

TEACHING DEAF AND HARD OF HEARING LEARNERS: TESTING INNOVATIVE TEACHING PRACTICES IN INCLUSIVE SECONDARY SCHOOLS IN TANZANIA

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Abstract

Deaf and hard of hearing (DHH) learners in Tanzania have challenges learning in inclusive classes dominated by hearing students and an environment with limited sensitization on deafness. The change in language of instruction from Kiswahili to English presents a bigger challenge to inclusion in secondary schools. This study aimed at testing pre-teaching and re-teaching strategies in aiding DHH academic achievement. A pilot quasi-experiment with post-test only was administered on 10 DHH students and 39 hearing students of Form II in one secondary school in Tabora region. The study was done in three subjects: Kiswahili, History and Geography. Using anova one way analysis, results revealed that pre-teaching and re-teaching led to a significant difference in the academic achievement of the DHH experimental, DHH control and hearing control groups in Geography but not in History and Kiswahili.

Key words: Pre-teaching, re-teaching, Deaf memory, Deaf education, rehearsal, inclusive education.

INTRODUCTION

The deaf and hard of hearing (DHH) students are not simply hearing students who cannot hear, but students with academic needs and strengths different from their hearing peers (Knors & Marschark, 2014). One of their major academic challenges that affect the DHH students' academic achievement revealed by studies conducted in America is memory, both shorter and longer term memory (Marschark & Spencer, 2010). Nevertheless, the DHH individuals have working memory strengths in areas including free recall, imagery, visuospatial recall and rehearsal that if exploited by educationists can enhance their academic achievement (Hamilton, 2011). In Tanzania, the DHH students have always lagged behind their hearing peers in academic achievement just like many others elsewhere. However, the challenges of the DHH students in Tanzania emanating from their ecology may be different making their academic achievement very low. They grow up in conditions of impoverished language, desolation, isolation and stigma with very limited technology. In secondary schools they meet yet more challenges of inexperienced teachers with limited or no knowledge about deafness, inclusive classes dominated by hearing peers and worse of all, a new language of instruction, English yet the modes of instruction used are hearing oriented (Batamula, 2009). Therefore, for teachers to effectively teach DHH students, they must have a number of instructional strategies at their disposal. This study investigates whether using innovative instructional strategies can improve DHH students' academic achievement.

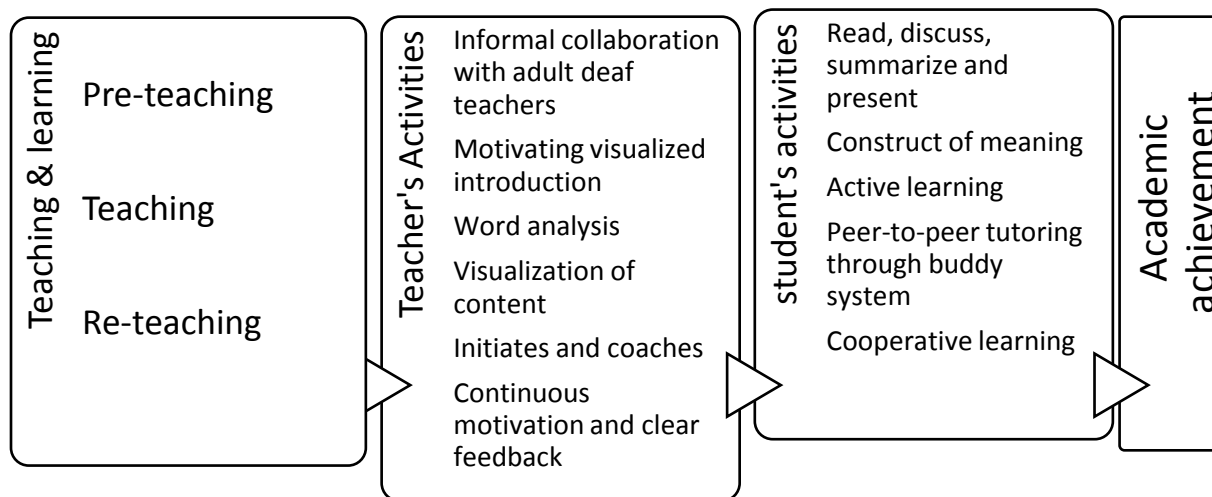
Denh (2008) articulates two interventions for working memory; compensatory methods which involve training in memory strategies for bypassing deficit processes and reducing memory demand or remedial methods that address the memory deficits and enhance them. Additionally, Gathercole and Alloways (2008) suggest three ways teachers can use to help deaf students to retain memory after instruction. First, teachers can structure their teaching in ways aimed at preventing or reducing memory overload. This can be done by limiting the amount of data or information to be stored by using shorter sentences and by presenting external memory aids using charts on the walls of the classroom. Second, repetition of information is also very

