively. The researcher visited the five schools at different times and collected data using the instruments discussed in the previous sections of this chapter: questionnaires, interview guides, observation schedules and document analysis guides.

Questionnaires

Questionnaires were administered to the teachers and were collected on the same day in some schools. Where this was not possible, the researcher got into an agreement with the head teacher of the respective school, who then sent the filled questionnaires by mail to the researcher. The questionnaires composed of two sections. Section A was on demographic information and section B was on impact of KSL, teachers' competence in KSL skills, teaching/learning resources and a Likert scale on teachers' opinions on KSL as a medium of instruction. The whole exercise took a month to get all the questionnaires.

Interviews

On the same day the researcher visited each school, she interviewed the head teacher and the learners. The interview sessions with the head teachers took between fifteen to twenty minutes. Responses were recorded manually, written down, by the researcher as the respondents were reluctant to be tape recorded. The researcher after interviewing the head teacher requested to be allowed to carry out an interview with five class seven and five class eight top performers in class. Permission was granted and the head teacher instructed the class teachers to organize the ten learners who were interviewed as a group in one of the classroom. The researcher, assisted by the class teachers, used sign language to communicate the questions to the learners after which the responses were noted down by the researcher. The interview took fifteen minutes.

Observation

The researcher further requested for permission to observe a lesson presentation in either standard seven or eight. The head teacher in every school called upon the concerned teacher to organise for a class presentation and the researcher was allowed to carry out class observation in the school. The researcher observed activities in the classroom, learners' seating arrangement and teaching/learning materials (Appendix IV). Furthermore, the researcher observed the teacher-learner interaction as well as learner-learner interaction. The researcher used non-participatory type of observation in this study. Some of the lessons observed included Mathematics, Science, KSL and Social Studies. Class observation took approximately thirty-five minutes. Observations were recorded by the researcher in an observation checklist.

Document Analysis Guide

Lastly, the researcher also requested access to KCPE results analysis for the period 2001-2017 from each of the schools. Data collected was in two parts, that is, KCPE results analysis from 2001-2004 which was before official recognition of KSL as a medium of instruction and then from 2005-2017 after introduction of KSL mode and as a subject in 2010. The information was then analysed and recorded for each of the five subjects taught in schools for the deaf.

3.10 Data Analysis

Data collected by use of questionnaires were of both quantitative and qualitative nature. Data obtained from closed-ended items of questionnaires and document guide were analysed quantitatively, while qualitative data generated from open-ended questions in the questionnaires were grouped according to the themes of the study, coded and quantified. Findings were then presented in tables, pie charts and graphs using descriptive statistics and inferential statistics using independent sample T-Test to compare means for before and after introduction of KSL. The data analysis was completed by applying computer software program, Statistical Package for Social Sciences (SPSS). Data collected by use of interview and observation were of qualitative nature. They were transcribed, organized according to the objectives of the study, quantified, and analysed using descriptions and thematic text.

3.11 Logistical and Ethical Considerations

The researcher acquired a letter showing approval of research proposal, and an introductory letter, from Graduate School at Kenyatta University (KU) to the National Commission for Science, Technology and Innovation (NCOSTI) that were then used to apply for a research permit to conduct the study in the selected counties. The application was successful and the researcher was given a research permit to conduct the study in the five counties. Permission

was also granted by County Commissioners and County Directors of Education of the five counties to conduct the study in the schools. The researcher then went to the five schools and established rapport with head teachers, teachers and learners in the schools. The researcher explained the purpose and relevance of the study before conducting the research. Respect for and confidentiality of the respondents was highly observed and maintained.

CHAPTER FOUR

FINDINGS, INTERPRETATION AND DISCUSSIONS

4.1 Introduction

This chapter presents the findings, interpretation and discussion of the data collected during the study which examined the impact of KSL as a medium of instruction on academic performance of learners with HI in five selected special primary schools in five Counties in Kenya. Both quantitative and qualitative analysis methods were utilized. The study presented and discussed the results based on the stated research objectives. This chapter has been organized according to the following themes: demographic information of teachers and head teachers, teachers` competence in KSL, Impact of KSL on academic performance, teaching/learning resources and teachers`/learners` opinions on KSL use.

4.2 General and Demographic Information

This part presents general and demographic information about the findings and results of the study according to the objectives and research questions.

4.2.1 General Information

Five Special Primary schools for learners with HI in five Counties were sampled for the study. The researcher used a sample size of one hundred and twelve respondents: five head teachers, fifty seven teachers and fifty learners in this study. Five head teachers and fifty learners were interviewed. Fifty four teachers out of fifty seven completed and returned the questionnaires indicating a 92.9% response rate. The response rate of the sampled 5 head teachers and 50 learners interviewed was 100%. The data collected from the respondents was therefore sufficient to give the desired results for the study. However, a few teachers returned

their questionnaires with some questions unanswered. For example, 6 teachers did not respond to the question on whether or not KSL improves the academic performance of the learners, while 5 teachers did not give a response on whether or not the technological resources available in the school were adequate.

4.2.2 Demographic Information

Demographic data was collected from the head teachers and teachers included in the study (59 respondents). The demographic characteristics were analysed across the following variables: gender, professional qualification and years of teaching experience. The statistics are summarised in Table 4.1.

Table 4.1: Gender of Respondents (N=59)

		Male	Female	No response	Total
Head teachers	Frequency	4	1	0	5
	Percent	80.0%	20.0%	0.0%	100%
Teachers	Frequency	19	34	1	54
	Percent	34.5%	61.8%	3.6%	100%

Table 4.1 above shows that majority of the head teachers 4(80.0%) interviewed were male; there was only 1(20%) female head teacher. These findings suggest that the top management of special primary schools could be male dominated; and that there was no gender balance in the administration of special schools. While there was a male dominance in top management, the results showed that majority of teachers were female; 34(61.8%) of all teachers included in the study were female, and 19(34.5%) were male. Only 1(3.6%) teacher did not give a response to the question. The results indicate that there were more females who teach in deaf

schools than there are males. Thus, gender may be seen as an important factor determining the most involved in teaching of learners with hearing impairment in schools for the deaf.

Table 4.2: Professional Qualification (N=59)

		Certificate in SNE	Diploma in SNE	Degree in SNE	Masters in SNE	Total
Head teachers	Frequency	0	4	1	0	5
	Percent	0.0%	80.0%	20.0%	0.0%	100%
Teachers	Frequency	4	11	34	5	54
	Percent	7.4%	20.4%	63%	9.3%	100%

Table 4.2 reveals that almost all the head teachers 4(80%) had a diploma in SNE with only 1(20%) having a degree, while majority of the teachers 34(63%) had a degree in SNE. Those who had a masters' degree in SNE and certificate in SNE were the minority 5(9.3%) and 4(7.4%) respectively as shown in Table 4.2. The high proportion of teachers with a degree and masters in SNE could support the proposition that the professional level of education of the teachers could lead to KSL knowledge hence improved performance. There were fewer respondents (teachers) with certificate and diploma qualification in SNE, which may mean that they have a basic understanding of the various techniques and strategies used in KSL. The findings indicate that, generally, the respondents were qualified professionals and had knowledge on educating learners with HI.

Table 4.3: Respondents' Years Working as a Teacher for Learners who are Deaf (N=59)

		0-5 years	6-10 years	11-15 years	16-20 years	Above 20 years	Total
Head teachers	Frequency	0	1	1	0	3	5
	Percent	0.0%	20.0%	20.0%	0.0%	60.0%	100%
Teachers	Frequency	6	13	19	7	9	54
	Percent	11.1%	24.1%	35.2%	12.96%	16.7%	100%

Table 4.3 shows the number of years that the respondents had taught learners with hearing impairment. Majority of the head teachers 3(60%) had over 20 years of teaching experience. Over a third of the teachers 19(35.2%) had an experience of between 11 to 15 years teaching deaf learners, while only 6(11.1%) of them had an experience of between 0-5 years. The results reveal that majority of the respondents (both teachers and head teachers) had taught for more than 10 years hence they had a wealth of experience and knowledge in teaching learners with HI.

The more the years of experience, the higher the likelihood, teachers would understand the educational trends on academic performance of these learners. It is also believed that the higher the number of years that a teacher has used KSL as a mode of instruction, the higher the likelihood that they would come across varying academic performance of learners with hearing impairment. This is supported by the views of Smith and Ramsey (2004) where they described the classroom practices of a deaf teacher with thirty-five years of teaching experience. The use of ASL by the teacher, as the mode of instruction, showed that the ASL linguistic features did encourage student participation.

The research findings also show clearly that majority of the head teachers had been in the teaching field for a long period and their interaction with the learners with HI enabled them to explain the possible impacts of KSL on learners’ academic performance. Evidently from the interviews conducted in the five schools, more than half of the head teachers had experience of above 20 years. Similar findings were observed by Albertini & Lang (2001) who confirmed through analysis of the ASL that teachers’ sign language fluency and experience interacted to yield an effective strategy for increasing student involvement. Chupina (2006) also found that the level of experience leads to positive results.

4.3: Academic Performance of Learners with Hearing Impairment in Schools

Objective one sought to establish the academic performance of learners with hearing impairment. For all the five schools, KCPE results from 2001 to 2017 were analysed for each subject (Appendix 1). The findings are shown in Figure 4.1.

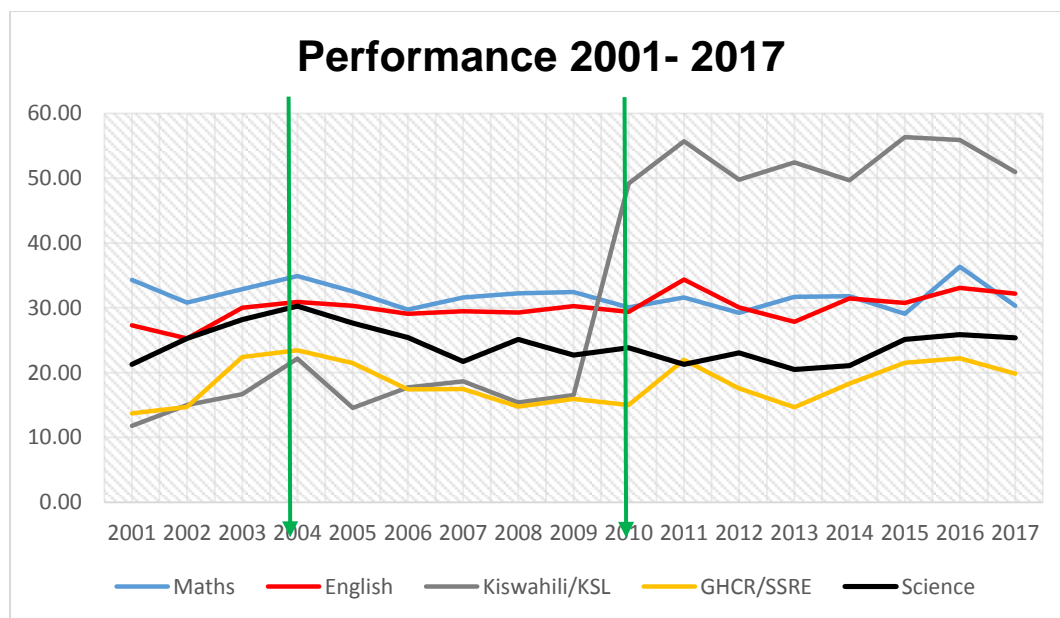


Figure 4.1: KCPE Subjects’ Performance Analysis (2001-2017)

Source: Sampled Schools, 2017 (Appendix IV)

Figure 4.1 shows the performance change represented by trend lines for the five subjects. The green dropline represents the partition of the before (recognition of KSL as a medium of instruction) and after group whereby there is an apparent growth in the KSL upon its introduction as an examinable subject in 2010. Comparatively, KSL outperforms other subjects in terms of improvement and has consistently improved over the period of consideration. The findings reveal that academic performance in all the subjects had an upward trend between 2001-2003 before official recognition of KSL in 2004 and slightly dropped from 2004-2009 with English subject remaining almost constant in performance. In 2002, there was a drop of performance in Maths and English. Generally, the findings reveal fluctuation of performance in all the subjects with GHCRE/SSRE poorly performed.

An analysis average scores of the individual subjects (for all schools) provides more detail on the extent of these improvements that occurred between before and after introduction of KSL. The results are shown in the Figure 4.2 below and indicate that the biggest improvements across all schools (on average) was in Kiswahili/KSL, which increased by 35 points; this difference is statistically significant ($p < 0.001$). There was a decrease in average science score by 3 points, but all other subjects did not record any significant differences.

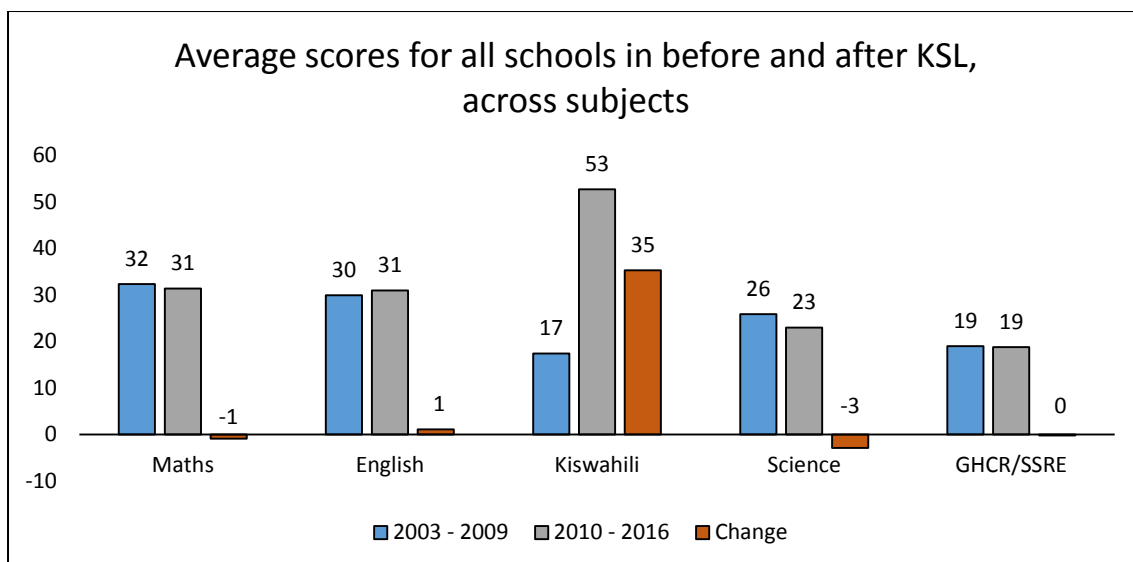


Figure 4.2: Average Scores of Subjects before and after KSL

From the above Figures 4.1 and 4.2, it is interesting to note that since the introduction of KSL as a subject in 2010, learners have generally performed better in that subject than in other subjects for the years under consideration. This could be an indication of success of the subject; it can be speculated that the students who are deaf would be interested in learning the subject more than other subjects. For this reason, KSL being a primary language seems to be consistently performing better for all the years under consideration.

Further results from interviews with the head teachers revealed that academic performance of learners with hearing impaired in their schools had improved, with the best performed subject being KSL while Social Studies was the least performed. Head teachers claimed that the academic performance in their schools was good and many students had done well in class performance and attained good grades proceeding to secondary education. For example, one head teacher stated that:

12 out of 17 learners joined secondary schools in 2016 and even one pupil scored 301 marks in KCPE. Performance is not the same as before when KSL had not been

introduced in schools as a medium of instruction and also as an examinable subject.

KSL has contributed a lot to the positive performance of learners who are deaf.

