

Influence of Medium of Instructions on Academic Performance in Sciences of Deaf Students' at Ngala School for the Deaf, Nakuru County, Kenya

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Abstract

Medium of instruction is expected to influence academic performance of deaf students in sciences. For many years the debate of which mode of instruction to be used has remained to be a controversy between oral versus manual methods of instruction. Therefore, the current study sought to find out whether the medium of instruction influences the academic performance in sciences of deaf students' at Ngala School for the Deaf in Nakuru County, Kenya. The study adopted descriptive research design. The study target population was 472 respondents at Ngala secondary school of the deaf. The quantitative data was presented using percentages, frequency tables and charts. The study results revealed that although varieties of communication approaches were being used by teachers, which were not limited to Sign Language, SEE, Bilingual Communication, Code Switching and Oral Communication, more than half of teachers were not fluent in Sign Language, Code Switching and Bilingual Communication approaches. Many teachers exhibited insufficient expressive and receptive skills. The study concluded that many teachers have difficulties in using KSL, Code Switching and Bilingual Communication. This has made it difficult for teachers to have a smooth interaction with the students in class. The study recommended that teachers should be exposed on in-service programs to enable them have skills in Total Communication as a philosophy for teaching deaf learners.

Key Words: *Medium of Instruction, Deaf, Academic Performance, Sciences, Kenya*

1.0 Introduction

Effective teaching of speech and language to learners with HI is a worldwide problem in both developed and developing countries (Karugu, 2000). The linguistic development and academic achievement of pupils with HI is significantly delayed in comparison with their hearing peers. A major contributing factor has been the difficulty of identifying methods of communication which facilitate development of pupils' linguistic and academic competencies (Moore, 2001). In Africa, the majority of children with HI lack access to education. This is especially so for those in the rural areas where poverty has been known to be prevalent (Kinyaga, 2003). In Uganda, Signing Exact English (SEE) is taught at all levels.

In Spain, the Complemented Oral Model has achieved its objective of converting the pre-lingual hearing impaired learner to an autonomous learner, through reading and writing (Santana, 2003). Learners supported through cued verbal communication use spoken and written language with the same precision as their hearing counterparts in terms of vocabulary, form, number, prepositions, verbs and pronouns. It is apparent that learners with HI receiving cued verbal communication outshine the majority of signing and oral children using only amplified resonance in spoken language skills. Okombo (2006) opine that teachers and other service providers in

the education system providing care and education to the hearing impaired children have not been well acquainted with sign language. Sign language being the official language of communication for hearing impaired individuals in the world, great importance is placed on the use of English in the Kenyan school system. All national examinations are written and conducted in English. Examinations are instrumental to a pupil's future; they are a passport for educational advancement and esteemed employment.

Itano (2000) opine that development of language is essential for the cognitive and social development of children. However many children with HI in Kenya do not go beyond secondary school. High dropout rates of these learners translate into significant wastage rates that are an important dimension of our school inefficiency (TIQET, 1999). For many years the debate of which mode of instruction to be used has remained to be a controversy between oral versus manual methods of instruction. Until now this matter has developed to include questions as the use of invented sign system whether or not to concurrently speak and sign; the use and/or lack of use of technology and whether or not to allow learners read the lips of people speaking to them. Learning to read is a sign to literacy and a gateway to education. In the education system, educators have paid very close attention to the age of onset of the loss of hearing ability and the degree of hearing loss since each is closely related to severity of language delay (Hallahan & Kauffman, 2000).

Baker (2011) opines that speech reading helps the deaf to establish communication to the rest of the society while sign language restricts communication to those others who have mastered that specialized form of expression. The author further opines that approximately forty percent of the speech sounds are visually distinguishable, therefore developing spoken language through speech reading alone is challenging and often unachievable. It is in regard to the challenged cited above that the current study sought to determine whether the Medium of instructions used by teachers in communicating science knowledge to learners influences the academic performance of in sciences of deaf students' at ngala school for the deaf, Nakuru County, Kenya. The remainder of this article paper is organized as follows. Section 2 covers review of past studies. Section 3 covers materials and methods. Section 4 results and discussion while section 5 conclusion and recommendations.

