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The effect of word recognition on the reading performance of children with reading difficulties in the Buea municipality

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ABSTRACT

This study investigates the effect of word recognition on the reading performance of children with reading difficulties in Buea municipality. A quasi-experimental research design was used for the study. The population of the study comprised of all primary three children with reading difficulties. Fourteen (14) children were drawn from the population to form the sample. The children were then divided into experimental and control groups (7 children in each group). Data were collected using the reading readiness diagnostic instrument and analysed using mean difference, standard deviations and the Cramer's V to measure the progression rate. The findings of the study indicate that word recognition has an effect on the reading performance of children as indicated on the results of the experimental group which was higher than that of the control group.

KEYWORDS:

Word recognition, reading performance, children, reading difficulties, Buea municipality, quasi-experimental research design, primary three, experimental group, control group, reading readiness diagnostic instrument, mean difference, standard deviations, Cramer's V, progression rate.

Background to the study

For beginning readers in nursery and primary schools to meet the reading demands of their social environment, teachers must develop in them reading readiness concepts and skills such as oral language foundation, print awareness, letter recognition skills, phono-phonemic awareness skills, sight word recognition skills as well as comprehension skills. These concepts and skills serve as a gradual development from non-reading to beginning reading (Oyetunde&Mmuodumogu, 1999; Davis, 2000; Andzayi&Ikwen, 2014)

One of the skills that children need to master before they can read books is the possession of a broad, general appreciation of the nature of print (Rosenberg, 2006). Children need to be exposed to forms of print in everyday life, including conventions associated with book reading. Learning reading comprehension, for beginning readers, requires having them prepare to hear astory, reading the story to them and then following up with questions to strengthen their reading comprehension skills (Torgesen& Matthews, 2000; Prasongsook, 2011;Andzayi&Ikwen, 2014).

Developing skilled reading is a significant milestone in the early years of schooling (Kern & Friedman, 2008; Kamhi&Catts, 2012). A lot of children will enjoy playing with print and reading new words while another group will experience significant difficulties in learning to read, which will affect their academic, social and personal development (Nelson, 2010).These children are at serious risk of falling behind their typically developing counterparts in reading acquisition and in experiencing significant inequalities in educational outcomes (Stanovich, 1986; Morgan, Farakas, & Hibel, 2008; Carson, 2012).

Reading is a linguistic skill that is reliant on the integration of sufficient phonological, semantic, syntactic and pragmatic spoken language abilities (Lonigan, Schatschneider&Westberg, 2008; Kamhi&Catts, 2012). In order to understand how fluent reading works, we have to first understand the ways in which a combination of lower-level processes works. The term "lower-level" does not necessarily imply un-demandingly; through these processes, we acquire the very skills that, when automatized, enable us to become fluent readers (Stanovich, 1990; 2000; Koda, 2005; Grabe, 2009 in Tsiadimos, 2015).

Word recognition is the first and most important of these lower-level processes. Word recognition can be broadly defined as the ability to read isolated words (Adlof, Catts& Little, 2006). Although this ability involves reading words fast and accurately, most of the research has focused mainly on the accuracy dimension (Florit& Cain, 2011), and the term word recognition has generally been associated with tasks in which the number of words read correctly is measured. For years, the 'word" had been ignored as theorists assumed that the speed at which fluent reading takes place renders attention to details impossible (Bald, 2007). However, modern technology scanners have shown that "the reader is paying attention not only to each word and each letter but also to the details that distinguish one letter from the other"(Bald, 2007, p.40). Studies of eye-movements have concluded that readers attend to almost every word in a given text (Dunn-Rankin, 1985; Rayner, 1995). Other studies have proved that 80% of the content words, as well as 50% of function words in any given text, draw and demand a reader's focused attention (Adams, 1990; Perfetti, 1999; Stanovich, 2000). Readers maintain this focus on words for an average time of 200-250 milliseconds (Ashby & Rayner, 2006).

Word reading skills are today acknowledged as key to successful reading comprehension (Cain, 2010) as word recognition has repeatedly been found to be a safe predictor of later reading competence

(Adams, 1990; Perfetti, 1999). In turn, automatic word recognition is the output of a process of combined interaction among four types of sub-skills: orthographic, phonological, semantic and syntactic (Grabe, 2009). Orthographic processing is a lower-level process that involves letter parts, letter and larger letter groups (e.g., in English, a, ba-, -ake, -ight, etc) recognition. Orthographic processing proves particularly useful with longer and more complex words as focus on morphological affixes can offer readers access to many words beyond the first thousand more frequent words in English which are their direct derivatives (Grabe, 2009).

