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# INFLUENCE OF KNOWLEDGE OF ENGLISH VOCABULARY AND GRAMMAR ON ACADEMIC ACHIEVEMENT OF DEAF STUDENTS IN ENGLISH READING COMPREHENSION IN SECONDARY SCHOOLS IN KENYA

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**Abstract:**
The academic achievement of deaf students in English in the Kenya Certificate of Secondary Education (KCSE) examination has continuously been below average, with a mean of below 6.0 out of the possible mean of 12 for the past five years. Reading comprehension contributes to 32.5% of the total marks in the KCSE English examination. Existing studies attribute the low academic achievement to inadequate knowledge of English vocabulary and grammar. This study, therefore, focused on establishing the influence of knowledge of English vocabulary and grammar on deaf students' academic achievement in reading comprehension. Using descriptive survey and correlational research designs, data were gathered from four secondary schools for the deaf in Kenya. The study established that knowledge of English grammar influenced the academic achievement of deaf students in reading comprehension ($r=0.821$, $p<0.05$). Knowledge of English vocabulary was also found to influence the academic achievement of deaf students in reading comprehension, in that 71(89.9%) of the students scored 0 in the vocabulary questions. 40(50.6%) of the students underlined more than 70.0% of the words in passages, as difficult influencing overall comprehension of the passage. The study

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recommends explicit teaching of story grammar and vocabulary for effective reading comprehension.

**Keywords:** knowledge of English vocabulary, knowledge of English grammar, academic achievement, English reading comprehension, deaf students

## 1. Introduction

Knowledge of English vocabulary has been reported as one of the best predictors of reading achievement in both hearing and deaf students (Richek, 2005; Kyle & Harris, 2006). Research indicates that deaf students experience delayed vocabulary development, which adversely affects their achievement in reading comprehension (Lederberg & Spenser, 2001; Musselman, 2000; Kelly, 1996). According to Johns (2009), comprehension decreased by 50.0% when readers knew less than 90% of the words in a passage. This was particularly true for deaf readers (Albertini & Mayer, 2011). In East Africa, Athiemoolam and Kibui (2012) observed that low proficiency in vocabulary affected secondary school hearing students' achievement in reading comprehension. Mukiri (2012) further indicated that there was a significant relationship between vocabulary breadth, depth and reading comprehension. These studies, however, did not look into deaf students' knowledge of contextual vocabulary, which Van Zeeland (2012) presumed to be a sufficient condition for comprehending a text. Other studies in primary schools for the deaf in Ethiopia and Kenya have established that deaf students had low vocabulary knowledge in English reading and writing (Ludago, 2014; Ogada, 2012). Nonetheless, the studies did not examine the influence of knowledge of English vocabulary on secondary school deaf students' achievement in reading comprehension, which the current study addressed.

Knowledge of English grammar has also been found to have a fundamental role in reading comprehension (Nation & Snowling, 2000). Consequently, the challenges of students in reading comprehension have been associated with difficulties in interpreting meaning in sentences. This was connected to a lack of familiarity with the complex sentence structures that occurred in written languages and rarely in oral languages (Kelly, 1996). Miller, Kargin Guldenoglu, Rathmann, Kubus, Hauser and Superegon (2012) reported that inaccurate syntactic knowledge exerted a direct and adverse effect on deaf students' reading comprehension. Studies involving primary school deaf learners have found a very low competence level in sentence construction when writing composition, and that knowledge of English structure was one of the major problems that influenced deaf students' overall understanding of a text (Ludago, 2014; Ogada, 2012). Establishment of the influence of English grammar achievement on reading comprehension of secondary school deaf students has, however, remained minimal, hence the need for this study.

## 2. Knowledge of English Vocabulary and Grammar and Achievement in Reading Comprehension

### 2.1 Knowledge of English Vocabulary

The term vocabulary refers to words that one needs to know to communicate with others. Vocabulary is important for reading to learn as well as learning to read. Students need to understand the meaning of the words they read if they are to learn from what they read (Nagy & Scott, 2000). Children learn vocabulary indirectly as well as directly (Armbruster, Lehr & Osborn, 2003). Most vocabulary is acquired indirectly through daily interactions with adults, siblings, and peers through conversations around routines, games, nursery rhymes, songs, and reading activities (Landry & Smith, 2006). Though most words are learned indirectly, some vocabulary items must be taught directly. Direct vocabulary instruction helps students to learn high-frequency words that appear most often in texts, as well as difficult words that represent complex concepts that are not part of their everyday experiences (Armbruster *et al.*, 2003). Skilled readers know several meanings of many words and are able to comprehend words in and out of context (Brabbham & Lynch-Brown, 2002).

Direct instruction of selected words is necessary for meaning-making in a text. It helps to learn high-frequency words that appear in texts, as well as difficult words that represent complex concepts that are not part of their everyday experiences (Armbruster, Lehr & Osborn, 2003). When students do not understand most of the words used in a text, they spend too much mental energy figuring out the unknown words. This compromises the comprehension of the text as a whole. According to Herzig (2009), deaf students preferred the teaching of vocabulary to be done before reading. Teachers, therefore, need to teach vocabulary items prior to reading texts. The vocabulary items selected for teaching should be relevant in the meaning-making process and not just the word lists supplied in textbooks. Apart from explicit teaching of vocabulary items, teachers can develop students' skills in the use of context clues, word parts and dictionaries (Blachowicz & Fisher, 2000). Teaching vocabulary before reading is recommended by Sandra (2005) and preferred by deaf students (Herzig, 2009).

Vocabulary knowledge has been identified as a significant predictor of reading comprehension in hearing students (Wallace, 2007; Zhang & Annual, 2008) and in deaf students (Kyle & Harris, 2006). Vocabulary experts assert that students need to know at least 95.0% of the words in a written or spoken text for general comprehension (Hu & Nation, 2000; Van Zeeland & Schmitt, 2012). Others like Hirsch (2003) and Sedita (2005) contend that adequate reading comprehension depends on a reader's knowledge of at least 90.0% of the words in a text. Readers who do not recognize at least 90.0% of the words not only have difficulty in comprehending a text but also miss out on the opportunity to learn new words (Sedita, 2005). According to Johns (2009), when readers know less than 90.0% of the words in a passage, comprehension drops to 50.0% or less. This is particularly true for deaf readers (Albertini & Mayer, 2011). The current study

considered knowledge of 90.0% and above of the words in the passages as the threshold for effective reading comprehension.

