

## Perceptions of Teachers on the Impact of Kenyan Sign Language on Academic Performance of Learners with Hearing Impairment in Special Primary Schools in Kenya

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### Abstract

*Research assessing the academic performance of learners with hearing impairment have routinely found them to lag far behind their hearing peers. The poor academic performance has been attributed to lack of an appropriate language of instruction. Since 2004, the Kenyan government has recognized the Kenyan Sign Language (KSL) as a medium of instructing learners with hearing impairment. This study was conducted to examine the perceptions of teachers towards the impact of KSL on the academic performance of learners with hearing impairment. The study was carried out in five selected special primary schools in five counties and had a sample size of 62 respondents (5 head-teachers and 57 teachers). The counties and head-teachers were selected through purposive sampling, while the teachers were selected using simple random sampling. Data collection tools included questionnaires and interview guides. Quantitative data were analyzed using descriptive tools while qualitative data were coded, quantified, categorized and analyzed based on research themes. Findings showed that a majority of the respondents felt that KSL resulted in improved academic performance, and that learners with hearing impairment could understand and comprehend concepts better. However, the study found that there were various challenges, which affected the learners' education, including lack of appropriate signs for abstract concepts.*

### Introduction

Many learners with hearing impairment (HI) have considerable difficulty succeeding in an education system that depends mainly on spoken or written language for transmitting knowledge. In Kenya, academic performance in national examinations, like the Kenya Certificate of Primary Education (KCPE), has historically been an indicator of the quality of education for learners with HI (Ministry of Education, Science and Technology (MOEST), 2005). Generally, the academic performance of learners with HI has been below average compared to that of their hearing counterparts. Only a small percentage of these learners who attain primary education proceed to secondary and university levels for further studies (Ministry of Education, Science

and Technology, 2005). This poor academic performance has over the years been attributed to lack of a proper mode of communication and the inability (or incompetence) of teachers to use a proper language of instruction (Adoyo, 2007).

In countries where a national sign language has been adopted as a medium of instruction in schools for individuals with HI, unprecedented successes have been achieved in the education of these learners (Mwari, 2014). The French Sign Language (FSL), for example, is used in France as a medium of instruction (learning academic content) and as a medium of learning other languages, an approach that is reported to be very beneficial to children with HI who are able to learn other subjects and languages (Mwari, 2014). In Sweden, the Swedish Sign Language became the language of instruction in

1995 (Chipuna, 2006), and since then both special schools and mainstream schools use one curriculum that includes sign language as a subject and deaf students study sign language alongside other lessons in written Swedish. This has improved learners' academic performance (Chipuna, 2006).

Since 2004, the Kenyan government, has officially recognized the use of the Kenyan Sign Language (KSL) as a medium of instructing learners with HI in special schools (Ministry of Education (MoE), 2009). Since then, some studies have examined the development of the sign language in Kenya (Imbiti, Awori, & Kwena, 2014; Ministry of Education, 2004), but there is limited information available on the impact of its use (Owiko, 2009; Wanjau, 2005). There is also not much evidence available on the extent to which KSL, as a medium of instruction, has influenced the academic performance of learners with HI. In addition, it is not clear what the experiences and perceptions of teachers are, towards the use of KSL in teaching learners with HI.

Findings of this study will provide evidence that can be used to enhance and improve the education of learners with hearing impairment as well as support advanced training for teachers who may not be skilled in the use of KSL. These findings are particularly relevant to teachers, curriculum developers, and other stakeholders, who can use the findings to formulate appropriate education policies for learners with HI, as well as develop adequate and appropriate teaching and learning resources that can be used to enhance the teaching of KSL. This will in turn help improve the quality and standards of education, as well as education outcomes for learners with HI in Kenya.

### **Sign Language as a Medium of Instruction – Impact on Academic Performance**

Past research has shown that learners with HI in Kenya have consistently trailed behind their hearing counterparts in academic performance, and this has been attributed to lack of a proper medium of instruction (Adoyo, 2004; Ndurumo, 1993; Okombo, 2004). Over the years, there has been debate on what the country should adopt as the most appropriate mode of instruction for learners with HI (Adoyo, 2002). A pilot study conducted in 1986 on Total Communication (TC) philosophy revealed that sign language, a component of TC, was overemphasized

by learners with HI as their preferred mode of communication. This prompted the Kenya Institute of Education to carry out more research on the relevance and development of a Kenyan Sign Language (Imbiti et al., 2014). The Kamunge report of 1988 also reinforced the need for more research in order to determine the most appropriate sign language for Kenyan learners with HI. In the 1990s, different modes of instruction such as Sign Exact English (SEE) and Signed English (SE) were tried out, but these did not adequately fulfill the communication needs of learners with HI as they proved too hard for them to comprehend (Adoyo, 2002). In 1999, KSL was included in the curriculum as a subject based on recommendations contained in the Koech report of 1999 (Ministry of Education, 2009).

