



# Sources of Variations in the Kenyan Sign Language and its Effects on Academic Performance of Students in Hearing Impairment Schools. A Case Study

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## **Authors' contributions**

*This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.*

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## **ABSTRACT**

Sign language is a system of communication that uses manual alphabets, hand gestures, facial expressions and finger spelling to convey meaning. It is used in communication as well as instructional language during teaching and learning process. However, there are variations in sign language worldwide and Kenya is no exception. The variations in sign language may affect academic performance among students in secondary school for the hearing impairment (HI). This study aimed at to identifying the sources of variations and the effects of variations on academic performance of students in HI schools. The study was guided by the ecological system theory of human development. Descriptive research design was employed. The target population of the study was 17 secondary schools for HI students, 589 form four students and 189 teachers. Two questionnaires were used, one for the teachers and the other for the HI students. A pilot study was conducted to assess the validity and reliability of research instruments. Data was analyzed descriptively with the help of SPSS version 25. The results were presented in tables and figures in form frequencies and percentages. Results from the respondents established that there were

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variations in the KSL which were brought about by the family background, the teachers' interactions, peers and friends, the curriculum and also regional variations. It was also established that the variations affected the way the students receive and respond to various concepts during teaching and learning process which affected their academic performance. The study concluded that there were variations in the KSL, which influenced students' academic performance. The researcher recommends that curriculum developers should consider these findings and align the curriculum to reduce variations. Curriculum developers to use the media to teach the community on the appropriate signs used for communication in Kenya more in service courses for the trained teachers to all other teachers to get the basic sign languages used in Kenya.

*Keywords: Variation; hearing impairment; performance; Students; Teachers.*

## 1. INTRODUCTION

Sign language is a system of communication that uses manual alphabets, hand gestures, facial expressions and finger spelling to convey meaning [1]. Sign language is used by hearing impaired persons for communication as well as instructional language during teaching and learning process.

Kenyan Sign Language (KSL), like any other sign language, is a full language with all human language features used by hearing impairments individuals in Kenya. The HI students in Kenya are educated in this natural language which make their understanding easy [2]. The use of KSL allows them to not only understand the curriculum subject, but also to become bilingual, capable of engaging in complex conversation in both KSL and written English, which will be useful in their future careers and social lives.

Globally, education is considered as a fundamental human right for all regardless of socio-economic and or physical wellbeing or status [3]. Globally, it is estimated that 15% of the seven billion people are disabled in one form or another [4]. Among the global disability index, hearing impairment is a common problem [5]. According to World Bank [6], an estimated 360 million people have HI disability globally. Global studies by World Health Organization reported that hearing impairment is worst in Africa as compared to other parts of the world according to the World Health Organization report. In Malawi, the 2018 population and housing census estimated that 1, 734, 250 people have a disability in Malawi. This number represents 11.6% of the total population of the country [7].

Students with HI are more vulnerable to several challenges that hinder their learning capability. Malmberg et al. [8] reported that most of the students with HI suffer from social

maladjustment, psychological problems, emotional disturbances, and difficulties in interpersonal relationships, having poor self-concept and personality problems. Other challenges include attitudes, stigma, and myths held by society, inadequate specialist teachers, shortage of specialized teaching and learning resources and assistive devices, and inadequate funding by the central governments [9].

Students with HI, therefore, need special education that address the student's differences and needs. Ideally, this process involves individually planned and systematically monitored arrangement of teaching procedures, adapted equipment and accessible setting. Other intervention strategies designed to help students with HI achieve their full potential in academic performance are; higher level of personal self-sufficiency, ability to make relationships and to interact with the rest of the community that would be available if the students were only given access to typical classroom education.

In sub-Saharan Africa, students with HI, unlike other students face particular challenges, which are reflected in their uniqueness due to the problems brought about by hearing impairments [10]. Many countries in Africa do not have adequately trained personnel; accompanied by chronic understaffing [11].

The government of Kenya has made commendable efforts to provide the children with special needs decent education [12]. Several special schools cater for students with special needs ranging from HI, physical handicaps, visual impairment, and mentally challenged just to mention a few. Nevertheless, with the onset of free tuition in secondary education, there was a surge in enrolment of students with HI [10].

It is important to note that, KSL like any other SL is a fully blown language in its right, complete with its own rules of grammar. More importantly, no sign language is based on any spoken language. While spoken language makes use of sounds and letters for communication, SL uses gestures (manual) and non-manual signs. Each country has its own sign language. These sign languages are different as English is to Kiswahili, that is why SL is normally given the name of the country it belongs to. Teachers in school for the HI like other teachers are employed after going through training in registered institutions. KICD noted that the preparedness of these teachers in teaching the students with HI is a matter that requires further assessment following the poor academic performance posed by these students [13].

In Kenya, several policies that govern Special Needs Education have been adopted from Presidential directives, Cabinet papers, and Education Commissions and Legal notices from the Ministry of Education, all aimed at achieving education for all. The main aim of educating students with HI is to give them the power to attain a position in intellectual knowledge, personal happiness, and social welfare [14]. Most studies have been done on students with HI. However, the studies mainly focused on social interaction and family perception, issues of special education and few studies have dealt with factors influencing the academic performance of HI students [15].