Responses from learners interviewed also revealed that KSL was their favourite subject in terms of performance, compared to other subjects. Learners complained that social studies was too difficult to learn. These results show a deviation from an earlier study by MOEST (2004d) which showed that learners with hearing impairment scored low marks and few proceeded for further education at secondary school and university levels. This deviation is attributed to the adoption of KSL, as a mode of teaching in 2004 and the language being made examinable in 2010, in the education curriculum of learners with hearing impairment as a way to improve their performance.

However, these findings also support a study by Friend (2008) which showed that learners with HI encounter great difficulty in processing Standard English but achieve high grades in Mathematics than in reading or writing. Additionally, Omutsani (2012) pointed that learners who are deaf have consistently trailed behind their hearing counterparts in academic performance.

4.4 Impact of KSL as a Medium of Instruction on Academic Performance

Objective two sought to find out how the use of KSL as a medium of instruction had affected the academic performance of learners with hearing impairment. The use of KSL as a medium of teaching/learning is based on the recommendation made to special primary schools in Kenya. This study sought to establish whether the sign language was having an impact on academic performance of learners who are hearing impaired. To measure the impact of KSL both qualitative and quantitative analysis were done. From questionnaires, teachers were asked to state whether or not the Kenyan Sign Language had any impact on academic

performance of learners with HI as a medium of instruction. The findings are shown in Figure 4.3.

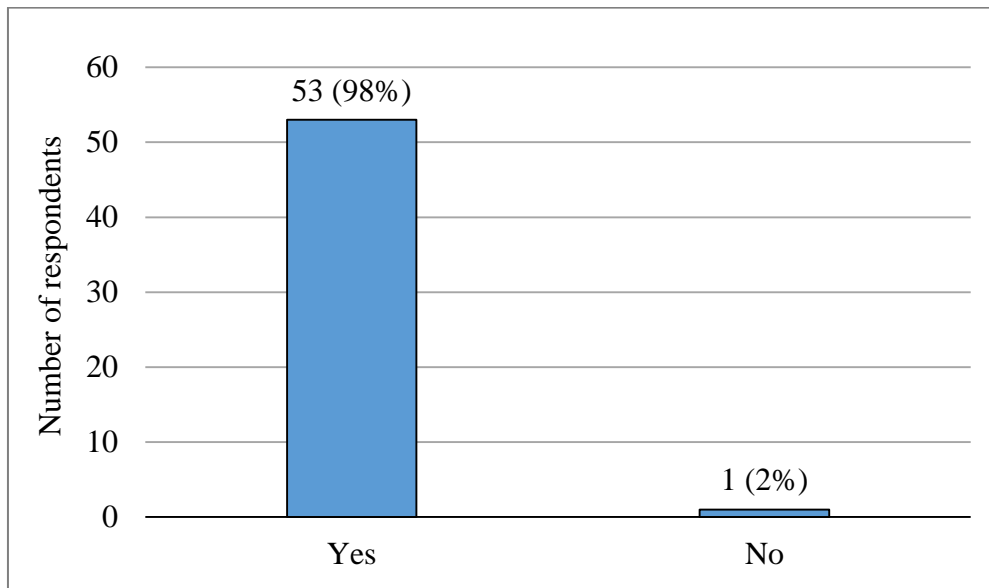


Figure 4.3: Impact of KSL on Academic Performance

Majority of the respondents, a total of 53(98%), overwhelmingly agreed that there were impacts resulting from the use of KSL as a mode of instruction. Only 1(2%) participant pointed out that there was no impact of KSL use as a mode of instruction. Similar findings have been seen in other parts of the world. Chupina (2006) reports that since Swedish Sign Language became the language of instruction in 1995 as well as a taught subject, it had helped improve the academic performance of deaf learners in Sweden. The respondents who agreed to the assertion that KSL had impacts on performance were asked to provide an explanation for their agreement. They provided several reasons for their opinions, which are shown in Figure 4.4.

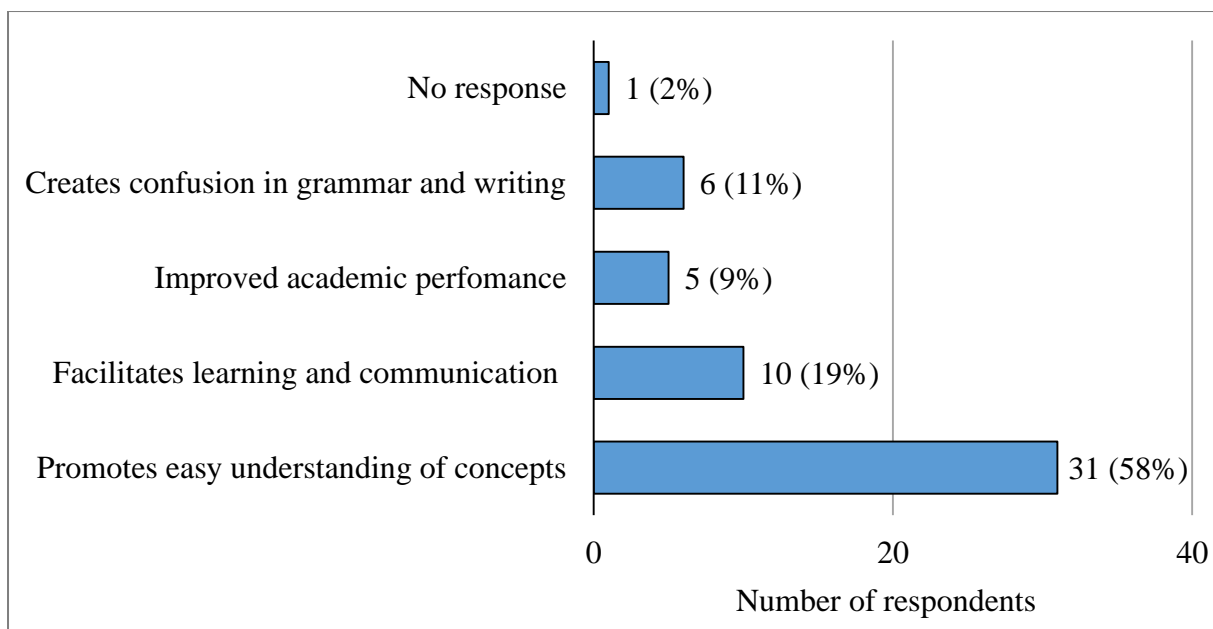


Figure 4.4: Ways in which KSL affects Academic Performance

The findings reveal that of the 53(98%) respondents felt that the use of KSL had made an impact as a method of instruction, majority 31(58%) observed that the use of KSL promoted understanding of concepts. This is similar to the arguments by Adoyo (2002) who felt that KSL would allow learners with HI to acquire expressive, receptive and written-signing skills that would assist them to communicate across the curriculum effectively. Other respondents 10(19%) stated that KSL had helped facilitate learning and communication while others 5(9%) pointed out that there was improved performance upon the use of KSL.

The findings are also similar to those by Imbiti et al. (2014) who examined strategies used to facilitate KSL progress in primary schools for learners with hearing impairment in Western Province of Kenya, and found widespread use of KSL especially in the clarification of concepts in all subjects thereby enhancing the understanding of concepts. However, there were a few respondents 6(11%) from this study who stated that the use of KSL created confusion on grammar and writing.

Findings from document analysis in Figure 4.1 and 4.2 above, however, shows that academic performance had not been impressive as given by teachers and supported by Adoyo's (2002) study. These results, therefore, can be reinforced by findings presented by Heward (2006) who showed that approximately 30% of students with hearing impairment are functionally illiterate when they leave school, compared to less than 1% of hearing students, and Omustani (2012) who argues that learners who are deaf have consistently trailed behind their hearing counterparts in academic performance.

4.4.1 Effects of KSL on English, Mathematics and Science Subjects

The researcher further, under objective two, sought to investigate whether KSL as a medium of instruction had an impact on the academic performance in specific subjects among learners with hearing impairment. Thus, the study in its effort to establish the effects of KSL use, included the effects it had on performance in English, Maths and Science subjects.

(i) Effects of KSL on English Subject

The study findings regarding impacts on English are in Figure 4.5.

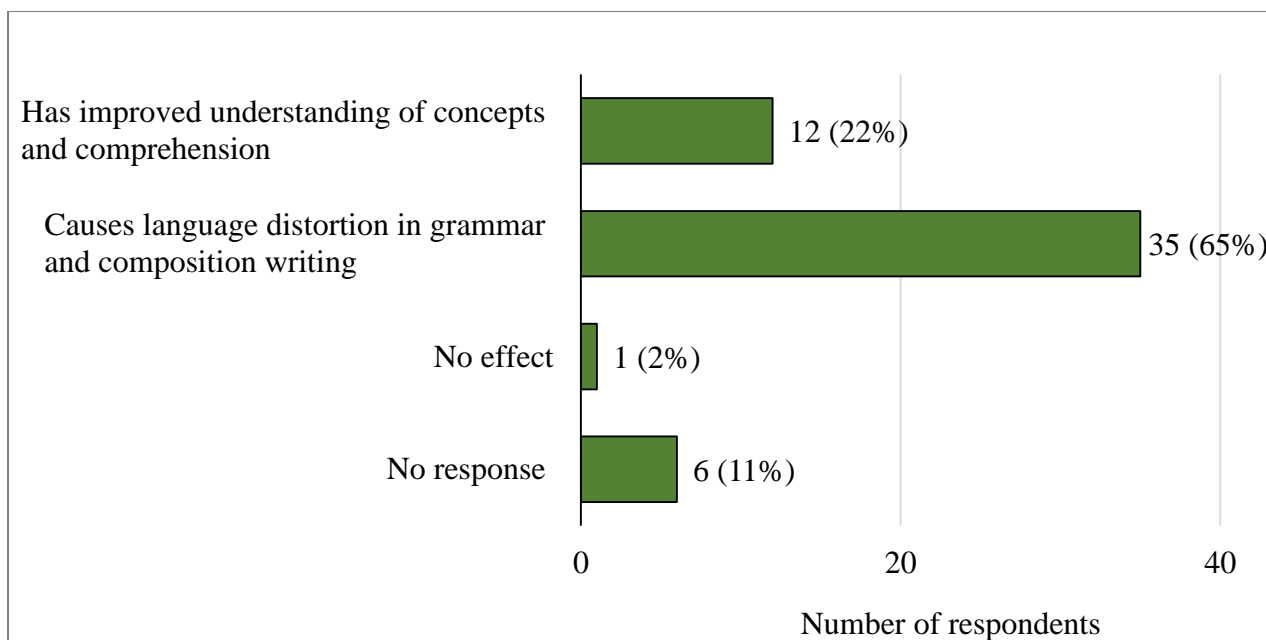


Figure 4.5: Ways in which use of KSL affects Learners’ Performance in English

Majority of the respondents 35(65%) as presented in the Figure 4.5 above stated that KSL use had affected English subject by causing language distortion in grammar and composition writing. Another sizable proportion 12(22%) of respondents stated that KSL had improved the understanding of concepts and comprehension. Only 1(2%) respondent stated that KSL use had no effect on English as a subject. The opinions of the majority are similar to studies by Kimani (2012) and Ogada (2014) who pointed out that KSL sentence structure causes confusion to learners with many mixing letters, and in addition the variations of signs also create confusion. This is because the written form of KSL is in English yet the structure is significantly different from that of the English language exemplified by use of a Subject-Object-Verb (S-O-V) sentence pattern whereas KSL sentence is glossed because each “word” represents a sign and not a word as is the case with English. Conversely, these findings differ with Aura et al. (2016) study that mastery of sign language was associated with better English literacy skills.

(ii) Effects of KSL on Mathematics

The study also investigated the effect of KSL on Mathematics; the findings are presented in Figure 4.6.

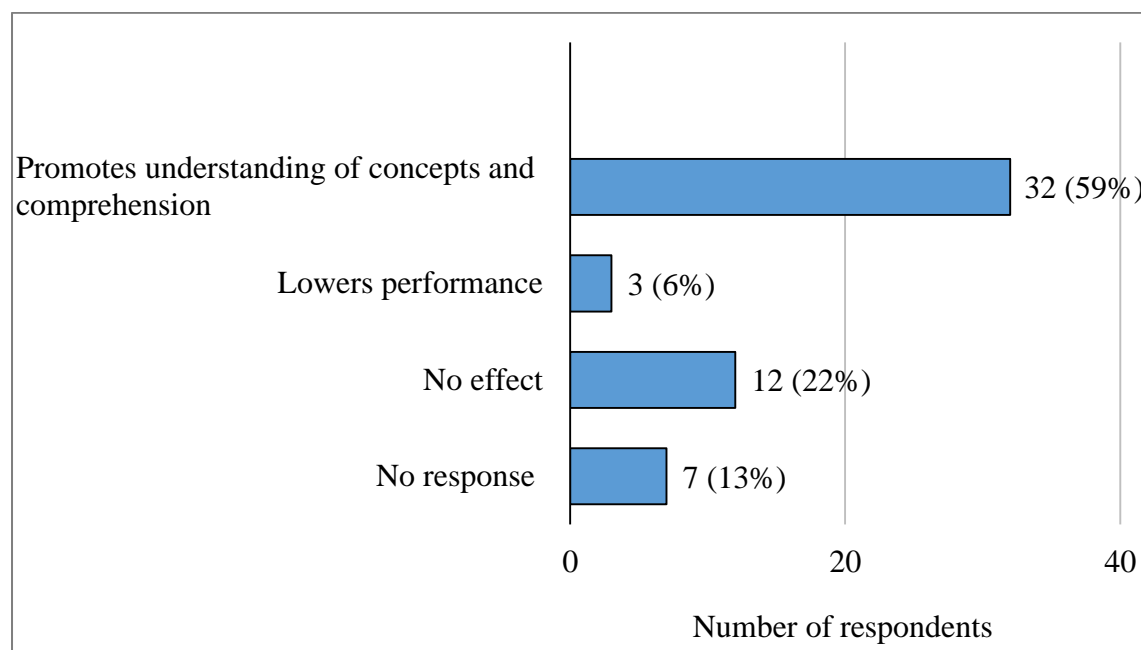


Figure 4.6: Ways in which use of KSL affects Learners' Performance in Mathematics

Figure 4.6 shows that most of the respondents 32(59%) felt that the use of KSL promoted understanding of concepts and comprehension in Mathematics. Almost a quarter of the respondents 12(22%) indicated that KSL had no effect and 7(13%) gave no response respectively. Fewer respondents 3(6%) revealed that KSL lowers performance. These findings are in agreement with Sandler and Lillo-Martin (2009) who noted that sign language effectively fulfils the same social and mental functions as spoken language and it can even be simultaneously interpreted into and from spoken languages in real time. Additionally, MOEST (2005b) report revealed that deaf students performed better in mathematics than other subjects. Friend (2008) also supports these findings by stating that students who have hearing impairment achieve better grades in Mathematics than in reading or writing.

(iii) Effects of KSL on Science

The study, still on objective two, similarly looked at the impact of the use of KSL as a medium of instruction in the teaching of Science Subject; these findings are presented in Figure 4.7.

