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Learning Strategies Used by Deaf Students in English Reading Comprehension in Secondary Schools for the Deaf in Kenya: Implications on Academic Achievement

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Abstract

Research findings reveal that the majority of deaf students in Kenya complete secondary school when they barely know how to read. In the past five years the mean score obtained by deaf students in Kenya Certificate of Secondary Education (KCSE) English Examinations was below 4.0 points. Bearing in mind that reading comprehension is a major area in the English curriculum that contributes to 32.5% of the total marks in KCSE English examination, explanations regarding the poor performance have pointed to teaching strategies with minimal consideration of learning strategies. This study therefore aimed at finding out the learning strategies used by deaf students in English reading comprehension and the implications on academic achievement. Using descriptive survey research design data was gathered from four secondary schools for the deaf in Kenya. The study established that the learning strategies used by deaf students in reading comprehension included looking at pictures and titles, finger spelling, signing while reading, pointing at words with fingers, determining main idea, memorization, re-reading, reading slowly and carefully, use of prior knowledge and use of the dictionary. These findings pointed to lower level processing and a deficiency in metacognitive skills which had a negative implication on academic achievement in reading comprehension. The study therefore recommends explicit teaching and scaffolding of the reading strategies during reading comprehension lessons.

Keywords: Learning Strategies, English Reading Comprehension, Academic achievement, Deaf Students

INTRODUCTION

The learning of English reading comprehension necessitates readers to be armed with a variety of strategies to help them understand what is read (Snow et al., 2002). The poor grasp of deaf students in reading comprehension has therefore been related to their learning strategies. According to Andrews and Mason (1991) and Strassman (1992) deaf students experienced difficulties with lower-level skills which delayed the development of independent reading strategies.

In Kenya, deaf students have been reported to complete school when they can barely read in English (Adoyo, 2001). This challenge is exemplified by deaf

students' performance in KCSE examination which has continuously been below average. In the years 2008, 2009, 2010, 2011 and 2012 deaf students obtained mean scores of 2.53, 3.56, 2.47, 3.18 and 2.50 respectively out of the possible 12.0 points (Kenya National Examinations Council, 2008, 2009, 2010, 2011 and 2012). The poor performance has been attributed to deaf students' deficiency in English language as a result of poor teaching strategies (Adoyo, 2001, 2004; Ogada, 2012). Research on the learning strategies of deaf students in English reading comprehension as a possible explanation to the low achievement has however remained minimal.

English language plays a vital role in Kenyan education system since it is the official language and the medium of instruction in all schools (Republic of Kenya, 1988). An integrated approach is adopted in the teaching of English where four skills are taught: listening, speaking, reading and writing. Through reading a student is exposed to new vocabulary, new sentence structures, varied registers, and good models of language use. The expectation therefore is that by the end of form four a student should be able to: read and understand a range of texts; select essential points and apply inference and deduction; enjoy reading literary and non-literary material; enhance vocabulary and knowledge of language use through reading; demonstrate awareness of contemporary issues and acquire a long life interest in reading. In addition, the student should be able to apply reading comprehension skills such as recall, comprehension, analysis, synthesis, summarizing and note making (Kenya Institute of Education (K.I.E), 2004).

The KCSE English examination consists of three papers. Paper one tests functional skills and is marked out of 60 marks. Paper two which tests comprehension, literary appreciation and grammar is marked out of 80 marks. Paper three marked out of 60 marks, tests creative composition and essays based on set texts. Much of the reading comprehension is found in the first three questions of paper two which add to 65 marks. The questions involve reading and answering comprehension questions from a passage, excerpt, poem or story. In relation to the total marks from the three papers, reading comprehension therefore accounts for 32.5% of the total marks in KCSE English examination. This is a significant percentage that may influence deaf students' performance in English.

Besides, reading comprehension being an important skill in English, it is also a service skill in other subjects written in English. According (Chege, 2012) a positive correlation exists between reading comprehension and performance in other subjects. There is no doubt therefore that reading comprehension has an influence on the overall academic achievement of deaf students. Research on the learning of English reading comprehension among deaf students in Kenya however remains minimal. It was for this reason that this study set to find out the learning strategies used in English reading comprehension and the implications on the academic achievement of deaf students in secondary schools in Kenya.