supportive to deaf students. Another literature suggests that the level of engagement and the amount of time the DHH students are engaged in a task help to bring learning success. The frequency with which the DHH students are exposed to a subject content and the kinds of strategies used to enable them understand are crucial in deaf education (Knoors & Renting, 2000). Roald's (2002) study examined the influence of pre-teaching on learning. His findings revealed that systematic communication of scientific topic concepts using sign language prior to the reading of the textbook is helpful in content understanding. Stinson and Liu's (1999) study also revealed that pre-reading strategies such as allowing students to read before starting the lesson are very beneficial. This, of course, should be accompanied with discussion, and controlling the pace of discussion. Notwithstanding the above mentioned, there is limited research to show their effectiveness with DHH students. The study aimed at examining the impact of pre-teaching and re-teaching on the academic achievement of DHH students.

The teaching model

Marzano (2003) suggests that learning has to be an active process done by the students. The art of teaching is to involve students in their own active learning process by offering many different kinds of learning strategies. This is in line with the constructivism theory which stipulates that the best way of learning is by allowing the learners to construct meaning (Arends, 2009). This paper therefore adopted a teaching model where Marzano teaching strategy (where students are given texts to read in groups, discuss, summarize and present) was integrated with other innovative practices pertinent in teaching DHH learners. Specifically, a motivating visualized introduction and continuous motivation (Bandura 1997), word analysis (using pictures, words, synonyms, translation and signs) visualization of content (using diagrams, pictures, short films and mind maps, word spiders), (Marschark, Lang and Albertini, 2002; Marschark & Spencer, 2010), informal collaboration with deaf adults for Sign language support and peer tutoring

Figure 1: The Teaching Model



The study addressed the following research hypothesis:

1. Pre-teaching and re-teaching result in no significant difference in the academic achievements of the DHH experimental group, DHH control group and hearing students.

METHODOLOGY

The study was conducted in one inclusive secondary school in Tabora region. The study conveniently sampled 49 Form II students. Of the sampled students, 39 were hearing while 10 were deaf or hard of hearing students. We included hearing students in the study to allow comparison. Three subjects were studied: Kiswahili, Geography and History. The reason for the selection of these three subjects were: the DHH students are more familiar with Kiswahili in school and in social interactions, Geography is a social constructed subject, observable and experienced in their daily lives but taught in English and History is more of an abstract subject out of DHH students' context and taught in English and it requires more conceptual developments. Therefore the three subjects required different levels of concept processing in two different languages.

Pre and re-teaching: The study involved three groups: DHH experimental, DHH control and hearing control groups. The pre-teaching was administered to five randomly selected DHH students prior to teaching in an inclusive classroom with the purpose of clarifying concepts and misconceptions that may occur. The three groups were taught together using the model. Re-teaching was conducted after to consolidate what was taught in class.

Visualization: Improved visualization was employed including mind maps, concept maps, pictures, films, diagrams and word spiders to enable easy concept processing.

Marzano teaching strategy: In each lesson, students were given texts to read, discuss and present with clear guidelines to promoting active learning.

Peer tutoring and collaboration with deaf adults: A buddy system was encouraged in the classrooms between the DHH themselves and hearing students in order to support knowledge processing. In order to support their sign Language skills, teacher trainees informally worked with deaf adult teachers.