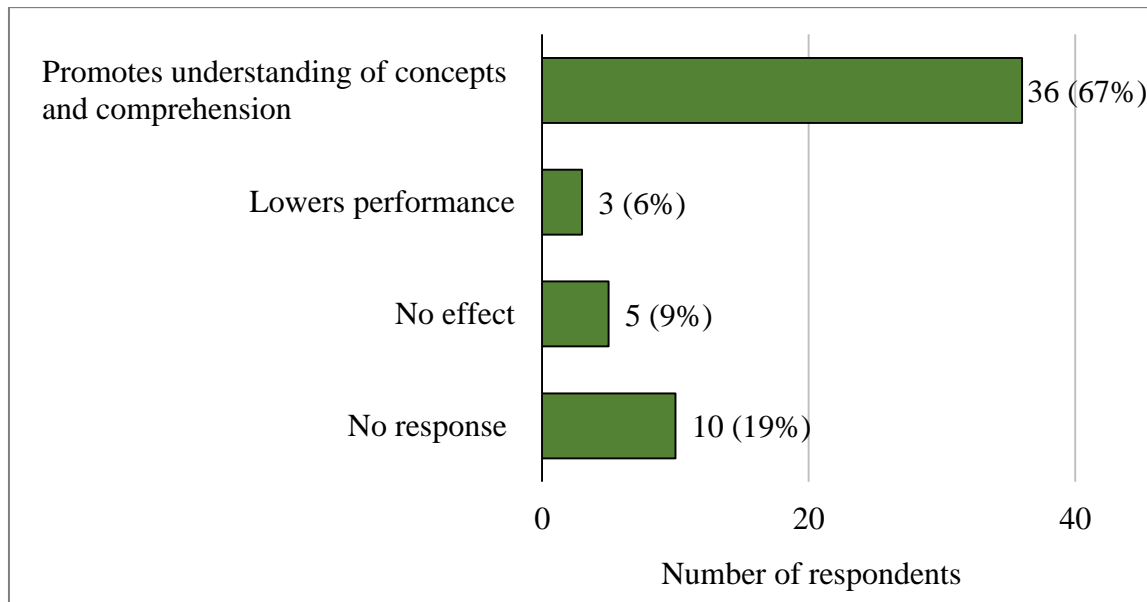


Figure 4.7: Ways in which use of KSL affects Learners' Performance in Science

As shown in Figure 4.7, majority of the respondents 36(67%) stated that the use of KSL promoted understanding of concepts and comprehension. There were no responses on this question from less than a half of the respondents 10(19%). Almost a tenth of the respondents 5(9%) revealed that KSL had no effect. A few of the respondents 3(6%) noted that use of KSL to instruct the science subject resulted in lower performance. Albertini and Lang (2001) found similar results showing that the mode of communication (verbal or non-verbal) well acquainted to learners who are deaf or hard of hearing had positive impact on their scientific content understanding and writing. Santau et al. (2010) emphasise the need for science teachers to know their subject, vary practices that promote understanding, advance scientific

inquiry, and use supportive practices for ELLs (English Language Learners). They argue that the integration of ASL into science and other content areas created many openings for vocabulary development and enhancement in elementary classrooms. Using ASL in the content areas further supported the varying learning styles of students and built connections among peers who perhaps had difficulties communicating and connecting with one another. Content areas provide more opportunities in which the entire class participated together, allowing for the building of camaraderie, communication, and meaningful connections.

4.4.2 Kenya Sign Language improves Academic Performance

Having examined the views regarding use of KSL and their effects at subject level, the study sought to investigate whether or not the use of KSL, as a medium of instruction, improves the overall general performance of learners who are deaf. The findings are summarised in Figure 4.8.

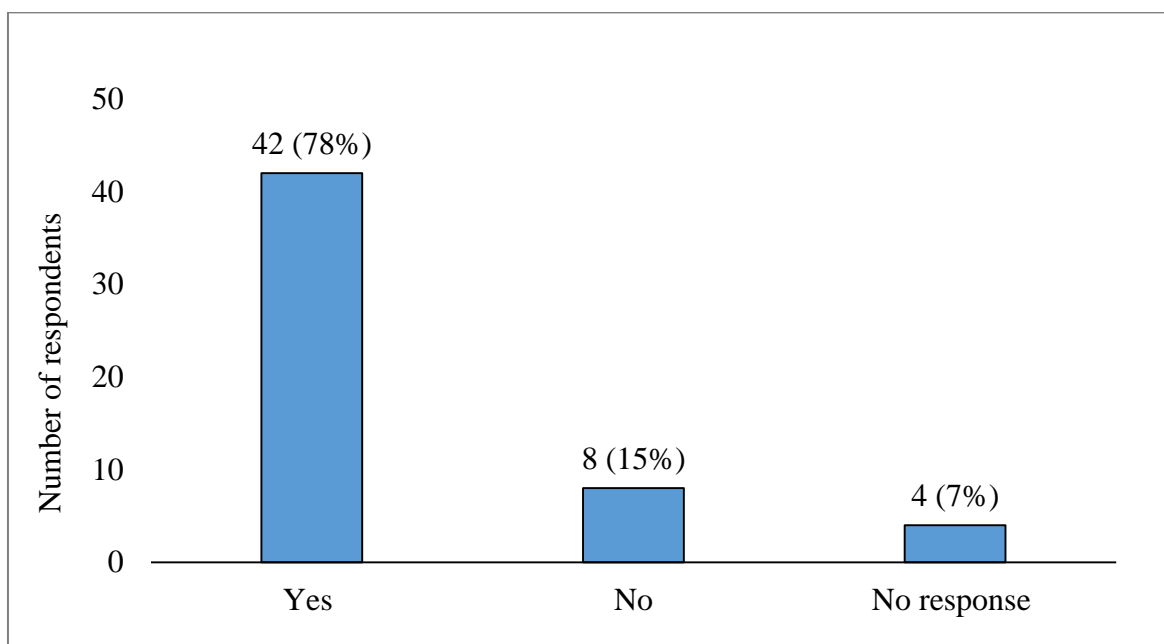


Figure 4.8: Opinions on whether or not KSL resulted to Improved Academic Performance

From Figure 4.8, it can be seen that majority of the respondents 42(78%) thought that KSL had improved academic performance though there were a few respondents 8(15%) who noted that KSL had no effect, while a minimal number 4(7%) gave no response. These findings are supported by Heslinga (2012) who noted that sign language allows learners to adapt to content via a preferred modality, to provide support through blends of action, symbols, and speaking. Signing encourages exploration, reinforcement, and comprehension. Further, Mweri (2014) revealed that in countries that had adopted the use of national sign languages as the medium of instruction in schools for the deaf, an unprecedented success had been achieved in the education of the deaf.

Those who agreed that KSL use as a medium of instruction improved academic performance of the learners were also asked to give their views on how it influences performance of the learners. The findings therefore are presented in Figure 4.9.

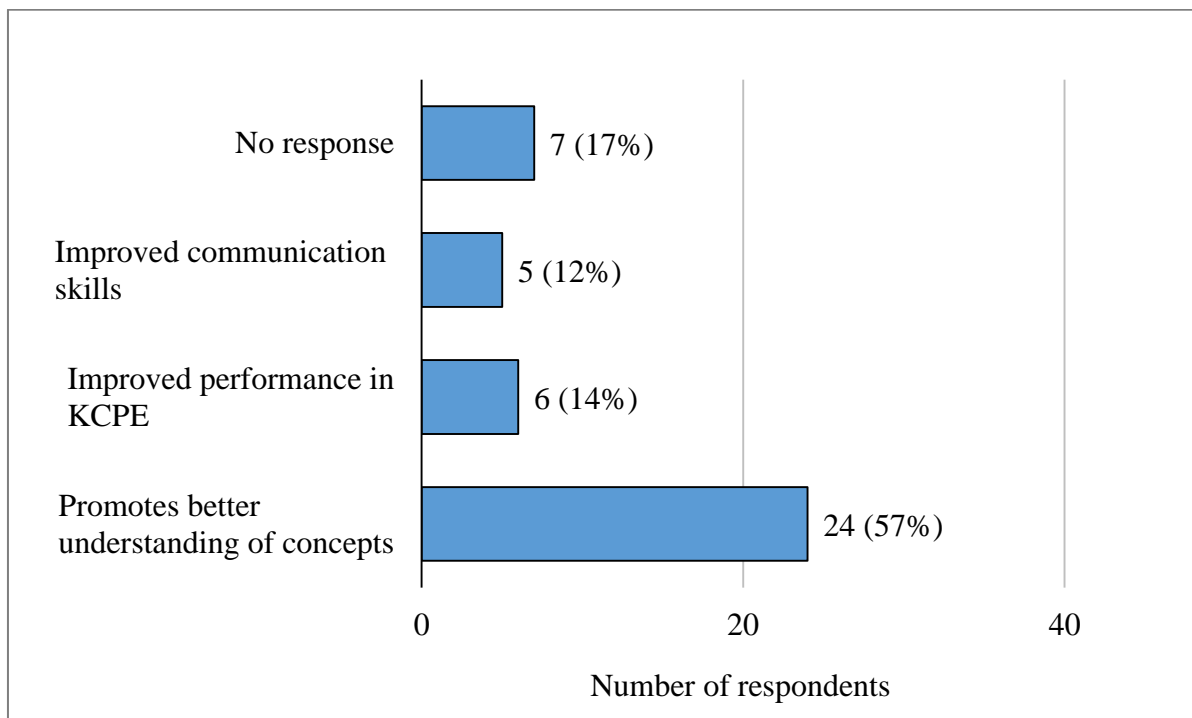


Figure 4.9: Ways in which KSL had Improved Academic Performance

The findings shown in Figure 4.9 reveal that majority of the respondents 24(57%) felt that the use of KSL promoted better understanding of concepts, corroborating findings from a study by Muiti (2010) who found that learners with HI learn and understand concepts better when KSL is used, underscoring the fact that teachers need to be proficient in using it so as to pass the knowledge and skills to their learners. Almost a quarter of the respondents 7(17%) gave no response to the question. A few of them 6(14%) felt that KSL improved learners' performance in KCPE and only 5(12%) noted that KSL had positively impacted on their communication skills.

The interviews from head teachers and learners were also analysed qualitatively. In general, the results indicated that there had been good performance of learners in schools since the introduction of KSL, and it was established to be a preferred one by most of the learners interviewed. The use of KSL has proven to be an effective mode of teaching and learning. It has led to good performance to the learners with KSL itself as a subject being the best performed as compared to other subjects, with one of the head teachers noting:

There is generally desirable performance since the introduction of KSL. The schools' performances have improved with Mumias School for the Deaf having average performance in 2015. Students generally do well and performance improvement has been witnessed where the performance has been poor before, some of the learners do have a fair understanding of concepts upon use of KSL mode. There is an increase in those learners joining secondary schools and this is attributed to the proper use of the KSL mode of instruction supported by the continued training of the teachers. Although the use of KSL leads to variation of results, there is generally good averaged performance as KSL is a learner – centred approach.

To a large extent, results from questionnaires and interviews show that the use of KSL leads to better understanding of the learned concepts although it does not guarantee a hundred percent conceptual knowledge. The results also support the findings from MoE (2004) and Okombo (2004) which showed that the use of KSL enables learners to master content, become bilingual and participate in complex discourse in both KSL and written English, hence achieving better academic performances.

Quantitative data from document analysis (KCPE results) was conducted to try to corroborate the findings evidenced by the descriptive statistics. The general view had been that KSL introduction in the curriculum has significantly led to improvement in the performance. T-Test was conducted whereby the results from 2001 to 2003 were considered as the before group and the results for 2004 to 2017 as the results for the after group (introduction of KSL) as given in Figure 4.1 above as earlier shown.

For the comparison of the means for the groups, the descriptive statistics were obtained from the t-test results. The findings are shown in Table 4.4 below.

Table 4.4: Samples Statistics for Subjects

Group		N	Mean	Std. Deviation	Std. Error Mean
Maths	Before	3	32.66	1.760	1.016
	After	14	31.69	2.047	.547
English	Before	3	27.54	2.369	1.368
	After	14	30.61	1.720	.460
Kiswahili/KSL	Before	3	14.50	2.488	1.436
	After	14	37.51	18.186	4.860
GHCR/SSRE	Before	3	16.93	4.761	2.749
	After	14	18.69	3.045	.814
Science	Before	3	24.93	3.455	1.995
	After	14	24.22	2.747	.734

The findings in Table 4.4 show that English, Kiswahili/KSL and GHCR/SSRE recorded negative mean change (Before-After) meaning improvement after the introduction of KSL, though KSL had the highest absolute mean difference. On the other hand, Maths and Science seems to record positive mean difference which indicates decline in performance on average, though the difference was seemingly slight. The t-test inference for the difference in means were observed to identify the mean differences that were statistically significant. Table 4.5 below shows summary of the test.

Table 4.5: Independent Samples Test for Subjects

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Maths	Equal variances assumed	.06	.80	.76	15.00	.46	.97	1.28	-1.76	3.70
	Equal variances not assumed			.84	3.28	.46	.97	1.15	-2.53	4.47
English	Equal variances assumed	.26	.62	-2.65	15.00	.02	-3.07	1.16	-5.54	-.60
	Equal variances not assumed			-2.13	2.47	.14	-3.07	1.44	-8.27	2.13
Kiswahili/ KSL	Equal variances assumed	45.67	.00	-2.13	15.00	.05	-23.01	10.79	-46.00	-.02
	Equal variances not assumed			-4.54	14.64	.00	-23.01	5.07	-33.84	-12.19
GHCR/SS RE	Equal variances assumed	1.30	.27	-.83	15.00	.42	-1.76	2.12	-6.26	2.75
	Equal variances not assumed			-.61	2.36	.59	-1.76	2.87	-12.44	8.93
Science	Equal variances assumed	.05	.82	.39	15.00	.70	.71	1.81	-3.16	4.57
	Equal variances not assumed			.33	2.57	.77	.71	2.13	-6.74	8.16

The findings in Table 4.5 of the t-test indicate that the only mean difference that was statistically significant was that of Kiswahili/ KSL group. Specifically, the statistics for equal variances not assumed were found to be: $t(14.64) = -4.54, p < 0.00$. Since the means of Kiswahili - introduction of KSL and the direction of the t -value, it can be concluded that there was a statistically significant improvement in subject performance following the introduction of KSL to replace Kiswahili from 14.50 to 37.51. This means that the general

inference from descriptive statistics that KSL introduction has led to improved academic performance was especially for the particular subject, KSL. However, since other subjects led to a conclusion of insignificant change, therefore the effect may not be statistically significant, except for the KSL subject. This could be interpreted that both the teachers and learners were more enthusiastic about the new subject and focus on KSL, compared to other subjects.

4.4.3 Kenyan Sign Language has not improved the Academic Performance

For the respondents 8(15%) who felt that KSL use did not improve on the performance (Figure 4.8), they were asked to give more details on what informed their opinions. Figure 4.10 shows some of the responses that the respondents gave.

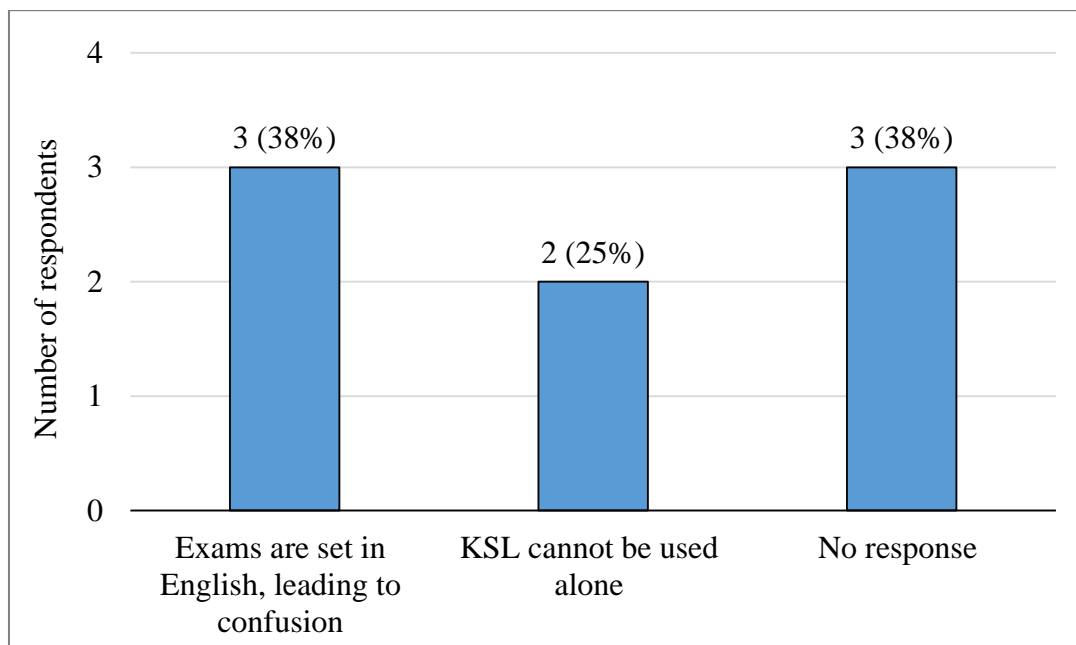


Figure 4.10: Reasons why KSL had not Improved Academic Performance

Figure 4.10 shows that those who failed to respond were equal in numbers with the number of respondents 3(38%) who felt the reason why KSL did not have a positive impact was due

to examinations being set in English, which created confusion amongst learners. Notably less than half of the respondents 2(25%) stated that the improvement in academic performance cannot be as a result of KSL alone hence performance improvement should not be attributed to KSL use alone.