Curriculum objectives are well understood by learners if they are delivered in the respective learner's first language (Enns, Hall, Isaac, & MacDonald, 2007). Learning a first language, such as KSL, 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). Heslinga (2012) has advocated for addition of signing to learning as a way to keep challenges high while at the same time lessening stress. The use of sign language also allows learners to adapt to content via a preferred modality, and provides support through blends of action, symbols, and speaking. Signing encourages exploration, reinforcement, and comprehension (Heslinga, 2012). Basically, sign language fulfils the same social and mental functions as spoken language and can even be simultaneously interpreted into and from spoken languages in real time (Sandler & Lillo-Martin, 2009).

The use of sign language in classes has also been reported to have positive impacts on learners' overall performances and subjects like English, Mathematics and Science (Kluwin & Stewart, 2001). In the USA, the integration of American Sign Language (ASL) into science and other content areas has created many openings for vocabulary development and enhancement (Lang & Albertini, 2001). The use of ASL in the content areas has also supported the varying learning styles of learners and continues to build connections among peers who perhaps have prior difficulties communicating and connecting with one another (Lang & Albertini,

2001). Content areas provide opportunities in which an entire class participates together, allowing for the building of camaraderie, communication, and meaningful connections (Santau, Secada, Maerten-Rivera, Cone, & Lee, 2010). Zarchy (2008) argues that a good background in sign language enhances acquisition of English language amongst learners who have HI and that early exposure to sign language can improve the literacy abilities of these learners. A Kenyan study found that KSL influenced English composition writing to a very large extent, and analysis showed that sentences had KSL structure rather than the English language structure (Ogada, 2014). 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 was found to be correlated with high scores in English, while low scores in KSL paired with low scores in English literacy. However, Awori (2010) revealed that teachers' proficiency in KSL use was inadequate.

In a United States study that sought to determine how well deaf students understood science concepts, Lang and Albertini (2001), who employed an inductive analysis approach, analyzed a sample of 228 written concepts in science literacy for learners in grade six through 11 and the subsequent reflective comments from their teachers. The teachers' felt that the mode of communication (verbal or non-verbal) well acquainted by learners who are deaf or hard of hearing, had an impact on their scientific content understanding and writing. Other research has shown that the use of deaf learners' 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).

In general, learners with hearing impairment achieve better grades in mathematics than in reading or writing (Friend, 2008). However, the use of sign language in teaching science to learners with HI faces some challenges. A study by Lang et al. (2006), for example, found that about 60% of the words that are considered fundamental in science curriculum have no sign representation. Therefore, teachers should work together with their learners to explore possible signs that could be used to communicate scientific concepts without compromising the quality of the content. 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).

The use of KSL as a mode of instruction has been reported as beneficial to learners with HI, allowing them to acquire expressive, receptive, and written signing skills (Ministry of Education, 2004), thus enabling them to communicate effectively across the curriculum. KSL is widely used as a medium of instruction to clarify concepts in all subjects, it is learner-centred and, as a subject itself, it has enhanced understanding (Imbiti et al., 2014). However, lack of access to KSL learning can adversely affect the language development of some learners with HI and so impedes their subsequent learning (Adoyo, 2002).

### **Teachers' Perceptions on the Use of Sign Language**

Teachers of learners with HI have an important role to play in making sure that the learners are competent in the use of KSL, which then enables them to learn other languages and acquire other academic content. Ideally, KSL should be used not only as a medium of communication amongst learners and teachers, but should also be used to instruct other subjects (Mwari, 2014). The teacher is the most indispensable factor in the effective administration of an education system. It can be argued, to some extent, that the characteristics of the teachers and their experiences and behaviors in the classrooms, contribute to the learning environment of their students, which in turn have effects on learning outcomes (Kalee, 2014). Research has also shown that teachers who are knowledgeable about the needs, attitudes, and expectations of learners with HI are generally more positive, resulting in better outcomes for the learners (Sari, 2007).

Teachers' abilities and attitudes can be some of the major contributors to learners' academic performance (Lieberman & Houston-Wilson, 2009). The attitude of teachers toward the learners will be reflected in the way they communicate with them (Kalee, 2014). Adoyo (2007) argues that if a teacher has low expectations of learners with HI, then it is unlikely that the learners will receive satisfactory education. A teacher's positive attitude could lead to the use of an appropriate medium of instruction, suitable teaching methods and proper use of teaching and learning resources, thus contributing positively

to better academic performance of the learners (Lieberman & Houston-Wilson, 2009). When it comes to the use of sign language, there are studies across Africa that have shown that there is a general positive attitude towards its use. In South Africa, a study on application of the South African Sign Language (SASL) revealed that teachers had positive attitude towards learners with HI they taught, their language (sign language) and their level of expectation in view of education (Akach, 2010). In that study, it was established that approximately 94% of the teachers maintained that SASL was the learner's first language and suggested that parents be encouraged to learn and use it in order to support their children in their learning. In Kenya, Imbiti et al. (2014) used a five-point Likert scale to capture teachers' opinions about the use of KSL as a medium of instructing and teaching deaf learners, and found that the teachers had a positive attitude on the use of KSL to instruct the learners. However, there are hardly any studies in Kenya that have examined teacher's perceptions towards impacts of KSL on the academic performance of learners with HI. Given the importance of teachers' attitudes towards modes of instruction, it is important that their perceptions towards KSL are examined in order to ascertain the extent to which KSL can be used and how it can be strengthened in order to cater for the needs and requirements of teachers and learners alike. This study therefore, sought to examine the perceptions of teachers on the impact of KSL as a medium of instruction on the academic performance of learners with HI and was guided by the following research question: what are the perceptions of teachers on the impact of KSL on academic performance of learners with hearing impairment?