Theoretical Perspectives to Reading

Three major groups of reading models namely bottom-up, top-down and interactive have been developed in an attempt to explain the reading process. Each group of these models differs in the strategies believed to be used by students in the process of gaining meaning from the text.

Bottom-Up Models

The reading process in the bottom-up models starts with the decoding of the smallest elements of linguistics especially phonemes and words, continued with creating meaning from the larger elements (Carrell, 1989). The elements of text that are emphasized include letters, words, phrases, and sentences. These elements are integrated from smaller to larger units to arrive at meaning (King and Quigley, 1985). Gough (1972) argued that bottom-up theory emphasizes on the print itself, where the starting point of reading is to grasp words description, letters information, linguistic elements and sentences before understanding the meaning of the whole text. A reader's background knowledge may not be considered in the process (Grabe and Stoller, 2002).

Readers who rely too much on bottom-up processing make reading errors because they are attending too much to graphic features and not enough to semantic concerns. They also tend to give verbatim answers from the text when inferences should be made and prior knowledge applied, rely on surface meaning and often use the dictionary for translating new words (McAnally et al., 2006).

Webster (1986) noted that the use of a bottom-up approach was not a very efficient way of reading. If one had to generate hypotheses about words, sentences and context all the time in order to read, this might be very laborious. Lipson and Wixson (2003) further asserted that words, letters and sentences cannot simply be read correctly. They need to be understood in meaningful way which is determined by the knowledge in a reader's long-term memory. According to van Duzer (1999), Grabe (2004) and Eskey (2005) when using the approach the reader decodes a text word by word. This leads to a slowed pace of reading and overload of the short term memory. Consequently, the reader cannot remember what they read or critically think which lowers motivation for reading.

Top-Down Models

Top-down models recognize the importance of higher skill levels in the reading process. Theorists such as Goodman (1970) proposed that prior knowledge and its interaction with the processing were more valid explanations of the reading process. These theorists argued that skilled readers rely as little as possible on graphemic details and use prior knowledge and context as they strive for comprehension. According to Lewis (1998), readers using top-down approaches are actively involved because of their use of semantic and syntactic guides, which help with the anticipation and prediction of meanings. They rely on their knowledge and experience of the world, language and reading. Apart from prior knowledge, Eskey (2005) further asserted that readers employ other strategies such as guessing the main idea,

contextual prediction, skimming and scanning during the reading process.

Lipson and Wixson (2003) however noted that top-down approaches often cannot account for the ways in which beginner and poor readers approach a text. These readers often read using a lower-level text-driven system, focusing on the text only because they are unfamiliar with it and the content, yet they can still derive meaning in the process. Even accomplished readers resort to text-driven options if they are reading a passage they find particularly difficult. Ahmadi, Hairul, and Pourhossein (2012) further observed that emphasis on the model may result to over reliance on a reader's background knowledge and ignorance of textual features. Moreover, the model overlooks the possible difficulties that a reader may experience with predicting an unfamiliar topic of a text.

Interactive Models

Rumelhart (1977) maintained that the key to understanding the reading process is to determine how bottom up and top down models interact. Stanovich (1984) on the other hand opined that interactive reading models provided a more realistic account of the reading process for both good and poor readers than strictly top-down or bottom-up theories. The central argument was that reading is neither a bottom-up nor a top-down process because it involves a synthesis of simultaneous processes at several different levels.

According to Anderson (1991), the interactive models emphasize that the reader is an active information processor whose goal is to construct a model of what the text means. Two important principles of the interactive models state that first, prior knowledge plays a central role in constructing meaning from text. Second, readers develop and apply a large repertoire of processing strategies ranging from strategies for decoding print to complex metacognitive strategies. Guérard and O'Brien (2005) further observed that any complete model of the reading comprehension process needed to include both bottom-up and top-down components.

According to Lewis (1998) an interactive approach is particularly useful to deaf students as they may be lacking both bottom-up and top-down abilities. Bottom-up challenges, may include reading problems regarding decoding because of reduced language and listening skills. Top-down challenges on the other hand may include limited experience of the world and of language.