According to Gallaudet Research Institute, hearing impaired students continue to perform dismally in their academic results as opposed to their hearing peers [16]. It was discovered that there was a significant accomplishment gap between hearing impaired students and their hearing contemporaries due to a lack of hearing-impaired students' learning platforms. This study thus, aimed at to identifying the sources of variations and the effects of variations on academic performance of students in HI schools.

## **2. METHODOLOGY**

### **2.1 Research Design**

This study adopted a descriptive survey design to collect data on the variations in KSL. This research design was considered suitable for this study because it enables the researcher to obtain cross-referencing data and some independent confirmation of data. The design is not only

restricted to fact-finding but often result in the formulation of important principles of knowledge and solutions to significant research problems [17]. Descriptive research involves collecting data in order to answer questions concerning current status of the subject under study. Descriptive research helps to answer questions of how, where, what, who, and when associated with a particular research question or problem. Descriptive studies also enable quantitative data to be typically represented in tables, figures, and charts which in turn makes it easy to interpret the results. Descriptive research is also limited in geographical scope and hence tends to be logically easier and simpler to conduct. Descriptive research according to Kothari helps the researcher to collect and analyze both quantitative and qualitative data from respondent's actual environment [18].

### **2.2 Research Approach**

This study was carried out in five counties which are Kericho County, Nandi County, Bomet County, Nakuru County and Kisii County. Each of these counties have one school for HI and from the preliminary assessment all the five schools have had candidates for the last five years (Table 1). According to Black, 2010 the recommendable study setting should be directly linked to the researcher's area of interest [19]. The researcher sought to assess the effect of variations in Kenya sign language which required the collection of data from the actual environmental setting of the respondents. The five counties offer a suitable study area because of their accessibility and convenience. Additionally, the five schools had witnessed poor performance among the schools for the HI students. Furthermore, there was limited studies on the reasons for the poor performance among the schools.

### **2.3 Target Population**

The target population of the study constituted 17 schools for the students with HI which have been in operations for the last five years and hence have had candidates sitting for the KCSE between the year of 2014 and 2018. These 17 schools are dispersed to various counties in the country. The study however, focused on form four students from the 17 schools who are 589 and the 189 teachers in the secondary schools for hearing impaired.

## **2.4 Sample Size and Sampling Technique**

### **2.4.1 Sample size**

The study used a sample from the target population. Since the 17 schools are widely dispersed across the country, the researcher used purposive sampling to select schools situated only in the five counties. The study sampled 5 out of the 17 schools for the HI which is 30% of the target population.

According to Mugenda & Mugenda (2003), an appropriate sample size should be 10% for the population more than 10,000 and 30% of the population less than 10,000 [20]. Kothari also suggested the same that an appropriate sample for a descriptive survey should be at least 30% of the population [18]. The researcher used all the form four students from the five schools because they were potential students who were expected to do standard exams; Kenya Certificate of Secondary Examinations (KCSE). The form fours were also expected to be conversant with sign language since they have been in the system for three years. Out of the schools all the 163 form four students and all the 63 teachers were selected for the study as presented in Table 1.

### **2.4.2 Sampling techniques**

Because of the large population size, the study used purposive sampling method to select the five schools for the HI from which the data was collected. All the form four students and the teachers from the five HI schools were purposively selected.

## **2.5 Data Collection Instruments**

The study used questionnaires and observation schedule to collect data from the respondents in HI secondary schools.

### **2.5.1 Questionnaires**

A questionnaire consists of sets of question statement that assist the respondents to provide the required data that was appropriate in addressing the research objectives. Questionnaires were preferred because they provide quick and efficient way of obtaining large amount of information from a large sample of population. The questionnaires were designed to capture the demographic variable of the respondents and a 5- scale Likert was used,

where the respondents were required to rate some statement that was used to describe certain views on variations in KSL. A Likert scale is appropriate in assessing the views and opinions of the respondents regarding the various statements defining the objectives of the study. Also, 5- scale Likert was used because it takes less time and effort to complete than higher-point scales and allows for a lower margin of error. The respondents were required to respond by indicating their level of agreement on the statement item provided. There were two sets of questionnaires one to be addressed by the students and the other by the teachers.

### **2.5.2 Direct observation**

The observation schedule was used by the researcher to gather information by observing the variations that existed in Kenya sign language among teachers and students from the selected HI secondary schools. Observation is a simple method of data collection which allows the researcher to check the accuracy of the information collected.

## **2.6 Data Analysis Procedure**

Before processing the responses, data preparations were done on the completed questionnaires by editing, coding, entering and cleaning the data. The study used both quantitative and qualitative data in order to give a broader understanding of the research subject. Quantitative research was used to analyze the questionnaire which was inform of a Likert scale and hence the responses could be computed quantitatively to give percentages and frequencies. It helps to describe the magnitude and distribution of change, whereas qualitative research gives an in-depth understanding of the opinions provided by the respondents on the open-ended statements and also on the observation schedule. The responses were analyzed thematically following common themes. The quantitative data collected was analyzed using descriptive statistics. The descriptive statistics of mean, and frequency was computed in order to describe the data in terms of the quantities. The data analysis was done with the help of a Statistical Package for Social Sciences (SPSS) version 25. The results were presented in form of figures and tables for ease of understanding. After the analysis has been done, conclusions and recommendations were made on variations in Kenyan Sign Language.