## Method

### *Research Design*

The study employed a descriptive survey design and mixed method approach to examine the perceptions of teachers towards the impact of KSL as a medium of instruction in special primary schools in Kenya. Special primary schools cater for learners with special needs, including those with hearing impairment. 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 utilizes both quantitative and qualitative procedures to provide a more complete investigation in answering research questions (Harwell, 2011). This design was valuable for this study because it capitalizes on the respective strengths of both qualitative and quantitative methods.

### *Participants and Sampling*

Kenya is administratively divided into 47 devolved governance units called counties. This study took place in five selected counties located in the Western part of the country: Kakamega, Siaya, Machakos, Nakuru, and Kericho. The study was carried out in five special primary schools and targeted head teachers and teachers in standards seven and eight. The study population comprised of five head teachers, and 111 teachers resulting in a total population of 116 individuals.

Purposive sampling was used to select the five counties, the five schools and subsequently, the five head-teachers that were included in the study. Simple random sampling was employed to select the fifty-seven teachers for the study. Fifty-four teachers participated in the study, resulting in a response rate of 95%.

### *Instrumentation*

Questionnaires, interview guides, and observation checklist were used to collect data. Reliability and validity of the instruments was determined through a pilot study that was conducted within a population that had similar characteristics as the one used for the study. The pilot study involved 12 teachers, and a head teacher. Reliability of the instruments was determined by test-retest method on the pilot sample, where the instruments were administered to the pilot subjects twice within a period of two weeks, with a break in between but maintaining the same initial conditions. Content validity was done through expert judgment approach.

The questionnaires, which included both open and close-end questions to capture data on the objective of the study, were administered to the teachers, while head teachers were interviewed using a structured and semi-structured interview schedule. The use of questionnaires, interviews, and an observation checklist together generated data that provided in-depth information for the study. Quantitative data

were analyzed using descriptive statistics while qualitative data from interviews and observation checklist were transcribed and reported. The qualitative data generated was organized into themes and categories based on the study objectives, and the data was then presented in descriptive form.

## Results

### *Demographic Information*

Table 1 shows the demographic characteristics of the head teachers and teachers who participated in the study (n=59 respondents), including gender, professional qualification, and years of teaching experience. Almost all the head teachers (4 out of the 5) were male, while a majority (n=35; 64.8%) of teachers were female. Table 1 also reveals that almost all the head teachers (n=4) had a diploma in Special Needs Education (SNE) and only one had a degree. Thirty-four (63.0%) of the teachers had a degree in SNE, 9.2% (n=5) had a Master's degree in SNE, 7.4% (n=4) a certificate in SNE while 20.4% (n=11) had a Diploma in SNE. Over a third of the teachers 35.2% (n=19) had taught the learners for approximately 11-15 years, while 11% (n=6) had five years or less of teaching experience. A majority of the respondents (both teachers and head teachers) had more than 10 years of teaching experience.

### *Impact of Kenyan Sign Language as a Medium of Instruction on Academic Performance of Learners with Hearing Impairment*

Respondents were asked whether or not they had observed any impact of KSL on the overall academic performance of learners with HI when using the Kenyan Sign Language as a medium of instruction. As shown in Figure 1, almost all 98% (n=53) of the respondents felt they had observed some impacts (positive or negative) while using KSL as a medium of instruction. Only one participant pointed out that there was no impact of KSL use as a mode of instruction.

The 53 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 2.

A majority of the respondents, (58%; n=31) felt that the use of KSL resulted in easier understanding

Table 1

### *Respondents' Demographic Information*

	Numbers of Head Teachers (%)	Number of Teachers (%)
<b>Gender:</b>		
Male	4 (80)	19 (35)
Female	1 (20)	35 (65)
<b>Qualification:</b>		
Certificate in SNE	0	4 (7)
Diploma in SNE	4 (80)	11 (20)
Degree in SNE	1 (20)	34 (63)
Masters in SNE	0	5 (9)
<b>Years of Teaching Experience:</b>		
0-5 years	0	6 (11)
6-10 years	1 (20)	13 (24)
11-15 years	1 (20)	19 (35)
16-20 years	0	7 (13)
Above 20 years	3 (60)	9 (17)

of concepts, while another 19% (n=10) felt that it facilitated learning and communication. For those who felt that KSL had not had any impacts, the argument was that academic performance of the learners was still low, hence they did not think that KSL's impact was positive.

The study further sought to establish the impact of KSL on English language. The findings are presented in Figure 3. A majority of the respondents (65%; n=35), stated that the use of KSL had affected learning of English by causing language distortion in grammar and composition writing. Another 22% (n=12) felt that KSL had improved the understanding of concepts and comprehension, and only one of respondents thought that the use of KSL had no effect whatsoever on the teaching and learning of English.