2.0 Literature review

2.1 Medium of Instruction and Academic Performance in Sciences

Education of the deaf worldwide has been one of the most controversially discussed topics (Adoyo, 2002). This had resulted into difficulty in finding appropriate classroom communication that effectively provides access to curriculum content. At independence, many schools were following Oral learning approach (Ayiela, 2012). The approach mainly focused on use of hearing aids, speech and lip reading to try and make Deaf function like hearing individuals. In 1980, Total Communication was introduced; however research had noted that many teachers lacked necessary Sign Language skills to engage learners in science classroom at the time. Omuthani (2012) cites Crume (1999) who observes that, many teachers of learners with hearing impairments are unable to teach properly because they cannot communicate with them clearly. Furthermore, most of them sign very poorly and this has been found to create obstacles in the teachers endeavor to provide instruction in science class to learners with hearing impairments (Omuthani, 2012).

Adoyo (2002); Ayiela (2012) seems to agree when they states that, although teachers interacted daily with learners who are native speakers and who could provide them with an ideal environment for signing there was still poor attitude towards this indigenous language as a medium of instruction. Mitchell and Karchmer (2006), while commenting on this, argued that, teacher preparation programs must adapt to meet the changing needs of deaf education in class. Conner, Lang, and

McKee (1993), noted that; ability to sign clearly, lecture at a good pace, communicate content expectations and assignments clearly increase the levels of understanding among learners who are deaf and hard of hearing.

Omuthani 2012 seems to agree when he states that instructional materials accomplishes 83% of what is learnt through sight making learning very interesting even to dull and hyperactive students. Students who are deaf being bilingual in their communication approach, teachers of science need not only to train in science pedagogy, but also in dual language development in order to be effective in classroom. Ogunniyi (1997) suggested that, there should be continuous language development at all levels to improve science instructions which may include using mother tongue (Sign Language) as medium of instruction in class. Code switching, had also been found to be effective in learning science subjects. This involves switching from the language of catchment area (KSL) to English and then transferring this knowledge to unlock scientific terminologies in class.

El-zraigat (2012) carried out a study on challenges of educating students who were deaf and hard-of-hearing in Jordan. He used qualitative approach with a target population of 30 teachers and four Principals. He found out that most teachers who taught students who were deaf and hard of hearing lacked the necessary pre-requisite skills such as Sign Language and basic skills essential to make adjustment on needs of deaf learners in class. He concluded that most of these teachers had trained to handle students in regular classes and not deaf students.

Ndurumo (1986) conducted a similar survey in Kenya and found out that, deaf learners are usually blamed for their inability to grasp information during classroom teaching even when speech and speech reading are used as a method of instruction. This clearly demonstrates how misplacement of skills may have far reaching implication on the learning of science in schools for the deaf. However, according to Ayiela (2012), the government now follows a policy where-by all learners with special needs have to be given the necessary support services whether they are attending regular or special schools. In light of this, the present study seeks to find out if teachers at Ngala have the pre-requisite skills to function in schools for the deaf and whether they are aware of Special Needs Education Policy on the needs of deaf learners and how this was impacting on performance.

3.0 Materials & Methods

The study used the descriptive research design to obtain data. The design was adopted because it provides an indepth description of data in the natural setting (Kothari, 2004). The target population comprised of 1 principal, 21 teachers, and 250 students of Ngala secondary school of the deaf. The sample size was obtained using Yamane (1967) sample size determination formula. $n = N / 1 + Ne^2$
 $n = 250 / 1 + 250 * 0.05^2 = 153.85 \approx 153$ students at Ngala secondary school for the deaf. The Teachers and Principals were selected using purposive sampling technique. The study adopted stratified random sampling technique to select the students. Out of the 153 students, 117 are deaf and 36 had a hearing impairment. Primary data was the main source of data which was collected by use of both the questionnaires, interview and lesson observation schedules.

Two sets of questionnaires were used in the study, one for science teachers while the other for the students. The interview schedule was used for the principal. The data that was collected by the researcher was analyzed using both quantitatively and qualitatively. The quantitative data that was collected using unstructured questionnaires and lessons observations schedules were analyzed and presented by descriptive statistics. SPSS Version 22.0 aided in the analysis of the quantitative data. Qualitative data was presented using common themes and was then reported in narrative form.

4.0 Results & Discussions

4.1 Demographic information of the respondents

The demographic information of the respondents was in regards to the gender, teacher qualifications and training and teaching experience. The demographic results were presented in Table 4.1; 4.2 and 4.3 respectively.