**Table 1. Sample Size distribution**

	<b>Name of Schools for the HI</b>	<b>Number of students in form four class</b>	<b>Number of Teachers</b>
1	Kapsabet secondary school	33	12
2	Kedowa secondary school	25	10
3	St. Kizito secondary school	34	14
4	Ngala secondary school	40	12
5	Gianchere secondary school	31	15
	<b>Total</b>	<b>163</b>	<b>63</b>

\*Sample Size distribution

### 3. RESULTS AND DISCUSSION

#### 3.1 Questionnaire Return Rate

Out of the 163 questionnaires that were distributed to students, the researcher received back 154 (94.5%) of the questionnaires. While for the teachers out of a total of 63 questionnaires 49 (77.8%) were returned and used for the analysis. The responses were presented in Table 2.

The response was noted as adequate enough to be used for the analysis. According to Mugenda and Mugenda (2003) a response rate of 70% and above is considered adequate for data analysis [20].

#### 3.2 Demographic Profile of the Study Respondents

For this study, the various demographic characteristics of the respondents that were considered were; gender, age, years of study in the school and when they learned about the first language. The results were presented in tables and figures.

##### 3.2.1 Age and gender of the respondents

The study sought to assess the age of the respondents as it has an influence on the understanding of variation in the sign language. The respondent's age was therefore important in understanding variations in Kenya sign language. The results were presented in Fig. 1.

From Fig 2, it is noted that most of the respondents 58.45% were aged between 15-18 years of whom 82.50% were female and 17.50% were male. It was also noted that 41.60% of the respondents were above 19 years where 67.60% were male and 32.40% were female. This implies that most of the female students in the HI schools were younger in age compared to male

students. Students above 18 years are likely to have difficulties in mastering KSL, therefore, age factor was important. These results agreed with the findings of Chibwe, (2015) and Costa, (2013) who conducted a study to assess the effect of demographic factor among the students with HI and they established that most students with HI tend to join school late [21-22]. This could indicate that the students find it difficult to master the KSL learnt in school which is different from the signs they learnt at home resulting to KSL variations.

##### 3.2.2 Duration the students have been in the school

The study also sought to find out the duration the student has been in school on the understanding of the variations in the KSL language. The results were as presented in Fig. 2.

The findings showed that most of the respondents 94.4% had stayed in the school for only two years. This represented 51.2% of the female and 43.2% of the male. This was followed by 53.6% who indicated that they have been in the school for three years of whom 31.2% were female and 22.4% were male. It was also noted that 17.6% of the students had been in their current school for less than one year. Only 11.2% of the students indicated that they had been in the school for more than four years. This implies that most of the students had been in the current school for at least two years hence they were in a position to give their views on the variations in the Kenyan Sign Language.

##### 3.2.3 Response on Teachers age distribution

The response according to the teachers age distribution was analyzed and presented in Fig. 3.

The results in Fig. 3, showed that most of the respondents 59% were in the age bracket of 30-

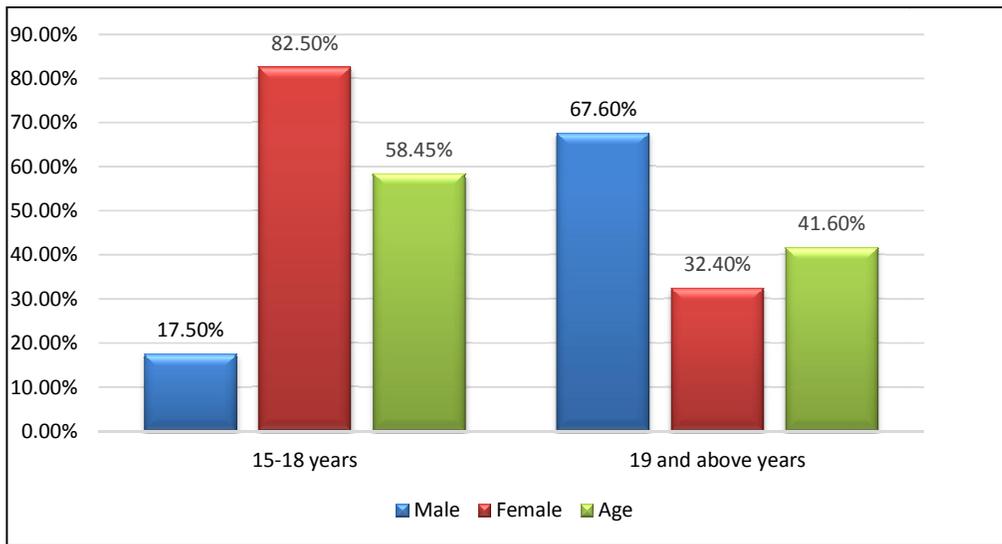
40 years, 29% were below 30 years and the rest 12% were above 40 years. This implies that most of the teachers in the HI secondary schools were in the age bracket of 30-40 years. This agrees

with the findings of Chibwe, (2015) who conducted a study to assess the effect of demographic factor among teachers in HI secondary schools [21].