Learning Strategies in Reading Comprehension

Scholars have argued that appropriate learning strategies can improve learners' reading comprehension. Some have classified these strategies into two broad types - cognitive and metacognitive (O'Malley et al., 1985). While cognitive strategies involve direct interaction with the text,

thereby facilitating comprehension by operating directly on oncoming information and manipulating it in ways that enhance learning, metacognitive strategies involve a reader allocating significant attention to planning, controlling, monitoring, and evaluating the reading process at different phases (Pressley, 2002; Brown, 2007). Examples of cognitive strategies include underlining, using titles, using the dictionary, note taking, guessing from the context, visualisation, activating prior knowledge, summarizing, use of linguistic clues, use of text markers, skipping difficult parts and repeating words or phrases (Anastasiou and Griva, 2009). Effective reading comprehension necessitates the combination of both cognitive and metacognitive strategies (Ahmadi and Hairul, 2012; Blair-Larsen and Vallance, 2004).

Existing literature indicates that reading strategies can be classified into the phases in which they are used that is, pre-reading strategies, during reading strategies and post-reading strategies (Yang, 2006; Lau, 2006; Mihara, 2011). Before reading, skilled readers employ strategies such as setting the purpose for reading; previewing the text; making predictions; and activating relevant background knowledge (Duke and Pearson, 2002). Setting the purpose for reading gives the reader an idea of how to be selective in the reading of material and to focus on the critical content (Pressley, 2000). Previewing in contrast allows readers to become familiar with text contents and activate prior knowledge (McNamara, 2007). According to Hibbing and Rankin-Erickson (2003), struggling readers benefit greatly from illustrations provided in the text. They offer support to these readers because they tend to need confirmation about what they are reading. However, when text illustrations do not match the story, comprehension can decrease and learning can be reduced.

During reading is a phase in which readers try to make sense of what they read by monitoring their comprehension and using fix up strategies (Vacca, 2002; Duke and Pearson 2002). Comprehension monitoring is the awareness of whether comprehension is occurring while use of fix-up strategies involves the conscious application of appropriate strategies to correct comprehension (Zipke, 2007). Consequently, skilled readers employ strategies such as visualization, self questioning, identifying main ideas, the use of contextual clues and utilisation of reference resources such as the dictionary to handle unfamiliar words and phrases (Duke and Pearson, 2002).

After reading is an evaluation phase where skilled readers summarize the text, question themselves or generate questions about the text to confirm whether they understand and remember what they have read. In case of gaps in comprehension, they use fix-up strategies such as re-reading, reading more slowly and carefully or reflecting about the text (Duke and Pearson, 2002; Grabe 2004; Gourgey, 2001; Horner and Shwery, 2002; Pressley and Hilden, 2006).

Banner and Wang (2011) in their study on reading strategies used by adult and student deaf readers observed that skilled deaf readers were capable of using multiple reading strategies proficiently. Specifically, the strategies employed by skilled deaf readers included: Setting purpose for reading; use of background knowledge; use of mental imagery; self-questioning; self generation of questions; summarization; paraphrasing; predicting; visualizing; and identification of main ideas. Other strategies included: skimming; substituting an unfamiliar word with a familiar one in relation to the context; and translation the text into sign language. Less skilled deaf readers on the other hand rarely used metacognitive strategies; skipped unfamiliar words; re-read the text several times; relied on contextual clues; and were unable to visualize and make connections.

Research indicates that deaf students are less aware than their hearing peers when they do not comprehend what they are reading; rely more on pictures and less on their relevant background knowledge to help them predict and comprehend text; and generally make passive readers instead of actively engaging comprehension strategies unless prompted by the teacher (Marschark, Sapere, et al., 2004; Schirmer, 2003; Schirmer et al., 2004).

Strassman's (1997) explanation for the challenges of deaf students in implementing metacognitive regulative strategies was that they continued to struggle with lower level text-based skills, such as word recognition and vocabulary comprehension. This meant that they did not develop higher level independent strategies, such as self-questioning, activating prior knowledge, inferring, predicting and monitoring for understanding. Schirmer et al. (2004) further observed that the lack of use of metacognitive strategies was largely influenced by teaching methods that fostered dependence.