Table 4.1: Teachers and Students' Gender

		Students		Teachers	
		Frequency	Percent	Frequency	Percent
Gender	Male	61	58.1	3	60.0
	Female	44	41.9	2	40.0
Total		105	100.0	5	100.0

The findings revealed that 58.1% of the students were male while 41.9% were female. This implies that majority of the students were of male gender. In regards to teachers, 3 (60.0%) were male while 2 (40.0%) were female. This implies that most of the teachers were male. On teacher qualification, the responses were as shown in Table 4.2.

Table 4.2: Teacher Qualifications

n = 5	Frequency	Percent
Diploma in special needs	1	20.0
Diploma in education (science)	1	20.0
BED special needs education (special needs)	2	40.0
BED (Science)	1	20.0
Total	5	100.0

The study revealed that 20% of the teachers had had Diploma in Special Needs Education, 20% had Diploma in Education Science, 40% had Bachelor of Special Needs Education and 20% Bachelor of Education Science. This implies that majority of the teachers had a bachelors' degree of Special Needs Education. The teachers were asked the training they had after graduation, 20.0% had training in Kenya sign language, 40.0% had training in SMASSE, 20.0% had exam marking skills while 20.0% had no other training after graduation. In relation to teaching experience, 20.0% had a teaching experience of between 0 and 2 years, 40.0% between 3 to 5 years, 20.0% between 6 to 9 years and 20.0% above 10 years as shown in Table 4.3: This implies that majority of the teachers who participated in this study had other qualification to justify their presence at Ngala secondary school as teachers of deaf students.

Table 4.3: Training and Teaching Experience

n = 5	Frequency	Percent	
Training	Kenya sign language	1	20.0
	SMASSE	2	40.0
	exams marking skills	1	20.0
	Nothing	1	20.0
Teaching Experience	0 - 2 years	1	20.0
	3 - 5 years	2	40.0
	6 - 9 years	1	20.0
	> 10 years	1	20.0

4.2 Medium of Instruction Used By Teachers in Communicating Science Knowledge to Learners

During a study on medium of instruction used by teachers in communicating science knowledge to learners; teachers were asked to indicate which medium of instruction you usually use in class when teaching science. Their responses were as shown in Figure 4.1. 33% of the teachers used Kenya sign language as the best mode of instruction for students to understand science, 17% acknowledged use of spoken English, 17% used written English while 33% used sign exact English.

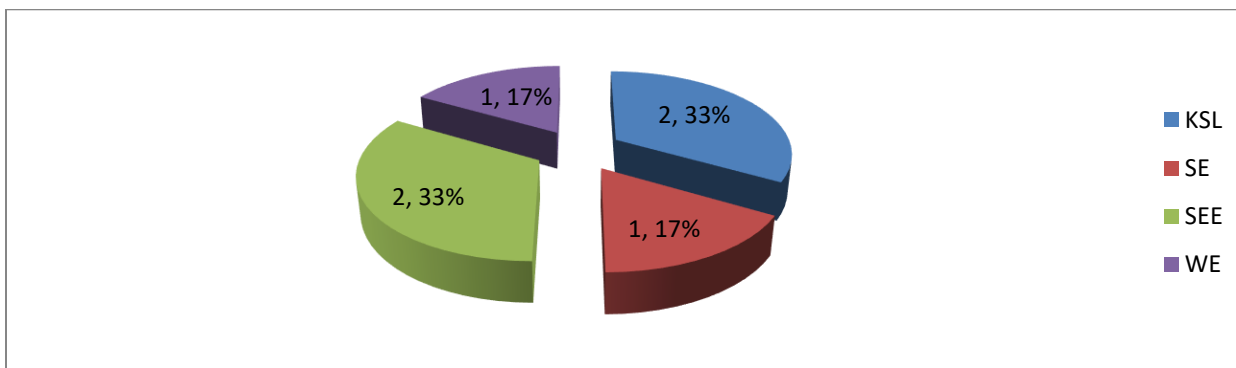


Fig 4.1: Teachers responses on how students were likely to understand science when different medium of instructions are used

In regards to teachers communication skills in Kenya Sign Language when teaching science subjects, 2 (33.3%) of the teacher had excellent communication skills in Kenya Sign Language, 2 (33.3%) good, 1 (17.0%) fair, and 1 (17.0%) not sure.

