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Influence of Pupils Interpretation of Kenyan Sign Language on Academic Performance of Pupils with Hearing Impairment in Selected Public Primary Schools, Kenya

Tom M Wawire

Masters Student, Masinde Muliro University, Kenya

Dr. Nick Namunga

Lecturer, Rongo University, Kenya

Abstract:

The government of Kenya recognizes the importance of special needs education as a crucial sector for accelerating the attainment of Education for all students and the 2030 Millennium Development Goals. The purpose of this study was to establish the relationship between mastery of Kenya Sign Language (KSL) and academic performance of pupils with hearing impairment in public primary schools in western Kenya. Study objective was to find out the influence of pupils' interpretation of Kenya Sign Language on academic performance. The study employed a mixed research approach and a descriptive survey design to collect qualitative and quantitative data. Using purposive sampling technique, 12 head teachers, 93 teachers and 108 pupils with hearing impairment forming a sample size of 213 respondents. Research instruments used were a Likert scale questionnaire and interview schedule. Piloting of the questionnaire was done in a public special primary school for the pupils with hearing impairment in Birunda School for the Deaf in Trans Nzoia. The collected data was analysed using descriptive statistics of frequencies, percentages, means, standard deviation and Pearson correlation coefficient and inferential statistics of chi-square using the statistical package for social sciences [SPSS] program of version 23. Qualitative data was analysed by describing the emerging themes in relation to the study objectives. The study established that there was significant relationship between pupils' interpretation of KSL at $p < 0.05$. Therefore, the null hypothesis was rejected and concluded that mastery of KSL significantly influences academic performance. The results will help stakeholders in the education sector to establish how KSL is used in the teaching of pupils with hearing impairment in schools, hence providing valuable data on the current policy and practice in the field of education and training of teachers of the learners with hearing impairment. The following recommendations were made: pupils should be equipped with more interpretation and literacy skills for the KSL, further training in special needs education be given to teachers and adequate resources and support services be given to the learners.

Keywords: Interpretation, Kenyan sign language, academic performance, public primary schools

1. Introduction

Sign language is a form of communication that is gestural based. It has been known to be the first language of children with hearing impairment. Research has shown that when this language is used appropriately it facilitates learning which also allows mobility across other languages.

The use of signs to help pupils with hearing impairment learn dates back to the 19th century when Thomas Hopkins Gallaudet who pioneered education for the deaf in the United States, advocated for using sign language and finger spelling to help increase vocabulary and language development in pupils with hearing impairment (Daniels, 1996). In 1852, David Bartlett taught deaf children and their hearing siblings in a family school (Marschark & Spencer, 2006). He discovered that signing and finger spelling not only helped the deaf children learn but it also helped their hearing siblings as well. Other educators in the hearing-impaired field made similar observations during the 19th century and recommended that signing be used to help teach reading, spelling and writing to hearing impaired children (Hafer & Wilson, 1989).

According to Imbiti (2014), the United Nations Universal Declaration of human rights of 1989 mandates removal of barriers such as communication mode that may hinder education progress of pupils with hearing impairment. The 1993 United Nations Standard rules on equalization of opportunities for persons with disabilities further suggests that pupils with hearing impairment access education in their national language (Ayila, 2012). According to Adoyo (2007), education for the deaf in Kenya falls under the Ministry of Education, Special Education Division that deals with the administration of education of persons with special educational needs, and education for hearing impaired is one of them. Antia & Stinson (1999) added that children with hearing impairment many years ago were once Africa's "FORGOTTEN" children as they were disowned by their own parents and the society at large. Others left them to the mercy of villagers or town Elders who

often enslaved them. Unlike blindness, which craves for your sympathy, there is little or no sympathy for deafness. Deafness is not immediately visible or easily recognizable by passers-by. They further say that those decades ago, deaf children in Africa found love and compassion in the hearts of a few dedicated men and women (Chitiyo et al., (2015; Katitia, 2015).

