Effects of Graphic Organizers on Reading Comprehension of Pupils With Dyslexia in Primary Schools in Owerri, Imo State Nigeria

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Abstract

Dyslexia is a specific learning disability that is characterized by difficulties with accurate and/or fluent word recognition, by poor spelling and decoding abilities. A good number of pupils experience it. Therefore, intervention strategies are needed to ameliorate these challenges because of its effect on learners and their learning. This study examined the effects of graphic organizers on reading comprehension of pupils with dyslexia in primary schools in Owerri North Local Government Area of Imo State, Nigeria. Participants were 80 pupils with dyslexia selected through convenience sampling. Pretest-posttest quasi-experimental design was used for the study. Three hypothesis were tested using Analysis of Covariance (ANCOVA) and Multiple Classification Analysis (MCA). Results of data analysis shows that graphic organizer had significant main difference on reading comprehension of the participants (F-ratio = 85.329; $p<.05$) while gender had no significant main effect on reading comprehension of the participants (F-ratio = .344, $p<.05$). Significant interaction effect of graphic organizer on reading comprehension of the participants was also found (F-ratio = .305, $p<.05$). The need for workshop on the use of graphic organizer for teaching reading comprehension to pupils with dyslexia and the need to ensure gender balance should be considered while grouping pupils with dyslexia for graphic organizer were advocated.

INTRODUCTION

Dyslexia is a specific learning disability that is characterized by difficulties with accurate and/or fluent word recognition and by poor spelling and decoding abilities. Dyslexia is a common learning disorder that affects between 4% and 8% of children and often persists into adulthood (Wang, Liu, & Xu, 2019; Peterson, 2015). This neurodevelopmental disorder is characterized by reading and spelling impairments that develop in a context of normal intelligence, educational opportunities, and perceptual abilities (Peterson, 2015). Reading and spelling abilities can be affected together or separately. The learning abilities of children with dyslexia are significantly lower than those of their unaffected pairs of the same age. Generally, difficulties begin to show during the early school years. Dyslexia is a complex multifactorial disorder whose etiology has not been fully elucidated, and it has caused great social and economic burdens. Over the last few decades, the research on dyslexia has made some progress. For example, some studies have shown that dyslexia have a strong genetic background that can affect brain anatomy and functions (Ikechukwu, Onwuka, & Ugwude, 2020).

The ability to process sounds is a necessity for reading. A child with dyslexia may manifest the ability to process sound and read fluently. It has been observed that dyslexia

do not have a known surface with clear disability sign. However, the clues to look out for may include: learning disability, delayed initial speech, difficulty with rhyming words, confusing letters for each other, poor reading fluency, grammar issues, and poor sentence structure. Others signs may include lack of phonemic awareness, avoidance of reading aloud and copying words from a secondary source (Ikechukwu, Onwuka, & Ugwude, 2020). Furthermore, Adetoun, Oladele and Oladele (2016) pointed out subtle signs of dyslexia to be withdrawal from peers, depression, low self-esteem, appearing unmotivated or lazy, having difficulties with peer and sibling relationship, misbehavior or acting out, delayed initial speech, difficulty with rhyming words and loss of passion for schooling (Ikechukwu, Onwuka & Ugwude,2020).

Dyslexia is a serious case of disability as it sometime not contacted but inherited. In this case, dyslexia is a very serious disability as it cannot be cured. In every ten households, there may be high case of dyslexia (Fletcher, et al, 2019). Even with the knowledge and effort being put in the teaching of pupils with dyslexia, the problem persists. This is an indication that the effects can only be ameliorated but the disability cannot be eliminated entirely. The ugly part of this disability is that it hinders recognition of letters, sound processing, pronunciation and reading comprehension. About 12 % of the world's population are leaving with one form of Dyslexia or the other (Jingau and Iroham, 2015).

It has been found that the reason for poor academic performance of most pupils in special needs schools is as a result of dyslexia (Sand & Bolger, 2019). Many parents at homes are battling with issues of reduction of dyslexia in their children. This raised the question of how well have teaching and instructions in basic schools aided the reduction of the number of pupils with dyslexia especially in the face of the fact that most of their teachers are not specialists or sufficiently trained in that area of specialization. There is also the argument about the nature and the extent of the impact of teaching and instruction on persons with dyslexia in basic schools. To a large extent, teaching and instructions promoted the reductions of the effect of dyslexia on pupils (Jingau, & Iroham, (2015). It is in view of these that the researchers are investigating the impact of graphic organizers on reading comprehension of pupils with dyslexia in basic schools in Owerri North Local Government Area, Imo State, Nigeria.