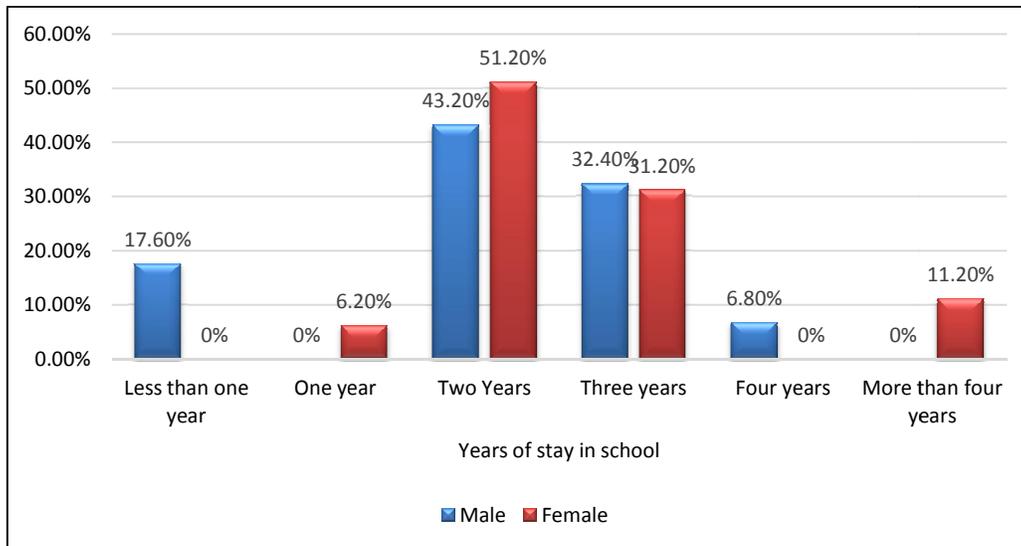
**Table 2. Respondents return Rate**

Category	Questionnaires Administered	Questionnaires Returned	
	Frequency	Frequency	Percentage (%)
Teachers	63	49	77.8
Students	163	154	94.5

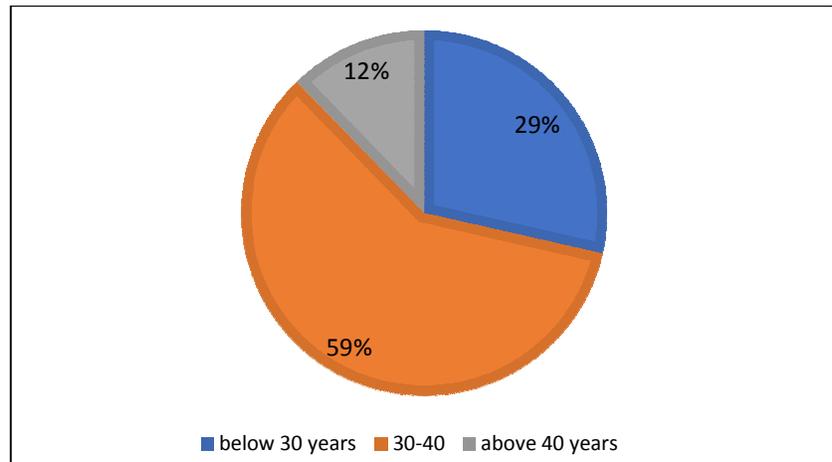
\*Respondents return RateSource: Survey (2021)



**Fig. 1. Age and gender of the student respondents**



**Fig. 2. Response on duration the students have been in school**



**Fig. 3. Response on Teachers age distribution**

### 3.2.4 Learning of first language

The study also sought to establish where the students learned the first sign language. The students were asked to indicate whether they learned their sign language from home (parents) or from school. The responses were presented in Fig. 4.

From Fig. 4, the results showed that majority of the respondents 89.95% indicated that they learned sign language at school while only 10.05% indicated that they learned sign language from parents at home. This indicates that most of the students did not have an opportunity to learn sign language at home. This poses a big challenge for the students with HI who have to attend school to start learning sign language.

### 3.2.5 Response on Teachers level of qualifications

The study sought to assess the response on level of teacher's educational qualifications. The study established that majority, 86% of the teachers were degree holders which is a true reflection of the requirement to teach a secondary school in Kenya. The rest 14%, were diploma holders with mainly special needs training who had been promoted to teach in these schools. The results are presented in Fig. 5.

### 3.2.6 Teachers teaching experience

The study sought to establish the teachers teaching experience as it has an influence on the

performance of the students in a HI secondary school. The results were presented in Fig. 6.

The results in Fig. 6 show that most of the teachers 59.2% had 6-10 years of teaching experience, 34.7% had below 5 years and the rest 6.1 % had above 15 years. This showed that most teachers in the special schools had been in the teaching profession for quite some time and hence understand how to deal with the learners.