Several studies have indicated that deaf students demonstrate low vocabulary knowledge (Marschark & Wauters, 2008; Paul, Wang, Trezek & Luckner, 2009; Rose, McAnally & Quigley, 2004). The challenge in vocabulary acquisition is attributed to factors such as less exposure to words in the environment because of hearing loss and weak reading abilities. As a result, deaf students undergo delays in building their level of vocabulary knowledge; have smaller lexicons; acquire new words at slower rates; have a narrower range of contexts that result in word learning; and have difficulty in understanding multiple word meanings (Lederberg & Spencer, 2001; Musselman, 2000).

Kyle and Harris (2006) established a relationship between vocabulary and reading ability among 7-8-year-old deaf students. The study employed the productive vocabulary measure in which the students were asked to give the correct name of an object. A regression analysis further indicated that productive vocabulary was the strongest predictor of sentence comprehension. However, the study involved deaf children whose vocabulary was still developing. The use of productive vocabulary, therefore, seemed suitable, bearing in mind that they were emergent readers. On the contrary, the current study considered receptive vocabulary knowledge, whose relevance in reading comprehension is absolute.

In East Africa, Athiemoolam and Kibui (2012) found that low proficiency in vocabulary affected secondary school students' achievement in reading comprehension. Mukiri (2012), in a study on the depth and breadth of vocabulary knowledge and English language reading comprehension among selected standard eight pupils in Meru Central District, further established that there was a positive and significant relationship between depth and breadth of vocabulary knowledge and reading comprehension, although depth of vocabulary knowledge had a slightly higher relationship. These studies, however, involved hearing students and did not consider the contextual knowledge of vocabulary of secondary school deaf students, which Van Zeeland (2012) presumed to be a sufficient condition for comprehending a text.

Ludago (2014) observed that limitation in vocabulary knowledge was a major challenge in reading comprehension as reported by Ethiopian eight grade deaf students. Ogada (2012) further established that deaf students had challenges in the choice and range of vocabulary used in composition writing, which influenced their achievement. Both studies were, nevertheless, done in primary schools and not secondary schools for the deaf. Moreover, Ogada's (2012) study did not address vocabulary knowledge in English reading comprehension. One outstanding fact is that KSL, the language that deaf students understand best, does not have sign equivalents for all the words used in English. This implies that the students might not be familiar with some of the words used in English, which is likely to affect their comprehension. The present study, therefore, aimed at establishing the influence of the knowledge of English vocabulary on deaf students' academic achievement in English reading comprehension.

## 2.2 Knowledge of English Grammar

Grammar (syntax) is a system regarding the structure of a language that involves rules along with the information about sequencing words in order to construct meaningful sentences (Davenport, 2002). It can be used to identify the relationship between words and contribute to the unique meaning of the text (Bernhardt, 1991). Students' knowledge of syntax is a powerful predictor of their reading comprehension abilities (Schoonen, Hulstijn & Bossers, 1998). According to Alderson (2000), there is no need to test syntactic knowledge and reading comprehension in isolation, as tests of reading comprehension had nothing more than what students gained from their proficiency in grammar.

The instruction of story grammar and text structure is essential for guiding learners to identify critical narrative elements, such as the setting, primary characters, central conflict, and subsequent resolution (Luckner & Handley, 2008). Beyond narrative components, this pedagogical approach assists students in deciphering organizational patterns by recognizing relationships between individual sentences and broader textual units (Gersten, Fuchs, Williams & Baker, 2001). Specifically, for deaf and hard-of-hearing students, a focused discussion on story grammar is vital for internalizing these textual components (Luckner & Handley, 2008). Conversely, a robust awareness of text structure empowers readers to effectively identify, summarize, and recall both main ideas and their corresponding supporting details (Kame'enui *et al.*, 2002; Meyer *et al.*, 2001).

Analyses of the English grammatical knowledge of deaf students have shown delays in virtually every aspect of English syntax (Berent, 1988). Musselman (2000) stated that deafness usually results in limited spoken language abilities and poor knowledge of the syntax of the spoken language. Consequently, explanations for the impoverished reading comprehension skills of deaf readers presuppose that they often lack adequate syntactic knowledge to sustain the integration of correctly recognized written words into broader ideas at the sentence level (Miller, 2000). According to Miller *et al.* (2012), failure of reading comprehension among the deaf appears to arise from reliance on a reading strategy that skips the processing of sentence structure as a vital source of information, as well as reliance on insufficiently developed or deviant syntactic knowledge for the processing of text meaning.

A number of studies by Quiley and Colleagues (in Paul, 2001) focused on the performances of deaf students on nine major English syntactic structures on the sentential level, that is, negation, conjunction, question formation, pronominalisation, verbs, complementation, relativisation, disjunction and alternation. The students were found to have specific difficulties with verb inflectional processes and auxiliaries, embedded structures such as relative clauses and sentences that did not adhere to a subject-verb-object interpretation. With respect to processing and knowledge issues, Quigley and Colleagues (in Paul, 2001) research indicated that syntactic difficulties were due to a lack of knowledge of the major syntactic constructions which appear frequently in written materials. Despite the detailed findings of this study on the syntactic structures that deaf

students had difficulties with, the influence of the same on achievement in reading comprehension was not addressed, which the current study aimed to establish.

Investigations of sentence level understanding have provided evidence that: while specific syntactic structures are particularly difficult for deaf students to comprehend, difficulties with syntax may be less of a factor in comprehension than the ability to identify words in print through phonological or non-phonological recoding; syntactic difficulties may depress the ability of deaf students to apply vocabulary knowledge during reading; inadequate context inhibits reading comprehension of deaf students; and text that is rewritten to control syntactic complexity and sentence length may result in more understanding difficulties for deaf students due to lack of text coherence (Miller, 2000).

Research has also shown that deaf students use sign language (L1) in reading comprehension (Chow, 2003). This implies that the linguistic specifications of their translations are equivalent to sign language syntax, which is different from English syntax. Lozanova and Savtchez (2009) observed that sign languages have a grammar and syntax that are quite different from those of spoken languages, a factor that confuses learners. Specifically, Ali, Okwaro and Adera (2003) indicated that Kenyan Sign Language (KSL) does not follow the English language pattern. Instead, it follows OSV (Object + Subject + Verb) word order, which is different from English word order, which follows SVO (Subject + Verb + Object) as in:

***English**: The cat is under the table*
***KSL**: TABLE CAT UNDER*

From the above example, a deaf student who is learning English as a second language is likely to be confused by the two sentences. KSL is a visual language: it is not a written language, even though it borrows words from English, which is written. A clear distinction between English and KSL, therefore, has to be made if deaf students are to master English.