Quantitative data from document analysis results as given in Table 4.5 above, also reveal that academic performance had not improved as such except for KSL subject when it was introduced in 2010. These findings are in agreement with Omustani (2012) who argued that learners who are deaf still perform below average as compared to their hearing counterparts and Ogada (2014) whose results revealed that the use of KSL influenced English composition writing to the extent that learners used KSL structure rather than the English language structure.

4.5 Teachers' Competence in using KSL

Objective three sought to examine teachers' competence in using KSL as medium of instruction. To understand the impact of Kenya Sign Language on academic performance of learners with hearing impairments in special primary schools in Kenya, it was necessary to establish the training capability of the teachers, and examine the teachers' competence in using KSL. Figure 4.11 shows findings on whether the teachers had prior training on KSL.

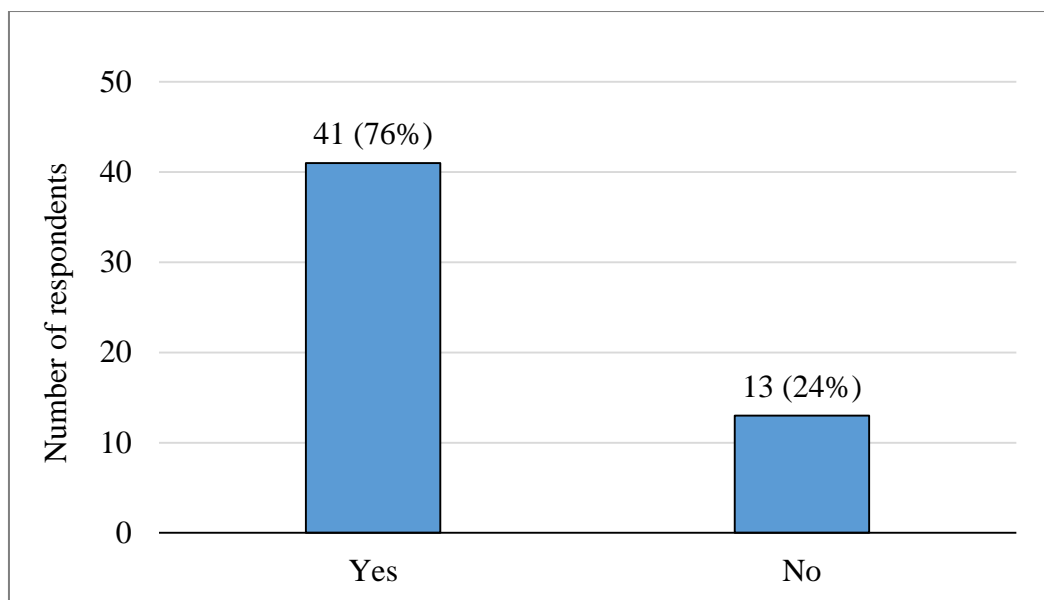


Figure 4.11: Teachers' Training in KSL Skills

The findings in Figure 4.11 reveal that majority of the teachers 41(76%) had prior training in KSL skills. However, close to a quarter respondents 13(24%) who taught learners with hearing impairments had not undergone training in KSL skills. In 2010, the Global Deaf Connection (GDC) (2010) stressed that some teachers teaching in Deaf schools still lacked the necessary training needed to instruct learners with hearing impairment. Mweri (2014) argues that the quality of teachers in institutions for the deaf is “below par” as they lack the linguistic know how to use KSL to impart knowledge to the deaf. Adoyo (2002) argues that lack of access to KSL learning may adversely affect the language development of some children who are deaf thereby interfering with their subsequent learning.

These findings indicate that there is a need for teachers who do not have the appropriate KSL skills to undergo the necessary training. Teachers who were trained in KSL were competent in the use of sign language.

(i) Alternative Ways Teacher`s acquired KSL Skills

The researcher further sought to establish how the respondents 13(24%) who did not have prior training in KSL skills as indicated in Figure 4.11 above, gained knowledge on the sign language. In particular, the study asked the respondents to provide the alternative methods that they could have used to acquire KSL skills. The findings are as shown in Figure 4.12.

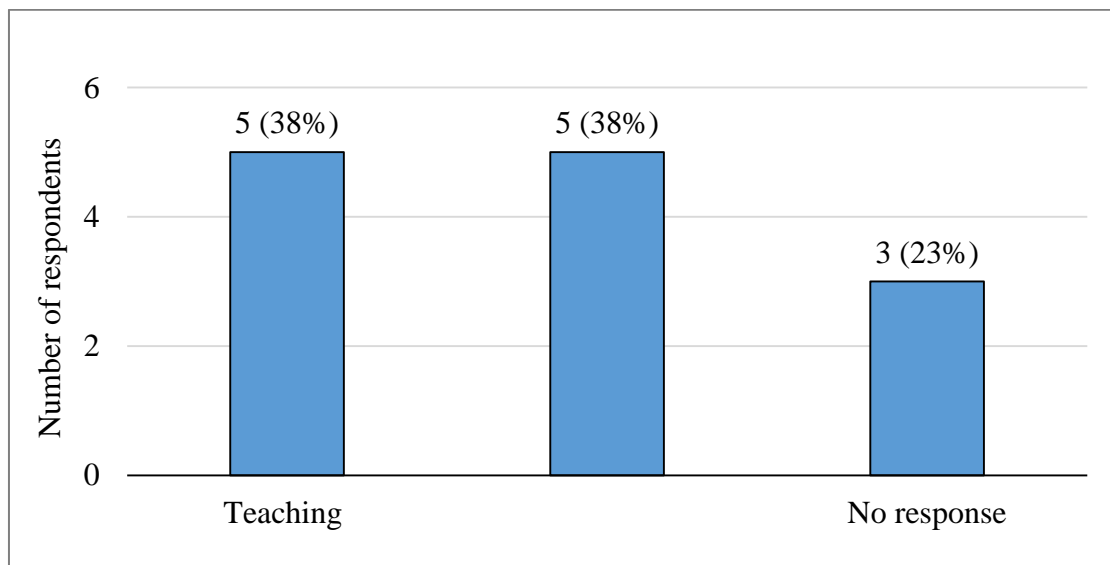


Figure 4.12: Alternative Ways Teachers learned KSL Skills

From Figure 4.12, it is worth noting that training is not the only mechanism that can be used to learn and understand KSL. Some teachers 5(38%) stated that they understood KSL through interaction with learners who are deaf while others 5(38%) pointed to teaching as a mechanism to gaining knowledge on using KSL. Both responses indicate that through experience or practice, the teachers have become knowledgeable in KSL. A small number of respondents 3(23%) stated that they had not had training in KSL but preferred not to reveal how they were going to learn the use of KSL. Despite the fact that some had learnt to use KSL through other ways, it must be noted that KSL training still remains the most appropriate mechanism to get the skills.

Therefore, the few teachers who had not undergone training should, as recommended by Marschark et al. (2002), undergo formal training, since the training allows them to acquire knowledge on the most effective way for teachers to communicate with learners who are deaf. This forms the basis for the acquisition of literacy skills as well as other academic, personal and social skills. This is seconded by Roald (2002) who revealed that using sign language in teaching promoted classroom engagement leading to active participation and peak performances for learners who are deaf.

From interviews with head teachers, it was established that teachers' competence is a key determinant of performance as it influences the delivery of concepts in a clear manner. Findings reveal that many teachers had been trained in SNE although not all of them were conversant and fluent in KSL use. It can be speculated though that, those teachers who have undergone training yet cannot deliver using KSL could be due to lack of interest and seriousness. One interviewee responded that:

Several teachers have attended seminars for purposes of acquainting themselves with certain KSL skills while others have undergone three month courses. They undergo training in KSL through seminars, three month courses, diploma and degrees, which improves their competency in KSL but most of them are not able to communicate fluently. KSL structure causes confusion with the various variations in signs. Also, abstract concepts lack adequate signs which are a big challenge to teachers and learners.

The response may be ambiguous, which calls for further investigation. It was also observed by the researcher during class presentation, that there were challenges emanating from the teachers' inability to use KSL as some teachers could not express themselves effectively.

This could be attributed to the insufficient training in some teachers as communication aspect in most instances seemed to be a challenge. Thus, teachers require updated and comprehensive KSL training to match the needs of these learners

The study results are similar to those of Muiti (2010) whose study looked at the views on the hindrances to effective learning of hearing impaired pupils and who found that learners with HI learn and understand better when KSL is used, and for this reason teachers should be proficient in using KSL in order to ensure that knowledge and skills are adequately passed on to the learners. Inadequacy in teachers' proficiency in KSL was also observed by Bunyasi (2010) who noted teachers' inability to effectively use KSL. Another study by Kihingi (2011) found that despite the fact that learners who are deaf preferred the use of KSL in learning and communication, only 7.7% of the teachers in schools for the deaf had the skills required to teach their respective subjects using KSL. Teachers' training remains low, with statistics showing that only 15% of teachers have been trained in deaf education (Kihingi, 2011).

4.5.1 Teachers' Skills in using KSL to teach Learners

On objective three also, the study rated teachers' skills in using KSL to teach learners on the basis of excellent, good, satisfactory, and fair. The findings are as shown in Table 4.6.

Table 4.6: Rating of Teachers' Skills in using KSL to Teach (N=54)

	Frequency	Percentage
Excellent	12	22%
Good	31	57%
Satisfactory	7	13%
Fair	3	6%
No response	1	2%
Total	54	100%

The findings in Table 4.6 show that slightly more than half of the teachers 31(57%) felt that their ability to use KSL to teach learners was good. This could be as a result of training they had undergone; many of the respondents had undergone training in KSL as was presented earlier in Figure 4.11. Almost a quarter of the respondents 7(13%) indicated that they were excellent in using KSL to teach learners while the rest indicated being fair except 1(2%) who gave no response. Enns (2007) and Zarchy (2008) studies support these findings that deaf students being instructed by professionals with higher levels of sign language proficiency often have better results more so in reading and writing literacy tests therefore performing better in cognitive tasks. Thus, there's need to have desirable teacher's capabilities.

In Figure 4.13, the results of the respondents' rating of their skills are compared with the results of whether or not they had prior training in KSL (presented in Figure 4.10).

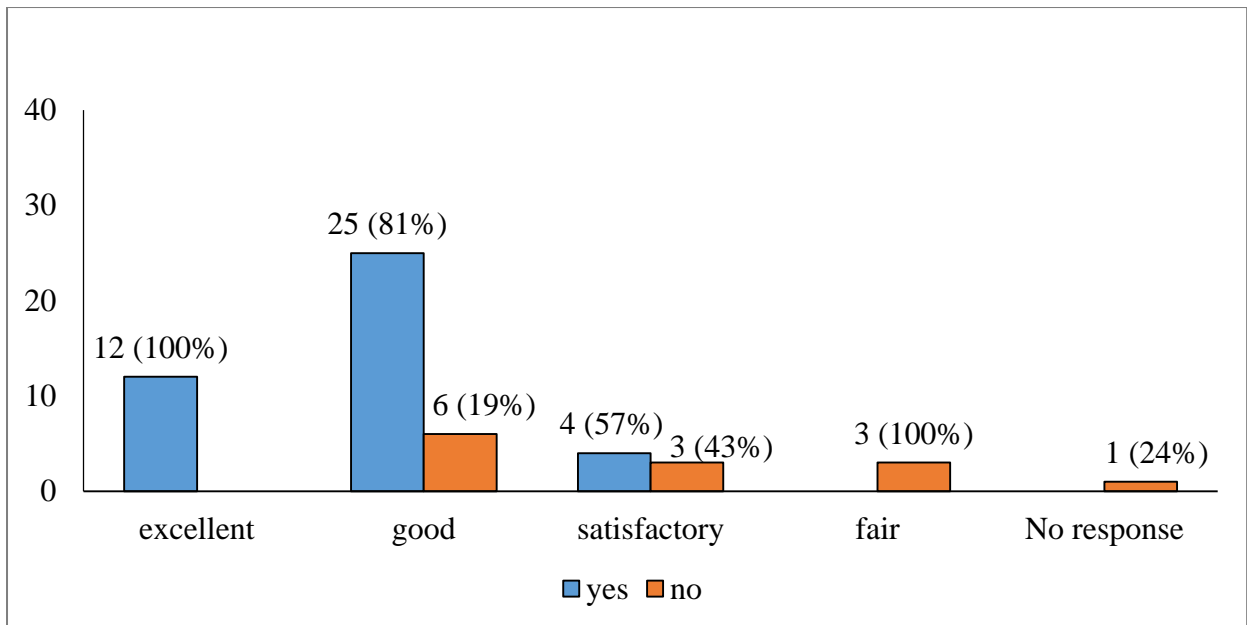


Figure 4.13: Rating of Skill levels, by prior Training in KSL

As shown in Figure 4.13, it appears that majority of those who had training in KSL, were more confident about their skills' levels and described as excellent or good. For the respondents 13(24%) in Figure 4.12, who did not have prior training in KSL, none of them felt that their skills were excellent, while close to half of them felt that their skills levels were good. These results are statistically significant.

4.5.2 Frequency of the Use of KSL in Class Presentation

While, the use of KSL is deemed appropriate in teaching learners with hearing impairments, academic performance is also dependent, to some extent, on how frequently the language is used in class. The respondents were asked to state how frequently they used KSL in class, and during lesson presentations. The findings are as shown in the Table 4.7.

Table 4.7: Frequency of using KSL in Class Presentation (N=54)

	Frequency	Percentage
Very often	34	63%
Often	14	26%
Less Often	5	9%
Not used at all	1	2%
Total	54	100%

Table 4.7 shows that almost two-thirds of the teachers 34(63%) used KSL very often during lesson presentation while just slightly over a quarter of them 14(26%) used it often. Only 1(2%) of the study respondents did not use KSL in class presentation at all.

It appears then that many teachers used KSL during class presentation. All the teachers agreed to have used KSL as a medium of instruction to the learners although their level of usage varies which is in line with the set-up of the skills in Kenya as it was adopted as a medium of instruction for learners with HI in 2004 upon trial of other hence deemed suitable (MoE, 2004). These findings support results from research by Imbiti, Awori and Kwena (2014) carried out in Western Province of Kenya to investigate strategies facilitating KSL progress in primary schools for learners with hearing impairment. The study by the three scholars affirmed the use of KSL as a medium of instruction by teachers to clarify concepts in all subjects and therefore enhancing learner understanding.

4.6 Teaching/Learning Resources used to facilitate KSL

Teaching and learning resources are vital in proper learning. Thus, objective four wanted to establish some of the visual and technological resources available for KSL utilisation in schools.

4.6.1 Visual Resources

This study sought to identify the most commonly used visual teaching and learning resources used in schools. Some of the many teaching/learning resources mentioned by the respondents included KSL text books, KSL dictionary, charts/pictures, illustrations, maps and real objects. Some respondents mentioned more than one teaching/learning resources that they utilized for KSL. The findings are contained in Figure 4.14.