## 3.3 Variations in the Kenyan sign Language

### 3.3.1 Sources of variations in the Kenyan sign language among students in hi secondary schools in Kenya

The first objective of the study sought to establish the Sources of variations in the Kenyan sign language among students in HI secondary schools in Kenya. In order to test the respondent's opinion and views, various statements about the sources of variations were used. That is variation due to; family surrounding; the teachers at school; by friends and peers; by mode of teaching in different schools and by changes in the curriculum. The respondents were expected to tick from the alternatives given on the five scale Likert where 5- strongly agreed, 4- agreed, 3- not sure, 2- disagreed and 1- Strongly disagree were used.

Both the teachers and the students were required to rate each statement on the provided scale. The study further presented the frequencies of the responses generated from the measures of variations in KSL. The results are

presented in Table 3. The results indicated that most teachers 34(69.4%) strongly agreed that variation in KSL is influenced by family surrounding while 4(8.1%) strongly disagreed with the statement. This implies that the family has an influence on the variations in the KSL. This was contrary to the views of the students where by 22(44.9%) indicated that variations in the signing is influenced by the family background. The study also sought to establish whether variation in KSL is influenced by the teacher's competency at school. The results show that majority of the teachers 31(63.3%) agreed, 2(4.1%) of the teachers were not sure and 5(10.2%) disagreed with the statement. Among the student's, majority 61.7% also agreed with the statement. This implied that both teachers and students indicated the teacher's competency had an influence on the variations in the sign language used by the teachers and the students in HI secondary schools.

The study also sought to examine whether variation in KSL is influenced by friends and peers. The results showed that majority of the teachers 28(57.1%) strongly agreed with the statement, 2(4.1%) were not sure of the statement on variations in the KSL. Regarding the student's views, majority 79(51.3%) also agreed with the statement indicating that friends and peers had an influence on the variations on the KSL.

The study also sought to assess how differences in the modes of teaching in different schools causes variations. The results show that majority of the teachers 35(71.4%) agreed with the statement, 2(2.0%) disagreed and 2(2.0%) were not sure of the statement.

A similar response was noted among the students where majority 63(40.9%) agreed with the statement. On whether changes in curriculum leads to variation in KSL, majority 35(71.4%) of the teachers strongly agreed while 1(2.0%) strongly disagreed. This was in agreement with students' response where majority 106(68.8%) agreed while 2(1.3%) strongly disagreed. This shows that variation in the KSL tends to bring about confusion among the students which makes it difficult for them to learn effectively. These results support the work of Ong & Ranganath [1], Fenlon et al., (2013) and Lucas (2013) who established that there were various variations in the sign language ranging from ethnicity, geographical, and family background [1,23,24]. The aspect of variations in sign

language caused by different factors poses a great challenge during the communication process to the sign language users, depending on the environment they find themselves in Ong & Ranganath, and Fenlon et al., (2013) [1,23]. The result also in support of the findings of Saville, (2010) it was noted that in America, when students from different schools socially interact, they could not understand each other during sharing academically [25]. Similarly, Lucas et al, 2001 noted that variations in signs were caused by counterparts leading to a mix up of signs [26]. Due to these variations, students' experiences confusion during teaching and learning leading to communication breakdown hence influencing the academic performance of students negatively.

### **3.3.2 Views on effects of variations in the Kenyan sign language on academic performance of students in HI secondary schools in Kenya**

The second objective of the study sought to establish the effect of variations in KSL in secondary schools for HI. The respondent's opinion and views, on various statements indicated that there are variations between signs of the students and teachers. Therefore, these variations affect the acquisition and transfer of information among students and teachers during teaching and learning. Due to these variations, the students misunderstand some questions put across to them due to foreign signs from other signers from other regions or source. During examinations, instructions given to students by teachers were not clear due to exam supervisors having same signs for different meanings and different signs for same meaning affecting the performance of the students. Therefore, these signs variations disable or confuse the students understanding to a large extent hence affecting the performance of the students. These were measured on a five Likert scale where 5- strongly agreed, 4- agreed, 3- not sure, 2- disagreed and 1- Strongly disagree. The results were summarized and the descriptive statistics were presented in Table 4.

The results on Table 4 shows that most of the teachers 35(71.4%) strongly agreed and 10(20.4%) agreed that there is variation between signs of the students and teachers hence affecting acquisition and transfer of information while 2(4.1%) disagree with the statement. A similar response was noted among the students where 89(57.8%) strongly agreed with the

statement and 45(29.2%) agreed with the statement, while 20(13.0%) disagreed with the statement. A similar view was observed by the teachers where most of them 38(77.6%) strongly agreed with the statement that students misunderstand questions put across to them by signers from foreign regions. The results also indicated that majority, 66(42.9%) of the students agreed with the same statement while 10(6.5%) strongly disagreed with the statement.

On whether instructions given to students by teachers were not clear due to exam supervisors having same signs for different meanings 32(65.3%) of the teachers strongly agreed, 16(32.7%) agreed and the rest 1(2.0%) were not sure with the statement. Among the students 66(42.9%) strongly agreed with the statement while 37(24.0%) disagreed with the statement this implies that both teachers and students held the view that students sometimes got the signs wrong especially during the exams and this had an effect on the academic performance of the learners.