The study findings regarding impacts of KSL on mathematics and science subjects are presented in Figure 4, which shows that 68% (n=37) of the respondents felt that the use of KSL enhanced better understanding of concepts and comprehension in mathematics. A smaller percentage of respondents, 3(6%), felt that KSL lowers academic performance. As indicated in Figure 4, over 80% (n=43) of the respondents felt that the use of KSL promoted understanding of concepts and comprehension in

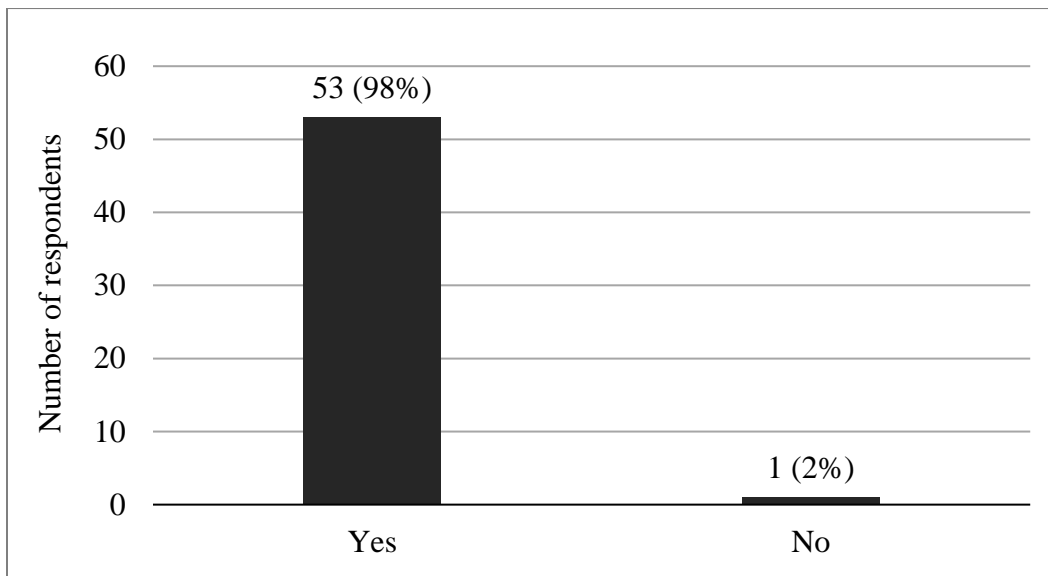