Strassman (1992) categorized the reading comprehension strategies that deaf students reported using if they did not understand what they read or needed to remember information in a story or answer questions. She found that most of the responses fell into three categories: asking someone; matching the words on the work sheet to those in the texts; and re-reading. Ewoldt et al. (1992) also identified an extensive list of reading comprehension strategies used by 16 deaf readers enrolled at a large residential day school for the deaf. In rank order by frequency, the strategies included: rereading the text; asking someone; using prior knowledge ; using picture cues; continuing to read more text; using the dictionary ; reading the text slowly; reading other materials; reading the text carefully; memorizing aspects of the text; using text features ; and using mental imagery. Mc Anally et al. (2007) however asserted that the use of prior knowledge among deaf students has generally been insufficient. This is as a result of lack of a link between language and experiences which affected the usable prior knowledge that a deaf student could apply to comprehend a text.

Chow (2003) in a study on reading experience through deaf eyes- a case study of two deaf high school students, found out that the students showed a preference for reading the text themselves before they asked for help. The students used a combination of English and American Sign Language (ASL) in building comprehension, decoding words, monitoring and repairing comprehension. Finger spelling was used when they did not understand the meaning of a word or phrase while mental pictures were used in the translation of information read into ASL. The students reported that they referred to a personal bank of English vocabulary and background knowledge combined with context clues such as the text structure to draw appropriate meaning from the text. Self questioning was used to check comprehensions while varying the reading rate, looking back, re-reading or reading ahead were used as fix-it strategies.

The K.I.E English syllabus for Secondary Schools (2004) does not clearly stipulate the reading comprehension strategies that the deaf should use. It is also not well known what strategies the students use in English reading comprehension. The present study therefore aimed at establishing the learning strategies used by Kenyan Secondary School deaf students in English reading comprehension and the implications on academic achievement.

RESEARCH METHODOLOGY

The study was conducted in four secondary schools for the deaf in Kenya that had done KCSE examinations for at least two years. Descriptive survey research design was employed to find out facts and opinions about the leaning strategies used by deaf students. The target population comprised 88 form four deaf students and 12 teachers of English. Saturated sampling technique was used to select 79 students and 11 teachers of English. Data was collected through questionnaires and lesson observation schedules. Face and content validity of the research instruments was established by experts in the Faculty of Education, Maseno University. Reliability of the instruments was determined through a pilot study involving 1(8.3%) of the teachers and 9(10.2%) students who did not take part of the actual study. Data was analyzed using descriptive statistics such as frequency counts and percentages. Qualitative data from lesson observation schedules was transcribed and organized into emerging themes that were reported.

RESULTS AND DISCUSSION

Teachers of English were asked to indicate in the questionnaires how often deaf students used selected learning strategies during reading comprehension. The results are presented in Table 1.

Evidence from Table 1, indicates that the learning

Table 1. Learning Strategies used by Deaf students in English Reading Comprehension as reported by teachers (n=11)