According to Kimani & Cecilia (2012), Deaf Education in Kenya is a constantly changing sector of the Kenyan education system that is focused on educating deaf, hard-of-hearing, and hearing-impaired Kenyan children. There are many organizations in Kenya, formed to protect the rights of Deaf Kenyans and promote progress in deaf education. The state of Kenyan deaf education is constantly changing and improving (Lewis, 2009). Bishop (1985) as cited in Makumi (1987) reveals that children in Zambia who begun their schooling in their first language fared well in their learning. In Kenya, Kenyan Sign Language (KSL) was adopted as a medium of instruction for learners with HI in 2004 after various modes were tried out and seemed not to fulfil the communication need of these learners. A study done by Lewis (2009) reveal that KSL is used in 32 out of 71 institutions for pupils with hearing impairment in Kenya. This shows a positive move towards the use of Kenyan Sign Language. However, Owiko (2009) reveals that there is need for further research on KSL. He recommended that investigations on measures to enhance the use of KSL in teaching to improve performance of learners with hearing impairment should be carried out. These views are echoed by Bunyasi (2010) who reveals that teachers' skills and experience in KSL are wanting and that there are inadequate resources in classes to support the learning of pupils with hearing impairment. The academic performance of children with hearing impairment was at stake. Therefore, this current study came in handy by looking at effect of mastery of KSL on academic performance in western region. From the year 2014 to 2018, the records from the County Education offices indicate poor academic performance in Kenya Certificate of Primary Education (KCPE) of the hearing impaired learners as shown in table 1 below. Western Region).

Year	Mean Score
2014	248.3
2015	247.2
2016	242.5
2017	249
2018	246.8
Overall Mean	246.76

*Table 1: Western Region Kcpe Results from 2014-2018
Source: County Education Offices in Western Region: 2018*

Raising academic standards for all students and measuring student achievement to hold schools accountable for educational progress are central strategies for promoting educational excellence and equity in our schools. In United States of America for example, the No Child Left Behind Act (NCLB) of 2001 was designed to support state efforts, establish challenging standards, develop aligned assessments, and build accountability systems for districts and schools that are based on educational results (Mouny, 2001). Sign Language proficiency is an important factor given the considerable research arguing that the use of sign language is more complex than everyday languages (Gutierrez, 2002). Effect of literacy and competency in KSL is part of the objectives of this study. Case (2003) says Language is the structured form of communication agreed upon and commonly understood by a group of people. It is the expression of human communication through which knowledge, belief, and behaviour can be experienced, explained and shared. Sign language competency (literacy) is the goal for all students so that communication is comparable with age level peers (Case, 2003). Determinants of learners' performance have been the subject of ongoing debate among educators, academics and policy makers in Kenya (Chitiyo et al., (2015). There have been many studies that sought to examine this issue and the findings of these studies point out to hard work and discipline, previous schooling, parents' education, family income, teacher competencies and self-motivation as factors that can explain differences in learners' grades.

This study intends to determine the relationship between interpretation of Kenya sign language as a means of communication and academic performance of pupils with hearing impairment.

Sign language interpretation is an essential support service for many deaf students, but until recently, little was known about how well deaf students learned via interpreting sign language symbols (Harrington, 2000; Lang, 2002). In what appears to have been the first examination of this issue, Jacobs (1977) demonstrated that deaf college students who depended on sign language interpreting learned significantly less from classroom instruction than hearing peers. His study involved written tests, but similar findings have been obtained when learning assessments were signed (Marschark, Sapere, Convertino, Seewagen, & Maltzan, 2004). Marschark, Sapere, et al. (2004) compared learning via (American Sign Language [ASL]) interpreting and (English) transliteration by deaf college students who varied in their ASL and English-based sign language skills. Regardless of how tests were administered, there were no effects of mode of interpreting and no interactions with student language skills. Similar results were obtained by Murphy and Fleischer (1977), Marschark, Sapere, Convertino, and Seewagen (2005b), and Marschark et al. (2005); Livingston, Singer & Abramson (1994). Moreover, the studies included comparison groups have consistently replicated Jacobs' finding that deaf students learned significantly less in interpreted settings than their hearing peers did.