LITERATURE REVIEW

Although some researchers have described dyslexia as synonymous with reading disability (Fletcher, Lyon, Fuchs, & Barnes, 2019; Pennington, McGrath, & Peterson, 2019), the term is generally used to describe difficulty in word-level reading (decoding) difficulties.

Dyslexia refers to the low end of a normal distribution of word reading ability. Thus, in order to diagnose the disorder, a somewhat arbitrary cutoff must be set on a continuous variable. (Peterson & Pennington, 2015). Clearly, reading disability has a neurobiological component, like proficiency across all domains of human performance (Protopapas & Parrila, 2018).

Reference to a neurobiological origin, therefore, neither offers explanatory power nor serves a diagnostic function (Sand & Bolger, 2019). Given the reciprocal interaction between environmental and biological components in human development (Petrill et al., 2010), dyslexia and other decoding difficulties seems to be interwoven on the basis of nature versus nurture controversy (Fletcher et al., 2019; Olson, Keenan, Byrne, & Samuelsson, 2019; Protopapas & Parrila, 2019). Thus, the idea that people are born with dyslexia because they have bad genes and bad brains is an outmoded notion. This should be replaced with concepts of risk and malleability that are dependent on instruction and early intervention (Miciak & Fletcher, 2020).

GRAPHIC ORGANIZER

A graphic organizer is a diagram that represents a relationship directed by a thinking-skill verb. The verb "sequence" calls for a diagram of a series of boxes connected by arrows that shows the "event" of one box leading to the "event" of another box (Hibbard, & Wagner, 2003). In 1992, Jay McTighe in his book outlined three main ways teachers may use graphic organizers in their teaching and a number of ways that students can use them to aid their learning process. In the reading process, graphic organizers can be used at three levels: Before instruction, during instruction and after instruction. Before instruction, graphic organizers are used to understand the level of the students in terms of the contents. During instruction, graphic organizers allow students to approach the content cognitively because they assist thinking. It also allows students to construct maps that are appropriate to their learning styles.

After instruction, they help students as a summarization tool or technique and they help the learner to understand their improvement in terms of understanding read passages. If a student can connect prior knowledge with what was learned and identify relationships between those ideas, it means graphic organizers have successfully assisted them in the course of their learning process. The strategy that has received the most attention in helping learners with dyslexia from the research community is the graphic organizer (Barron, 1969). Graphic organizers are representations, pictures or models used for processing textual information. They facilitate understanding of knowledge when there is a large amount of information to work with, in a given limited time (Liliana, 2009). There

are various functions of graphic organizers. In reading comprehension, they assist learners to:

• Clarify and organize information into categories (main idea, supporting details, topic sentence, facts opinion, etc).

• Organize information in a paragraph for better understanding.

• Construct meaning of difficult words and sentence dividing into lexias.

• Understand the context by associating with prior knowledge.

• Identify conceptual and perceptual errors that may occur in the course of reading a passage.

Graphic organizers can have various forms, from representations of objects to hierarchical and cyclical structures. Although their uses in learning activities are preferred by people who have a visual style of learning, graphic organizers are extremely useful to different learners (Liliana, 2009). Semantic map, structured overview, web, concept map, semantic organizer, story map, graphic organizer, etc. no matter what the special name, a graphic organizer is a VISUAL representation of knowledge. It is a way of structuring information, of arranging important aspects of a concept or topic into a pattern using labels (Bromley, Irwin-DeVitis, & Modlo, 1995). Ciascai (2009) investigated Graphic Organizers as 'instruments of representation, illustration and modeling of information'. Her investigation also examined the use of graphic organizers in educational practices for building and systematizing knowledge. This investigation concluded that graphic organizers help learners in understanding the content of the text by classifying and modeling ideas in the text (Ciascai, 2009).