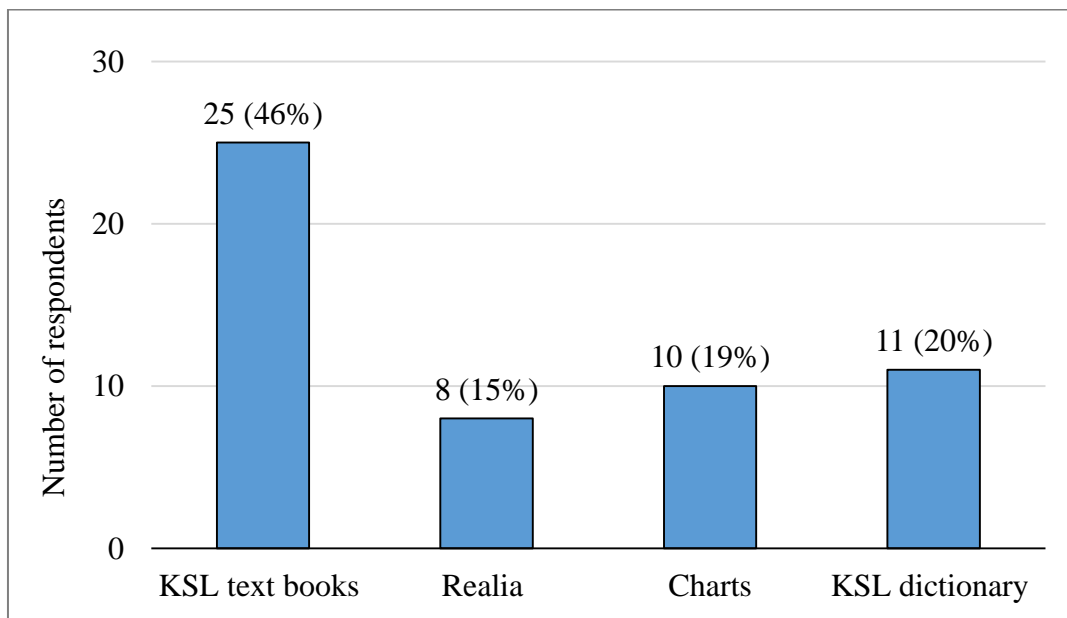


Figure 4.14: Types of Visual Teaching/Learning Resources

Figure 4.14 shows that majority of the respondents 25(46%) mainly made use of KSL text books and 11(20%) of them utilised KSL dictionary during teaching. There were some

respondents 10(19%) who noted that they were using charts, to diagrammatically present explanations, during teaching to enhance the use of KSL. A few of the respondents 8(15%) indicated that they used realia (real objects) as a learning resource appropriate for KSL. In addition, classroom observation by the researcher reveals that there were few resources displayed in some of the classrooms in the sampled schools (Appendix V). The researcher also observed that majority of the teachers were not using resources while teaching in class despite knowing that learners understand concepts better and participate actively and physically when resources are used during class lesson. Teachers should be encouraged to use the available resources as much as possible to aid in learning.

(i) Adequacy of Visual Resources

In order to get an understanding on whether or not the visual resources identified were adequate for KSL use as a mode of instruction, the study sought the views and opinions of the respondents. The findings are presented in Figure 4.15.

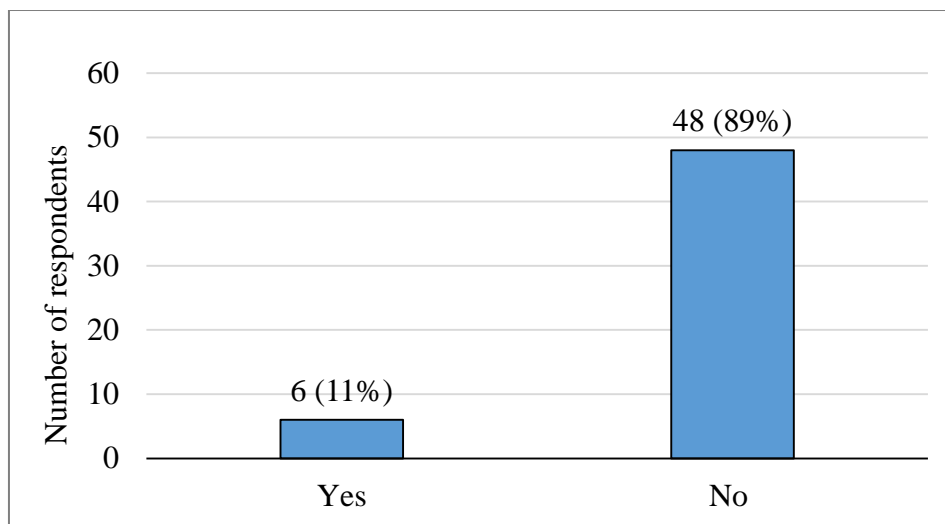


Figure 4.15: Adequacy of Visual Resources

The results in Figure 4.15 indicate that most of the respondents 48(89%) were of the view that the visual teaching or learning resources were inadequate for KSL purposes. Only a few respondents 6(11%) agreed that the resources were adequate.

Findings from interviews revealed that visual aids were insufficient in the schools. One head teacher lamented that;

Kenyan Sign Language resources are scarce, there are no supplementary text books in the bookshops. More textbooks should be developed and made available for these pupils the same way as their hearing counterparts. SNE learners are always the last to be remembered. They receive their share much later after regular schools. Ministry of Education need to do something for these learners.

As noted by Kluwin & Stewart (2001), resource scarcity limits the capacity of the teacher to fully demonstrate certain aspects, which may lead to learners being unable to properly understand concepts. Across Africa, a study by Dixon (2005) in Liberia showed that the system of education for hearing impaired students faced challenges around limited resources such as funds, qualified personnel and limited facilities. The adequacy of the learning resources often determines the ability and capacity to assist the learners in understanding concepts. Both qualitative and quantitative results show that one of the main challenges surrounding use of learning materials was the inadequacy of the resources. This may result in increased demand for more written material in KSL, which will have to be developed, availed and made easily accessible in bookshops.

Therefore, it should be a policy concern that the resources used be developed for KSL utilisation within all the learning institutions for learners with hearing impairment.

(ii) Recommendations on Visual Resources

Further, respondents were asked to give their recommendations on what could be done about the inadequacy of visual resources. The results are presented in Figure 4.16.

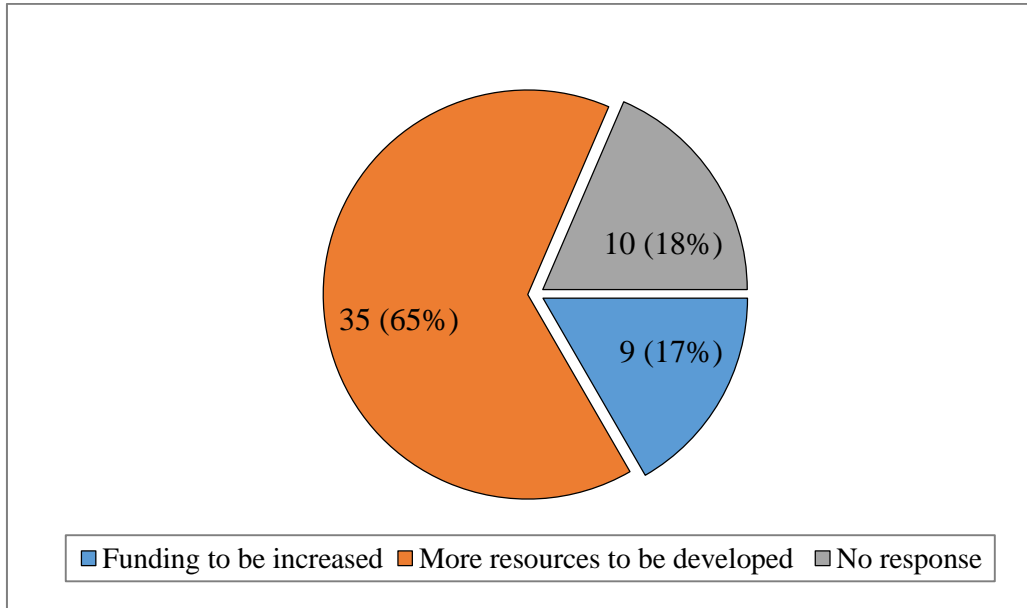


Figure 4.16: Recommendations on Teaching/Learning Resources

From Figure 4.16, majority of the respondents 35(65%) were of the view that more resources needed to be developed in order to avoid limitations that may arise. Almost a fifth of the respondents 9(17%), advocated for increased funding be allocated to purchase of more resources. However, there were a few respondents 10(18%) who withheld their responses. Therefore, there is need to develop more resources which are relevant and appropriate for KSL utilisation to meet the emerging issues in the education of deaf learners so that they can be at par with their hearing peers bearing in mind that they all follow the same education curriculum currently in use.

4.6.2 Technological Resources

The study also examined the technological teaching/learning resources that were used to facilitate KSL when instructing learners. In this study, respondents were asked to list some of the technological resources available in their schools. Some of the resources listed, shown in Figure 4.17, included KICD video tapes, computers and projectors.

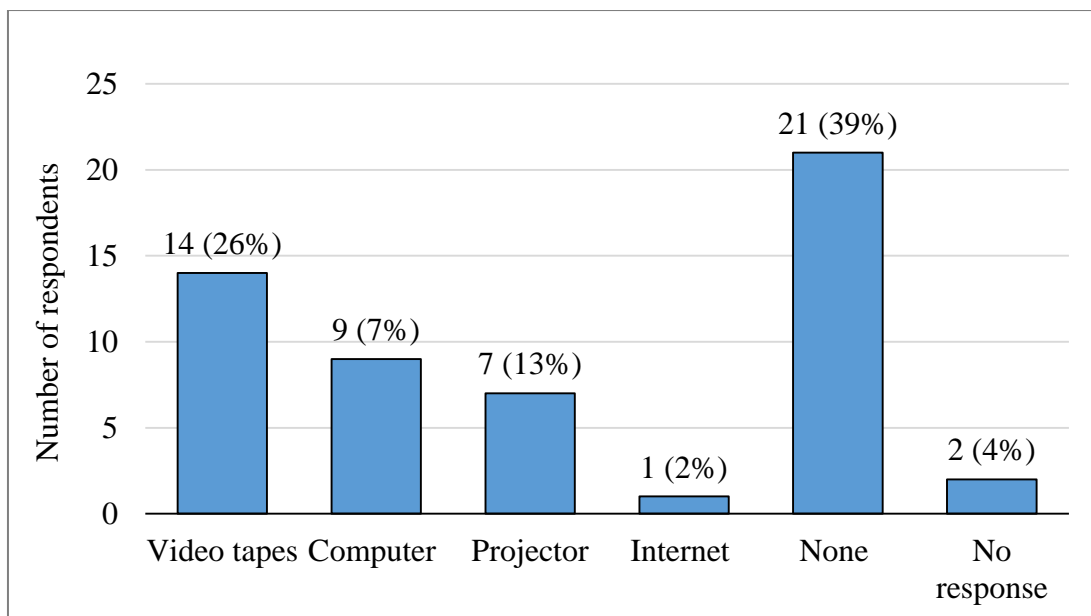


Figure 4.17: Technological Resources

Majority of the respondents 21(39%), as shown in Figure 4.17, had no preferred technological resource for KSL in their schools, which could be because of lack of technology at their disposal. However, for those whose school had some technological resources available, majority of them identified video tapes as the main resource available to them. The use of computers was also identified, as was the use of projector and internet. Findings from the interview revealed that one school had a computer lab signifying the school's commitment towards enhancing the learners' experience. Technology such as computers, CDs and internet, can provide learners with experiences that enhance content

mastery, decreases learning time, and increases chances to learn by discovery, especially since deaf students often understand more from scripts accompanied by videos rather than reading scripts alone (Lopez, 2007; Lewis & Jackson, 2001).

Findings point to a generally low uptake of technology among the institutions, which suggests a reassessment of the education policy. Research is needed and further attention needs to be given to the use of technology as a mode of instruction, particularly with the increased use in other sectors. The respondents' views regarding adequacy of the technology point to the resources being inadequate. As previously mentioned in the case of use of visual aid, many respondents felt that more resources should be provided to assist in facilitating technological use while other respondents recommended increase in funds to facilitate more purchase of technological learning resources.

4.6.3 Learners' Reaction on Use of Resources

Additionally, the attitude of learners toward the use of resources in class were examined. The teachers were asked to gauge whether learners signalled their like or dislike as well as their understanding or failure to understand concepts. Figure 4.18 display results of the learners' reactions to the use of resources in the classroom.

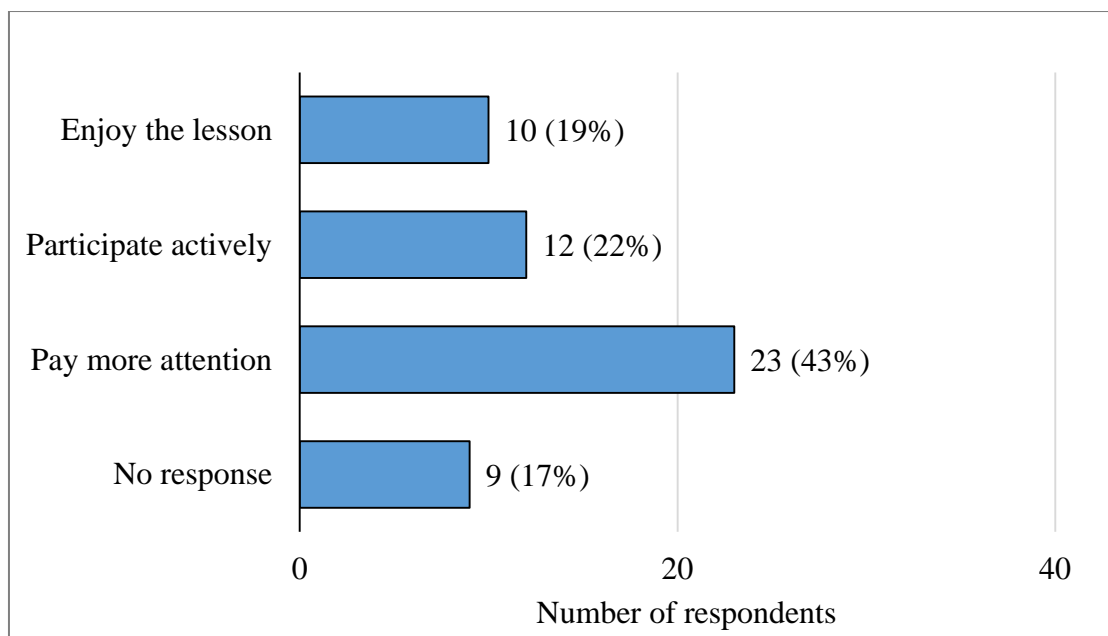


Figure 4.18: Learners` reaction on Use of Resources

The results presented in Figure 4.18 show that majority of the respondents, 23(43%), felt that learners paid more attention when resources were used in class. Almost half of the respondents, 12(22%), affirmed that the use of resources in KSL teaching caused learners to participate actively and enjoy the lessons.

These results show that adequate resources are important in explaining concepts to learners since they capture their attention hence increasing the chances of concepts being understood. There is, therefore, need for the provision of adequate learning resources in special primary schools for learners with HI.

In addition to the quantitative data, qualitative data analysed provided more detail on the perceptions regarding teaching/learning resources used to facilitate instruction. One of the respondents commented:

Some of the resources used as visual aids bring the practical aspect to the learner. These visual aids are good in teaching as they attract good participation from the learners.