A study by Ludago (2014) revealed that understanding the grammar of the Amharic and English languages was a major problem that affected the reading comprehension of eighth-grade deaf students in Addis Ababa. On the other hand, Ogada (2012) asserted that the use of Kenyan Sign Language by deaf students had implications for the use of English syntax in composition writing. The study revealed that most deaf students had low-level competence in sentence construction. It also emerged that most sentences were written in KSL, which affected the level of coherence. This study, however, did not establish whether the knowledge of English syntax also had an implication on achievement in English reading comprehension. The present study, therefore, aimed at determining the influence of knowledge of English grammar on deaf students' academic achievement in reading comprehension.

## 3. Methodology

### 3.1 Research Design

Descriptive survey and correlational research designs were adopted for this study. A descriptive research design is used to gather information on the nature or condition of a present situation. Past events and how they relate to current conditions are also considered (Cresswell, 2009; Best & Kahn, 2006). The use of the design is advantageous in that a combination of procedures such as questionnaires, interviews and observations is employed, providing an opportunity for triangulation (Cohen, Manion & Morizon, 2000; Kombo & Tromp, 2006). Correlational design was used because it explores relationships between two or more variables (Cresswell, 2009). The use of the design maximises the generalisability to situations because it measures variables in their natural settings (Steg, Buunk & Rothengatter, 2008). The combination of descriptive survey and correlational research designs in this study, therefore, enabled the researcher to find out facts; seek opinions; determine relationships; describe, analyse and interpret data on the teaching of reading comprehension and academic achievement of deaf students in secondary schools in Kenya.

### 3.2 Study Population

The study population of this study comprised teachers of English and students because of the key role they play in the teaching and learning of English reading comprehension, respectively. Specifically, the study population included 88 form four deaf students and 12 teachers of English. Teachers of English were chosen because of the key role they play in the teaching and learning of English reading comprehension. Four deaf students were considered because they had covered adequate content of the English curriculum and had adequate experience. This put them in a better position to give informed opinions and views on the teaching and learning of English reading comprehension. Additionally, their achievement in reading comprehension in the county mock examinations depicted the output of the teaching and learning practices employed.

### 3.3 Sample and Sampling Techniques

Purposive sampling technique was used to select four secondary schools for the deaf. The technique involves the use of the researcher's discretion in selecting cases that best meet the research objectives. It is normally used when the researcher wishes to select cases that are particularly informative (Saunders, Lewis & Thornhill, 2009). In this study, the technique allowed the researcher to select secondary schools for the deaf that had already registered for KCSE and County mock examinations.

Saturated sampling, a non-probability sampling technique in which all the members of the target population are selected because there are too few to select a sample out of them (Mugenda & Mugenda, 2003), was used to select 11 teachers of English and 79 form four students. This was after a pilot study that involved 1(8.3%) of the teachers

and 9(10.2%) of the students. In this study, the number of teachers of English and form four students was considered too few to necessitate picking a sample out of them. Table 2 shows the population and respective sample sizes of teachers and students.

### 3.4 Instruments of Data Collection

Interview schedule, observation schedule and document analysis guide were used to collect data on knowledge of English grammar, vocabulary and achievement in reading comprehension.

Document analysis is a technique used to categorise, investigate, interpret and identify the limitations of written documents (Payne & Payne, 2004). It has the potential for revealing information that a respondent is not ready to share or may not be available during observations. It further provides first-hand information on the kind of written feedback given by students (Merriam, 2001). Achievement tests have been recognized as crucial documents for establishing the influences of teaching methods (Best & Kahn, 2006). This study, therefore, used a document analysis guide to obtain information about deaf students' achievement in English reading comprehension, knowledge of grammar and vocabulary. The documents analyzed included form four deaf students' county mock English paper two examination marked scripts. The county mock examination was considered appropriate for this study, first, because it has been found to be a strong predictor of students' performance in KCSE (Njuguna, 2006; Kipng'etich, 2012; Odhiambo, 2013; Andala, Digolo & Kamande, 2014). Secondly, the examination is comprehensive and done at a time when form four students have covered much of the syllabus content. Finally, individual students' marked scripts were accessible. This made it possible to obtain detailed information on achievement in reading comprehension, grammar and vocabulary.

The analysis of achievement in reading comprehension involved three different passages that tackled health and literacy topics. From the curriculum content, the topics were found to be relevant and within the students' knowledge. The reading comprehension section of paper two was marked out of twenty in all three passages. Part of the comprehension questions in each of the passages tested knowledge of English grammar. The testing of knowledge of grammar involved at least one question which required students to rewrite a sentence by changing its tense or starting it with an adverb. The sentences were derived from the passage. In addition, the last section (question 4) of each paper tested knowledge of English grammar. This provided additional information on the achievement of deaf students in English grammar.

Vocabulary knowledge was established by analyzing the achievement of deaf students in vocabulary, which was the last question among the reading comprehension questions. Contextual vocabulary knowledge was tested in all the papers. This involved students explaining the meaning of at least two and a maximum of four vocabulary items as used in the passage. A correct response on each of the vocabulary items was awarded one mark. The researcher further asked individual students to underline in their scripts

the difficult words they encountered while reading the passages. Word counts of the difficult words helped in establishing the extent to which deaf students understood the words used in the passages (contextual vocabulary knowledge). In this study, the set threshold for effective comprehension was knowledge of at least 90.0% of the words in the passage as recommended by Hirsh (2003), Sedita (2005) and Johns (2009).

The interview schedule was used for in-depth interviews with the teachers of English. The instrument enabled the collection of information that could not be directly observed and detailed information on teaching strategies used. It also complemented the document analysis guide and interview schedule in the collection of information related to teaching strategies, vocabulary knowledge and knowledge of English Grammar.