Figure 1. Impact of KSL on Academic Performance

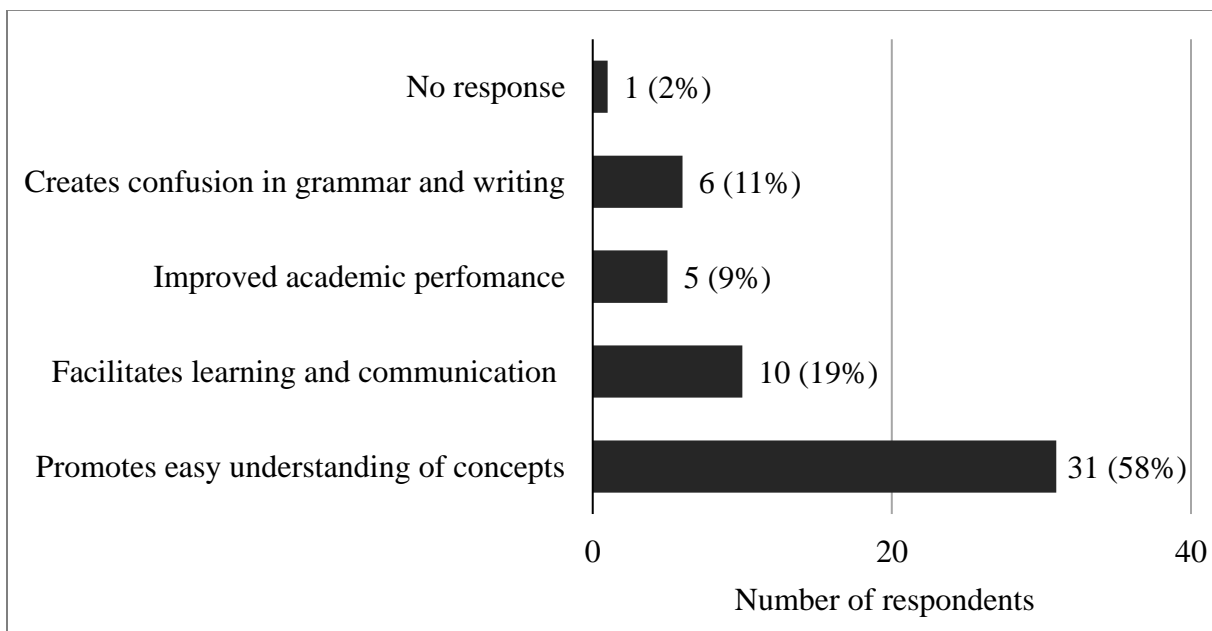


Figure 2. How KSL impacts on academic performance

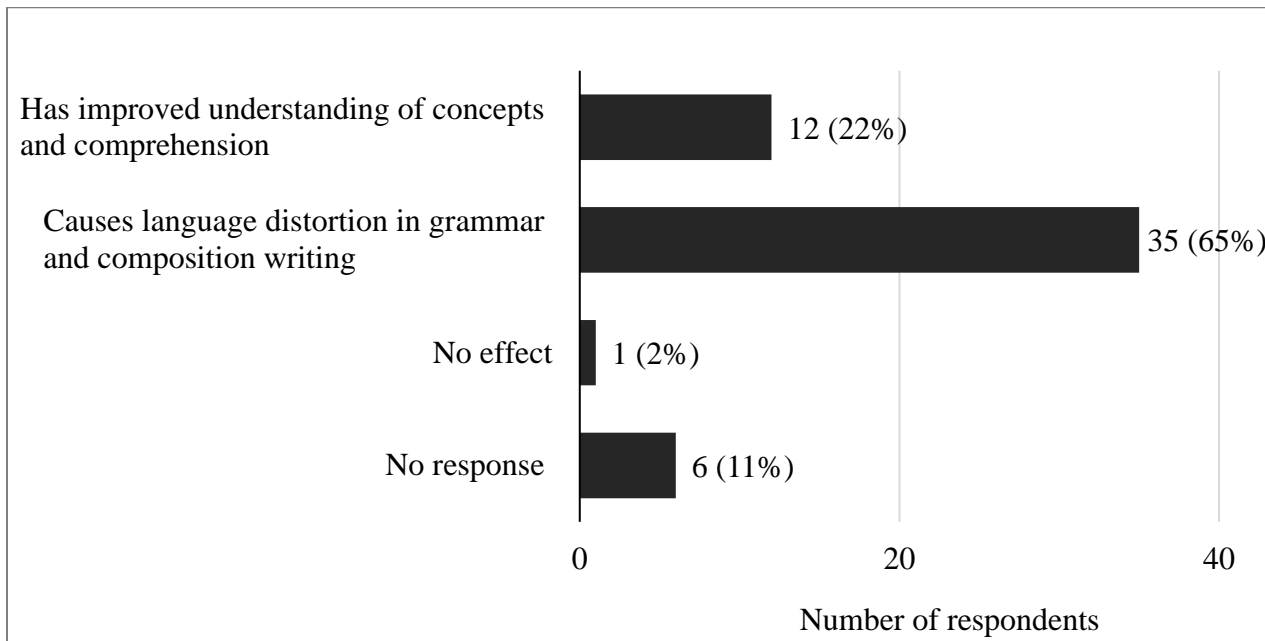


Figure 3. Impact of KSL use on Teaching English Language

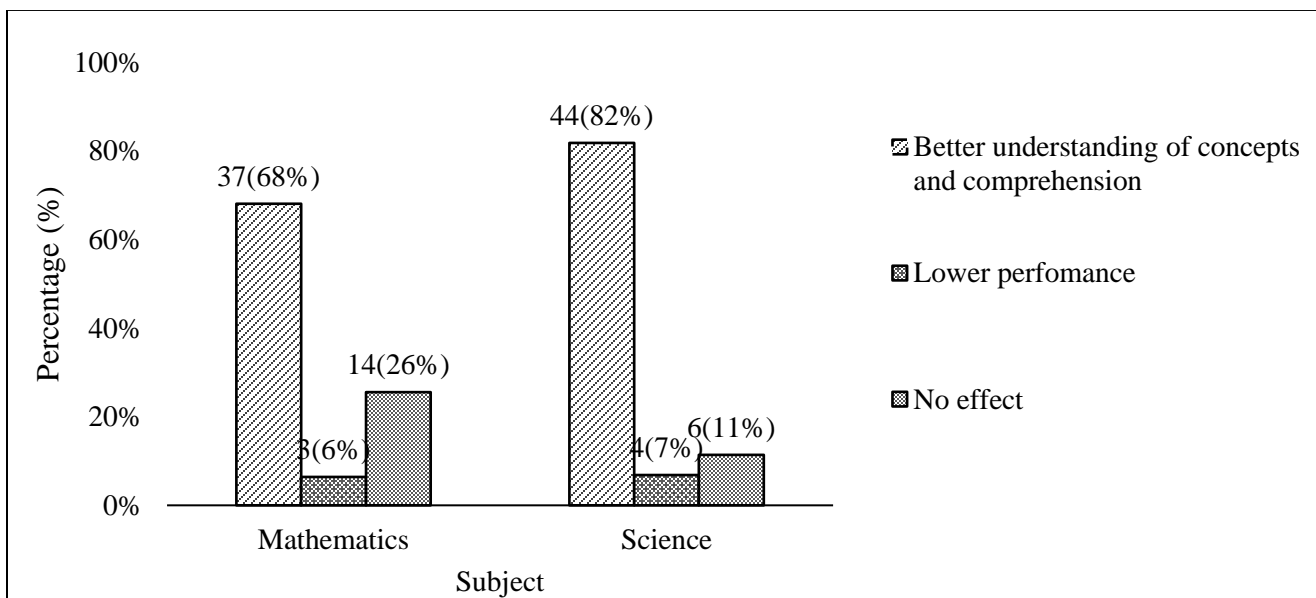


Figure 4. Perceptions of Teachers on Impacts of KSL use on Mathematics and Science Subjects

science. A few of the respondents, 7% (n=4), thought that the use of KSL for instruction in science subject resulted in lower performance.

