Teaching strategies and technological tools that enhance literacy development among learners with hearing impairment

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Abstract: **This paper is part of a broad study that looked at the impact of hearing loss on literacy skills development. This paper explores the teaching strategies and technological tools that enhance literacy development among learners with hearing impairments. The study employed mixed methods where both qualitative and quantitative techniques were used. However, the case study design largely underpinned the study. The representative sample was composed of five educators (two teachers and three administrators) and 10 parents who were conveniently selected. Questionnaires, interviews and observation were the data gathering tools used. The results showed that despite the availability of a school library to provide print-rich materials needed to support literacy development there was no technology in form of computers that were used to enhance literacy development. There were no specific teaching strategies in place for the enhancement of literacy development. It was recommended that educators must be provided with solid training in Special Needs Education, at both pre-service and in-service levels. It was also recommended that that written language be used to communicate with deaf learners within the family setting and classroom**

Keywords: **literacy development, hearing impairment, sign language, deaf, educators.**

1. INTRODUCTION

Literacy provides students with hearing impairment with opportunities to enter the world of literature and enjoy videos, television with captioning and other forms of entertainment with their hearing peers. It allows them to access information through all types of media. Opportunities to read and enjoy books alone, with friends or with teachers are important learning experiences for all students. Exploring the written word through drawing and writing also benefits all students (Briggle, 2005). Children who are hearing impaired, like their hearing peers, participate in literacy events and use written language in many typical ways. The current situation in which, learners with hearing loss experience difficulties in achieving normative standards of literacy in spoken and written language, is not new. However, as already stated, the consequences of low literacy skills for people with hearing impairment this digital era are far graver than at any other era. High levels of literacy achievement are now more important than ever before. Literacy skills have become central to the daily communication and information requirements of students with hearing impairment. Leigh (2000) noted that, for most individuals with hearing impairment, access to telephone communication is via a text message in a cellular-phone. In these situations, communication is totally dependent upon their literacy skills and those of their communication partners who, in a large percentage of cases are deaf themselves.

Similarly, in regards to news and information on public affairs, a strong dependence on literacy skills is again evident. In a society where so much information is conveyed through the electronic media, this represents a very high degree or reliance upon print-based media. Strong literacy skills are also needed to allow students with hearing impairment to complete in the job market. Students with hearing impairment, who use sign language to communicate, live and interact in an English speaking world. They are expected to read and produce English in assignments at school. Students with

hearing impairment are required to be functionally bilingual to effectively participate in their community. However, literacy development in students who are impaired is a multifaceted issue. Literacy achievement in a spoken and written language is a challenge for students with hearing impairment (Rottenberg and Scarfoss, 1992).

1.1 Statement of the Problem:

Students who are deaf experience poor reading and writing performance in schools (Padden and Ramsey, 1993). There are reported significant lower levels of attainment in literacy in students with hearing impairment when compared with their hearing age peers. Most students with hearing impairment in Zimbabwe today (roughly 80 percent) are placed in a mainstream school environment, that is, in integration units hearing peers and teachers (Salend, 2001). As students with hearing impairment are increasingly being educated in mainstream public school programs and are required to be functionally bilingual to effectively participate in their community, there is a need to critically analyse the factors affecting literacy development as these factors affect the student's educational success.

1.2 The Research Question:

What are the teaching strategies and technological tools that enhance literacy development among learners with hearing impairment?

1.3 Delimitation of the Study/ Scope:

The study focused on factors affecting literacy development in students with learning impairments who are in an integration unit at primary school level. Out of the two primary schools with integration units of students with hearing impairment in Epworth- Mabvuku/Tafara District in Harare, the research was carried out at Epworth Primary School in Epworth, a township located North-East of the capital city, Harare . The community that makes up the township is of different cultural groups, the Shona, Ndebele and Deaf. Furthermore, these students with hearing impairment that are enrolled in this school are neither of English nor part of the Deaf cultural group.

