

Reading Comprehension Level and Background Knowledge of a Text among Deaf/Hard of Hearing Students

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Abstract: The general objective of this study was to assess the relationship between reading comprehension level and background knowledge of a text among deaf/hard of hearing students. Accordingly, it investigated the relationship between reading comprehension level and background knowledge of a text of grade 9-12 deaf students at Mekane Eyesus School for the Deaf, Hossana. It particularly determined the reading comprehension level of grade levels 9 to 12 deaf students; assessed the role of background knowledge of a text in comprehending a text and identified the correlation between reading comprehension level and background knowledge of a text. A case study research design was chosen. One hundred fourteen grade 9-12 deaf students were randomly selected. The data were collected through an adapted Standardized Diagnostic Reading Test, MICO and a background knowledge questionnaire. The data were analyzed using frequency, percentage mean, standard deviation and Pearson's r correlation coefficient. The results from the reading comprehension test revealed that overall low reading comprehension with ($M = 42$, $SD = 20$), categorizing the students as struggling readers with a reading comprehension score below 60%. In relation to background knowledge of a text, the result revealed that deaf students believe that prior knowledge sometimes enable them to comprehend what they read in English as a Foreign Language (EFL) with ($M = 3.09$, $SD = .46$). Regarding the correlation between reading comprehension level and background knowledge of a text, there was a modest positive significant correlation between background knowledge and reading comprehension level. (Pearson's $r = .243$ and $p = .009$).

Key words: Deaf/Hard of hearing Comprehension, Comprehension level, Deaf/Hard of hearing learners, Background knowledge, Reading text

Introduction

Reading comprehension is the ultimate goal of reading. It has been described as a complex process because, at the very least, it relies on the appropriate interactions among the writers and readers, the text, and the context (Weaver, 2002). The National Reading Panel (2000) stated, "Comprehension is critically important to the development of children's reading skills and therefore to the ability to obtain education. The UN Universal Declaration in 1948 on Human Rights declared providing education for all children. Consequently, all countries in the world are working towards it. However, more people because of different reasons among different societies worldwide are not entertaining this right of education. From many other factors, disability is a constraint that holds many people back from education. Approximately 10% of children worldwide have physical, sensory, intellectual or mental health impairments. Almost 80% of

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these children with disabilities live in developing countries (Shiv, 2006). Hearing impairment, the key concern of this study, is one of the sensory impairments that are well-recognized all over the world. Conceptually, it is the partial loss of the ability to hear (Hard of Hearing) or total loss of the ability to hear (Deafness) in one or both ears caused by damage to or malformation of one or more parts of the ear (Rafi, 2008).

For deaf and hard-of-hearing (d/hh) students, attaining grade-appropriate reading comprehension levels presents a specific challenge. Among these problematic issues, deaf education and the factors that affect deaf students' learning place them in a special position. The field of deaf education has long struggled to develop literacy skills among deaf and hard of hearing (d/hh) children comparable to their hearing peers' literacy achievement.

Recent reading research shows that several key factors impede a student's reading comprehension (Torgeson, 2002). For instance, cognitive strategies (Strategies that good readers use while reading, such as predicting, inferring and summarizing). Particularly, prior knowledge, which is one of the cognitive strategies and the variable of this study, a deficit can interfere with the way that students understand the information presented to them. For some students with a reading disability, a cognitive strategies deficit can play a major role.

Brain research shows strong evidence of differences in brain function between poor and normal readers (Shaywitz, 2008).

Reading Comprehension and Prior Knowledge

Research supports that prior knowledge about a topic improves both comprehension and memory. Prior knowledge has been defined as domain or content knowledge that has been attributed to increased reading comprehension and memory of what has been read (Priebe, Keenan, & Miller, 2012).