| Strategy | VFU f (%) | FU f (%) | RU f (%) | NU f (%) | DK f (%) |
|---------------------------------|--------------|-------------|-------------|-------------|-------------|
| Silent reading | 3(27.3) | 4(36.4) | 3(27.3) | 1(9.1) | 0(0.0) |
| Signing while reading | 8(72.7) | 2(18.2) | 1(9.1) | 0(0.0) | 0(0.0) |
| Translating the text into K.S.L | 3(27.3) | 6(54.5) | 1(9.1) | 1(9.1) | 0(0.0) |
| Re-reading | 4(36.4) | 5(45.5) | 1(9.1) | 1(9.1) | 0(0.0) |
| Guessing meaning of words | 0(0.0) | 1(9.1) | 4(36.4) | 6(54.5) | 0(0.0) |
| Use of background knowledge | 6(54.5) | 3(27.3) | 1(9.1) | 1(9.1) | 0(0.0) |
| Asking the teacher or friend | 3(27.3) | 5(45.5) | 2(18.2) | 1(9.1) | 0(0.0) |
| Self questioning | 0(0.0) | 2(18.2) | 0(0.0) | 8(72.7) | 1(9.1) |
| Use of picture cues | 7(63.6) | 1(9.1) | 2(18.2) | 1(9.1) | 0(0.0) |
| Use of the dictionary | 6(54.5) | 3(27.3) | 2(18.2) | 0(0.0) | 0(0.0) |
| Finger spelling unknown words | 8(72.7) | 2(18.2) | 1(9.1) | 0(0.0) | 0(0.0) |
| Visualization | 1(9.1) | 0(0.0) | 1(9.1) | 7(63.6) | 2(18.2) |
| Note taking | 1(9.1) | 1(9.1) | 2(18.2) | 6(54.5) | 1(9.1) |
| Memorizing aspects of the text | 0(0.0) | 1(10.0) | 3(27.3) | 5(45.5) | 2(18.2) |
| Varying the reading rate | 0(0.0) | 3(27.3) | 5(45.5) | 2(18.2) | 1(9.1) |
| Skimming and scanning | 0(0.0) | 3(27.3) | 4(36.4) | 2(18.2) | 2(18.2) |
| Summarizing | 0(0.0) | 3(27.3) | 6(54.5) | 2(18.2) | 0(0.0) |

KEY: Very Frequently Used (VFU), Frequently Used (FU), Rarely Used (RU) Not Used (NU), Don't Know (DK)

strategies that were very frequently used included signing while reading (8, 72.7%), finger spelling (8, 72.7%), use of picture cues (7, 63.7%), use of background knowledge (6, 54.5%) and use of the dictionary (6, 54.5%). The learning strategies that were not used included self questioning (8, 72.7%), use of mental imagery (7, 63.7%), note taking (6, 54.5 %), guessing the meaning of words (6, 54.5%) and memorizing aspects of the text (5, 45.5%). It can therefore be concluded that according to teachers of English the most used learning strategies by deaf students in reading comprehension included signing while reading, finger spelling and the use of picture cues.

Classroom observations during reading comprehension lessons further revealed that the learning strategies used by the students to a very large extent included signing while reading, finger spelling and pointing at words with fingers. Use of the dictionary and asking a friend or the teacher were also used to a small extent.

The teachers' reports and classroom observations show that finger spelling, signing while reading, pointing at words with fingers were the learning strategies that were frequently used by deaf students during comprehension reading. The identification of the strategies is likely to have been limited to what could be directly observed by the teachers and the researcher when the students were reading. Some strategies like the use of mental imagery were unlikely to be reported since they could not be directly observed unless self reported by the students themselves.

Finger spelling is one of the strategies used by deaf students when they encounter vocabularies. Its use in most of the classes observed signifies a lack of either knowledge of words used in a text or a sign equivalent.

The use of the strategy does not provide the direct meaning of a word unless supplemented with other strategies such as the use of a dictionary. Frequent finger spelling on encounter with vocabularies interferes with the flow of ideas which eventually affects the overall comprehension of a text.

Pointing at words with fingers during reading on the other hand indicates an active engagement with text. However, this strategy has been regarded as a bad reading habit often associated with beginners (Gathumbi and Masembe 2005; Johns, 2009). The practice also points to difficulties in word identification often characterized by slow reading rate which compromises comprehension.

Signing while reading can be equated to vocalized reading among hearing readers. The use of the strategy has been regarded as a bad reading habit by Gathumbi and Masembe (1997). It slows down the speed of reading not only when the students vocalize but also when they sign. Nutall (2005) pointed out that those who read aloud do not learn much about the meaning of the text. They only have a shallow impression of what they have just read.

The students were similarly asked to indicate in the questionnaires the learning strategies they used in the pre-reading phase; during reading phase; after reading phase; when comprehension failed; and when they encountered a difficult word. The results are presented in Tables 2, 3, 4, 5 and 6 respectively.