The study employed a quasi-experiment with post-test only in order to collect data. The design was selected because, the teacher trainees taught concepts that were new to both the DHH and hearing students. After pre-teaching, teaching and re-teaching for two weeks, the researchers administered achievement tests in each subject to examine the effects of pre-teaching and re-teaching on academic achievement. The achievement tests included multiple choice items, true/false and fill in items and each test was scored out of 10. Participant observation was also conducted where researchers attended different teaching situations with the aim of observing the teacher trainees effectiveness in using the model in teaching DHH students and the attitude of deaf students towards it. Focus group discussions were done with teacher trainees in different subjects to compare observation results.

Data from the quasi experiment were analyzed using the analysis of variance. Data from observation and focus group discussions was analyzed using content analysis and themes such as similar responses and observations to the same question or observation clue by different respondents were identified.

RESULTS

From an analysis of variance the results revealed: Academic achievement in Geography (Hearing group: $M = 7.3$, $SD = 4.8$, $n = 39$; Deaf experimental group: $M = 4.8$, $SD = 2.3$, $n = 5$; Deaf control group: $M = 0.8$, $SD = 0.8$, $n = 5$). Kiswahili (Hearing group: $M = 8.4$, $SD = 1.8$, $n = 39$; Deaf experimental group: $M = 6.1$, $SD = 2.3$, $n = 5$; Deaf control group: $M = 5.7$, $SD = 2.0$, $n = 5$) and History (Hearing group: $M = 7.9$, $SD = 2.2$, $n = 39$; Deaf experimental group: $M = 4.4$, $SD = 4.3$, $n = 5$; Deaf control group: $M = 1.2$, $SD = 2.7$, $n = 5$).

The anova was significant because in Geography $F = 23.0$, $p = 0.00$, $p < 0.05$, in History, $F = 18.7$, $p = 0.00$, $p < 0.05$ and Kiswahili $F = 7.5$, $p = 0.001$, $p < 0.05$. There was significant evidence to reject the null hypothesis in all subjects. However, in the Tukey poc hoc tests all significant levels were less than 0.05 in geography, so there was a significant between the means of the DHH experimental, DHH control and hearing groups. However, the DHH experimental and control groups significant levels were more than 0.05 in History and Kiswahili, so there was no significant difference in the means of these groups. Therefore the null hypothesis was rejected in Geography but not in History and Kiswahili (Table 1, 2 and 3)

Table 1: Dependent Variable: Achievement in Geography

Tukey HSD

(I) STUDENTCATEGOR Y	(J) STUDENTCATEGOR Y	Mean Difference (I- J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Hearing (.00)	1.00	2.59744*	1.01055	.035	.1500	5.0448
	2.00	6.59744*	1.01055	.000	4.1500	9.0448
DHH EG (1.00)	.00	-2.59744*	1.01055	.035	-5.0448	-.1500
	2.00	4.00000*	1.34549	.013	.7415	7.2585
DHH CG (2.00)	.00	-6.59744*	1.01055	.000	-9.0448	-4.1500
	1.00	-4.00000*	1.34549	.013	-7.2585	-.7415

*. The mean difference is significant at the 0.05 level. (EG = Experimental Group, CG = Control Group)

Table 2: Dependent Variable: Achievement in History

Tukey HSD

(I) STUDENTCATEGOR RY	(J) STUDENTCATEGOR RY	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Hearing (.00)	1.00	3.51026*	1.18638	.013	.6371	6.3835
	2.00	6.71026*	1.18638	.000	3.8371	9.5835
DHH EG (1.00)	.00	-3.51026*	1.18638	.013	-6.3835	-.6371
	2.00	3.20000	1.57959	.117	-.6255	7.0255
DHH CG (2.00)	.00	-6.71026*	1.18638	.000	-9.5835	-3.8371
	1.00	-3.20000	1.57959	.117	-7.0255	.6255

*. The mean difference is significant at the 0.05 level.