The study also sought to find out whether the variations in Signs language affect students due to confusions caused by the usage hence affecting the performance of the students. The results showed that majority of the teachers 39(79.6%) strongly agreed, 9(18.4%) agreed

while only 1(2.0%) disagreed with the statement. Among the students the results show that 60(39.0%) strongly agreed, 32(20.8%) agreed while 20(13.0%) disagreed with the statement. This implied that variations in the KSL affects students' performance due to confusion in various words caused by the variations in the signing. This leads to poor sign interpretation among the students and the teachers causing negative effect in academic performance of the students.

The results also show that most of the teachers 29(59.2%) agreed to the statement that teachers wrongly observed signs made by the students and thus getting wrong information from students leading to communication breakdown. The results also show that 16(32.7%) of the teachers agreed while only 3(6.1%) disagreed with the statement. This implies that Students misunderstand questions put across to them due to foreign signs from other signers from other regions. Regarding students views on the same statement, 39(25.3%) of the students strongly agreed while 13(8.4%) were not sure about the statement. The results support the work of Fulford & Ginsborg (2013) and Carnoy, (2008 ) who noted that there were many variations in the sign language and these variations had negative implications on the students academic performance [27,28].

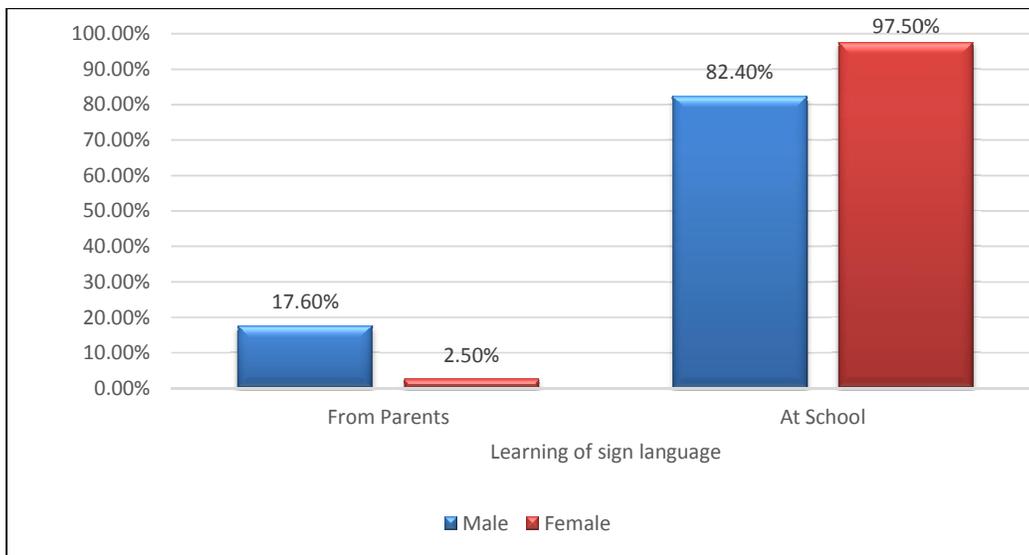
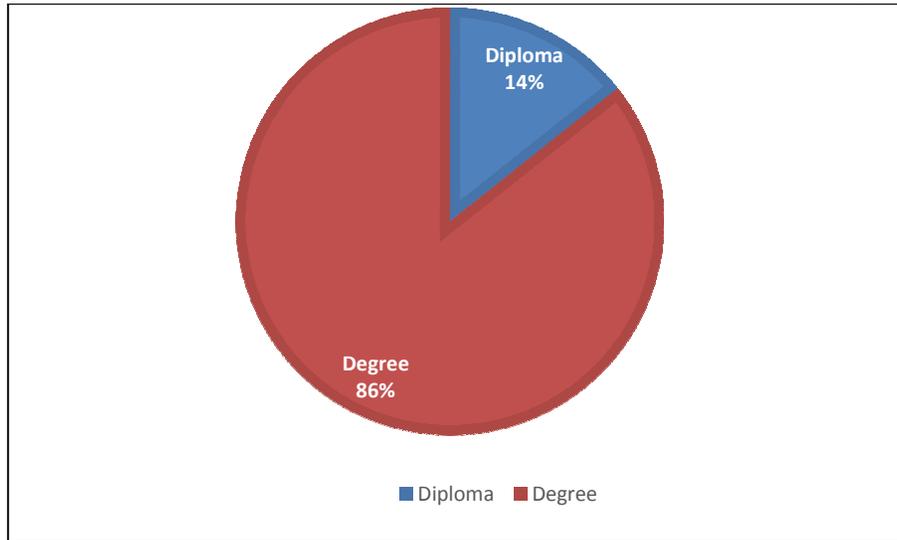
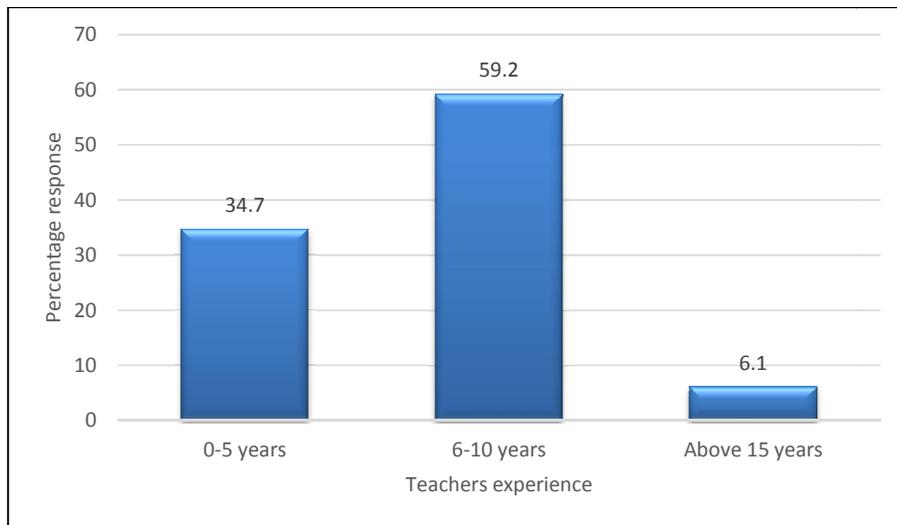