A lesson observation schedule was used during English reading comprehension lessons to collect information on teaching strategies. Observations allow the researcher to see what the respondents actually do rather than what they say they do (Gall, Gall & Borg, 2007)

### 3.5 Validity of the Research Instruments

Validity refers to the degree to which results obtained from the analysis of data actually represent the phenomenon under study (Mugenda & Mugenda, 2003). In this study, face and content validity were considered. Face validity is a qualitative means of ascertaining whether a measure, on the face of it, appears to reflect the content of a concept (Bryman & Bell, 2003). Content validity, on the other hand, is a qualitative means of ensuring that a measure includes an adequate and representative set of items to cover a concept (Drost, 2011). Consequently, the determination of the face and content validity of the research instrument in this study guaranteed accuracy and connection among the variables measured. Normally, face and content validity are ensured by obtaining subjective judgments from the experts in the concerned field (Bryman & Bell, 2003; Sekaran, 2003). The research instruments for this study were presented to experts who judged the face and content validity of the instruments independently and made recommendations.

### 3.6 Reliability of the Research Instruments

According to Best and Kahn (2006), reliability refers to the extent to which a research instrument measures whatever it is meant to measure consistently. The reliability of the research instruments was established through a pilot study involving 9 students (10.2%) and 1 teacher (8.3%) who did not take part in the actual study. Any inadequacies, inconsistencies and weaknesses of the research instrument identified during the pilot study were corrected.

Inter-rater reliability was used to establish the reliability of the lesson observation schedule. Inter-rater reliability refers to the degree to which two or more observers make consistent estimates of the same phenomenon (Cohen, Manion & Morrison, 2007). In this study, a teacher of the deaf who had been trained by the researcher was involved in the observation of reading comprehension lessons. Both the researcher and the teacher

checked the teaching strategies used. A percentage of agreement was obtained by dividing the number of times the researcher and the teacher agreed by the total number of ratings. The acceptable level of agreement was set at 80.0% and above, which is the conventionally accepted level of agreement for inter-observers (Leslie & Reilly, 1999; Barlow *et al.*, 2008; Cooper *et al.*, 2007 in Matella, Nelson, Morgan & Marchlands, 2013).

### 3.7 Data Collection Procedures

Before conducting the research, permission was sought from the School of Graduate Studies, Maseno University. Courtesy calls were paid to the County Education Offices. Thereafter, a visit to the schools was made to obtain permission from the principals on behalf of the students; meet the respondents for public relations; and make necessary arrangements. The first visit was made to the schools to conduct classroom observations and interviews. One reading comprehension lesson was observed for each teacher of English. To reduce the observer effect, students and teachers were prepared beforehand about the observation and its purpose. The researcher played the role of a non-participant observer in the classroom by sitting at the back of the classroom and taking notes.

After the classroom observation, each teacher was engaged in a face-to-face interview in a separate venue. This provided confidentiality for the teachers and an opportunity for the researcher to seek clarifications on issues observed. The teachers were encouraged to provide their opinions voluntarily and openly without being confined to the interview questions. The researcher took notes on the teachers' responses as the interview progressed.

Subsequent visits were made to the schools for the collection of marked scripts. This enabled the researcher to have the students underline difficult words encountered in the reading comprehension passages and make copies of individual student Paper 2 marked scripts. Each student was given a code number, which was assigned to the respective scripts for identification purposes.

### 3.8 Data Analysis

Quantitative data collected from document analysis were analysed using descriptive statistics such as frequency counts, percentages and means. Pearson's product-moment correlation ($r$) was used to establish the influence of knowledge of grammar on deaf students' academic achievement in English reading comprehension. It was similarly used to establish the influence of attitude towards reading on deaf students' academic achievement in English reading comprehension. The significance level ($\alpha$) was set at 0.05.

### 3.9 Ethical Considerations

To uphold ethical standards, participants were informed of the study's purpose and procedures through their school principals. Participation was strictly voluntary and free from coercion. To safeguard participant identities, anonymity and confidentiality were maintained through the use of pseudonyms.

## 4. Results and Discussion

### 4.1 The Influence of Knowledge of English Vocabulary on Deaf Students' Academic Achievement in Reading Comprehension

In order to determine the influence of knowledge of English vocabulary on deaf students' achievement in reading comprehension, their achievement in vocabulary was first established. This was done by obtaining the form four deaf students' scores in vocabulary questions of the county mock English paper 2 examinations. The data collected was analyzed and presented in Table 1.

**Table 1:** Achievement of Form Four Deaf Students in Vocabulary (n=79)

| Score | Frequency | Percentage (%) |
|---|---|---|
| 0 | 71 | 89.9 |
| 1 | 7 | 8.8 |
| 2 | 1 | 1.3 |
| 3 | 0 | 0.0 |
| 4 | 0 | 0.0 |
| **Total** | **79** | **100.0** |

Table 1 shows the achievement of form four deaf students in vocabulary. From the table, 71 (89.9%) of the students scored 0, 7(89.9%) scored 1, and 1(1.3%) scored 2. None of the students scored 4, which was the maximum achievement. This indicates that most of the form four deaf students scored 0 in vocabulary.

The fact that deaf students scored 0 in the vocabulary question shows that they could not interpret the meaning of the words as used in the passage. It is also an indication of low vocabulary knowledge, which coincides with the findings of Marschark and Wauters (2008), Paul (2009) and Rose, McAnally and Quigley (2004). The vocabulary provided was just a sample of the many words used in the passage. It was therefore likely that the learners did not understand other words in the text.

More data was therefore collected on contextual vocabulary knowledge by asking deaf students to underline words that they did not understand in the reading comprehension passages. The passages were different for various schools depending on the county. They were therefore named as passages 1, 2 and 3 respectively. The results are summarized in Tables 2, 3 and 4.

**Table 2:** Difficult Words in Reading Comprehension Passage 1 as Underlined by Students (n=15)

| Number of Difficult Words | Frequency | Percentage (%) |
|---|---|---|
| 0-25 | 2 | 13.3 |
| 26-50 | 3 | 20.0 |
| 51-75 | 3 | 20.0 |
| Above 75 | 7 | 46.7 |
| **Total** | **15** | **100.0** |

Table 2 shows the difficult words underlined by students in passage 1, which had a total of 740 words. From the table, most students 7(46.7%) did not know more than 75(10.1%) of the words used in the passage. This meant that the students knew less than 90.0%, which was the set threshold for effective comprehension.