This study therefore confirms the assertion by Easterbrooks & Stoner (2006) that through the use of visual aids to represent information (visually) to learners, it assists the learners to focus on the important information, see how concepts are connected, and integrate prior knowledge with new knowledge. It also affirms the argument by Kluwin & Stewart (2001), that the use of visual resources, like maps, graphs, charts, and visual maps, to explain concepts enhances the understanding of content among deaf learners. Insufficient materials and resources would therefore limit the understanding of such concepts and result in challenges that hinder good academic performance.

4.7 Teachers' and Learners' Opinions towards KSL as an Instructional Medium

Objective five sought to establish teachers' and learners' opinions towards KSL as a medium of instruction. To examine teachers' opinions towards KSL, the study used a five level Likert scale to capture teachers' views on the impacts of KSL use in teaching the deaf and the general outcome as measured by academic performance. Responses on the Likert scale ranged from Strongly Agree (SA) to Strongly Disagree (SD), whereby 1 score represented strongly disagree, 2 represented disagree, 3 undecided which implies neutral, score of 4 agree and score of 5 represented strongly agree. Score 3 is the mid-point of the scale and represented neutrality. Scores below 3 signals agreement that the impact stated had an effect on academic performance, while scores above 3 indicated disagreement. The research findings are shown in the Table 4.8.

Table 4.8: Teachers` Opinions towards the Use of KSL (N=54)

		SA	A	UN	D	SD	NR	Total
Kenyan sign language is the best way of instructing deaf learners	F	35	16	1	0	0	2	54
	%	64.8	29.6	1.9	0	0	3.7	100
KSL is easy to use when teaching deaf	F	17	2	2	28	3	2	54
	%	31.5	3.7	3.7	51.9	5.6	3.7	100
Learners understand better when taught with KSL	F	36	16	0	0	0	2	54
	%	66.7	29.6	0	0	0	3.7	100
Use of KSL leads to poor performance	F	5	6	19	0	21	3	54
	%	9.3	11.1	35.2	0	38.9	5.6	100
KSL has limited vocabulary use in our school	F	16	22	4	6	4	2	54
	%	29.6	40.7	7.4	11.1	7.4	3.7	100
Abstract concepts can be expressed using KSL	F	10	16	3	15	8	2	54
	%	18.5	29.6	5.6	27.8	14.8	3.7	100
Teachers like using KSL during teaching	F	13	22	5	10	2	2	54
	%	24.1	40.7	9.3	18.5	3.7	3.7	100
KSL should be used to teach all subjects	F	12	12	3	14	11	2	54
	%	22.2	22.2	5.6	25.9	20.4	3.7	100
Knowledge of KSL helps teacher understand English	F	3	8	5	16	20	2	54
	%	5.6	14.8	9.3	29.6	37	3.7	100
Using KSL to teach has improved academic performance	F	23	19	3	3	4	2	54
	%	42.6	35.2	5.6	5.6	7.4	3.7	100
Is KSL developed enough to be used in educating deaf	F	4	16	1	22	9	2	54
	%	7.4	29.6	1.9	40.7	16.7	3.7	100

Key: SA-Strongly Agree, A-Agree, UN-Undecided, D-Disagree, SD-Strongly Disagree,

NR- No Response

The results in Table 4.8 show that majority of the respondents 35(64.8%) feel that the Kenyan sign language is the best way of instructing deaf learners. This is consistent with previous findings that have shown that KSL has significant impact on the performance of the learners. Majority of the responses from the teachers 28(51.9%) disagreed with the statement that KSL is easy to use. The disagreement could be due to the continued inability of the teachers to effectively use KSL as noted by Bunyasi (2010).

The respondents, however, seemed to agree with the statement that learners understood concepts better when taught with KSL, over 52(90%) of them responded strongly agree and agree to the statement. Most 21(38.9%) of the respondents disagreed with the statement that “use of KSL leads to poor performance”. However a large proportion 19(35.2%) of the teachers marked their answers to the statement as “neutral”, indicating that they could not decide whether or not KSL had resulted in poor performance amongst students.

This is supported by Mweri, (2014) assumption that teachers of the deaf have an important role to play in making sure deaf children are competent in KSL to enable them learn other languages and academic content, however, it is vital to note that the teachers had inadequate necessary proficiency in sign language for instruction. Consequently, in-service programs on KSL skills for teachers need to be organised.

On whether they agreed or disagreed with the statement that KSL had limited vocabulary use, majority of the respondents totalling 38(70.3%) either strongly agreed or agreed to the statement, indicating that sign language has limited vocabulary. This implies that KSL has poor usage of vocabulary and thus, it has implications on policy and practice, as it elicits concerns on the depth of the current curriculum. The high rate of agreement from the respondents shows that majority of them agree with Adoyo (2004) who argued that the

Kenyan Sign Language needed to be constantly expanded to include more vocabulary of arbitrary signs accompanied by a set of rules, or grammar. The set rules are meant to govern the formation of individual units as well as their modification and combination into phrases and sentences.

Over two-fifth of the respondents 15(27.8%) seemingly disagreed with the idea that abstract concepts can be expressed using KSL. However, close to half 26(48.1%) of the respondents felt that the use of KSL does equate to use of abstract concepts, indicating that there could be other accompanying aspects like the use of verbal or non-verbal techniques. This was outlined by a research conducted by Albertini and Lang (2001) which looked at how well students, especially the deaf ones, would understand science concepts. Using a sample of 288 written concepts in science literacy for learners in grade 6 through 11 and their teachers' perceptions, the study found sign language had an impact on learners' understanding and writing of scientific content. Friend (2008) argues that the usage of visual teaching resources helps in retaining information and should be used to guide students, grasp information, see how concepts are connected, and integrate prior knowledge with new knowledge gained.

Close to two thirds of the respondents 22(40.7%) agreed with the statement that teachers liked using KSL during teaching. Results included in Table 4.6 also showed that there was a balance between those who agreed and disagreed with the statement that KSL should be used to teach all the subjects. Enns (2007) and Zarchy (2008) argue that that deaf students understand the concept of sign language proficiency have better results, more so in reading and writing literacy tests, and thus do better in cognitive tasks. KSL is known to be the best performed subject as compared to other subjects like mathematics, science, English and social studies. If the view of some of the respondents that KSL should be used to teach all subject were to be incorporated, it would not concur further with Zarchy (2008) where he

states that the background of the learners should be good especially in sign language as it boosts the acquisition of English language and thereby contributing to the improvement in their literacy abilities.

However, it is worth noting that the use of KSL in instructing other subjects, as Ogada (2014) affirm, can lead to distortion of concepts which causes ambiguity on the applicability of KSL across all subjects. Ogada (2014) study carried out on the languages used in teaching and writing English composition in Nyanza Province of Kenya, and which targeted 71 class seven pupils and 5 class seven teachers of English, found that KSL impacts on English composition writing to a very large extent and that sentences observed had KSL structure rather than English language structure. In as much as the respondents do not agree to the use of KSL to teach all the subjects, it is true that it affects the other subjects by having a positive influence on performance.

The teachers 16(29.6%) however seemed to disagree with the idea that knowledge of KSL helps a teacher understand English. This could be due to the fact that the adoption of KSL, which has variant grammatical expression compared to the common language, would have adverse impact on the English language of the teacher. This could explain why majority of the respondents disagreed with the view that KSL helps the teacher to understand English.

There was a large proportion of the respondents 42(77.8%) who agreed that the use of KSL to teach improved the academic performance of the learners. A 2005 report by MOEST showed that academic performance in national examinations had negatively affected the quality of education for learners with hearing impairment to the extent that majority of the learners with hearing impairment rarely scored above 250 marks in KCPE performance. This had resulted in a small proportion of the learners joining secondary schools.

The adoption and use of KSL has led to improved performance of the learners. In other parts of the world, studies have found that the use of sign language has a positive impact on the academic performance of learners. Chupina (2006) pointed out that the Swedish Sign Language had taken over as the language of instruction, and was also a taught subject itself in 1995, thus contributing to improvement in academic performance of learners in Sweden. The ability of the deaf students to effectively use sign language contributes to better results in reading and writing literacy tests and better performance in cognitive tasks.

However, despite agreement that KSL improved academic performance, there was disagreement around whether or not KSL is developed enough to be used in educating deaf learners. As shown in Table 4.6, slightly above half of the respondents 31(57.4%) felt that KSL needs to be developed further so as to enhance the effectiveness of KSL as a mode of instruction for students with hearing impairment.

Results from interviews conducted with learners showed that they had a positive attitude towards KSL as a medium of instruction and were of the opinion that other subjects be written in KSL, so as to enhance and promote better understanding of concepts. This would enable them to perform better in all the subjects.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter presents a summary of the findings of the study. It also gives conclusion and recommendations on how the study could be useful and relevant. The chapter concludes with suggestions for future research.

5.2 Summary

The purpose of the study was to assess the impact of KSL as a mode of instruction on academic performance of learners with hearing impairment in Special Primary Schools in selected Counties in Kenya. The study had five objectives: to assess the academic performance of learners, establish the effects of KSL on academic performance, find out teachers` level of competence, identify teaching/learning resources used for KSL and establish teachers`/learners` opinions on KSL as a mode of instruction.

A descriptive survey design and mixed method research approach were used. This involved the use of both quantitative and qualitative research (descriptive) methods. A population of 369 respondents was targeted. Using purposive and simple random sampling procedures a sample size of one hundred and twelve respondents was selected. Four research instruments were developed for the study: questionnaires, interview schedules, observation checklist and a document analysis guide.

In summary, the findings showed that since the introduction of KSL, the learners had generally performed better in KSL subject with other subjects` performance fluctuating over the years.

5.2.1 Academic Performance of Learners with HI

The first objective of the study was to establish the academic performance of learners with hearing impairment. The study found that, between 2001 -2017, results from the national examinations (KCPE analysis) showed varying results over the years, that is, before and after introduction of KSL as a medium of instruction. Generally, the findings reveal fluctuation of performance in all the subjects with GHCRE/SSRE poorly performed. From 2010, however, when KSL was introduced as a subject and Kiswahili was faced out, great improvement on performance of KSL subject was realized. As a subject, KSL was the best performed, compared to other subjects such as mathematics and science. This may have boosted the overall marks of the learners leading teachers to generalise and conclude that KSL as a medium of instruction had improved the academic performance. Head teachers and learners interviewed revealed that social studies curriculum was too wide and its concepts were too abstract to be understood.

5.2.2 Impact of KSL on Academic Performance

The second objective of the study was to establish the impact of KSL on academic performance of hearing impaired learners. The study established that most of the respondents (head teachers, teachers and learners) were of the opinion that there were positive impacts resulting from the use of KSL as a mode of instruction; they highlighted that it had helped in promoting the understanding of concepts and had improved the academic performance of learners with hearing impairment in schools. The improvements were attributed to the use of KSL which, as aforementioned, ensured that concepts were better explained to the learners. There was also a rise in the use of English vocabulary. The respondents claimed that many

learners got 'A' grades not only in KSL as a subject but also in other subjects too. Quite a good number of them proceeded to secondary level of education.

Some respondents (teachers and head teachers), however, felt that the use of KSL created confusion in English grammar and composition writing; because of the many mixing letters, the sentence structure caused confusion. Variations of signs also created confusion. This resulted in low performance being recorded in grammar.

Results from document analysis, however, revealed improved performance in KSL as a subject with other subjects' performance fluctuating over the years. KSL was found to be the best performed subject which could be as a result of it being the most applicable mode of instructing the learners.

5.2.3 Teachers' Competence in using KSL

Objective three sought to find out teachers' competence in using KSL during class presentation. The research findings revealed that many teachers had been trained in SNE. Their highest qualifications ranged from certificate, diploma, to a degree or masters. However, there were some teachers who were found not to be conversant and fluent in the use of KSL. Several teachers had attended seminars in order to acquaint themselves with certain KSL skills while others had undergone three month courses. Some of these teachers, despite having KSL skills, could not express themselves using it.

Findings also revealed that those teachers who had undergone training yet could not deliver using KSL, lacked the interest and were not serious in using the sign language. In service courses should be organised regularly to train and equip teachers with current signs and skills to be conversant with KSL.

5.2.4 Teaching/Learning Resources

Objective four sought to identify teaching/learning resources available for KSL utilization in schools. The study found that the most commonly used visual aids in schools included KSL text books, KSL dictionary and charts/diagrams. KICD video tapes were the main technological resources. The study also found that these resources were inadequate and that there is need for more resources to be either developed or/and made available in schools. However, there were some cases of teachers not using the resources in class, despite listing them as being available in their schools.

5.2.5 Teachers`/Learners` Opinions on KSL as an Instructional Medium

Objective five wanted to establish the opinions of teachers and learners on KSL as a medium of instruction. Teachers and learners had varying opinions on the use of KSL as a mode of teaching/learning. The study findings revealed that both teachers and learners agreed that KSL better facilitated learning and improved academic performance. However, many teachers claimed that KSL was not the best mode to use when instructing learners with HI, and felt that other modes needed to be incorporated. This was because using KSL alone was inadequate as some concepts had no signs, making it difficult for the teachers to communicate and explain. Learners, on the other hand, had the opinion that other subjects be put in KSL for easy understanding and better performance.

5.3 Conclusions

In conclusion, the study found that the academic performance of learners with HI only improved when KSL was introduced as a subject and not as a medium of instruction in schools. The findings reveal that performance had been fluctuating showing below average

results over the years before and after introduction of KSL as a medium of instruction. The study found that KSL as a subject was the best performed, with social studies recording the lowest performance. On the impact of KSL as a mode of instruction, the study concluded that KSL as a mode of instruction had positive impacts on KSL subject and had made no significant in other subjects. Head teachers and teachers, however, claimed that KSL facilitated learning and communication: learners understood concepts better. Thus, it was seen as having a negative impact on English language as it affected grammar acquisition and composition writing.

On teachers` competence in using KSL for instruction, the study concluded that teachers were not sufficiently fluent in KSL skills when teaching although many of them had been trained in SNE up to the degree level, some had master`s degree. Teachers lacked adequate training in KSL which can be attributed to limited sign language skills in content specific vocabularies. Therefore, there is need for teachers to be taken for in-service training on KSL in order to improve their skills and ensure that they are able to facilitate effective teaching using the sign language.

The study found that there was use of certain teaching/learning resources, with teachers mainly found to utilize mainly KSL textbooks and KSL dictionary during lesson presentation. Through observation, the study found that that some teachers were not making use of teaching/learning resources when teaching. However, the findings also revealed that teaching/learning resources were inadequate for KSL use. In addition, interview results revealed that there were no supplementary books in the market for learners with HI as in the case for their hearing counterparts. There is need for more KSL resources in schools.

Lastly, the study concluded that both teachers and learners had positive attitudes towards KSL as a mode of teaching/ learning. However, teachers felt that abstract concepts and words that had no signs proved challenging to articulate when KSL was used. Learners revealed that KSL was easy to understand and they were of the opinion that other subjects be written in KSL structure. This would enable them to perform better and do well in national examinations.

5.4 Recommendations

Based on the conclusions made for the study the following recommendations were made:

5.4.1 Policy Recommendations

Based on the results of the study, the following policy changes are recommended:

- i. The Ministry of education should provide financial assistance to organize seminars and workshops that will be used to train teachers in use of KSL. This is in line with Special Needs Education Policy (2009) that proposes that teachers of hearing impaired learners should be trained and must be fluent in sign language, so that they are able to effectively communicate with the learners. This will contribute to improved academic performance in line with Vision 2030 goals as far as education is concerned.
- ii. Kenya Institute of Curriculum Development should develop more resources that could be used in KSL. These should include visual and technological resources. The resources should be relevant, appropriate, and current and contain more content to capture more signs to meet the emerging issues. Varied range of teaching aids should be developed for teachers and learners to utilize.