Fig. 4. Response on where the Student first sign language



**Fig. 5. Teacher's level of qualifications**



**Fig. 6. Teachers teaching experience**

It was noted that when students from different regions meet, they were not in a position to interact academically since the signs they were using differ with those they saw from different students. This was noted in American schools, Ghana and also in Zambia. The results therefore, indicated that the variations in sign language could be having effects on academic performance of the students in HI secondary schools. Chibwe, (2015), also noted that in South Africa, there was variations between the teachers and the students during teaching and learning, presenting and answering of questions which indicated that students didn't understand the

questions clearly as posed by the teachers [21]. Mbewe, (2010) in Zambian primary schools on the variations of sign language and the performance of the hearing-impaired students showed that there was a clear variation between the signing of the students and the parents at home [29]. The varied signs in different regions/institutions become a challenge when the students from different regions meet and interacted at various school activities [30]. This implies that majority of the respondents agreed that the variations in the Kenya sign language affect the academic performance of the students with HI.

**Table 3. Teachers and students view on sources of Variation in KSL**

<b>Statements Teachers</b>	<b>Strongest disagreed</b>	<b>Disagreed</b>	<b>Not sure</b>	<b>Agreed</b>	<b>Strongly agreed</b>
Variation in KSL is influenced from family surrounding	4(8.1%)	3(6.1%)	4(8.2%)	4(8.2%)	34(69.4%)
Variation in KSL is influenced from the teacher's competency at school	3(6.1%)	5(10.2%)	3(6.1%)	16(32.7%)	22(44.9%)
Variation in KSL is influenced by friends and peers	0	5(10.2%)	2(4.1%)	11(22.4%)	31(63.3%)
Differences in the mode of teaching in different schools causes variations	1(2.0%)	3(6.1%)	2(4.1%)	15(30.6%)	28(57.1%)
Changes in the curriculum leads to variation in the KSL.	1(2.0%)	1(2.0%)	2(8.2%)	10(20.4%)	35(71.4%)
<b>Students' views</b>	<b>Strongest disagreed</b>	<b>Disagreed</b>	<b>Not sure</b>	<b>Agreed</b>	<b>Strongly agreed</b>
Variation in KSL is influenced from family surrounding	59(38.3%)	56(36.4%)	14(22.1%)	5(3.2%)	0
Variation in KSL is influenced from the teacher's competency at school	6(3.9%)	46(29.9%)	7(4.5%)	54(35.1%)	41(26.6%)
Variation in KSL is influenced by friends and peers	9(5.8%)	12(13.6%)	5(3.2%)	49(31.8%)	79(51.3%)
Differences in the mode of teaching in different schools causes variations	14(9.1%)	5(3.2%)	10(15.6%)	62(40.3%)	63(40.9%)
Changes in the curriculum leads to variation in the KSL	2(1.3%)	7(4.5%)	16(16.2%)	106(68.8%)	23(14.9%)

\*Views on sources of Variation in KSL

**Table 4. Teachers and students view on the effects of variation**

<b>Statements Teachers' responses</b>	<b>Strongest disagreed</b>	<b>Disagreed</b>	<b>Not sure</b>	<b>Agreed</b>	<b>Strongly agreed</b>
There is variation between signs of the students and teachers hence affecting acquisition and conveying of information	0	2(4.1%)	2(4.1%)	10(20.4%)	35(71.4%)
Students misunderstand questions put across to them by signers from foreign region.	0	0	1(2.0%)	10(20.4%)	38(77.6%)
Instructions given to students by teachers were not clear due to exam supervisors having same signs for different meanings hence affecting the performance of the students	0	0	1(2.0%)	16(32.7%)	32(65.3%)
KSL variations causes confusions to students during teaching and learning thus affecting the performance of the students negatively	0	0	1(2.0%)	9(18.4%)	39(79.6%)
Teachers wrongly observed signs made by the students and thus getting wrong information from students leading to communication breakdown	1(2.0%)	3(6.1%)	0	16(32.7%)	29(59.2%)
<b>Students Responses</b>	<b>Strongest disagreed</b>	<b>Disagreed</b>	<b>Not sure</b>	<b>Agreed</b>	<b>Strongly agreed</b>
There is variation between signs of the students and teachers hence affecting acquisition and conveying of information	0	20(13.0%)	0	45(29.2%)	89(57.8%)
Students misunderstand questions put across to them by signers from foreign region	0	10(6.5%)	15(9.7%)	66(42.9%)	63(40.9%)
Instructions given to students by teachers were not clear due to exam supervisors having same signs for different meanings hence affecting the performance of the students	0	37(24.0%)	0	66(42.9%)	51(33.1%)
KSL variations causes confusions to students during teaching and learning thus affecting the performance of the students negatively	5(3.2%)	20(13.0%)	37(24.0%)	32(20.8%)	60(39.0%)
Teachers wrongly observed signs made by the students, thus getting wrong information from students leading to communication breakdown	0	41(26.6%)	13(8.4%)	61(39.6%)	39(25.3%)