1.4 Theoretical Framework:

Theoretical framework which informed this study emerged from the socio-cultural model of literacy development relating to students who are hearing impaired and with limited English proficiency. According to Rodda and Eleweke (2000), in socio-cultural model, it is considered that people who are deaf have a culture and language different from hearing people and are linguistic minorities for whom the learning of English literacy skills must be considered a second language learning.

2. LITERATURE REVIEW

There are multiple ways and strategies to obtain English literacy (Padden and Ramsey, 1998). Gioia, Johnson, and Cooper (2001) described the use of multiple strategies in literacy development of students with hearing impairment which include the use of Sign Language, the use of Manually Coded English and teaching strategies that are supported by use of computers and other technological tools. Some of these strategies are also used by educators of students with hearing impairment in Zimbabwean schools. The extents to which the strategies are used depend on the individual teacher's expertise and innovativeness. Availability of resources also determines the strategies and technology to be used in enhancing literacy development. The socio-economic status and perceptions of parents also determine the strategies and technology to be used in the home environment for literacy enhancement.

Five technology researchers, supported under the Individuals with Disabilities Education Act (IDEA) of 1990, between 1992 and 1996 investigated the use of computers and other technological tools to teach reading and writing to students with hearing impairment. Their work represents a concerted effort to align new and innovative technology with proven strategies that support English literacy instruction for these students. The findings under these projects are particularly useful, given the deficits in reading and writing traditionally found among some members of the deaf community. Lags in reading achievement, difficulties in comprehending and writing English syntax, and limited English vocabularies are particularly prominent among students with hearing impairment, and the findings of these IDEA researchers address some of these important problems.

The combined challenges faced by students who are deaf influence the ways in which effective literacy instruction can be provided for them. A number of teaching strategies have been developed to help these students realize their full literacy potential, and in recent years, technological advances such as video captioning and multimedia technology increasingly have been used to reinforce these strategies. Strategies for teaching literacy to students who are deaf include techniques to support basic fluency as well as strategies to develop more advanced writing and reading comprehension skills. Researchers, according to Mclnerney, Riley and Order (1999), have developed technology that advances these strategies in both areas.

A number of teaching strategies have been identified that are designed both to encourage natural social literacy learning, and to support its continuation through more formal means. These strategies include: exposure to a wide range of written materials in "print-rich" physical environments; demonstration of written, finger- spelled, and signed language, and the relationship among the three as well as ; opportunity to experiment with reading and writing in a risk- free and supportive setting (Rottenberg and Searfoss, 1992). The teaching strategies also include what is referred to as Deaf-Evolved Strategies.

3. METHODOLOGY

The study employed mixed methods where both qualitative and quantitative techniques were used. However, the case study design largely underpinned the study. In this case the single unit of study was an institution, Epworth Primary School Integration Unit. As stated by Merriam and Simpson (1984), a case study tends to be concerned with investigating many, if not all, variables in a single unit. In this case study of Epworth Primary School Integration Unit, both the two teachers of students with hearing impairment in the Integration Unit, together with their three supervisors, the school head, deputy and teacher in-charge were part of the population. All the sixteen parents and caregivers of the students in the integration unit also constituted the population. Of the two integration units of students with hearing impairment at primary level in Epworth – Mabvuku/Tafara District, the Epworth Primary School Integration Unit was purposively selected for the study because it exhibited characteristics of interest to the researcher. It was the integration unit of students with total hearing loss that was so severe that they could not process linguistic information through hearing, with or without amplification. All the five educators (two teachers and three administrators were made part of the sample due to small numbers. Convenient sampling was used to select 10 parents from the 16 parents. Questionnaires, interviews and lesson observation were the data gathering tools used. A pilot study was carried out at one of the primary schools with an integration unit in Hatfield. The five respondent educators who participated in the pilot study were selected by convenience and were not included in the main research. The researcher also pilot-tested the interview research questions scheduled for parents of student who are deaf on four parents of children with hearing impairment who had come to fetch their children home after school. These parents were also not included in the main research.