Phonological processing involves using phonological clues that interact with orthographic and semantic ones in the effort to recognise words in a process prompted by visual input (Plaut, 2005). Phonological processing skills have also been found to predict later reading development and are often connected to reading problems (Grabe, 2009). As syntactic and semantic information is always preceded by word recognition (Grabe, 2009), the contribution of semantic and syntactic processing to word recognition has often been the subject of heated debates. The theory of automatic spreading activation mechanisms (Mc Rae, Sa & Seidenberg, 1997;Coltheart, Rastle, Perry, Langdon & Ziegler, 2001) has offered us an interesting insight into the ways in which these processes can contribute to lexical access by a reader. The theory suggests that accessed words spread some sort of activation to their semantic neighbors, such as collocates, thus activating their recognition. In other words, syntactic and semantic processing of context can aid the recognition of difficult to process or unknown words, especially by non-fluent readers.

All these processes "are carried out as part of working memory, the framework in which cognitive processing and knowledge resources are integrated for comprehension" (Garbe, 2009, p. 21). Proficient readers make simultaneous use of these processes, at times relying more on grapho-phonic (letter to sound) correspondences and at times relying more on background knowledge and experience or contextual information when trying to gain lexical access (Church, Fessler, & Bender,1998).

The foregoing information establishes word recognition as an interactive process built upon "constituent"(Perfetti& Hart, 2001) orthographic, phonological and semantic-syntactic sub-processes. Despite the fact that most researchers today emphasize the importance of word recognition to reading, it will be rather superficial to assume that it is the one and only pre-requisite to reading competence. We have to acknowledge, however, that "it is critical to reading and the one unique aspect of language comprehension associated with reading"(Grabe, 2009, p. 102 in Tsiadimos, 2015). Learning to read in an alphabetic system, such as English, requires the development of mappings between speech, sound and letters called the alphabetic principle. Reading comprehension, which is the desired outcome of most reading activity, is strongly connected to other language aspects as well; wider language skills (vocabulary, grammar, and pragmatics) are critical for the understanding of the meanings of words and sentences. Readers are, thus, enabled to integrate words and sentences into texts and make inferences that go beyond the printed word (Caroll, Bowyer-Crane, Duff, Hulme&Snowling, 2011).

Statement of the problem

It has been observed that children are able to read out words that are taught to them through drills and memorization methods but are not able to read out the same words presented to them in an alternated order or when mixed with other words having similar initial, medial or final vowel or consonant sound blends. This is because the method used in teaching encourages memorization and rote reading rather than developing reading skills. Most children with reading difficulties may face problems with word recognition; the effect of poor word recognition makes learning and reading challenging. Without the ability to read well, opportunities for personal fulfilment and job success will inevitably

be jeopardized. Against this understanding, this study sets out to investigate the effect of word recognition on the reading performance of children with reading difficulties in the Buea municipality.

Purpose of the study

The purpose of this study is to find out the effect of word recognition on the reading performance of children with reading difficulties.

Specific Objectives

- To investigate the influence of word recognition on the reading performance of children with reading difficulties.

Research question

How would word recognition influence the reading performance of children with reading difficulties?

Hypothesis

- There is no significant effect of word recognition on the reading performance of children with reading difficulties.

Methodology

The research design used in this study was the quasi-experimental design. For the purpose of the study, we adopted the quasi-experimental design that made use of the Pre-test Post-Test design with non-Randomized experimental and control groups as presented in table 1 below.

Table 1: The Pre-test Post-Test Design with Non-Randomized Experimental and Control Groups

Group (independent)	Pre-test	Experimental	Post-test (Formative Evaluation)
G1	Q1	X	Q2
G2	Q1		Q2

Table 1 above can be explained as follows:

1. X represents the independent variable, which was referred to as the experimental variable. The experimental variable has been put into a master plan of activities relating to each variable. Each subsection of the master plan reflects phonemic awareness activities relating to a variable and a hypothesis.
2. Q1 and Q2 represent the dependent variable before and after the manipulation of the independent variable X. In this study, it represents the pre-test and post-test respectively, administered before and after the experimental treatment.
3. G1 and G2 represent the experimental and control groups respectively.