\*Views on the effects of variation

### 3.4 Observations on KSL Variations

During observations, researcher noted that the greetings from both the teachers and students were varying; the word “hello” had different sign from students, teachers, and among different schools. Some signers used “one-handed sign” while some used “two-handed sign” indicating that variations existed in word sign of hello. Furthermore, some students and teachers from different schools used foreign signs such American sign of “hello” where the handshape was placed on the forehead. The results showed the variations that existed in the sign of hello. Variations were also observed by the researcher *where a lot of signs varied from student to student, from teacher to teacher and from school to school. For instance, learners signed the word “water” by using the initial letter of the word “W” placing it twice on the mouth while others signed the word “water” by imitating the action of drinking water.*

Students also signed the word “fish” by pointing out the index finger downwards in form of a hook shape, imitating the action of fishing. Similarly, other teachers and students used both fingers joining together where the thumb fingers remain separate mimicking the fish swimming. One hand was also used by some of the teachers and students to imitate a fish swimming in one direction.

In addition, some students and teachers could sign the word “parent” by placing letter “P” on the chin and the forehead while some students and teachers used the right-hand placing it on the chin and the right cheek. It was also observed that some teachers and students signed the word “one thousand” differently. Some signers placed the index finger on the “lower lip” and draw a “comma” using the same finger while others used index finger to illustrate the numbers “one” followed by the three “zeros”.

*During the observations, the researcher noted that the hearing-impaired schools had few Kenyan Sign Language dictionaries. The students could not learn the KSL effectively because of the shortage of Kenyan Sign Language dictionaries. Some of the available KSL dictionaries were old edition while others were new edition.*

From the findings, it shows that variations existed in some of the word signs being used during teaching and teaching process. The variations

from both teachers and students among different schools posed a great challenge during teaching and learning. The students could not understand the intended meaning being taught by their teachers in various subjects. The varied signs brought about the confusion hence leading to communication breakdown. The teachers also could not understand what the students were trying to express. During constructive teaching and learning, the mix-up of signs brought the challenges which could be affecting the academic performance of the students negatively.

## 4. SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATIONS

### 4.1 Summary of Findings

The findings of the study showed that there was variation in the KSL among the hearing impaired and this affected their academic performance. The study also established that majority of the respondents; the students and the teachers agreed that there were variations in various signs in the KSL. In addition, the findings established that the variations bring about confusion among the students and hence affect the academic performance of the HI students. It was noted that most of the students agreed that they learned the sign language in school and not from home. The study established that the variations in the KSL were attributed to geographical locations where different people from different regions have different signing for similar words or objects.

It was also established that the variations in the KSL have an effect on the students especially their academic performance. The mix up in the different signs from both the teachers and the peers were bringing confusion among the students hence making it difficult for the students to effectively interpret the signs and hence not giving the appropriate reactions to them. The study recommends that more study be done on the problems and solutions to the variations in KSL.

### 4.2 Conclusions

From the findings of the study, it was concluded that there were variations in the KSL which were brought about by the, the teachers’ interactions, peers and friends, the curriculum and also regional variations. It was also established that

the variations affected the way the students receive and respond to various concepts during teaching and learning process which affected their academic performance. Thus, curriculum developers should consider these findings and align the curriculum to reduce variations. Curriculum developers to use the media to teach the community on the appropriate signs used for communication in Kenya more in service courses for the trained teachers to all other teachers to get the basic sign languages used in Kenya.

## DISCLAIMER

The products used for this research are commonly and predominantly use products in our area of research and country. There is absolutely no conflict of interest between the authors and producers of the products because we do not intend to use these products as an avenue for any litigation but for the advancement of knowledge. Also, the research was not funded by the producing company rather it was funded by personal efforts of the authors.

## CONSENT

Informed consent was established by the researcher engaging the respondents in a conversation explaining to them what the study was about as well as giving them room for voluntary participation. Respect and confidentiality of the respondents was very well preserved as the information gathered was for academic purposes. The results were made available at Maasai Mara University and the National Council of Science and Technology Libraries, where they were made available to all. Findings may also be distributed in academic workshops and conferences as well as publication in academic research journals so as to disseminate the findings.

## ETHICAL APPROVAL

The researcher sought relevant authorization before the commencement of the study.

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## COMPETING INTERESTS

Authors have declared that no competing interests exist.

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