- iii. Teachers should utilize teaching/learning resources during class presentation. To ensure this happens, the Ministry of Education should organize induction courses regularly to train teachers and equip them with the knowledge and skills they need to improvise the teaching/learning resources and, ultimately, provide effective teaching of learners with hearing impairment.
- iv. Kenya Institute of Curriculum Development should modify the curriculum to suit the needs and interests of learners with HI, and make it easily understandable especially in subjects like Social Studies and Religion which have especially proven challenging to these learners. KICD should develop signs for abstract concepts.
- v. Kenyan Sign Language is the mother tongue of deaf learners. The language is diverse, and signs used vary across schools. Different schools have different signs for some concepts. This has created confusion amongst teachers and learners with HI. The Ministry of Education should develop a policy detailing the standard signs to be used when instructing learners in schools.
- vi. Kenya National Examinations Council should modify examination questions in all subjects to suit the abilities of hearing impaired learners for easy understanding. This will contribute to improved performance in all subjects.

5.4.2 Recommendations for Further Research

There are various aspects of learning in special schools that this research did not cover. Some of the areas which should be covered in future studies are listed below.

- i. This study only covered five special primary schools in five counties. A similar study should be replicated in other counties or a national study covering all special schools (or a representative sample) should be conducted. The study did not cover secondary

schools. Future studies could be done to assess the impact of using KSL in delivering content to learners with HI.

- ii. A study should also be carried out to establish the factors contributing to poor performance among learners with hearing impairment in Social Studies and other subjects which are performing below average. Academic performance is still below average and research needs to be carried out on the best mode of instruction.
- iii. The current study did not distinguish between hearing teachers and those with hearing impairment. Some participants in the study who were identified to have outstanding knowledge and skills in KSL happened to be KSL users themselves. Confidence in their KSL knowledge may derive from their similar disability experiences with their learners which would be particularly valuable for future research. A study comparing how teachers who are hearing impaired and those who are not use KSL to teach learners can help researchers to gain an understanding of teachers' views and strategies for KSL utilization.
- iv. A comparative study could be carried out to evaluate the performance of the KSL subject in relation to other subjects, and its influence on academic performance.
- v. Kenyan Sign Language has variations and there is no uniformity of signs in schools. Different schools have different signs for certain words and abstract concepts. There is need for sign language to be harmonized in Kenyan schools. Therefore, a research study can be carried out to establish appropriate and relevant signs for such concepts which can be replicated in schools.

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Appendix I: Research Instruments

Questionnaire for Teachers

Kindly complete this questionnaire. The information you give will strictly be used for academic purposes and will be treated with confidentiality.

Section A: Demographic information.

1. What is your gender?

Male Female

2. a) What is your professional qualification?

Certificate in SNE

Diploma in SNE

Degree in SNE

Masters in SNE

3. How many years have you been working as a teacher for learners who are deaf?

0-5 years

6-10 years

11-15 years

16-20 years

Above 20 years

No response

Section B.

a) Impact of KSL as a mode of instruction

1. Do you think the use of KSL as a mode of instruction has impact on academic performance of learners with HI?

Yes No

- a) If Yes, how?
- b) If No, give reasons.

2. How has KSL affected the performance of subjects such as;

- i) English
- ii) Mathematics
- iii) Science

3. Therefore, do you think teaching using KSL as a mode of instruction improves the academic performance of learners with HI? Yes/ No.

- (i) If the answer in 3 above is Yes, state how?
- (ii) If the answer in 3 above is No, state why?

b) Teachers` competence in KSL skills

1. Have you trained in KSL? Yes/No

a) If the answer in question 1 above is No, how did you learn KSL? -----

2. How do you describe your skills in using KSL to teach learners who are deaf?

Excellent Good Satisfactory Fair

3. How often do you use KSL for instruction during lesson presentation?

Very often Often Less often Not used at all

c) Teaching/ Learning resources

1. What types of visual teaching/learning resources for KSL are available in your school?

- (i) _____
- (ii) _____
- (iii) _____
- (iv) _____

b) Are they adequate? Yes/No

2a) What types of technological resources are available for KSL use in your school?

b) Are they adequate? Yes/No

c) If the answer in (b) above is No, what are your suggestions/recommendations?

3) How do learners react when these resources are utilised in class?

d) Teachers' opinions towards KSL

Instruction: Using the following 1-5 scale, please tick the most correct response, you agree with the table below.

NB: SA= Strongly Agree; A= Agree; U= Undecided; D= Disagree; SD= Strongly Disagree.

Statement	SA	A	U	D	SD
Kenyan Sign Language is the best mode of instructing deaf learners					
KSL is very easy to use when teaching the deaf					
Learners understand content better when taught using KSL					
Use of KSL to teach may lead to poor performance among learners					
KSL has limited vocabulary to use					
Abstract concepts can be expressed using KSL by teachers					
Teachers like using KSL during teaching					
KSL should be used to teach all subjects					

Knowledge of KSL helps the teacher to understand English					
Using KSL to teach has improved academic performance of deaf learners					
Is KSL developed enough to be used in educating deaf learners					

Interview Schedule for Head teachers

Questions

1. How long have you been the head teacher in the school?
2. Have you been trained in special needs education?
3. Which area of specialization?
4. How many teachers have been trained KSL?
5. What types of teaching/learning resources are available in your school?
6. How does your school perform in national examinations?
7. What impact has KSL made on academic performance of learners with hearing impairment?
8. What challenges do you face when using KSL to instruct learners?
9. Given the opportunity, what would you suggest to be done to alleviate these challenges?

Interview Schedule for Learners

Questions

1. Do you think KSL is a better mode to use during class instruction?

2. Do you understand concepts well when teachers use KSL when teaching?
3. Are there cases when you don't understand the certain concepts in KSL?
4. When such happens, what do you do? What does the teacher do?
5. Do you think using KSL during teaching has helped you to perform better in academics?
6. In which subjects do you perform well?

Observation Checklist

1. Do classrooms have visual resources such as pictures, paintings and diagrams?
2. Are teachers able to communicate well in Kenyan Sign Language?
3. Do teachers have adequate teaching support materials?
4. How do students react to the use of visual resources in class?
5. Do teachers use teaching/learning resources during teaching?

Document Analysis: KCPE Results Analysis: 2001-2017

Nyangoma School

Year	Maths	English	Kiswahili/KSL	Science	GHCRC/Social Studies
2001					
2002					
2003					
2004					
2004					
2005					
2006					
2007					
2008					
2009					
2010					
2011					
2012					
2013					
2014					
2015					
2016					
2017					

St. Martins, Mumias School

Year	Maths	English	Kiswahili/KSL	Science	GHCRE/Social Studies
2001					
2002					
2003					
2004					
2005					
2006					
2007					
2008					
2009					
2010					
2011					
2012					
2013					
2014					
2015					
2016					
2017					

Machakos School

Year	Maths	English	Kiswahil/KSL	Science	GHCRE/Social Studies
2001					
2002					
2003					
2004					
2005					
2006					
2007					
2008					
2009					
2010					
2011					
2012					
2013					
2014					
2015					
2016					
2017					

Ngala School, Nakuru

Year	Maths	English	Kiswahili/KSL	Science	GHCRE/Social Studies
2001					
2002					
2003					
2004					
2005					
2006					
2007					
2008					
2009					
2010					
2011					
2012					
2013					
2014					
2015					
2016					
2017					

St. Kizito School, Litein

Year	Maths	English	Kiswahili/KSL	Science	GHCRE/Social Studies
2001					
2002					
2003					
2004					
2005					
2006					
2007					
2008					
2009					
2010					
2011					
2012					
2013					
2014					
2015					
2016					
2017					

Appendix II: Work plan

Time	Event
June 2014 - November 2014	Problem selection
January - April 2015	First Proposal development and submission
May - August 2015	Second Proposal development and submission
September - November 2015	Third Proposal development and submission
January - 2016	Data collection
February - March 2016	Data analysis
April - June 2016	Development and submission of 1 st draft of thesis
July 2016	Revision of final draft of thesis
October 2016	Thesis Final draft correction and submission

Appendix III: Budget

ITEM	DETAILS	UNIT COST (Kshs)	TOTAL COST (Kshs)
Proposal development	Literature search; library, journals, internet		10,000
Printing & binding	Proposal 1 st , 2 nd & 3 rd drafts- 50 pages each	100	15,000
Piloting			
Transport & Recording	1 Assistant; transport & lunch	2000	3,000
Instruments	Typing and printing		10,000
Data collection, transport & field assistant	Siaya, Kakamega, Kericho, Nakuru & Machakos		50,000
Data analysis	Analysing 56 questionnaires, transcribing 5interviews, printing etc.		10,000
Thesis writing	Typing & printing, 150 pages	100	1,500
	Photocopying		500
	Print - 2 drafts report	500	1,000
	Print - 4 copies final report & binding	2,000	8,000
Contingencies			30,000
Total			139,000

Appendix IV: KCPE Raw Data

Year	Maths	English	Kiswahili	Science	GHCR/SSRE	School	Total
2003	32.6	34.1	22.8	21.7	19.6	Machakos	130.8
2004	34.7	36.8	25.6	24.9	23.5	Machakos	145.5
2005	29.3	41.5	19.8	26.6	20.2	Machakos	137.7
2006	27.1	30.4	25.1	25.1	18.9	Machakos	127.5
2007	30.2	35.7	26.5	21.9	17.3	Machakos	131.5
2008	31	35	17.2	21.3	15.7	Machakos	120.2
2009	35.2	36.6	20.1	28.7	19.5	Machakos	140.1
2010	33.2	38.7	53.8	23.7	18.4	Machakos	167.78
2011	33.7	40.8	52.9	24.4	24.4	Machakos	176.16
2012	29	37	53.7	22.9	16.5	Machakos	158.95
2013	36	39.1	59.4	27.2	16.5	Machakos	178.21
2014	33.3	37.8	49.9	25.8	18.7	Machakos	165.4
2015	28.1	32.3	52.6	22.2	23.2	Machakos	158.37
2016	36.7	39.5	67.2	30.2	26.8	Machakos	200.41
2017	31.2	32.5	51	25.2	18.4	Machakos	158.26
2003	33.7	35.4	18.2	27.5	21.9	Mumias	136.7
2004	35	38.8	24.1	33	23.3	Mumias	154.2
2005	33.4	32.6	17.3	27.7	21.5	Mumias	132.5
2006	30	35.3	22.1	25.8	17.4	Mumias	130.6
2007	32.9	36	15.3	22.7	19.2	Mumias	126.1
2008	32.8	35.9	15.1	28.7	18.7	Mumias	131.2
2009	33.8	32.9	22.6	21.7	17.4	Mumias	128.4
2010	31.5	28.7	54.6	25.9	16.6	Mumias	157.5
2011	33.8	42.5	62.1	24.8	25.1	Mumias	187.3
2012	28.5	32.4	49.2	26.3	19.6	Mumias	155.7
2013	32.3	27.2	53.3	21.3	17	Mumias	150.7
2014	31.6	33.8	49.1	24.8	19.5	Mumias	159.1
2015	30.3	30.9	54.8	28.4	21.5	Mumias	166
2016	35.9	29.8	50.8	23.6	19.9	Mumias	158.9
2017	32	37.1	48.8	28.6	21	Mumias	161.5
2001	34.3	27.3	11.8	21.3	13.7	Ngala	108.4
2002	30.8	25.3	15	25.3	14.7	Ngala	111.1
2003	33.4	27.3	14.8	31.4	22.4	Ngala	129.8
2004	33.2	22.5	23.8	29	22.6	Ngala	131.2
2005	31.5	25.3	12	26.3	19.8	Ngala	114.9
2006	30.5	28.3	14.4	25.1	18	Ngala	116.2
2007	30.1	21.8	25.1	21.1	15.2	Ngala	113.6
2008	31.5	26.6	10.8	28.8	13.4	Ngala	113.1
2009	28.4	37.8	12	22	15	Ngala	118.3
2010	28.6	25.3	45	23.6	12.6	Ngala	135.1

2011	32.7	30.5	61.6	21.1	23.1	Ngala	169.1
2012	29.3	27.7	51.4	22.1	17.9	Ngala	148.4
2013	29.8	22.6	48.1	17	13.3	Ngala	130.7
2014	30.2	29	55.4	18.2	20.3	Ngala	153.7
2015	28.9	32.5	67.7	28.6	24.2	Ngala	181.9
2016	36.9	33.2	56.7	25.6	22.8	Ngala	175.3
2017	31.5	31.2	50.5	24.4	21.1	Ngala	158.7
2003	33.5	25.8	17.6	28.4	25.2	Nyangoma	130.5
2004	36.1	29.2	18.4	32.6	24.7	Nyangoma	141
2005	34.6	25.5	13.8	31.4	26.4	Nyangoma	131.7
2006	30.1	26.1	15.3	28.2	19.5	Nyangoma	119.2
2007	33.7	26.3	14.5	20.5	18.7	Nyangoma	113.7
2008	33.9	25.2	18.3	23.7	12.3	Nyangoma	113.4
2009	32.7	21.1	17.8	21.1	14.8	Nyangoma	107.5
2010	28.5	26.4	50.5	22.6	15.6	Nyangoma	143.6
2011	28.6	28.2	49.6	19	17.2	Nyangoma	142.6
2012	31.8	28.1	52	22.4	17.4	Nyangoma	151.7
2013	31.5	26.2	52.5	18.8	12.8	Nyangoma	141.9
2014	35.4	28.7	51.3	19.2	18.5	Nyangoma	153.1
2015	28.5	29.2	51.2	22.4	17.8	Nyangoma	149.1
2016	38.5	33.6	55.3	25.9	24.2	Nyangoma	177.5
2017	28	31	57.2	24.1	20.3	Nyangoma	160.6
2003	31.2	27.5	10.1	31.9	22.9	St. Kizito	114.3
2004	35.5	27.2	19	31.9	23.2	St. Kizito	131.2
2005	34	26.8	10	26.3	19.6	St. Kizito	116.5
2006	31	25.3	11.8	23	13.3	St. Kizito	104.5
2007	31.2	27.7	11.9	22.5	16.9	St. Kizito	110.2
2008	32	23.8	15.6	23.1	13.6	St. Kizito	108
2009	32.2	23	10.3	20.1	13	St. Kizito	98.5
2010	28.5	27.8	42.1	23.5	11.9	St. Kizito	133.8
2011	29.1	29.9	52.4	17.1	20	St. Kizito	148.4
2012	27.6	25.1	42.7	21.6	16.4	St. Kizito	133.4
2013	28.9	24.1	48.8	18.2	13.7	St. Kizito	133.8
2014	28.6	28	42.8	17.3	14.6	St. Kizito	131.4
2015	29.7	28.9	55.5	24.1	21	St. Kizito	159.2
2016	33.6	29.2	49.6	24.1	17.3	St. Kizito	153.9
2017	28.9	29.1	47.2	24.5	18.5	St. Kizito	148.3

Mean scores

Year	Maths	English	Kiswahili/KSL	GHCR/SSRE	Science
2001	34.30	27.30	11.80	13.70	21.30
2002	30.80	25.30	15.00	14.70	25.30
2003	32.88	30.02	16.70	22.40	28.18
2004	34.90	30.90	22.18	23.46	30.28
2005	32.56	30.34	14.58	21.50	27.66
2006	29.74	29.08	17.74	17.42	25.44
2007	31.62	29.50	18.66	17.46	21.74
2008	32.24	29.30	15.40	14.74	25.12
2009	32.46	30.28	16.56	15.94	22.72
2010	30.06	29.38	49.20	15.02	23.86
2011	31.58	34.38	55.72	21.96	21.28
2012	29.24	30.06	49.80	17.56	23.06
2013	31.70	27.84	52.42	14.66	20.50
2014	31.82	31.46	49.70	18.32	21.06
2015	29.10	30.76	56.36	21.54	25.14
2016	36.32	33.06	55.92	22.20	25.88
2017	30.32	32.18	50.94	19.86	25.36
Grand Total	31.79	30.46	35.54	18.81	24.45

Appendix V: Pictures of classroom observations

St. Kizito, Litein School for the Deaf



Source: Field Data, February, 2017



Source: Field Data, February, 2017

Nyangoma School for the Deaf



Machakos School for the Deaf



Source: Field Data, March, 2017



Source: Field Data, March, 2017

Appendix VI: Research Permits Documents



KENYATTA UNIVERSITY
GRADUATE SCHOOL

E-mail: kubps@yahoo.com
dean-graduate@ku.ac.ke
Website: www.ku.ac.ke

P.O. Box 43844, 00100
NAIROBI, KENYA
Tel. 8710901 Ext. 57530

Our Ref: E83/20338/12

Date: 12th November, 2016

The Director General,
National Commission for Science, Technology & Innovation,
P.O. Box 30623-00100,
NAIROBI

Dear Sir/Madam,

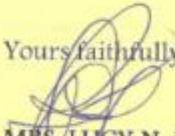
RE: RESEARCH AUTHORIZATION FOR MS. SAMBU M. CHEPTANUI REG. NO. E83/20338/12

I write to introduce Ms. Cheptanui who is a Postgraduate Student of this University. She is registered for a Ph.D. degree programme in the Department of Special Needs Education in the School of Education.