STATEMENT OF THE PROBLEM

Dyslexia is a serious disability that cannot be cured. In every ten households, there is a very high probability that there may be a case of dyslexia. Even with the knowledge and efforts being put in the teaching of pupil with dyslexia, the problem persists. This is an indication that the effects can only be ameliorated but the disability cannot be eliminated entirely. The inculcation of literacy and numeracy into primary school pupils' curricula is one of the core components of the National Policy on Education (2014). This is because reading comprehension is pivotal to academic success as it is required to understand other subjects. Reading is needed for daily activities in the current society. A pupil who cannot read will not be able to follow written instructions and may likely not do well in his/her studies because most aspects of instruction depends on reading. Hence, ameliorating the challenges for such pupils with dyslexia is inevitable. Therefore, the need to research into strategies for enhancing reading comprehension is the motivation behind this study.

PURPOSE OF THE STUDY

The purpose of the study is to investigate if graphic organizer will enhance performance in reading comprehension of pupils with dyslexia in basic schools in Owerri North Local Government Area, Imo State, Nigeria. Specific objectives of the study are to determine the:

• Effect of graphic organizer reading on reading comprehension performance of basic school pupils with dyslexia.

• Effect of gender on reading comprehension performance of basic school pupils with dyslexia.

• Interaction effect of graphic organizer and gender on reading comprehension performance of basic school pupils with dyslexia.

HYPOTHESES

The following hypotheses were tested at .05 level of significance:

i. There is no significant effect of graphic organizer reading on reading comprehension performance of basic school pupils with dyslexia.

ii. There is no significant effect of gender on reading comprehension performance of basic school pupils with dyslexia.

iii. There is no significant interaction effect of graphic organizer and gender on reading comprehension performance of basic school pupils with dyslexia.

METHODOLOGY

The design used for this study was a quasi-experimental design using a pre-test, post-test control group design. In this variation, three intact groups were used, two were assigned to experimental group and one to control group. The three intact groups were primary school pupils, comprising primary three pupils in three schools. The graphic organizer was applied to teach comprehension to primary three pupils in two schools which were the experimental groups, while no reading strategy was applied to the control group. Pre-tests were administered to both the experimental and control groups. The pre-test scores were used to assess their competence in the skills before the strategies, while the post-test scores were used to compare the effects of the strategies. The structure of the design is represented as follows:

Group 1	R	O_1	X	O_2
Group 2	R	O_3	X	O_4
Group 3	R	O_5	x	O_6

Where:

Pre-test for experimental group 1

Post-test for experimental group 1

Pretest for control group

Post-test for control group

X   Treatment for the experimental group

The population for this study is the entire pupils in Basic schools in Owerri North Local Government Area, Imo State, Nigeria, as may be made available by the management of selected schools. The sampling technique used for this study was purposive sampling technique. Purposive sampling techniques also known as judgmental, selective or subjective sampling technique is a type of non-probability sampling technique. Based on the information gotten from the class teachers on the pupils' performance in reading and through indirect observation of their characteristics, the researchers were able to identify pupils with dyslexia from the intact classes used.

The sample for this study was primary three school pupils with dyslexia from two selected primary schools, which comprised of 80 pupils in all. The experimental group (school A) consisted of 44 pupils, and the control group (school B) 36 pupils, making the total number to be 80 male and female pupils in all. This sample is based on the number of pupils per selected class for the study and the source of this information was based on their overall class performance and also on informal test results conducted by the researchers on their reading ability, characteristics and signs of dyslexia. The characteristics were measured based on children that read below the expected age performance, problems with processing and understanding what he or she read, difficulty forming right words, problems remembering sequence of things, difficulty in spelling, difficulty seeing and hearing similarities and differences in letters and words, avoiding activities that involve reading.

The treatment package developed for this study was the Graphic Organizer Reading Package (GORP). The instrument has two parts: A and B. Part A elicited information on the bio- data of selected participants. Part B contained the short passage for the assessment of reading comprehension. The post-test was a repetition of the pre-test. The repetition was done in order to access the effect of the treatment on the pupils in relation to treatment. The data collected was analyzed using Analysis of Covariance (ANCOVA) to test the stated hypotheses and Multiple Classification Analysis (MCA) was used to check the source of significance if there is any.

RESULTS

Hypothesis 1: There is no significant main effect of graphic organizer on reading comprehension performance of basic school pupils with dyslexia.

Table 1 shows the analysis of the effects of graphic organizer on reading comprehension of subjects. The table shows that at df of 1, 75, F-ratio = 85.329; p-value is .000 < p<.005. This implies that graphic organizer impacts reading comprehension of Basic School pupils with dyslexia. Therefore, the null hypothesis is rejected.