To examine teachers' opinions on various aspects of the use of KSL, the study used a five level Likert scale to capture teachers' views as shown in Table 2. Responses on the Likert scale ranged from Strongly Agree (SA) to Strongly Disagree (SD), whereby 1 represented strongly disagree, 2 represented

disagree, 3 undecided, 4 agree and 5 strongly agree. Score 3 is the mid-point of the scale and represented neutrality. A score below 3 signifies agreement with a positive impact, while scores above 3 indicates disagreement.

The results in Table 2 show that out of the 54 respondents, a majority 67% (n=36) felt that use of the KSL was the best way of instructing deaf learners. A majority of the respondents (54%; n=29)

disagreed with the statement that KSL was easy to use, with an additional three strongly disagreeing with this statement. All the respondents felt that learners understood concepts better when taught with KSL. Over 40% (n=22) strongly felt that the use of KSL would not lead to poor performance. However, a large percentage (37%; n=20) 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. On whether they agreed or disagreed with the statement that KSL had limited vocabulary use, a majority of the respondents (62%; n=33) either strongly agreed or agreed with this statement, indicating that they felt that sign language had limited vocabulary. Over a quarter (29%; n=16) of the teachers disagreed with the notion that abstract concepts could be expressed using KSL, but 50% (n=27) felt that abstract concepts could be expressed through KSL. It is possible that there were other accompanying aspects, like the use of verbal or non-verbal techniques that were additionally used by the teachers when instructing learners with HI. There was a large percentage of the respondents who felt that teachers liked using KSL. Sixty-seven percent (n=36) of respondents either strongly agreed or disagreed with this statement. Results in Table 2 also show that there was a balance between those who

either agreed or disagreed with the use of KSL to teach all the subjects. Over 70% (n=38) either disagreed or strongly disagreed with the statement that KSL helped teachers to understand/promote English language. 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. There was a large proportion of the respondents (81%; n=44) who either agreed or strongly agreed with the statement that the use of KSL for teaching and learning improved the academic performance of the learners. However, 60% (n=32) of the respondents felt that KSL is not developed enough to be used in educating learners with HI.

Qualitative interviews with the head teachers also found that, in general, there had been good performance of learners in schools since the introduction of KSL. One head teacher summarized the impacts of KSL:

*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*

Table 2

*Teachers' Opinions Towards The Use of KSL (n=54)*

Statement	SA	A	UN	D	SD
Kenyan Sign language is the best way of instructing learners with HI	67%	31%	2%	0%	0%
KSL is easy to use when teaching learners with HI	33%	4%	6%	54%	6%
Learners understand better when taught with KSL	69%	31%	0%	0%	0%
Use of KSL leads to poor academic performance	10%	12%	37%	0%	41%
KSL has limited vocabulary to use in our school	30%	41%	7%	11%	11%
Abstract concepts can be expressed easily in KSL	19%	31%	6%	29%	15%
Teachers like using KSL during teaching	25%	42%	10%	19%	4%
KSL should be used in teaching all subjects	23%	23%	6%	27%	21%
Knowledge of KSL helps a teacher understand English	6%	15%	10%	31%	39%
Using KSL to teach has improved academic performance	44%	37%	6%	6%	8%
Is KSL developed enough to be used in educating learners with HI	8%	31%	2%	42%	17%



*well and improvement has been witnessed where the performance has been poor before. Some of the learners do have a fair understanding of concepts upon the use of KSL mode. There is an increase in those learners joining secondary schools and this is attributed to the proper use of KSL as a 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 average performance as KSL is a learner – centred approach.*

### **Discussion**

A 2005 report by the Kenyan government revealed that academic performance in national examinations had negatively affected the quality of education for learners with hearing impairment to the extent that a majority of these learners rarely scored above 250 marks (out of a possible 700) in KCPE performance (Ministry of Education, 2005). This had resulted in a small proportion of the learners transiting to the secondary schools. The poor performance has been partly attributed to the lack of use of a suitable sign language in special schools. In 2004, the Kenyan government officially recognized KSL as a medium of instructing and teaching learners with HI in special schools, and its use has since increased significantly. This study sought to establish whether teachers felt that the use of KSL had any positive impact on the learning experience and academic performance of learners with HI. The results showed that generally, teachers felt that the use of KSL leads to better understanding of concepts by learners, although KSL does not guarantee a hundred percent conceptual knowledge. Almost all respondents (98%; n=58) out of 59 felt that the use of KSL had made an impact as a method of instruction, while a majority (58%; n=34) felt that the use of sign language promoted better understanding of concepts. These results agree with Adoyo (2002) who argues that the use of KSL allows learners with HI to acquire expressive, receptive, and written-signing skills that would assist them to communicate effectively across the curriculum. The findings are also similar to those by Imbiti et al. (2014) who found widespread use of KSL especially in the clarification of concepts in all subjects thereby enhancing the understanding of concepts. Similar arguments come across in other parts of the world

including Sweden where the use of the Swedish Sign Language as a language of instruction is reported to have resulted in improved academic performance of learners with HI (Chupina, 2006).