4. RESULTS

4.1 Demographic Data:

Table 4.1: Characteristics of the two classes

Class Code	A	B	Total	%
No of Boys	6	5	11	58
No. of Girls	5	3	8	42
Total Enrolment	**11**	**8**	**19**	**100**
Male Teachers	0	0	0	0
Female Teachers	1	1	2	100
Total No. of Teachers	**1**	**1**	**2**	**100**
Teacher: Pupil Ratio	**1:11**	**1:8**	**1:10**	

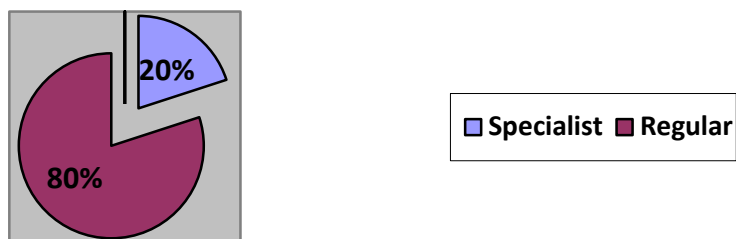The striking features of table 4.1 are the high teacher: pupil ratio of Class A.

Figure 4.1: Distribution of Educators by Professional Qualification

Figure 4.1 indicate that all educators were qualified teaching professionals. However only one teacher was a specialist educator and the rest were regular educators
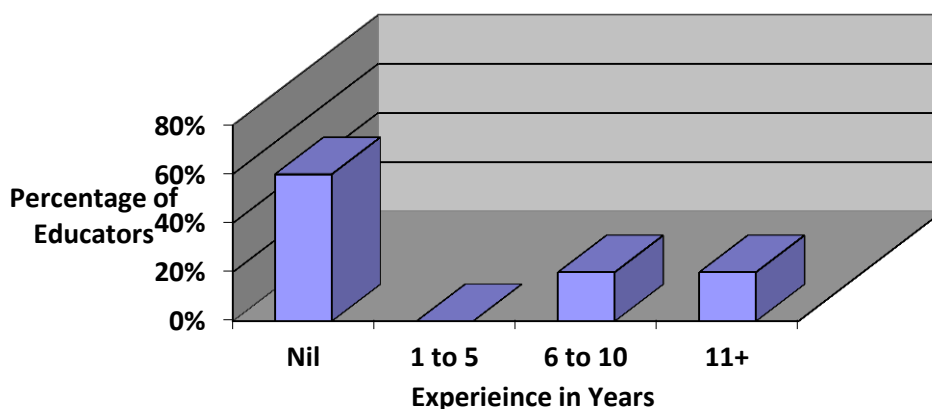

Figure 4.2 Experiences in Teaching Students with Hearing Impairment

The striking feature of figure 4.2 is the vast experience of educators in teaching students with hearing impairment but without training in Special Needs Education

4.2 Teaching Strategies and technology that can be used to effectively enhance literacy development.

The last research question sought to establish the teaching strategies and technology that can effectively enhance literacy development of students with hearing impairment.

Table 4.18: Educators' responses on teaching strategies and technology that can enhance literacy development (N=50

Strategies and Technology for literacy development	Responses				Modal Response
	Yes		No		
	No.	%	No.	%	
a) Do you have a school library that caters for students with hearing impairment?	3	30	2	40	Yes
b) Does your school curriculum offer computer studies to learners with hearing impairment?	1	20	4	80	No
c) Are you computer literate enough to use computers in lesson delivery?	1	20	4	80	No
Aggregate					No

Despite the availability of a school library to provide print-rich materials needed to support literacy development there was no technology in form of computers that were used to enhance literacy development. The majority of educators were computer illiterate as far as use of computers in lesson delivery was concerned. From the interviews, respondents proposed the engagement of interpreters of Zimbabwean Sign Language in integration units as well as use of computers to enhance literacy development.