Table 2 shows the pre-reading strategies used by deaf students during reading comprehension. From the table the most used pre-reading strategies included looking at pictures to get a clue about the text (48,60.8%) and

Table 2. Pre-reading Strategies as Reported by Students (n=79)

| Strategy | Frequency | Percentage |
|--|-----------|------------|
| Looking at pictures to get a clue about the text | 48 | 60.8 |
| Looking at the title and predict that main idea of the text | 42 | 53.2 |
| Starting to read immediately | 37 | 46.8 |
| Scanning the text to know its length, main idea and organization | 29 | 36.7 |
| Deciding what to read closely and what to ignore | 16 | 20.3 |
| Setting purpose for reading | 14 | 17.7 |

Table 3. During -Reading Strategies as Reported by Students (n=79)

| Strategy | Frequency | Percentage |
|---------------------------------------|-----------|------------|
| Taking note of key words and ideas | 57 | 72.2 |
| Memorizing aspects of the text | 49 | 62.0 |
| Visualizing the information as I read | 36 | 45.6 |
| Asking myself questions as I read | 15 | 19.0 |

looking at the title to predict the main idea of the text (42,53.2%). The least used pre-reading strategy was setting purpose for reading (14, 17.7%).

The finding that looking at pictures and titles to get a clue about the text was the most used pre-reading strategy corresponds with the findings of Marschark, Sapere et al. (2004), Schirmer (2003) and Schirmer, Bailey and Lockman (2004) studies. This can be explained by deaf students' dependence on visual information as a result of hearing loss. Pictures and titles help the students to get the gist of the text although they don't guarantee overall comprehension of the text. Moreover, dependence on the strategy is likely to disorient students especially when a text is not accompanied by a title or a picture. According to Hibbing and Rankin-Erickson (2003) the use of this strategy is associated with poor readers who need confirmation about what they are reading. Consequently, the frequent use of this strategy in this study may be associated with less skilled reading which would influence deaf students' achievement in reading comprehension given that most reading comprehension passages in examinations are not accompanied by pictures or titles.

The fact that setting purpose for reading was the least used strategy denotes that deaf students rarely read with a purpose. According to Duke and Pearson (2002) effective reading involves setting a purpose before starting to read. This helps in planning how to approach a reading task, choose strategies and know what is important to understand and remember from the text. The lack of setting purpose for reading by deaf students therefore portrays their ineffectiveness in approaching a reading task. The implication is that reading is done haphazardly or lacks any value which eventually affects their academic achievement in comprehension.

Table 3 indicates the strategies used by deaf students during reading. From the table the most used learning strategies during reading were taking note of key words and ideas (57,72.2%) and memorizing aspects of the texts (49,62.0%). The least used strategy was asking self questions (15, 19.0%).

Taking note of key words and ideas is one of the strategies used by skilled readers. The strategy helps students understand the core of the text. It also provides a foundation for other strategies such as questioning, visualizing and connecting to prior knowledge. The use of the strategy by a majority of the deaf students therefore signifies an understanding of its importance. According to Bloom et al. (1956) higher order thinking skills in learning do not include memorization. This means that comprehending a text goes beyond memorizing and it is expected to be critical as reading progresses. The use of memorization strategy by deaf students therefore indicates shallow or lower level processing of information often associated with beginners or poor readers. It is a less effective strategy because it is possible to memorize a text without comprehending or thinking about it. For deaf students' the use of the strategy is likely to strain the working memory given that the students also experience language difficulties.

Asking self questions while reading is a metacognitive skill which requires students to create questions in their minds and search for possible answers as they read. It helps students remember what they have read. The rare use of this strategy among deaf students denotes a lack of metacognitive skills during reading which is in accord with Strassman (1997) findings. It also indicates a lack of active engagement with the text. This would negatively influence achievement in reading comprehension in that students become passive readers who fail to evaluate the text or pay attention to the content.