The Kenyan Education Ministry reported in 2005 learners with hearing impairment performed better in mathematics, compared to other subjects (Ministry of Education, 2005), and other studies have also shown that learners who have hearing impairment achieve better grades in mathematics compared to reading or writing (Friend, 2008). In this study, teachers felt that the use of KSL had led to improved performance in Mathematics, Science and English as students understood concepts better. However, while some studies had found that mastery of sign language was associated with better English literacy (Aura et al., 2016), this was not the case in this study where a majority of the respondents (65%; n=38) felt that KSL use had affected English Language as a subject by causing language distortion in grammar and composition writing. This could be due to KSL's sentence structure, which causes confusion amongst learners with many mixing letters, and variations in signs (Ogada, 2014). The written form of KSL is in English yet the structure is significantly different from English language structure, which is exemplified by use of a Subject-Object-Verb (S-O-V) sentence pattern, as opposed to the KSL sentence, which is glossed as each "word" represents a sign and not a word, as is the case with English. Zarchy (2008) argues that in order to improve acquisition of English language, which will result in improved literacy abilities, the background of the learners in sign language should be solid. Learners with HI who understand the concept of sign language proficiency have better results, in reading and writing literacy tests, and thus do better in cognitive tasks (Zarchy, 2008). This study also found that over half of the teachers did not view KSL as an easy language to use. A possible reason for this could be the inability of the teachers to effectively use KSL, something that has been reported in other studies (Awori, 2010).

However, despite reported positive impacts, the academic performance of learners with HI is still relatively low, compared to other students. Respondents felt that this was due to the fact that examinations were set in English language leading to confusion amongst these learners. There was disagreement amongst respondents on whether or not KSL is developed enough to be used in educating learners with HI. A majority of the respondents felt

that KSL needs to be developed further so as to enhance its effectiveness as a mode of instruction. It is important to note that 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. It is also important that teachers be well-trained in the use of KSL and other subjects they teach. In addition, there is need to expand KSL to include more vocabulary of arbitrary signs accompanied by a set of rules, or grammar (Adoyo, 2004). The use 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 (Kluwin & Stewart, 2001).

### Conclusion and Recommendations

Findings from this study indicated positive attitudes towards the use of KSL to instruct learners with hearing impairment. However, it appears that the use of the language can cause confusion amongst learners who then struggle to grasp concepts. The fact that language is diverse, and signs used vary across schools, there is confusion amongst teachers and learners with HI on the signs that should be used in the classrooms. The Kenyan Ministry of Education should develop guidelines that spell out the standard signs that should be used in teaching and learning. In addition, the Kenya National Examinations Council should modify examination questions in all subjects to suit the abilities of learners with HI for easy understanding. This will contribute to improved performance in all subjects.

### References

- Adoyo, P. O. (2002). Emergent approaches towards sign bilingualism in deaf education in Kenya. *Vienna Journal of African Studies*, 3, 83–96. Retrieved from [http://www.univie.ac.at/ecco/stichproben/Nr3\\_OrachaAdoyo.pdf](http://www.univie.ac.at/ecco/stichproben/Nr3_OrachaAdoyo.pdf)
- Adoyo, P. O. (2004). *Kenyan Sign Language and Simultaneous Communication: Differentiated effects on memory and comprehension in deaf children in Kenya*. Kisumu: Lake Publishers & Enterprise Ltd.
- Adoyo, P. O. (2007). Educating Deaf Children in an Inclusive Setting in Kenya: Challenges and Considerations. *Electronic Journal for Inclusive Education*, 2(2), 1-13. Retrieved from <https://corescholar.libraries.wright.edu/cgi/viewcontent.cgi?referer=https://www.google.co.za/&httpsredir=1&article=1087&context=ejie>
- Akach, P. O. A. (2010). *Application of South African Sign Language (SASL) in a Bilingual-Bicultural Approach in Education of the Deaf*. University of the Free State. Retrieved from <http://scholar.ufs.ac.za:8080/xmlui/bitstream/handle/11660/663/AkachPAO.pdf?sequence=1&isAllowed=y>
- Aura, L. J., Venville, G., & Marais, I. (2016). The relationship between Kenyan sign language and english literacy. *Issues in Educational Research*, 26(2), 165–181.
- Awori, B. B. (2010). *The Relationship Between Self-Esteem and Academic Achievement of Girls with Hearing Impairments in Secondary Schools for the Deaf in Kenya*. *JAASEP*, 2010(Spring/Summer), 38-51.
- Chupina, K. (2006). The Role of sign language in Sweden. Retrieved from <http://www.1711.com/my711.php.tab=28&articles=125>
- Easterbrooks, S. R., & Stephenson, B. M. (2006). Master teachers' responses to twenty literacy and science/mathematics practices in deaf education. *American Annals of the Deaf*, 151(4), 398–409.
- Enns, C., Hall, R., Isaac, B., & MacDonald, P. (2007). Process and Product: Creating Stories with Deaf Students. *TESL Canada Journal*, 25(1), 1–22.
- Friend, M. (2007). *Special Education: Contemporary Perspectives for school professionals* (2<sup>nd</sup> ed.). Boston: Pearson/Allyn and Bacon.
- Harwell, M. R. (2011). Research design: Qualitative, quantitative, and mixed methods: Pursuing ideas as the keystone of exemplary inquiry. In C. F. Conraf & R. C. Serlin (Eds.), *The Sage handbook for research in education* (2nd ed.). Thousand Oaks, CA: Sage.
- Heslinga, V. (2012). Sign language and ELLs in the heterogeneous classroom. Paxton.
- Imbiti, B., Awori, B., & Kwena, J. (2014). Strategies facilitatin Kenyan Sign Language Process in Primary Schools for Learners with Hearing Impairments, in Western Province, Kenya. *International Journal of Education and Research*, 2(1), 1–14.