A Study by Chiesi, Spillich, & Voss (1979) indicated that prior knowledge can enhance passage recall. They had adults rated as high or low in baseball knowledge recall a play-by-play account of a baseball game. They found that the recall of subjects rated as high in baseball knowledge was more coherent and that they preserved information important to the goals of the game in their recall, while the recall of subjects rated as low in baseball knowledge was more fragmented.

Priebe et al. (2018) also indicated that there has been scant research on whether prior domain knowledge impacts word recognition. Prior knowledge may increase reading comprehension because understanding the topic may aid in word identification. Priebe et al. examined the reading comprehension of poor readers with prior knowledge and poor readers without prior knowledge. The sample consisted of 60 fourth-grade students (males = 27, females = 33) with a mean age of 9.7 years. Students were either suspected of having a reading disability (poor reader) or part of the control group. Thirty students were in the prior-knowledge group (15 poor

readers, 15 controls) and thirty were in the no prior-knowledge group, with 15 poor readers and 15 controls. The results indicated that controls (good readers) could remember more idea units from the text than poor readers, but there was no main effect for prior knowledge. Poor readers could recall more information when they had prior knowledge than those who did not. There was no statistically significant effect for the controls with or without prior knowledge.

There were several limitations to this study. First, the sample of students was not only small ($n = 15$ for each of the four groups), but the students were all of a similar age (mean age of 9.7). These two facts inhibit generalizing the findings to older students, which is the focus of the current study. Since the focus of this study was d/hh secondary students, similar results would not be realized.

Thus, the present study intended to assess the relationship between reading comprehension level and background knowledge to read EFL of grade 9-12 deaf students of Mekane Eyesus School for the Deaf. Accordingly, the study aimed to achieve the following specific objectives.

1. To determine the reading comprehension level of grade levels 9 to 12 deaf students of Mekane Eyesus School for the Deaf.
2. To assess background knowledge contribution to reading EFL of grade 9 to 12 deaf students.
3. To identify the correlation between reading comprehension level and background knowledge to read EFL.

Methods

Study Design

A case study design was used because of its importance for a study of an instance in action to illustrate a more general principle (Nisbet and Watt, 1984:72). Besides, as a bounded system is represented by a single instance, such as a child, a clique, a class, a school, or a community Adelman et al., 1980, the design offers to study example of real people in actual situations, allowing readers to grasp concepts more clearly than if they were merely presented with abstract theories or principles. Therefore, this research attempted to determine the reading comprehension level of deaf students.

Sources of Data and Population of the Study

There were 220 students from 'o' class up to grade 12 in Hossana Mekane Eyesus School for the Deaf in 2014 E.C academic year. The population of the research was therefore 220 students.

Sample Size

The researcher used Kothari (2004) sample size calculator formula to determine the sample size of the study.

$$(Z\text{-Score})^2 p * q * N$$

$$n = \frac{E^2 (N - 1) + (Z\text{-Score})^2 p * q}{E^2}$$

Thus, the sample of this study with a confidence level of 95% and a margin of error of 5% (0.05) was 114 deaf students who were attending their education from grade 9 to 12.

Sampling Technique

A purposive sampling technique was employed and d/hh students in grade levels 9 and above in which the medium of instruction shifts from the mother tongue to English consistently throughout the country, particularly in SNNPRS and the grade levels where reading comprehension develops well and becomes incredibly important were included in the study.

Data Collection Tools and Procedures

Students' Reading Comprehension Test

Reading Comprehension level was assessed by adapting a Standardized Diagnostic Reading Test, MICO (Milner, 1995), using the Gunning Fog Index to check whether the reading passages matched the students' grade level. The Gunning fog index is a readability test for English writing in linguistics. The results of the test were interpreted based on three reading levels. According to Vivian, 2017 there are three levels of reading comprehension categories: independent reader (a reading comprehension score of 90% and above), instructional reader (a reading comprehension score of 60% to 89%), and frustrated reader (a struggling reader) (a reading comprehension score of below 60%). The estimated time for the test administration was 20 minutes.