Ms. Cheptanui intends to conduct research for Ph.D. thesis entitled, "Impact of Kenyan Sign Language as a Mode of Instruction on Academic Performance of Learners with Hearing Impairment in Special Primary Schools in Kenya."

Any assistance given will be highly appreciated.

Yours faithfully,


MRS. LUCY N. MBAABU
FOR: DEAN, GRADUATE SCHOOL

RM/cao



**NATIONAL COMMISSION FOR SCIENCE,
TECHNOLOGY AND INNOVATION**

Telephone: +254-20-2213471,
2241349, 3310571, 2219420
Fax: +254-20-318245, 318249
Email: dg@nacosti.go.ke
Website: www.nacosti.go.ke
when replying please quote

9th Floor, Utalii House
Uhuru Highway
P.O. Box 30623-00100
NAIROBI-KENYA

Ref. No.

Date:

NACOSTI/P/17/05938/15079

18th January, 2017

Mary Cheptanui Sambu
Kenyatta University
P.O. Box 43844-00100
NAIROBI.

RE: RESEARCH AUTHORIZATION

Following your application for authority to carry out research on *“Impact of Kenyan sign language as a mode of instruction on academic performance of learners with hearing impairment in special primary schools in Kenya,”* I am pleased to inform you that you have been authorized to undertake research in **selected Counties** for the period ending **17th January, 2018**.

You are advised to report **the County Commissioners and the County Directors of Education, selected Counties** 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.


BONIFACE WANYAMA
FOR: DIRECTOR-GENERAL/CEO

Copy to:

The County Commissioners
Selected Counties.

The County Directors of Education
Selected Counties.

National Commission for Science, Technology and Innovation is ISO 9001:2008 Certified

THIS IS TO CERTIFY THAT:
MS. MARY CHEPTANUI SAMBU
of KENYATTA UNIVERSITY, 4913-30100
Eldoret, has been permitted to conduct
research in Kakamega , Kericho ,
Machakos , Nakuru , Siaya Counties

Permit No : NACOSTI/P/17/05938/15079
Date Of Issue : 18th January,2017
Fee Received :Ksh 2000

on the topic: IMPACT OF KENYAN SIGN
LANGUAGE AS A MODE OF INSTRUCTION
ON ACADEMIC PERFORMANCE OF
LEARNERS WITH HEARING IMPAIRMENT
IN SPECIAL PRIMARY SCHOOLS IN
KENYA

for the period ending:
17th January,2018


.....
Applicant's
Signature




.....
Director General
National Commission for Science,
Technology & Innovation

REPUBLIC OF KENYA



THE PRESIDENCY

MINISTRY OF INTERIOR & CO-ORDINATION OF NATIONAL GOVERNMENT

E-Mail cc.siaya@yahoo.com
When replying please quote

COUNTY COMMISSIONER
SIAYA COUNTY
P O BOX 83-40600
SIAYA

CC/SC/A.31/(143)

6th February, 2017

All Deputy County Commissioners
SIAYA COUNTY

RE: RESEARCH AUTHORIZATION – MARY CHEPTANUI SAMBU

The person referred to above from Kenyatta University has been authorized by the Director-General/CEO, National Commission for Science, Technology and Innovation, vide letter Ref. No. NACOSTI/P/17/05938/15079 to carry out research on *“Impact of Kenyan sign language as a mode of instruction on academic performance of learners with hearing impairment in special primary schools in Kenya,”* for the period ending 17th January, 2018.

The purpose of this letter therefore is to ask that you accord her the necessary support as she carries out the research in your Sub County.


JOSEPHINE A.A. ONUNGA
COUNTY COMMISSIONER
SIAYA COUNTY

Copy to: Mary Cheptanui Sambu



REPUBLIC OF KENYA
MINISTRY OF EDUCATION, SCIENCE & TECHNOLOGY
State Department of Education

Telephone:

Fax:

Email: cdesiaya2016@gmail.com

When replying please quote

COUNTY DIRECTOR OF EDUCATION

SIAYA COUNTY

P.O. BOX 564

SIAYA

Ref. SCA/10/VOL I

Friday, February 3, 2017

TO WHOM IT MAY CONCERN

RE: RESEARCH AUTHORIZATION: MARY CHEPTANUI SAMBU

The above mentioned has been mandated to carry out research in Siaya County vide an authorization letter from National Commission for Science, Technology and Innovation Ref. No. NACOSTI/P/17/05938/15079 dated 18TH January, 2017.

The research title is "*Impact of Kenyan sign language as a mode of instruction on academic performance of learners with hearing impairment in special primary schools in Kenya*".

Kindly accord her the necessary assistance.

Thank you.


FOR:
COUNTY DIRECTOR OF EDUCATION
SIAYA COUNTY
P. O. Box 564 - 40600, SIAYA

S.C. ONDIEKI
FOR: COUNTY DIRECTOR OF EDUCATION
SIAYA COUNTY



**THE PRESIDENCY
MINISTRY OF INTERIOR AND
CO-ORDINATION OF NATIONAL GOVERNMENT**

Telegram: "DISTRICTER" Nakuru
Telephone: Nakuru 051-2212515
When replying please quote

DEPUTY COUNTY COMMISSIONER
NAKURU EAST SUB COUNTY
P.O. BOX 81
NAKURU.

Ref No. EDU.12/10 VOL.V/102

8th February 2017

TO WHOM IT MAY CONCERN

**RE:- RESEARCH AUTHORIZATION
MARY CHEPTANUI SAMBU**

The above named from Kenyatta University has been authorized to carry out research on "***impact of Kenyan sign language as a mode of instruction on academic performance of learners with hearing impairment***" in Ngala school for the deaf in Nakuru Sub County for a period ending 17th January, 2018

Please accord her all the necessary support to facilitate the success of her research.

DEPUTY COUNTY COMMISSIONER
NAKURU SUB-COUNTY
P.O. Box 81 - 20100,
NAKURU


**ANGELA MAKAU
FOR DEPUTY COUNTY COMMISSIONER
NAKURU EAST SUB COUNTY**

MINISTRY OF EDUCATION
State Department of Basic Education

Telegrams: "EDUCATION",
Telephone: 051-2216917
Fax: 051-2217308
Email: cdenakurucounty@yahoo.com
When replying please quote
Ref. NO.
CDE/NKU/GEN//4/1/21/VOL.IV/10



COUNTY DIRECTOR OF EDUCATION
NAKURU COUNTY
P. O. BOX 259,
NAKURU.

8th February, 2017

Sub-County Director of Education
NAKURU EAST SUB-COUNTY

RE: RESEARCH AUTHORIZATION – MARY CHEPTANUI SAMBU
PERMIT NO. NACOSTI/P/17/05938/15079

Reference is made to letter NCST/P/17/05938/15079 dated 18th January, 2017.

Authority is hereby granted to the above named to carry out research on "Impact of Kenyan sign language as a mode of instruction on academic performance of learners with hearing impairment in special primary schools in Kenya," for a period ending 17th January, 2018.

Kindly accord him the necessary assistance.

COUNTY DIRECTOR OF EDUCATION
NAKURU COUNTY
SAMMA MALABA
FOR: COUNTY DIRECTOR OF EDUCATION
NAKURU COUNTY

Copy to:

Vice Chancellor
KENYATTA UNIVERSITY

MINISTRY OF EDUCATION
State Department of Basic Education

Telegrams: "EDUCATION",
Telephone: 051-2216917
Fax: 051-2217308
Email: cdenakurucounty@yahoo.com
When replying please quote
Ref. NO.
CDE/NKU/GEN//4/1/21/VOL.IV/10



COUNTY DIRECTOR OF EDUCATION
NAKURU COUNTY
P. O. BOX 259,
NAKURU.

8th February, 2017


Sub-County Director of Education
NAKURU EAST SUB-COUNTY

RE: RESEARCH AUTHORIZATION – MARY CHEPTANUI SAMBU
PERMIT NO. NACOSTI/P/17/05938/15079

Reference is made to letter NCST/P/17/05938/15079 dated 18th January, 2017.

Authority is hereby granted to the above named to carry out research on **"Impact of Kenyan sign language as a mode of instruction on academic performance of learners with hearing impairment in special primary schools in Kenya,"** for a period ending **17th January, 2018.**

Kindly accord him the necessary assistance.


FOR: COUNTY DIRECTOR OF EDUCATION
NAKURU COUNTY

Copy to:

Vice Chancellor
KENYATTA UNIVERSITY

THE PRESIDENCY
MINISTRY OF INTERIOR AND CO-ORDINATION OF NATIONAL GOVERNMENT

Telegrams:
Telephone: Kericho 20132
When replying please quote
kerichocc@yahoo.com



COUNTY COMMISSIONER
KERICHO COUNTY
P.O. BOX 19
KERICHO

REF: MISC.19 VOL.II/ 228)

13th February, 2017

TO WHOM IT MAY CONCERN

RE: RESEARCH AUTHORIZATION-MARY CHEPTANUI SAMBU

Authorization has been granted to Mary Cheptanui Sambu by National Commission for Science, Technology and Innovation, as per a letter Ref: No. NACOSTI/P/17/05938/15079 dated 4th August, 2016 to carry out research on ***"Impact of Kenyan sign language as a mode of instruction on academic performance of learners with hearing impairment in special Primary Schools in Kenya"*** for a period ending 17th January, 2018.

Kindly accord her the necessary assistance.

COUNTY COMMISSIONER
KERICHO COUNTY

IBRAHIM BOKEYE
FOR: COUNTY COMMISSIONER
KERICHO COUNTY



MINISTRY OF EDUCATION

STATE DEPARTMENT OF BASIC EDUCATION

Email: cdekerichocounty@gmail.com
When Replying Please Quote:

County Education Office
P.O BOX 149
KERICHO

Ref: No.KER/C/ED/GC/2/VOL.I/

10TH FEBRUARY, 2017

TO WHOM IT MAY CONCERN.

RE: RESEARCH AUTHORIZATION – MARY CHEPTANUI SAMBU

The above named had been authorized by National Commission for Science Technology and Innovation to conduct research on '*Impact of Kenyan sign language as a mode of instruction on academic performance of learners with hearing impairment in special primary schools in Kenya, Kericho County* for a period ending 17th January, 2018.

Any assistance accorded to her will be highly appreciated.





OSEWE F.M
COUNTY DIRECTOR OF EDUCATION
KERICHO COUNTY.

REPUBLIC OF KENYA



THE PRESIDENCY INTERIOR AND CO-ORDINATION OF NATIONAL GOVERNMENT

Telegrams "DISTRICTER" Kakamega
Telephone 056 -31131
Fax 056 - 31133
Email: cckakamega12@yahoo.com
When replying please quote

COUNTY COMMISSIONER
KAKAMEGA
P O BOX 43 - 50100
KAKAMEGA.

Ref: ED/12/1/VOL.II/240

Date: 20/02/2017

Mary Cheptanui Sambu
Kenyatta University
P O Box 43844-00100
NAIROBI

RE: RESEARCH AUTHORIZATION

Following your authorization vide letter Ref: NACOSTI/P/17/05938/15079 dated 18th January , 2017 by Kenyatta University to undertake research on *"Impact of Kenyan sign language as amode of instruction on academic performance of learners with hearing impairment in special primary schools in Kenya," Kakamega County.*

I am pleased to inform you that you have been authorized to carry out the research on the same.

B. ODHAMBO
FOR: COUNTY COMMISSIONER
KAKAMEGA COUNTY

COUNTY COMMISSIONER
KAKAMEGA COUNTY

MINISTRY OF EDUCATION SCIENCE & TECHNOLOGY

Telephone: 056 - 30411
FAX : 056 - 31307
E-mail : wespropde@yahoo.com
When replying please quote.



COUNTY DIRECTOR OF EDUCATION
KAKAMEGA COUNTY
P. O. BOX 137 - 50100
KAKAMEGA

STATE DEPARTMENT OF EDUCATION

REF:WP/GA/29/17/VOL.III/191

20th February, 2017

Mary Cheptanui Sambu
Kenyatta University
P. O. Box 43844 - 00100
NAIROBI

RE: RESEARCH AUTHORIZATION

The above has been granted permission By National Commission for Science, Technology and Innovation vide their letter REF: NACOSTI/P/17/05938/15079 dated 18th January , 2017, to carry out research on "**Impact of Kenyan sign language as a mode of instruction on academic performance of learners with hearing impairment in special primary schools in Kenya in Kakamega County, Kenya**", for a period ending 17th January, 2018.

Please accord her any necessary assistance she may require.

FREDRICK M. KIIRU
CDE/CEB - SECRETARY
KAKAMEGA COUNTY



THE PRESIDENCY
MINISTRY OF INTERIOR AND COORDINATION OF NATIONAL GOVERNMENT

Telephone: 21009 and 21983 - 90100
Email Address: countycommasaku@gmail.com.
Fax No. 044-21999

OFFICE OF THE
County Commissioner
P.O. Box 1 - 90100
MACHAKOS.

When replying please quote

REF NO: CC/ST/ADM 5/9 VOL II/109

16th March, 2017

TO: WHOM IT MAY CONCERN

RE: RESEARCH AUTHORIZATION - MARY CHEPTANUI SAMBU

The National Commission for Science, Technology and Innovation has authorized the above named student to carry out a research on "***Impact of Kenyan sign language as a mode of instruction on academic performance of learners with hearing impairment in special primary schools in Kenya***" for the period ending **17th January, 2018.**

Please be notified and accord her necessary assistance.

COUNTY COMMISSIONER
MACHAKOS
P.O. Box 1 MACHAKOS

George Opiyo Juma
For: County Commissioner
MACHAKOS

MINISTRY OF EDUCATION, SCIENCE & TECHNOLOGY
STATE DEPARTMENT OF EDUCATION

Telegrams: "SCHOOLING" Machakos
Telephone: Machakos (
Fax: Machakos
Email - cdemachakos@yahoo.com
When replying please quote



OFFICE OF THE
COUNTY DIRECTOR OF
EDUCATION
P.O. BOX 2666-90100,
MACHAKOS

MKS/ED/CDE/U/1/VOL.2/105

Date: 8TH / 2/ 2017

Mary Cheptanui sambu
Kenyatta University
P.o Boxn 43844-00100
NAIROBI.

RE: RESEARCH AUTHORIZATION

Reference is made to the letter from National Commission for Science, Technology and Innovation Ref: **NACOSTI/P/17/05938/15079** dated **18th January, 2017.**

You are hereby authorized to carry out your research on, "**Impact of Kenyan sign language as a mode of instruction on academic performance of learners with hearing impairment in special primary school in Kenya.**" for a period ending **17st January, 2018.**



Samwel Boto
County Director of Education
Machakos