Table 3: Dependent Variable: Achievement in Kiswahili

Tukey HSD

(I) STUDENTCATEGO RY	(J) STUDENTCATEGO RY	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Hearing (.00)	1.00	2.33590*	.87782	.028	.2100	4.4618
	2.00	2.73590*	.87782	.009	.6100	4.8618
DHH EG (1.00)	.00	-2.33590*	.87782	.028	-4.4618	-.2100
	2.00	.40000	1.16876	.938	-2.4305	3.2305
DHH CG (2.00)	.00	-2.73590*	.87782	.009	-4.8618	-.6100
	1.00	-.40000	1.16876	.938	-3.2305	2.4305

*. The mean difference is significant at the 0.05 level.

70% of participant observation data revealed that Marzano strategy of teaching was effective in inclusive classes with the help of peer tutoring and 85% in Kiswahili special classrooms. It was less in special classes (15% in History and 35% in Geography). After reading the text and discussing in small groups, the DHH students who were selected to present were able to explain the concepts because of peer tutoring. In Kiswahili special classes, the deaf read the text, comprehended and presented ably. In special classes of Geography and History it was less effective possibly because of limited linguistic comprehension. When asked to read a particular paragraph in the text and identify the economic activities which were carried out by San and Khoikhoi the original inhabitants of South Africa, the DHH students seemed to simply cram the sentences.

Through focus group discussions the 95% of teacher trainees related that the DHH students did not only have very limited vocabulary in English but also a negative attitude towards the language which posed a very big challenge in learning since English is the medium of instruction in secondary schools. One teacher trainee lamented. He said:

“Madam when you begin speaking English, they show you an attitude that they cannot learn and therefore not interested in whatever you are teaching”.

However 88% of the teacher trainees agreed that the method was successful in special Kiswahili lessons and for hearing students (100%). One teacher trainee however observed that when he adopted a much slow pace by asking the DHH students to read one sentence at a time, he got better results. He said:

“First, I showed them a short film and then explained word by word of the text sentence using sign supported English, pictures, translating some words in Kiswahili. Then I asked them to read and explain the main ideas in each the sentence. Some students managed to get the main ideas.”

DISCUSSION

The results of the present study reveal that using pre-teaching and re-teaching significantly improved academic achievement of DHH experimental students in Geography. Consistent with previous theoretical studies and research (e.g. Roald, 2002; Stinson & Liu, 1999), our study reveals that pre-teaching strategies such as word analysis of subject concepts using sign

language and reading of content prior to joining the inclusive classroom could be helpful to DHH students. However, the study reveals the strategies improved academic achievement of DHH students only in Geography. The fact that Geography is a social constructed subject could have played a role because participant observation showed that the DHH students' concept comprehension was better in Geography than in History.

The results also revealed a difference in achievement in the different subjects due to language of instruction (LoI). The DHH and hearing students scored a relatively high mean in Kiswahili (6.1, 5.7 and 8.4) as compared to Geography (4.4, 1.2 and 7.4) and History 4.4, 1.2 and 7.9). The implication is that since Kiswahili is the most commonly used language at home and school all students find it palatable. However, although Geography is contextually familiar and History is normally out of their context, they were scored lower because they are taught in English. Consistent to Knoors and Marschark (2014), the results reveal that the LoI affect learning in different school settings. Additionally to the assertion by Rose, Meyer, Sranman & Rappolt (2002), the results reveal that to help students to get background information and develop schema and vocabulary related to content subject, visual aids such as photos, films, should be used to provide multi examples of concepts (Table 1). Therefore this study provides empirical support to these claims.

This being a construct that has not been much explored, it is imperative to carry out more experiments using a different design in different classes and in a more representative population. Having not administered baseline tests could probably have been another setback. It is important that in the subsequent studies on the impact of pre and re-teaching to administer baseline tests. Therefore, the results should not be generalized to the rest of Tanzania given these research limitations.

Our study demonstrates innovative practices teachers can explore to support the DHH students in inclusive situations. Though the results were not significant in all subjects, they support repetition of teaching, the use of visual materials and the use of learner centered approaches that encourage active participation in class in teaching DHH students. This study challenges educators to think of new pedagogical strategies that fit the new paradigms in education.

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