**Table 3:** Difficult Words in Reading Comprehension Passage 2 as Underlined by Students (n=36)

| Number of Difficult Words | Frequency | Percentage (%) |
|---|---|---|
| 0-18 | 3 | 8.3 |
| 19-36 | 3 | 8.3 |
| 37-54 | 5 | 13.9 |
| 55-62 | 6 | 16.7 |
| Above 62 | 19 | 52.8 |
| **Total** | **36** | **100.0** |

Table 3 shows the difficult words underlined by students in passage 2, which had a total of 620 words. From the table, most students 19(52.8%) did not know more than 62(10.0%) of the words used in the passage. This signified that the students knew less than 90.0% of the words, which was the set threshold for effective comprehension.

**Table 4:** Difficult Words in Reading Comprehension Passage 3 as Underlined by Students (n=28)

| Number of Difficult Words | Frequency | Percentage (%) |
|---|---|---|
| 0-24 | 2 | 7.1 |
| 25-48 | 3 | 10.7 |
| 49-72 | 4 | 14.3 |
| 73-96 | 5 | 17.9 |
| 96 and above | 14 | 50.0 |
| **Total** | **28** | **100.0** |

Table 4 shows difficult words underlined by students in passage 3, which had a total of 960 words. From the table, most students 14(50.0%) did not know more than 96(10.0%) of the words used in the passage. This indicated that the students knew less than 90.0% of the words, which was the set threshold for effective comprehension.

The findings from Tables 2, 3 and 4 suggest that the contextual knowledge of vocabulary of most deaf students was below the set threshold for effective comprehension. The fact that a total of 40(50.6%) students from all the schools underlined more than 10.0% of the words used in respective passages as difficult further indicates that deaf students did not understand a considerable number of vocabularies which affected their comprehension of the text as a whole. This concurs with the results of Albertini and Mayer (2011), which showed that deaf readers knew less than 90.0% of the vocabulary used in texts. According to Hu and Nation (2000) and Van Zeeland and Schmitt (2012), students need to know at least 95.0% of the words in a written text for general comprehension. Johns (2009) further asserted that when readers know less than

90.0% of the words in a passage, comprehension drops to 50.0% or less. This was evident in deaf students' below-average achievement in English reading comprehension (see Table 1).

The low achievement of deaf students in vocabulary may be attributed to challenges in the acquisition of the English language, low breadth of vocabulary knowledge, a negative attitude towards reading and ineffective teaching of vocabulary for reading comprehension.

### 4.2 Influence of Knowledge of English Grammar on Deaf Students' Academic Achievement in Reading Comprehension

In establishing the influence of English grammar knowledge on deaf students' achievement in reading comprehension, their achievement in English grammar was first established. Pearson product-moment correlation between deaf students' achievement in comprehension and grammar was then computed, and the results are presented in Tables 5 and 6.

**Table 5:** Achievement of Form Four Deaf Students in Grammar (n=79)

| Score(x/15) | Frequency | Percentage (%) |
|---|---|---|
| 0-3 | 69 | 87.3 |
| 4-6 | 10 | 12.7 |
| 7-9 | 0 | 0.0 |
| 10-12 | 0 | 0.0 |
| 13-15 | 0 | 0.0 |
| **Total** | **79** | **100.0** |

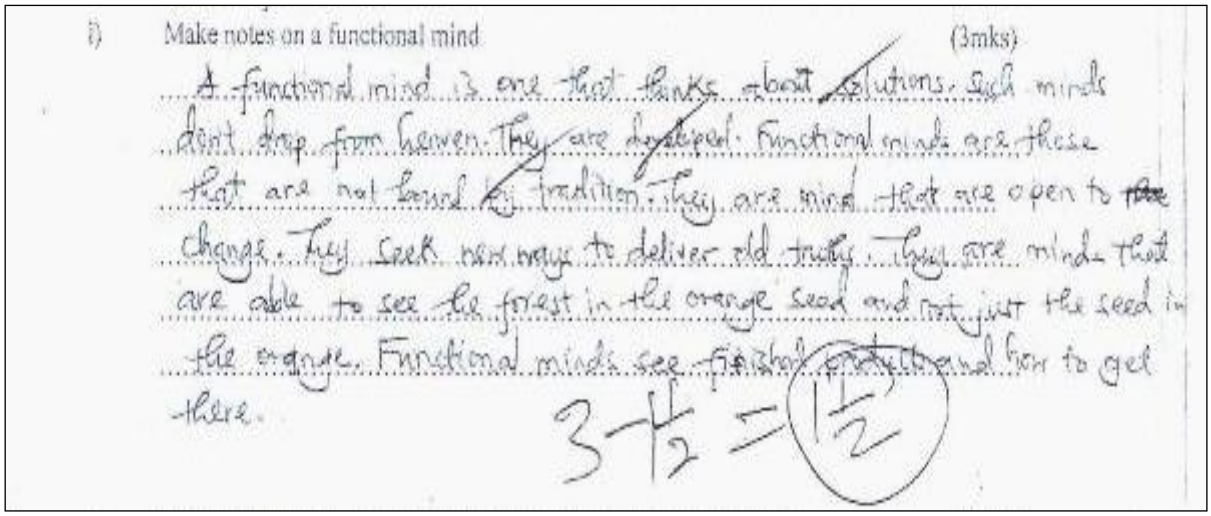
Table 5 shows the achievement of form four deaf students in grammar. From the table 69(87.3%) scored between 0-3 marks and 10(12.7%) between 4-6 marks. None of the students scored above 6. These results prove that the achievement of deaf students in grammar was below average (7.5), with most students scoring between 0 and 3 marks out of 15.

Among the reading comprehension questions was a question that required the students to rewrite sentences extracted from the text by adding a question tag, changing the tense or using an adverb. An analysis of the students' scripts revealed that only 6(7.6%) of the students were able to rewrite sentences as required. Most students either simply copied the questions or left the question blank.

Deaf students' responses to summary writing and note-making questions further provided information on their knowledge of English grammar. In summary writing, which was tested in passage 3, only 3(10.7%) out of 28 students were able to score the expected five marks. In note making, which was tested in all the passages, 28(35.4%) students got at least one mark out of three. However, only 7(8.9%) of all the students got the full marks. Direct copying from the passage and leaving blank spaces characterized

the responses of most students to the questions. The following samples of students' scripts and corresponding excerpts provide evidence of direct copying from the passages.