Findings indicating that deaf students do not comprehend as much as we (or they) think they do from interpreted lectures do not appear to be the result of any methodological or demographic confounding (Napier & Barker, 2004). Across all the studies by Marschark and his colleagues, including a meta-analysis of those studies conducted by Fabich (2005), analyses of a variety of demographic and communication variables failed to yield any consistent predictors of

learning from signed lectures. In particular, those studies have not found differences in deaf college students' learning as a function of degree of hearing loss, parental hearing status, the age at which they learn to sign, their English-based signing or American Sign Language (ASL) skills, or several academic measures. Although the search for predictors continues, it appears that the heterogeneity of deaf students- even just those attending college, is such that we are unlikely to find any simple answers (Marschark, 1993).

Demonstrations of deaf students' limited learning in interpreted settings also cannot be explained by some inherent inferiority of learning via mediated instruction relative to direct instruction. Two findings are revealing in this regard. First, Marschark et al. (2005) showed that bilingual interpreters did not differ in their performance when they learned via direct instruction (93%) or mediated instruction (90%) from a hearing instructor. They used a methodology almost identical to that used in the interpreting conditions of the present experiments. Twenty interpreters saw interpreted lectures (without audio) and then received a multiple-choice assessment of learning, created in collaboration with the lecturer. Ten others took the post-test without seeing the lecture. The interpreters' near-ceiling performance after seeing the interpretation contrasted with the performance of deaf college students who scored at an average level of 53% in an almost identical interpreted condition (but including instructor voice) involving the same lectures (Marschark et al., 2005). Interpreters who did not see the lecture scored at a level (57%) similar to that of deaf students who did see the lecture. Although it may well be that the interpreters' receptive sign language skills were superior to many of the deaf students, such a situation does not mitigate the implications of those findings for deaf students' learning through interpreting in mainstream settings.

Marschark, Convertino, Macias, et al. (2006) used an even simpler methodology that examined deaf college students' comprehension of direct communication, as in classroom interactions. Students were paired according to their primary mode of communication to play "strong" users of ASL, "strong" users of spoken English and mixed (ASL-spoken English) pairs. Comprehension of simple, one-sentence questions, in face-to-face communication, occurred only 63% of the time between signing partners, as indicated by the ability to repeat the question immediately after it was signed. This number was significantly higher than that in the case of "oral" partners, who understood each other only 44% of the time when a question was spoken. This, in turn, did not differ from the comprehension between partners who did not share a mode of communication (46%). Thus, deaf students may have less than full comprehension of "through the air" communication, even when it is simple and direct.

Among other things, such findings suggest that deaf students face academic challenges beyond limited English literacy skills, and communication in the classroom is in need of further investigation. Various investigators, in fact, have discussed the relatively language-impooverished environments of young deaf children, regardless of their preferred mode of communication, and there can be little doubt of consequent impact on cognitive and academic development. Marschark et al. (2005a), however, argued that the consistent findings from interpreting studies are not the product of student communication skills nor interpreting per se. Rather, they suggested that all the available evidence points to differences in the way that deaf and hearing students learn and the fact that interpreted lectures largely are structured by hearing teachers for hearing students. As a result, information presented in mainstream classrooms often may not match the knowledge and learning styles of deaf students, regardless of how it is presented.

Findings questioning the effectiveness of classroom interpreting are quite recent. Well before them, the rush to educate deaf students in integrated, general education classrooms and the shortage and expense of qualified educational interpreters led to a search for alternatives to interpreting (Ahmad, 2015; Burgstahler, 2015). Notwithstanding the well-documented reading difficulties of deaf students (Traxler, 2000), the use of printed text, with or without the aid of technology, is rapidly becoming the support service du jour, particularly in post-secondary education.