The population of the study was made up of 197 primary three pupils. From this population, a target population of 51 pupils with reading difficulties was selected. With an accessible population of 14 primary three pupils. From the sample, the researcher assigned an equal number of control and experimental group that was made up of 7 boys and 7 girls.

Data were collected using a triangulation of instruments. A teacher's report was used to collect anecdotal records and case history of the participants while classroom records were used to collect the children's progress during the school year and apre-test post-test was given to all the participants before and after the intervention period to get their starting level and end level of the pupils. The test was made up of aphonemic awareness test, oral blending test, word reading test, and a spelling test.

The test consisted of sections on phonemic awareness; oral blending; word reading and spelling. The instruments used for treatment were word and letter chats, card board letters, words and sentences.

A letter of introduction was given to the school head teacher introducing the researcher and soliciting for cooperation of the school authorities and the pupils. After the researchers had obtained permission from the school to conduct the research, the researchers then used the reading diagnostic instrument to conduct a pre-test on the pupils with reading difficulties. After the pupils were identified, they were then divided into control and experimental groups after which the experimental group was then taught separately with word and letter chats, card board letters, words and sentences using more examples and illustrations while the control group was taught normally without these items but similar lessons. After six weeks of treatment, the researchers administered the post-test to both the experimental and the control group using the same reading diagnostic instrument that was used for pre-test.

Data analysis

The statistical procedure used to analyze the research question was mean difference, standard deviations and the Cramer's V test based on the progression rate, as the composite variables were categorical and dichotomous ('Has progressed' and 'Has not progressed'), while the hypotheses were verified by comparing effect sizes, using Cohen's *d*.

Formula for Cramer's V

The formula for Cramer's V is:

$$V = \sqrt{\frac{\chi^2}{(N)(\min\ r-1, c-1)}}$$

Where (min r-1, c-1) is the minimum value of either the number of rows-1 or the number of columns-1 and X^2 the statistical value of the Chi-Square test.

Findings of the study

The findings are discussed based on the research question and hypothesis according to the performance of the experimental and control groups.

Research question: How would word recognition influence the reading performance of children with reading difficulties?

The results presented here focus on the ability to recognise words by children with reading difficulties in both the experimental group and the control group as presented below.

Table 2: Description of the ability to recognise word across test level for the experimental group

Ability to recognise word		Test level	
		Pre-test	Post-test
Identification of word	Mean	2.14	2.71
	Median	2.00	3.00
	Std. Deviation	.690	.756
Identification of number	Mean	2.59	3.97
	Median	2.60	4.20

	Std. Deviation	.951	.854
Ability to recognise word/20	**Mean**	**9.71**	**13.43**
	Median	**10.00**	**14.00**
	Std. Deviation	**1.799**	**2.760**

The results show that the mean scores and standard deviations for identification of word skills indicated that the mean score of the pupils on the pre-test was μ = 2.14, SD = 0.69 and the post-test was μ = 2.71, SD = 0.756. The findings indicated that there was an improvement in the mean score (0.57) from the pre-test to the post-test. Also, the test scores for the identification of numbers skills indicated that the mean score of the pupils on the pre-test was μ = 2.60, SD = 0.951 and the post-test was μ = 3.97, SD = 0.854. The results showed an improvement in the mean score (1.38) from the pre-test to the post-test. Furthermore, the test scores for the ability to recognize words indicated that the mean score of the pupils on the pre-test was μ = 9.71, SD = 1.799 and the post-test was μ = 13.43, SD = 2.76. The results showed an improvement in the mean score (3.72) from the pre-test to the post-test. The experimental group revealed that there was an improvement from pre-test to post-test for the two scales and the overall ability to recognize word scores. The results showed that the intervention had a positive effect on the post-test of the pupils in the experimental group.