Table 4.19: Summary of Observations 5 Excellent; 4 Very Good; 3 Good; 2 Average; 1 Below Average

	Item Observed	5	4	3	2	1
a)	Interaction of students who are deaf with their parents					√
b)	Interaction of students who are deaf with their teachers				√	
c)	Interaction of students who are deaf with their hearing peers					√
d)	Methodology of teacher in lesson delivery				√	
e)	Classroom Appearance		√			

From the lesson observations, the classroom displayed a lot of print –rich materials needed for literacy development. The appearance of both classrooms was very good.

5.   DISCUSSION

From the results indicated that on availability of print-rich material to enhance literacy development, educators agreed with Rottenberg and Searfoss (1993)'s idea of providing literacy learning environments that are rich with print material as well. Opportunities to read and enjoy books alone, with friends, and with teachers are important learning experiences for all students, with or without hearing impairment. Exploring the written word through drawing and writing also benefits all students (Rottenberg and Searfoss, 1993). Educators are urged to make sure that students have time to discuss their literacy experiences amongst themselves and with others. From the study, students were availed such opportunities through the use of the school library. From the observations made it was also established that the classrooms were full of print-rich materials that were on display. This enhanced the literacy development of students with disabilities. However, these students had to be taught the skill of reading, like what Chamberlain and Mayberry (2000) emphasized.

Eighty percent of the educators did not make use of some latest technology like computers, in their lesson delivery because they were computer illiterate. They were urged to move with times as they were now living in the digital era that calls for people to be computer literate in order to survive with ease. Use of video captioning can be used to enhance literacy in students with hearing impairment.

Captioned television instruction offers a visual stimulus and an interest that is hard to maintain through printed material alone (Koskinen, Welch, Jensema and Alexander, 1988). The combination of text and video creates a highly motivational and reinforcing context for literacy learning. For students with hearing impairment in particular, this combination supports greater accessibility of written language, as students can rely on the video components as much or as little as they need to in order to comprehend the text. As written material becomes more accessible to children who are deaf, they become much more comfortable with written English, and in turn, are more motivated to explore the language.

Access to captioned television and videos in the home helps expose children with hearing impairment to a large amount of written language and support their natural literacy development, while captioned materials in the classroom allow their educators to focus on broad textual concepts in a more directed instructional environment. Computer technology can help motivate students who are deaf to learn to read and write English. In addition, for students who are deaf, computer applications allow easy access to a wide range of linguistic information and in the format most comfortable for them in ways never before possible. Use of an overhead projector is recommended rather than a chalkboard. This allows the researcher to face   the students rather than have his or her back to them.

The issue of economic constraints also impeded the use of technology. UNESCO has found a correlation between illiteracy and poverty. From the interviews with parents it was established that most students were coming from a poor

economic background where most parents were vendors and unemployed. Most homes were not electrified and most of the electric gadgets like the television, digital video decoders (DVDs) and computers were not affordable. This reduced the chances of exposing the students with hearing impairment to the latest technology that could boost their literacy attainment standards.

6. RECOMMENDATIONS

As a way forward, the following suggestions need to be considered towards the effective enhancement of literacy development of students with hearing impairment.

➢ Educators must be provided with solid training in Special Needs Education, at both pre-service and in-service levels. Because deafness is a low incidence disability, many teachers do not have a strong knowledge base about learners with hearing impairment. To ensure that students with hearing impairment receive the quality education they deserve educators, must understand the learning needs of this population. Through this understanding, educators can work to create a new generation of highly literate students with hearing impairment.

➢ Language development should be the primary consideration when teaching students who are pre-lingually deaf (either born deaf or became deaf before acquiring language). Language development plays an important role in a student's literacy learning.

➢ To counteract the apparent language deficit in hearing families with children who are deaf, Katasse (1997) recommended a variety of strategies to provide meaningful language experiences. Teachers should share these suggestions with families, as well as remember them in their own teaching.

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