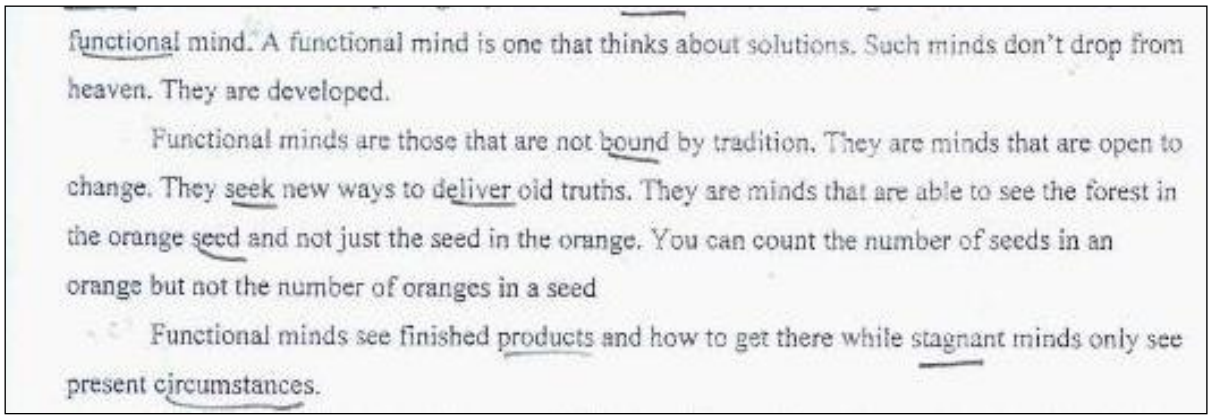
### 4.3 Sample of a Student's Response in Note-taking


i) Make notes on a functional mind (3mks)

A functional mind is one that thinks about solutions. Such minds dont drop from heaven. They are developed. Functional minds are those that are not bound by tradition. They are mind that are open to change. They seek new ways to deliver old truths. They are minds that are able to see the forest in the orange seed and not just the seed in the orange. Functional minds see finished products and how to get there.

3 1/2 = 1 1/2

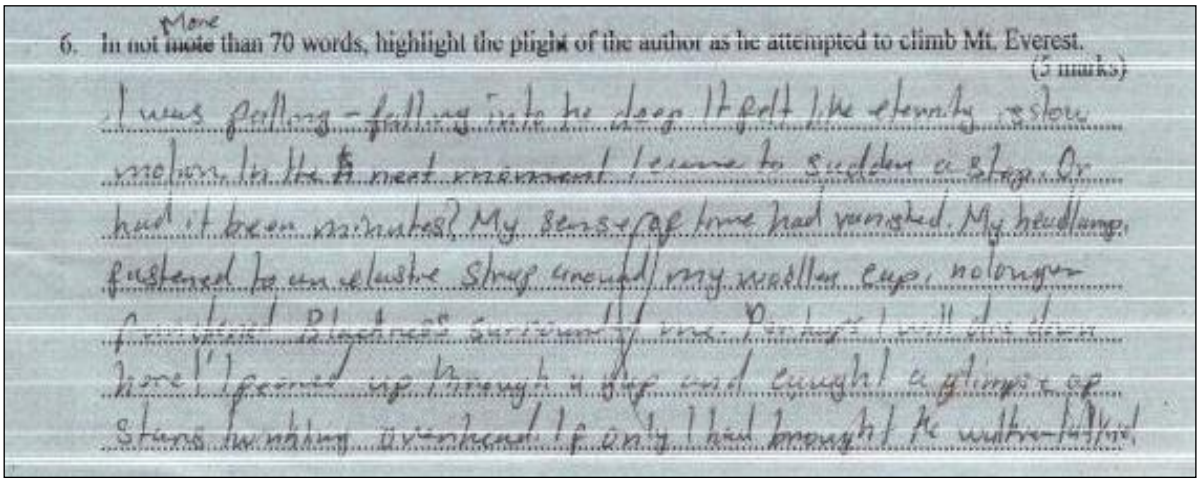
### 4.4 Sample of Corresponding Excerpt Copied by a Student in Note Making


functional mind. A functional mind is one that thinks about solutions. Such minds don't drop from heaven. They are developed.

Functional minds are those that are not bound by tradition. They are minds that are open to change. They seek new ways to deliver old truths. They are minds that are able to see the forest in the orange seed and not just the seed in the orange. You can count the number of seeds in an orange but not the number of oranges in a seed

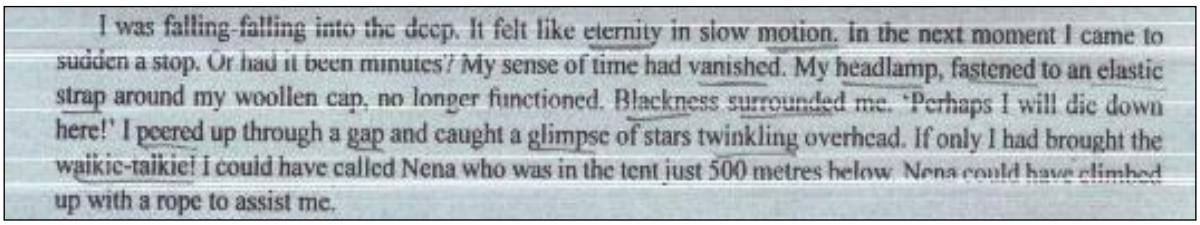
Functional minds see finished products and how to get there while stagnant minds only see present circumstances.

### 4.5 Sample of a Students' Response in Summary Writing


6. In not ~~note~~ More than 70 words, highlight the plight of the author as he attempted to climb Mt. Everest. (5 marks)

I was falling - falling into the deep. It felt like eternity in slow motion. In the next moment I came to sudden a stop. Or had it been minutes? My sense of time had vanished. My headlamp, fastened to an elastic strap around my woollen cap, no longer

### 4.6 Sample of Corresponding Excerpt Copied by a Student in Summary Writing


I was falling-falling into the deep. It felt like eternity in slow motion. In the next moment I came to sudden a stop. Or had it been minutes? My sense of time had vanished. My headlamp, fastened to an elastic strap around my woollen cap, no longer functioned. Blackness surrounded me. 'Perhaps I will die down here!' I peered up through a gap and caught a glimpse of stars twinkling overhead. If only I had brought the waikie-taikie! I could have called Nena who was in the tent just 500 metres below. Nena could have climbed up with a rope to assist me.