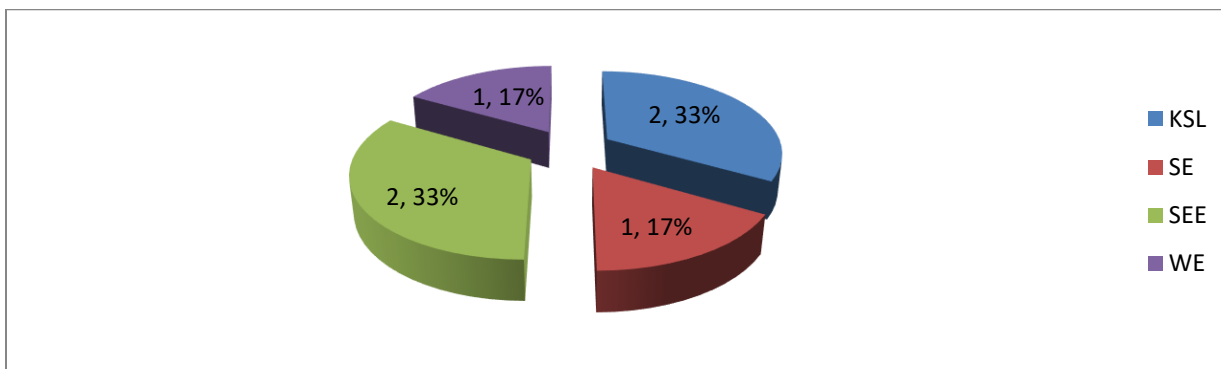


Fig 4.2: Communication skills in KSL when teaching science subject(s)

The students reported that when Oral language was used 21.0% of students were likely to understand science very much, 30.5% much, 9.5% undecided, 29.5% a little while 9.5% not at all. These findings agree with El-zraigat (2012) study on challenges of educating students who were deaf and hard-of-hearing in Jordan. In his study, he used qualitative approach with a target population of 30 teachers and four Principals. He found out that most teachers who taught students who were deaf and hard of hearing lacked necessary pre-requisite skills such as Sign Language and basic skills essential to make adjustment on

needs of deaf learners in class. He concluded that most of these teachers had trained to handle students in regular classes and not deaf students, a characteristic of Ngala secondary school for the deaf School teachers. The results were presented in Table 4.4:

Table 4.4: Students responses on methods of instructions used in class when learning science

		VM	M	U	A	NAA
Oral	F	22	32	10	31	10
	%	21.0	30.5	9.5	29.5	9.5
Sign Language	F	17	24	16	31	17
	%	16.2	22.9	15.2	29.5	16.2
Bilingual	F	23	17	11	36	18
	%	21.9	16.2	10.5	34.3	17.1
Code switching	F	18	28	9	40	10
	%	17.1	26.7	8.6	38.1	9.5
Sign Exact English	F	31	32	24	12	6
	%	29.5	30.5	22.9	11.4	5.7

When Sign Language is used, 16.2% reported that students were likely to understand science very much, 22.9% much, 15.2% undecided, 29.5% a little and 16.2% not at all. This concur with Conner, Lang and McKee (1993) who note that, ability to sign clearly, lecture at a good pace, communicate content expectations and assignments clearly increases the levels of understanding among learners who are deaf and hard of hearing. However, the current situation at Ngala secondary school for the deaf needs to be re-examined if we are to ensure learning objectives for science are achieved. When Bilingual Communication was used, 21.9% reported that students were likely to understand science very much, 16.2% much, 10.5% undecided, 34.3% a little, 17.1% not at all.

These findings agree with Ogunniyi (1997) who observes that, there should be continuous language development at all levels to improve science instructions which may include using mother tongue as a medium of instruction in class. When Code Switching was used; 17.1% very much, 26.7% much, 8.6% undecided, 38.1% a little and 9.5% not at all. These findings support El-Zraigat (2012) observation that, most teachers who taught deaf students and hard of hearing lacked the necessary skills to make adjustments on their needs in class. In regards to sign exact English, 29.5% revealed very much, 30.5% much, 22.9% undecided, 11.4% a little while 5.7% not at all.

5.0 Conclusions & Recommendations

The study concluded that virtually all communication methods in classroom were preferred by all the participants except oral where participant felt it was not the correct medium of instruction in science class. Many teachers have difficulties in using KSL, Code Switching and Bilingual Communication. This had made it difficult for teachers to have a smooth interaction with the students in class. The net effect of this was poor performance in sciences in KCSE. The study recommended that teachers should therefore be exposed on in-service programs to enable them have skills in Total Communication as a philosophy for teaching deaf learners. The Teachers Service Commission in conjunction with the Ministry of Education Science and Technology should only post teachers who have trained in Special Needs Education and understand the learning psychology of deaf learners.

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