1.1. Purpose of the Study

The purpose of this study is to establish the influence of the interpretation of Kenyan Sign Language (KSL) by pupils and academic performance of pupils with hearing impairment in selected primary schools in western Kenya.

1.2. Specific Objective

To find out the effect of learners' interpretation of KSL on academic performance of learners with hearing impairment.

1.3. Research hypothesis

The study will seek to test the following null research hypothesis:

- H_0 There is no significant relationship between learners' interpretation of KSL and academic performance of learners with HI in Kenyan Primary schools.
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2. Research Design and Methodology

2.1. Research Design

The researcher adopted a cross-sectional descriptive survey design to provide detailed analysis of the study population and was suitable for a study due to its ability to rapidly collect data in an extensive nature (Willis & David, 2005). This design enable the researcher to collect data simultaneously at various levels of study in the schools. In this case, class 7 and 8 pupils, teachers attending to hearing impaired pupils and head teachers were used for study at the same time.

2.2. Target Population, Sampling Techniques and Sample Size

This study targeted a total of 12 special schools namely (Mundika, Givavei, Ebukuya, Chekombero, Kakamega, Mumias, Mwikomo, Eregi, St. Antony, Kabuchai and Kimwanga schools for the deaf), for the pupils with hearing impairment in Western Kenya, 93 sign language teachers and 108 class seven and eight pupils from public primary schools for the learners with hearing impairment in the region (Table 2). Given the small number of the teachers, pupils and head teachers, all of them were included in the study. Gay (1992) observes that the larger the sample the smaller the sampling error.

Stratum	Target Population	Sample Size
H/ Teachers	12	12
Teachers	93	93
Pupils	108	108
Total	213	213

Table 2: Target population and Sample Size

3. Results and Discussion

3.1. Effect of Pupils' Interpretation of KSL on Academic Performance

The perceptions of teachers and pupils are presented in table 4.5. The study established that 4.6% of the pupils strongly disagreed and 4.6% disagreed that pupil's ability to interpret English words in KSL affects their academic performance while 48 (44.4%) agreed and 45 (41.7%) strongly agreed that indeed the ability of the pupils to interpret KSL has overall effects on their academic performance while 4.6 % were undecided. A cumulative 9.7% of the teachers disagreed that ability to interpret KSL by pupils affects their academic performance while 83.9% agreed that indeed pupil's ability to interpret KSL affects their academic performance. The results indicated that the importance of interpretation of sign language in teaching and learning. All the head teachers 12(100%) also emphasized the ability to interpret KSL as being key in academic performance. The studies by Nyakundi et al. (2016) and Mweri (2016) in their assessment of the KSL on performance of the learners.

Pupils	Frequency	Percent	Valid Percent	Cumulative Percent
Pupils				
Strongly disagree	5	4.6	4.6	4.6
Disagree	5	4.6	4.6	9.3
Undecided	5	4.6	4.6	13.9
Agree	48	44.4	44.4	58.3
Strongly Agree	45	41.7	41.7	100
Total	108	100	100	
Teachers				
Strongly disagree	2	2.2	2.2	2.2
Disagree	7	7.5	7.5	9.7
Undecided	6	6.5	6.5	16.1
Agree	36	38.7	38.7	54.8
Strongly agree	42	45.2	45.2	
Total	93	100		100

Table 3: Pupils Ability to Interpret English Word in KSL Affects Their Academic Performance

3.2. Translation of KSL Signed Exact English and Academic Performance of Pupils

The study established that 26.9% of the pupils strongly agreed that pupil's ability to translate KSL to signed exact English affects their academic performance. A significant percent at 43.5% agreed that ability of the pupil to translate KSL signed exact English affects their academic performance while 3.7% strongly disagreed. The study further showed that 9.3% of the pupils disagreed that their ability to translate KSL to signed exact English affects their academic performance 45.2% of the teachers strongly agreed that ability of the pupils to translate the KSL sign to exact English affects their academic performance while 38.7% of them agreed. Only 6.5% of the teachers were undecided while two (2.2%) of them strongly disagreed. The results indicated that both teachers and pupils' value translation of sign language into understood English language. The same view was held by head teachers. In coastal region, George & Nyakwara, (2013) found that the perception of the pupils' and teachers on KSL was that it influenced learners' performance. This was also supported by both Nyakundi et al. (2016) and Mweri (2016).