The Students' Questionnaire

Background knowledge, which refers to a reader's knowledge about the topic being read (James, 1987) was measured with a questionnaire adapted from Al-Jahwari and Al-Humaidi (2015) with some modifications. The questionnaire comprises 9 items with a five - point Likert scale that deals with students' views about the role of their prior knowledge in reading comprehension. A Cronbach's alpha calculated for this study also revealed acceptable reliability (.67).

Procedures of Data Collection

Having obtained the necessary permission from the director of the deaf school, deaf students took a reading comprehension test in the beginning of the first semester of the academic year 2014 E.C. Additionally, the following day, the deaf students completed a background knowledge questionnaire.

Data Analysis

The data from the comprehension test and background knowledge questionnaire were analyzed using descriptive statistics. Furthermore, inferential statistics, specifically Pearson's r was used to test the statistical significance of the relationship between the variables. The Statistical Package for Social Science software program (SPSS) version 21 was employed to enter, clean, and analyze the data.

Results

Results of the Reading Comprehension Test

The first objective examined the results of the adapted MICO reading comprehension test. The total number of correct responses received had been scored and converted to percentiles.

Table 1: Reading comprehension test score of the sample deaf/hh students

Grade level	N	Min.	Max.	Sum	Mean	St. Deviation	Percent of total N
Grade 9	44	17	83	2300	52	16	38.6
Grade 10	24	14	86	1031	43	21	21.1
Grade 11	32	14	71	1230	38	17	28.1
Grade 12	14	0	43	256	18	13	12.3
Total	114	0	86	4817	42	20	100

According to Table 1 above, grade 9 deaf students 44 (38.6%) of the total participants were struggling readers with ($M=52$ and $SD=16$). Though grade10 deaf students 24(21.1%) of the total participants scored the highest score from all secondary school deaf participants, they were similarly struggling readers with ($M= 43$ and $SD= 21$). Grade 11 deaf students 32(28.1%) of the total participants were also struggling readers with ($M=38$ and $SD=17$) and grade12 deaf students 14(12.3 %) of the total participants were struggling reader with ($M= 18$ and $SD = 13$) as well.

Generally, the scores on the adapted MICO reading comprehension test ranged from minimum 0% to maximum 86% and mean=42 and Std. deviation=20 for the total deaf participants. Thus, the result revealed overall low reading comprehension, categorized as struggling readers (a reading comprehension score of below 60%).

Results of Background Knowledge to Read EFL Questionnaire

The study's second objective was to examine the role of students' background knowledge of a text to read EFL using a background knowledge questionnaire. Table 2 presents the results of the questionnaire.

Table 2: Descriptive statistics of the role of deaf students' background knowledge to read EFL

No	Items	Median	Mean	Range	Standard Deviation
1	Background Knowledge enables to understand the text better	3	2.96	4	1.39
2	Background Knowledge enables recall information easily	3	3.16	4	1.21
3	Background Knowledge enables read the text Quickly	3	2.98	4	1.33
4	Background Knowledge enables link the ideas in the text easily	3	3.07	4	1.38
5	Background Knowledge enables focus on the main ideas	3	3.29	4	1.37
6	Background Knowledge enables overcome limited linguistic knowledge	2	2.61	4	1.34
7	Background Knowledge enables relate text to my own prior knowledge	3	3.34	4	1.20
8	Background Knowledge enables Predict text content easily	3	3.07	4	1.25
9	Background Knowledge enables Confirm predictions based on prior knowledge	3	3.32	4	1.31
Total		3	3.09	4	.46

The findings revealed that the students believe that prior knowledge sometimes help them to relate text to their own prior knowledge with and mean (3.34) and standard deviation (1.39) respectively. Similarly, the data revealed that prior knowledge sometimes enable them to confirm predictions based on prior knowledge with mean (3.32) and standard deviation (1.31), respectively.