The inability of deaf students to rewrite sentences, directly copying from the text and leaving blank spaces depicts challenges in English grammar. This concurs with the study by Ogada (2012), where most deaf students were found to have low-level competence in sentence construction. According to Brown and Palinscar (1985), the process of summarisation and note making involves the extraction of the gist and main themes of what is read while integrating the details into a coherent whole. It depends on basic language skills, inferential abilities and knowledge and engagement with the text. The difficulties of deaf students in sentence construction, summarisation and note making therefore point to a deficiency in language skills, identification of main ideas, inference and engagement with the text, which affected their achievement in reading comprehension.

Summarisation was one of the concepts reported by teachers as difficult for deaf students during interviews. However, classroom observations revealed that the utilization of teaching strategies such as summarisation and the teaching of story grammar and text structure was uncommon during English reading comprehension lessons. The challenges of deaf students in sentence construction, summarization and note making can therefore be attributed to a lack of exposure and practice in the skill.

**Table 6:** Bi-variate Correlation of Achievement of Form Four Deaf Students in English Reading Comprehension against Grammar

| | | **Achievement in Comprehension** | **Achievement in Grammar** |
|---|---|---|---|
| **Achievement in Comprehension** | Pearson Correlation | 1 | .821** |
| | Sig. (2-tailed) | | .000 |
| | N | 79 | 79 |
| **Achievement in Grammar** | Pearson Correlation | .821** | 1 |
| | Sig. (2-tailed) | .000 | |
| | N | 79 | 79 |

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

Table 6 illustrates the results of bi-variate correlation of deaf students' achievement in grammar and English reading comprehension. From the table, the correlation analysis yielded to $r$ = 0.821. This was a strong positive relationship and was statistically significant since the significance level value of 0.000 was less than the set significance level of 0.05 for the analysis. According to Hopkins (2002), the effect size of a correlation of 0.70- 0.90 is very large. The correlation of $r$ = 0.821 established in this study can therefore be considered to have a very large influence. A correlation of $r$ = 0.821 further shows that the shared variance is equivalent to 67.4% ($r^2$= 0.674). Rumsey (2009) asserted that where $r^2$ fell between 0.30 and 0.70, one variable (x) explained the variability in the (y) variable. This meant that 67.4% of the variance in achievement in reading comprehension could be explained by achievement in reading comprehension. The remaining unexplained variance of 32.6% can be attributed to other factors. It can therefore be deduced that deaf students' knowledge of English grammar influenced their achievement in reading comprehension.

The researcher also carried out observations and interviews to establish the teaching strategies used during English reading comprehension lessons. This aimed at establishing whether grammar and vocabulary were taught during reading comprehension lessons. Through observation, the study established the reading phases during which various teaching strategies were used. The results are presented in Table 7.

Table 7 shows the phases of reading in which teaching strategies were used. From the table, the most frequently used teaching strategies before, during and after reading were activation of students' background knowledge 8(72.7%), silent reading 8(72.7%) and questioning 11(100.0%) respectively.

**Table 7:** Teaching Strategies in English Reading Comprehension and Phase when Used as Observed (n=11)

| | Strategy | Pre-Reading Phase f (%) | During Reading Phase f (%) | Post Reading Phase f (%) | Not Used at All f (%) |
|---|---|---|---|---|---|
| 1. | Teaching vocabulary | 0(0.0) | 0(0.0) | 5(45.5) | 6(54.5) |
| 2. | Teaching story grammar and text structure | 0(0.0) | 0(0.0) | 0(0.0) | 11(100.0) |
| 3. | Repeated reading | 0(0.0) | 2(18.2) | 0(0.0) | 9(81.8) |
| 4. | Activation of students' background knowledge | 8(72.7) | 0(0.0) | 0(0.00 | 3(27.3) |
| 5. | Retelling | 0(0.0) | 0(0.0) | 6(54.5) | 5(45.5) |
| 6. | Skimming and scanning | 0(0.0) | 0(0.0) | 2(18.2) | 9(81.8) |
| 7. | Dramatisation | 1(9.1) | 0(0.0) | 0(0.0) | 10(90.9) |
| 8. | Summarisation | 0(0.0) | 0(0.0) | 2(18.2) | 9(81.8) |
| 9. | Reading aloud | 0(0.0) | 4(36.4) | 0(0.0) | 7(63.6) |
| 10. | Silent reading | 0(0.0) | 8(72.7) | 0(0.0) | 3(27.3) |
| 11. | Group reading | 0(0.0) | 5(45.5) | 0(0.0) | 6(54.5) |
| 12. | Questioning | 0(0.0) | 0(0.0) | 11(100.0) | 0(0.0) |
| 13. | Use of visual aids | 0(0.0) | 0(0.0) | 0(0.0) | 11(100.0) |
| 14. | Peer tutoring | 0(0.0) | 0(0.0) | 2(18.2) | 9(81.8) |
| 15. | Demonstration | 0(0.0) | 0(0.0) | 0(0.0) | 11(100.0) |
| 16. | Discussion | 0(0.0) | 0(0.0) | 5(45.5) | 6(54.5) |

The pre-reading stage is a preparation stage in which teachers are expected to employ strategies such as teaching of vocabulary; activation of students' background knowledge; surveying the text, discussion of the text title, pictures and illustrations, topic sentences and main idea; prediction; and use of instructional aids to set a context (Gathumbi & Masembe, 2005; Pinnell, 2002; Readence, Moore & Rickelman, 2004; McCormick, 2007; McIntyre, 2007; Udosen, 2011). Observations, however, revealed that none of the teachers applied other strategies apart from activating the students' background knowledge. This finding concurs with a study by Udosen (2011), which established that teachers rarely utilized diverse teaching strategies that actively prepared students for the construction of meaning from the text.