- Kalee, J. M. (2014). *Communication challenges faced by teachers of English language in primary schools for the hearing impaired in central Kenya*. Nairobi: Kenyatta University. Retrieved from [http://ir-library.ku.ac.ke/bitstream/handle/123456789/11074/Communication challenges faced by teachers of English language in primary schools for the hearing impaired inCentralKenya.pdf?sequence=1&isAllowed=y](http://ir-library.ku.ac.ke/bitstream/handle/123456789/11074/Communication%20challenges%20faced%20by%20teachers%20of%20English%20language%20in%20primary%20schools%20for%20the%20hearing%20impaired%20in%20Central%20Kenya.pdf?sequence=1&isAllowed=y)
- Kluwin, T. N., & Stewart, D. A. (2001). *Teaching deaf and hard of hearing students: Context, Strategies and Curriculum*. Boston: Allyn & Bacon.
- Lang, H. G., & Albertini, J. A. (2001). Construction of Meaning in the Authentic Science Writing of Deaf Students. *Journal of Deaf Studies and Deaf Education*, 6(4), 258–284. <https://doi.org/10.1093/deafed/6.4.258>
- Lang, H. G., Hupper, M. L. P., Monte, D. A., Brown, S. W., Babb, I., & Scheifele, P. M. (2006). A study of technical signs in science: Implications for lexical database development. *Journal of Deaf Studies and Deaf Education*, 12(1), 65–79. <https://doi.org/10.1093/deafed/enl018>
- Lieberman, L. J., & Houston- Wilson, C. (2009). *Strategies for inclusion. A Handbook for physical educators*. Champaign, IL: Human Kinetics.
- McMillan, J., & Schumacher, S. (2010). *Research in Education: Evidence-based inquiry (7th Edition)*. Upper Saddle River, New Jersey: Pearson Education, Inc.
- Ministry of Education. (2004). *Primary Education syllabus for learners with hearing impairments: Kenyan Sign Language*. Nairobi: Ministry of Education.
- Ministry of Education. (2009). *The National Special Needs Education Policy Framework*. Nairobi: Ministry of Education.
- Ministry of Education, Science and Technology. (2005). *Schools for the Deaf 2005 KCPE Results Analysis*. Nairobi: Ministry of Education, Science and Technology.
- Mweri, J. G. (2014). Diversity in education: Kenyan sign language as a medium of instruction in schools for the deaf in Kenya. *Multilingual Education*, 4(1), 1–14. <https://doi.org/10.1186/s13616-014-0014-1>
- Ndurumo, M. M. (1993). *Exceptional children: Developmental consequence and interventions*. Nairobi: Longman.
- Ogada, R. (2014). Languages used in Teaching and Learning English Composition writing among learners with hearing impairments in Nyanza Province, Kenya. *International Journal of Social Sciences and Entrepreneurship*, 1(12), 1-11.
- Okombo, O. (2004). Language development: Kenyan Sign Language situation in Africa, presented at *Kenyan Sign Language Research Project conference*. Nairobi: Nairobi: University of Nairobi.
- Owiko, C. O. (2009). *Factors contributing to poor performance in mathematics at KCPE among standard eight pupils in primary schools for learners with hearing impairment in Nyanza Province, Kenya*. Nairobi: Kenyatta University. Retrieved from <http://ir-library.ku.ac.ke/handle/123456789/1701?show=full>
- Sandler, W., & Lillo-Martin, D. (2009). *Sign Language and Linguistic Universals*. New York: Cambridge University Press.
- Santau, A. O., Secada, W., Maerten-Rivera, J., Cone, N., & Lee, O. (2010). US urban elementary teachers' knowledge and practices in teaching science to english language learners: Results from the first year of a professional development intervention. *International Journal of Science Education*, 32(15), 2007–2032. <https://doi.org/10.1080/09500690903280588>
- Sari, H. (2007). Outcomes from Cochlear Implantation for Child and Family: Parental Perspectives Outcomes from cochlear implantation for child and family. *Deafness and Education International*, 9(3), 131–146.
- Wanjau, A. W. (2005). *Development of signs for scientific terms in schools for hearing impaired*. Nairobi: Kenyatta University. Retrieved from <http://ir-library.ku.ac.ke/handle/123456789/2408?show=full>
- Zarchy, R. (2008). Deaf Language Acquisition and Transfer to Literacy. Retrieved December from <http://razisignlanguage.blogspot.co.za/>