Regarding prior knowledge contribution to focus on the main ideas, the finding revealed a mean (3.29) and standard deviation (1.37), respectively. The result also indicated that prior knowledge sometimes enables them to recall information easily with a mean (3.16) and standard deviation (1.21), respectively. Besides, the students believe that prior knowledge sometimes help them to link the ideas in the text easily and predict text content easily with mean (3.07 and 3.07) and standard deviation (1.25 and 1.38), respectively (Table 3.2). However, the students believe that prior knowledge sometimes enable them to read the text quickly with mean (2.98), understand the text better with mean (2.96) and overcome limited linguistic knowledge with mean (2.61) which were decreased below mean point 3.

In sum the overall score of students' perception about the role of prior knowledge of a text's topic for reading comprehension revealed that students believe that prior knowledge sometimes enable them to comprehend what they read in EFL with mean of 3.09 and standard deviation (.46). Thus, the result indicated that the students were fairly aware of the role of prior knowledge of a text's topic for reading comprehension as the mean and/or median indicated sometimes.

Results of the Correlation between Reading Comprehension Level and the Role of Prior Knowledge of a Text's Topic

The third research objective examined the correlation between reading comprehension level ($M = 42$, $SD = 20$) and the role of prior knowledge of a text's topic for reading comprehension ($M = 3.09$, $SD = .46$).

A Shapiro Wilk's Test ($p = .090$) and a visual inspection of the histograms, normal Q-Q plots and box plots showed that the background knowledge scores were normally distributed. A skewness of .188 ($SE = .226$) and a kurtosis of $-.193$ ($SE = .449$) were observed. Although a log transformation was made, the background knowledge scores were still normally distributed. Thus, a parametric test statistic, the Pearson's r correlation coefficient test, was conducted since the background knowledge scores were normally distributed. The Pearson's r correlation coefficient revealed that there was a modest positive significant correlation between background knowledge and reading comprehension ability, with Pearson's $r = .243$ and $p = .009$. Table 3 illustrates the results of the analysis.

Table 3: Pearson's r coefficients for reading comprehension and background knowledge

		Correlations	
		Background knowledge overall score mean	Adapted MICO Reading Comprehension test
Background knowledge overall score mean	Pearson Correlation	1	.243**
	Sig. (2-tailed)		.009
	N	114	114
Adapted MICO Reading Comprehension test	Pearson Correlation	.243**	1
	Sig. (2-tailed)	.009	
	N	114	114

** . Correlation is significant at the 0.01 level (2-tailed).

Discussion

Discussion on the Findings of d/hh Students' Reading Comprehension Level

In conducting studies on reading comprehension among a certain group of students, assessing their reading comprehension ability levels is useful. Accordingly, the reading comprehension ability levels of the participants of this study were assessed using adapted MICO, 1995 comprehension test. The assessment revealed that a lower mean score (Mean = 42). This is a lower result and categorized as struggling readers according to the parameter used in this study. Correspondingly, the finding is also lower than the average result expected in many classrooms and other types of achievement tests (average = 50).

These findings do speak to the overall low reading comprehension level of the sample d/hh students, which is consistent with the existing literature on other deaf/hh populations worldwide (Luckner 2008; Mayberry, 2000; Spencer & Marschark, 2010). In this case, it can be hard to expect these students to read more challenging texts and comprehend them sufficiently as comprehension is not only for language learning but also important for academic success in general. In relation to this it is worth to mention what has been noted by Hoffman and Wang (2010):

Research into the academic achievement of students who are deaf or hard of hearing often finds that the performance of many children in this population falls significantly below that of their typical hearing peers on many measures and across many domains.

On the other hand, the continued low reading scores (struggling readers) found from grade 9 – grade 12 level (Mean = 52, 43, 38, and 18), respectively, are a notable departure from what was expected in language learning: skill level in reading comprehension generally improves across grade level despite the noted challenges experienced by d/hh populations (Paul, 2009). However, the findings of this study indicated that these students have not been able to achieve any noticeable progression in their reading comprehension skills across grade levels.