Table 3: Description of the ability to recognize word across the test level for the control group

Ability to recognize word		**Test level**	
		Pre-test	**Post-test**
Identification of word	Mean	2.43	2.43
	Median	2.00	2.00
	Std. Deviation	.535	.535
Identification of number	Mean	2.63	3.06
	Median	3.00	3.20
	Std. Deviation	.640	.597
Ability to recognize word/20	**Mean**	**10.29**	**10.86**
	Median	**10.00**	**10.00**
	Std. Deviation	**1.799**	**1.069**

The results indicated that the mean scores and standard deviations for identification of word skills indicated that the mean score of the pupils on the pre-test was μ = 2.43, SD = 0.535 and the post-test was μ = 2.43, SD = 0.535. The findings indicated that there was no improvement in the mean score from the pre-test to the post-test. Also, the test scores for the identification of numbers skills indicated that the mean score of the pupils on the pre-test was μ = 2.63, SD = 0.64 and the post-test was μ = 3.06, SD = 0.597. The results showed an improvement in the mean score (0.43) from the pre-test to the post-test. Furthermore, the test scores for the ability to recognize words indicated that the mean score of the pupils on the pre-test was μ = 10.29, SD = 1.799 and the post-test was μ = 10.86, SD = 1.069. The results showed an improvement in the mean score (0.57) from the pre-test to the post-test. In the control group, a slight improvement was obtained with the identification of numbers but the overall ability to recognize word score almost stagnated. The improvement in the post-test scores may be due to practice by the children, interaction by the experimental and control group children as well as the learning at home which brought about the slight increase in the post-test of the pupils in the control group.

Research Hypothesis: There is no significant effect of word recognition on the reading performance of children with reading difficulties.

To ascertain the impact of the ability to recognize the word and the reading performance of the children, the progression rate was measured based on mean difference comparison and the progression based on the difference in the proportion of the number of pupils that had progressed was used to test the hypothesis as outlined in the sections below.

Table 4: Comparing progression (mean difference from pre-test to post-test) in the ability to recognize word between control end experimental groups

	Progression (mean difference from pre-test to post-test)	
	Control group	**Experimental group**
Identification of word	0.6	0.0
Identification of number	1.4	0.4
Ability to recognize word/20	**3.7**	**0.6**

Theoretical effect size= 0.725
Group SD=2.983
Calculated effect size=1.039

The theoretical effect size is smaller than the calculated one. This, therefore, implies that there was a significant progression for the overall ability to recognize word score from pre-test to post-test in the experimental group is due to the intervention. Comparing progression based on mean difference between the experimental and the control groups, it was higher in the experimental group for all the scales while in the control group there was an improvement only in the identification of numbers. This shows that the impact of the intervention on the experimental group positively influenced the pupils' ability to recognize words using the phonics method.

Progression based on the difference in the proportion of the number of pupils that had progressed is indicated in table 5 below where the results of the test statistics reveal the number of pupils who witness an improvement in their test scores in both the experimental and the control groups.

Table 5: Comparing progression rate based on simple progression between control and experimental groups

			Ability to recognize word		Total	Cramer's V
			No progression	Progression		
Group	Experimental	N	1	6	7	V=0.447; P=0.044
		%	14.3%	85.7%	100.0%	
	Control group	N	4	3	7	
		%	57.1%	42.9%	100.0%	
Total		N	5	9	14	
		%	35.7%	64.3%	100.0%	

:

Comparing progression rate based on simple improvement between control and experimental groups, six (85.7%) children out of seven children in the experimental group had progressed except one (14.3%) while three (42.9%) children out of seven children had progressed in the control group while four (57.1%) had no progression. This difference was significant as the Cramer's V test statistics

(V=0447, P<0.05). The hypothesis here stated is then rejected thus implying that the phonics method has a significant positive influence on the overall ability to recognize words by children in the experimental group. This shows that the phonemic method used in the intervention positively influenced pupils' word recognition in the experimental group.

Discussion

In line with the study, Grabe (2009) shows that phonological processing skills have been found to predict later reading development, which is in line with the theory of automatic spreading activation mechanism which offers an interesting insight into the ways in which phonological processing contributes to lexical access by a reader. Indicating that access to words helps the reader to be able to connect these words improving on the word recognition (Mc Rae, Sa & Seidenberg, 1997; Coltheart, Rastle, Perry, Langdon & Ziegler, 2001).

Conclusion

The findings of the study indicate that word recognition intervention has a positive effect on the reading performance of children as indicated by the results of the experimental group which was higher than that of the control group. The hypothesis here stated is then rejected thus implying that word recognition training has a significant positive influence on the reading performance of children with reading difficulties. The study recommends that children should be exposed to more words through short stories presented in passages arranged in paragraphs and picture forms that will attract their attention, thereby, motivating them to read.

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