From the observations, the teaching of vocabulary was found to be unsatisfactory. This is because in all the classes observed, teachers attempted to teach vocabulary provided in the text after the students had finished reading, as evident in Table 7. In addition, none of the teachers was able to teach all the difficult words provided in the text. Students were left to check the remaining vocabulary in the dictionary on their own. When teachers engaged students in checking out vocabulary in the dictionaries, the latter ended up finger spelling words in the dictionary or providing varied meanings of the word from the dictionary. This was an indication of low vocabulary knowledge, lack of sign equivalents for the words and difficulties in relating the dictionary to text meanings. Interviews with the teachers revealed that relating dictionary and text meanings of

vocabulary was one of the concepts that was challenging to deaf students. Most teachers 9(81.8%) further reported that in order to save time, they preferred to discuss the vocabulary provided in the text rather than allowing students to report the new words encountered. The explanation provided was that when students were given the chance to recount the vocabulary they ran into, they ended up supplying too many of them that could not all be discussed within a lesson.

The teaching of vocabulary after reading contradicts the recommendations by Sandra (2005) on the teaching of new vocabulary to deaf students prior to reading. It further disagrees with deaf students' preference for teaching vocabulary before reading, as reported by Herzig (2009). The implication is that the students approach the reading task without understanding the key words necessary for comprehension. Further, the tendency of deaf students to provide more vocabulary when given an opportunity suggests the need for intensive teaching of vocabulary and the involvement of students in the choice of the vocabulary to be taught. This should be done before reading to ensure that learners understand the words they read for comprehension purposes.

The post-reading phase involves consolidation and elaboration on understanding the text. Teachers and students are expected to engage in activities such as discussing and summarizing, retelling, appreciation, questioning and word work (Gathumbi & Masembe, 2005; Pinnell, 2002; Readence, Moore & Rickelman, 2004; McCormick, 2007; McIntyre, 2007; Udosen, 2011). Observations, however, indicated that most teachers utilized the questioning strategy only. In addition, the questions asked were limited to what was set in the core textbooks. This finding matches Udosen's (2011) study, which found out that none of the teachers tried questions outside those set in the text. Questioning is one of the traditional strategies commonly used to check understanding. Its use in this study, especially after reading, signifies a traditional approach towards the teaching of reading with the ultimate goal of assessing. This can be attributed to the reluctance of teachers to try out new methods and their perception towards strategies such as summarisation. Such a disposition does not develop deaf students' critical thinking skills after reading, such as inference, evaluation and application. It also contravenes the purpose of reading and puts the students at risk of failure in reading.

Through interviews, teachers recounted the teaching strategies they preferred in teaching English reading comprehension and the rationale for adopting them. The strategies that were preferred by most teachers included questioning, silent reading, retelling, discussion and peer tutoring. The questioning strategy was preferred because it helped in checking understanding and keeping the students attentive. Silent reading was favored because it saved time, while retelling aided in ascertaining comprehension of the whole text. On the other hand, discussion captivated students' interests and enhanced learner participation. It also enabled the students to learn from their peers. Peer tutoring compensated for the teachers' challenges in communication. The foregoing reasons for preference of the four strategies were informed by the following remarks:

*"I prefer questioning because it helps me test students' comprehension and capture their attention."* (Teacher 8)

*"I always use silent reading because it saves time. When deaf students sign and read, more time is consumed, and I am not able to cover what I had planned."* (Teacher, 1).

*"It is only through retelling that I am able to truly establish whether a deaf student has comprehended the whole text or not."* (Teacher 11)

*"I like discussion, especially after reading, because it captivates deaf students' interest, provides an opportunity for them to participate, and makes the class lively. The students also exchange ideas and learn from each other. "* (Teacher 2)

*"Sometimes when I explain a concept through signing, students do not understand me, but when a peer explains to them the same concept, they are able to understand*." (Teacher 6)

The reports by the teachers of English on the preferred teaching strategies indicate that none of them had an inclination towards effective strategies such as the teaching of vocabulary, the teaching of story grammar/structure, demonstration (explicit teaching of reading strategies), skimming, scanning, use of visual aids and summarisation. This implied a lack of awareness of the importance of the strategies to deaf students or rigidity in trying out new strategies. This could be detrimental to deaf students' academic achievement, given that some of the skills, such as summarisation, knowledge of English vocabulary and grammar, are vital in reading comprehension.

## 5. Conclusion and Recommendation

The study established that the academic achievement of deaf students in English comprehension was below average (10), with most students 46(58.2%) scoring 0-2 marks out of 20. None of the students scored above 8. In vocabulary, most of the form four deaf students 71(89.9%) scored 0 in the vocabulary section of the reading comprehension question. Analysis of the scripts further revealed that most of the students 40(50.6%) knew less than 90.0% of the words used in the passages. This was interpreted as having a negative influence on achievement in English reading comprehension. In grammar, the achievement of deaf students was found to be below average (7.5), with most students 69(7.3%) scoring between 0 and 3 marks out of 15. None of the students scored above 6.

A strong positive relationship, which was statistically significant ($r = 0.821$, $p<0.05$) was found between deaf students' achievement in grammar and English reading comprehension. The shared variance between the two variables was 67.4% ($r^2 = 0.674$). This implied that 67.4% of deaf students' academic achievement in English reading

comprehension could be explained by knowledge of English grammar. Knowledge of English grammar, therefore, influenced deaf students' academic achievement in English reading comprehension.

Deaf students' knowledge of English vocabulary was found to be insufficient, with 71(89.9%) of the students scoring 0 and 40(50.6%) knowing less than 90.0% of the words used in the passages, and this influenced their achievement in reading comprehension.

Findings from lesson observations indicate that 5(45.5%) of the teachers taught vocabulary after reading, while 6(54.5%) did not teach vocabulary at all. Interviews further revealed that effective strategies, such as the teaching of vocabulary and the teaching of story grammar/structure, were not among the preferred teaching strategies. This implied that deaf students approached reading tasks without understanding the key words, which compromised their comprehension. In addition, deaf students had limited opportunities for enhancing their vocabulary knowledge, which influenced academic achievement in English reading comprehension

This study therefore recommends that teachers of English be equipped with adequate knowledge, skills and strategies of teaching reading comprehension to deaf students through in-service training. This will ensure awareness of the varied effective teaching strategies and their relevance in improving deaf students' reading comprehension. Specifically, emphasis should be placed on explicit teaching of vocabulary before reading and teaching story grammar and texture. This will ensure that deaf students understand the vocabulary, story grammar and texture for effective reading comprehension. Further, teachers of English need to motivate deaf students to appreciate and embrace reading as a leisure activity. This will enhance their vocabulary knowledge and understanding of English grammar.



**Conflict of Interest Statement**

The author declares no conflicts of interest.

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