Table 4. After Reading Strategies as Reported by Students (n=79)

| Strategy | Frequency | Percentage |
|-------------------------------------|-----------|------------|
| Determining the main idea | 54 | 68.4 |
| Re-reading the text | 48 | 60.8 |
| Reflecting about the text | 33 | 41.8 |
| Summarizing the text | 27 | 34.2 |
| Generating questions about the text | 18 | 22.8 |

Table 5. Learning Strategies when Comprehension Fails as Reported by Students (n=79)

| Strategy | Frequency | Percentage |
|---------------------------------------|-----------|------------|
| Reading slowly and carefully | 51 | 64.5 |
| Using prior knowledge about the topic | 44 | 55.7 |
| Re-reading the text | 37 | 46.8 |
| Translating the text into KSL | 28 | 35.4 |
| Continuing to read | 26 | 32.9 |
| Reading aloud | 14 | 17.7 |
| Giving up and stopping to read | 6 | 7.6 |

Table 4 shows the strategies used by students after reading. From the table the most used after reading strategies were determining the main idea (54, 68.4%) and re-reading the text (48, 60.8%). Generating questions about the text was the least used strategy (18, 22.8%). These results suggest that most deaf students determined the main idea or re-read the text after reading.

Determining the main idea and re-reading the text portray aspects of skilled reading. However, re-reading the whole text several times may be associated with comprehension difficulties. The failure by most students to generate questions after reading further indicates a deficiency in metacognition particularly in evaluation of the text.

Table 5 shows the learning strategies used by deaf students when comprehension failed. From the table the strategies that were used by majority of the students included reading slowly and carefully (51, 64.5%), using prior knowledge on the topic (44, 55.7%), and re-reading the text (37, 46.8%). Very few students (6, 7.6%) reported giving up and stopping to read. It can therefore be deduced that most deaf students read slowly and carefully or used prior knowledge about the topic when comprehension of a text failed.

Reading slowly and carefully is one of the fix up strategies that involves paying more attention to aspects of the text including words and sentences. Its use however may be associated with bottom-up processing where readers decode a text word by word making the whole task laborious. Readers also tend to focus on reading words correctly even when they don't understand

their meanings. The dominance of the strategy therefore points out the amount of attention that deaf students gave to lower level processing which is not sufficient for effective comprehension.

The use of prior knowledge by most deaf students when they did not understand a text shows their awareness of the significance of prior knowledge in reading comprehension. It also indicates a top-down approach in processing. The use of prior knowledge by deaf students in reading comprehension has however been considered as inefficient. This is as a result of lack of a link between language and experiences which affects the usable prior knowledge that a deaf student can apply to comprehend a text (McAnally et al., 2007). The utilization of the strategy in this study therefore does not warrant comprehension especially when the texts are out of deaf students' experiences.

Table 6 shows the strategies used by deaf students on encounter with a difficult word in a text. From the table the strategies used by majority of the students included looking up the word in the dictionary (56, 70.9%), asking a friend (50, 63.3%) and finger spelling (41, 51.8%). The least used strategy was guessing the meaning of the word (11, 13.9%).

The use of the dictionary by most students denotes an independent fix-up strategy. Nevertheless, it indicates a lack of higher level skills such as inferring or the guessing of the unknown words from the context. Observations in the classrooms revealed that the frequent checking of words from the dictionary led to a slow pace of reading which compromised comprehension. In addition, students had difficulties in relating dictionary and text meaning of

Table 6. Learning Strategies on Encounter of a Difficult Word as Reported by Students (n=79)

| Strategy | Frequency | Percentage |
|------------------------------|-----------|------------|
| Looking up in the dictionary | 56 | 70.9 |
| Asking a friend | 50 | 63.3 |
| Finger spelling the word | 41 | 51.8 |
| Asking the teacher | 35 | 44.3 |
| Skipping the word | 17 | 17.7 |
| Guessing the meaning | 11 | 13.9 |

words when asked by the teacher. Some students ended up finger spelling words in the dictionary- an indication of low vocabulary knowledge. This implies that the use of the dictionary by deaf students was futile and did not guarantee understanding the meaning of a word or the text.

CONCLUSIONS AND IMPLICATIONS

The learning strategies used by deaf students in reading comprehension included looking at pictures and titles, finger spelling, signing while reading, pointing at words with fingers, determining the main idea, memorization, re-reading, reading slowly and carefully, use of prior knowledge, and the use of the dictionary. These findings point to lower level processing and a deficiency in metacognitive skills which have a negative implication on achievement in reading comprehension. This study therefore recommends explicit teaching and scaffolding of the reading strategies during reading comprehension lessons. This will ensure that deaf students are conscious of the appropriate reading strategies to apply for effectual comprehension.

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