Perception	Frequency	Percent	Valid Percent	Cumulative Percent
Pupils				
Strongly disagree	4	3.7	3.7	3.7
disagree	10	9.3	9.3	13.0
Undecided	18	16.7	16.7	29.6
Agree	47	43.5	43.5	73.1
Strongly Agree	29	26.9	26.9	100.0
Total	108	100.0	100.0	
Teachers				
Strongly disagree	2	2.2	2.2	2.2
Disagree	7	7.5	7.5	9.7
Undecided	6	6.5	6.5	16.1
Agree	36	38.7	38.7	54.8
Strongly agree	42	45.2	45.2	100.0
Total	93	100.0	100.0	

Table 4: Translation of KSL Signed Exact English and Academic Performance of Pupils

3.3. Interpretation of Finger Spelled Words and Academic Performance

The findings of the study revealed that majority of the pupils 43.5% agreed that ability to quickly interpret the finger spelled words during instruction impacted on their academic performance while 29 (26.9%) of them strongly agreed. The research also established that 16.7% of the pupils were undecided while another 10 (9.3%) disagreed with the statement. The other 4 (3.7%) of them 2.2% strongly disagreed. It was further noted that 48.4% of the teachers strongly agreed that ability of the pupils to quickly interpret the finger spelled words during instruction affects academic performance of the pupils while 9.7% disagreed while another 6.5% of them were undecided and 6.5% strongly disagreed. Results showed that majority of learners, teachers and head teachers as interviewed agreed that quick interpretation of finger spelled words affects performance. Hill-Miller, P. (2011). Established that pupils would be influenced by the speed to interpret the finger spelled words and thus influenced their academic performance.

Pupils				
	Frequency	Percent	Valid Percent	Cumulative Percent
Strongly disagree	4	3.7	3.7	3.7
Disagree	10	9.3	9.3	13.0
Undecided	18	16.7	16.7	29.6
Agree	47	43.5	43.5	73.1
Strongly Agree	29	26.9	26.9	100.0
Total	108	100.0	100.0	
Teachers				
Strongly disagree	6	6.5	6.5	6.5
Disagree	9	9.7	9.7	16.1
Undecided	6	6.5	6.5	22.6
Agree	27	29.0	29.0	51.6
Strongly agree	45	48.4	48.4	100.0
Total	93	100.0	100.0	

Table 5: Effect of Pupils Ability to Interpret Finger Spelled Words on Performance

3.4. Pupils' Ability to Differentiate Signed Word from Signer Spelled Words Language

The study noted that 30 (27.8%) of the pupils strongly agreed that their ability to differentiate signed word from finger spelled word in sentence construction affects their performance while 49 (45.4%) simply agreed that it affected their academic performance while 10 (9.3 %) of them were found to be undecided (table 6).

Pupils				
	Frequency	Percent	Valid Percent	Cumulative Percent
Strongly disagree	13	12.0	12.1	12.1
Disagree	5	4.6	4.7	16.8
Undecided	10	9.3	9.3	26.2
Agree	49	45.4	45.8	72.0
Strongly Agree	30	27.8	28.0	100.0
Total	107	99.1	100.0	
Total	108	100.0		
Teachers				
Strongly disagree	9	9.7	9.7	9.7
Disagree	12	12.9	12.9	22.6
Undecided	14	15.1	15.1	37.6
Agree	30	32.3	32.3	69.9
Strongly agree	28	30.1	30.1	100.0
Total	93	100.0	100.0	

Table 6: Pupils Ability to Differentiate Signed Word from Signer Spelled Words Language

The research established that 4.6% of the pupils disagreed that their ability to differentiate word from finger spelled words in sentence affects their academic performance. The other 13 (4.6%) strongly disagreed. Only 28 (30.1%) of the teachers also strongly agreed that ability of pupils to differentiate signed word from finger spelled word in sentence construction affected their performance, 30 (32.3%) agreed while 14 (15.1%) of them were undecided. The findings also showed that 12 (12.9%) of the teachers disagreed with the statement while 9 (9.7%) of them strongly disagreed. Majority learners and teachers viewed differentiating signed word from word finger spelled do affect performance (table 4.8). Interviewed head teachers have a similar stand.