Table 1
ANCOVA on the Effect of Graphic Organizer on Reading Comprehension Performance of Pupil with Dyslexia in Basic Schools in Owerri North Local Government Area

Dependent Variable: Post-test

Source	Type III Sum of Squares	df	Mean Square	F-ratio	p-value	Partial Eta Squared
Corrected Model	845.822a	2	311.911	80.420	.001	.738
Intercept	81.131	1	81.131	22.983	.000	.287
Pretest	477.016	1	477.016	135.130	.000	.703
Graphic organizer	301.214	1	301.214	85.329	.000	.600
Error	201.213	75	2.803			
Total	9385.000	80				
Corrected Total	768.983	79				

Hypotheses 2: There is no significant main effect of gender on reading comprehension performance of pupil with dyslexia in Basic school

Table 2 shows the analysis of the main effect of gender on reading comprehension of subjects. The table shows that at df = 1, 77, F-ratio = .344, p-value is .000 = p<.000. This implies that gender has no significant main effect on reading comprehension of Basic School pupils with dyslexia. Therefore, the null hypothesis is accepted.

Table 2
ANCOVA on the Effect of Gender on Reading Comprehension Performance of Pupils with Dyslexia in Basic Schools in Owerri North Local Government Area

Dependent Variable: Postest

Source	Type III Sum of Squares	Df	Mean Square	F-ratio	p-value	Partial Eta Squared
Corrected Model	239.571a	2	134.786	15.384	.000	.351
Intercept	304.678	1	304.678	34.774	.000	.379
Pretest	268.691	1	268.691	30.667	.000	.350
Gender	3.015	1	3.015	.344	.000	.006
Error	499.412	75	6.659			
Total	9385.000	80				
Corrected Total	768.983	79				

Table 3 shows the analysis of the interaction effects of graphic organizer and gender on reading comprehension of subjects. The table shows that at df = 1, 71, F-ratio = .305 and p-value is .583 > p<.060. This implies there is interaction effects of graphic organizer and gender on reading comprehension of Basic School pupils with dyslexia. Therefore, the null hypothesis is rejected.

Table 3
There is no significant interaction effect of graphic organizer and gender on reading comprehension performance of Basic School Pupils with Dyslexia

Dependent Variable: Postest

Source	Type III Sum of Squares	Df	Mean Square	F-ratio	p-value	Partial Eta Squared
Corrected Model	569.234a	4	142.308	39.184	.000	.740
Intercept	80.562	1	80.562	22.182	.000	.287
Pretest	476.534	1	476.534	131.211	.000	.705
Picture reading	298.206	1	298.206	82.110	.000	.599
Gender	.498	1	.498	.137	.712	.002
Graphic organizer * gender	1.108	1	1.108	.305	.583	.006
Error	199.750	71	2.813			
Total	9385.000	80				
Corrected Total	768.983	79				

DISCUSSION

This study investigated the effects of graphic organizer on reading comprehension performance of Basic School pupils with dyslexia in Owerri North Local Government Area. Significant effect of graphic organizer on reading comprehension of the participants was found. This finding is supported by Slavin (2011) whose findings demonstrated that visual learning is among the most effective methods for teaching comprehension skills to students of all ages. According to Keene and Zimmerman (1997), graphic organizer helps students to make connections with the text they read, thus increases the effectiveness of reading. No significant main effect on reading comprehension of Basic School pupils with dyslexia was found. This finding however negates that of Jiang (2012) who reported significant difference effect of gender on reading comprehension of students with dyslexia, noting that females did considerably better than male readers when graphic organizer was used in enhancing reading comprehension. Significant combined effects of gender and graphic organizer was found. These findings thus corroborate the earlier cited report of the study of Jiang (2012) who reported that there is significant interaction effects of gender and graphic organizer on reading comprehension of the dyslexic.

CONCLUSION

Based on the findings in this study, it is safe therefore to conclude that graphic organizer is a good strategy for enhancing reading comprehension of Basic pupils with dyslexia.

Recommendation

The following are the recommendations made based on the findings of the study:

i. Teachers in Basic School should be exposed to the use of graphic organizer for teaching reading comprehension to pupils with dyslexia. This can be achieved through periodic workshop and in-service trainings.

ii. Gender balance should be considered while grouping pupils with dyslexia for graphic organizer. This is necessary to avoid a situation whereby the strategy will only work for female pupils.

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