Discussion on the Findings of Background Knowledge

The overall score of students' perception about the role of prior knowledge of a text's topic for reading comprehension mean of 3.09 and a standard deviation .46 indicates that the students were fairly aware of the role of prior knowledge of a text's topic for reading comprehension. Particularly, the statements related to background knowledge helps to relate text to their prior knowledge, confirm predictions based on prior knowledge, focus on the main ideas and enable recall information easily came first with highest mean results, whereas the statements related to background knowledge helps to overcome limited linguistic knowledge came second with decreased mean result.

These findings are supported by previous studies which showed that prior knowledge can enhance passage recall. Chiesi, Spillich, & Voss (1979) had adults rated as high or low in baseball knowledge recall a play-by-play account of a baseball game. They found that the recall of subjects rated as high in baseball knowledge was more coherent and that they preserved

information important to the goals of the game in their recall, while the recall of subjects rated as low in baseball knowledge was more fragmented.

Discussion on the Correlation between Reading Comprehension and Background Knowledge

There was a modest positive significant correlation between background knowledge and reading comprehension ability, with Pearson's $r = .243$ and $p = .009$. This result indicates that a high score in background knowledge always goes with a high score in reading comprehension ability. The finding is quite similar to Karen's (2015) investigation on the relationship between background knowledge and reading comprehension ability. Karen (2015), studied factors that affect the reading comprehension of secondary students with disabilities (SWD). The participants were 158 SWD in grades 9 to 12 attending two large urban northern California high schools. Multiple regression analyses were conducted and prior or background knowledge was one of the affective and cognitive variables found to have a positive statistically significant influence on reading comprehension of secondary SWD. On the other hand, a non-significant result between prior knowledge and reading comprehension was found in (ibid) investigation when prior knowledge is put in regression with reading comprehension ability in the presence of a variable called word recognition, which had a strong statistically significant relation with reading comprehension ability. This might be because of multicollinearity; variables mustn't be too strongly correlated with one another, which effect of the two independent variables in the model. In sum, though word recognition is aided from prior knowledge, the end result is the same: prior knowledge is important to reading comprehension.

Conclusions

Based on the main findings synthesized above, this study makes the following conclusions.

First, it can be concluded that overall low reading comprehension ability levels can hinder deaf students' not only involvement in EFL reading texts but also involvement of reading a variety of subjects they learn in English language. The poor reading comprehension ability levels among deaf students can be rooted in their learning experiences in earlier grades (Smith, Stone & Comings 2012:9-10). It can also be concluded that the low reading comprehension ability levels among deaf students can slowly erode their positive attitude towards learning the English language, reading its literature and / or learning other subjects whose medium of instruction is English.

Second, as there was a modest positive significant correlation between background knowledge and reading comprehension level, it can be concluded that background knowledge fosters reading comprehension of deaf learners after they have decoded words by enabling them relate text to their prior knowledge, confirm predictions based on prior knowledge, focus on the main ideas and recall information easily.

Recommendations

- EFL teachers of schools for the deaf should work to improve their students' reading comprehension competence through instructional scaffolding. Scaffolding reading comprehension includes effective strategy instruction through interesting texts and tasks, working on students' reading attitude and reading motivation, and making adequate time to engage students in successful sustained reading (Huggins & Edwards 211:31). Similarly, d/hh students should realize their low EFL reading comprehension ability and work towards improving it through the strategy instructions offered by their teachers.
- EFL teachers should help their students make connections between their prior knowledge and new reading materials by implementing different pre-reading activities.
- EFL teachers and curriculum designers should review research findings on special need education, d/hh students. This enables curriculum designers to have comprehensive data and choose interesting and relevant texts, manageable tasks and provide persistent practice opportunities that enable d/hh students to be successful in reading comprehension and their academics.

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