3.5. Testing of the Null Hypothesis

In order to determine the relationship between the independent variable (Mastery of KSL) and the dependent variable (teaching and learning expressed in terms of KCPE mean scores) Chi-square was used at the significance level of $p < 0.05$.

3.6. The Chi-Square Results for How Mastery of KSL Influences Teaching and Learning

The study sought to determine how mastery of LSL influenced teaching and learning in public primary schools in western region. To accomplish this, Chi-square was used to test the effects of interpretation of KSL, teaching learning as expressed in terms of KCPE performance. The results of the analysis are summarized in table 7 and 8 for the teachers and Pupils respectively.

3.6.1. Hypothesis H_01

There is no significant relationship between mastery of KSL and academic performance. The results of the analysis summarized in table 7 and 8 shows that there was significant relationship between interpretation of Kenyan sign language and teaching and learning at $p = 0.003$ and $p = 0.001$ ($p < 0.05$). The study therefore rejected the null hypothesis and concluded that interpretation of KSL has significant effect on the teaching and learning.

Mean Score-2013-2017	KSL Interpretation	Mean score 2014-18
Chi-Square	176.528 ^a	
Df	43	
Asymp. Sig.	.003	

Table 7: Chi-Square for the Teachers' Responses

	KSL interpretation	Mean score 2014-18
Chi-Square	162.583 ^a	
Df	13	
Asymp. Sig.	0.001	

Table 8: Chi-Square of the Curriculum Practices for the Class Prefects' Responses

4. Conclusions and Recommendations

4.1. Conclusion

Master of KSL by teachers has significant influence on academic performance of learners with hearing impairment. The teachers understanding of KSL determines the extent to which they are able to give instruction to the pupils in similar language being the language of instruction. This in turn affects the academic performance of learners in English, Mathematics and Science since the mastery of KSL by teachers influences the understanding of pupils in the subjects. Learners with hearing impairment faces various difficulties in using such as ignorance among parents and other stakeholders, unavailability of resources and inadequate knowledge of teachers in KSL affects their learning process. These difficulties affect the learners with hearing impairment in using KSL both inside and outside classroom.

Master of Kenya Sign Language by teacher and pupils ensures wide covered of the curriculum content within a short time. When both pupils and teachers have good understanding of the KSL, the pupils are able to grasp the curriculum content much faster and therefore they teachers take lesser time to cover all the content and with sea. On the other hand when both teachers and pupils have little understanding of the KSL, then the curriculum content might not be adequately covered by the teachers because both teachers and pupils will be struggling to understand the contents. These descriptive research results were supported by the chi-square results where mastery of KSL has significant effect on academic performance at $p < 0.05$.

4.2. Recommendation

The study recommends that there is for programs to enlighten and adequate community and other stakeholders on the importance of supporting pupils with hearing impairment to learn and understand Kenya Sign Language. Such programs should be geared towards having the community including parents to support the government efforts to provide KSL among learners with hearing impairment at an early age. The government should also train and deploy more teachers to schools with learners with hearing impairment as one of the challenges facing the learners with hearing impairment was inadequate trained and skilled teachers. This move should be geared towards reducing the number of Teacher to pupils ration and enable the teachers to give personal attention to learners.

Since mastery of KSL among teachers have a direct influence on academic performance of learners with hearing impairment, the study recommends that the government should consider supporting teachers to enable them advance their education and acquire additional skills on KSL as a long term strategy or increased performance among learners with hearing impairment.

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