

Effect of Multisensory Approach on the Spelling abilities of pupils with Dysorthography in Ibadan, Nigeria

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Abstract

Spelling is a revered skill in the modern world which can be significantly impaired by some factors like dyslexia, dysgraphia, and dysorthography. Previous studies in this field have primarily relied on inference from other populations, such as dyslexia, with limited empirical support for individuals specifically affected by dysorthography. Furthermore, within Nigeria, the absence of formal spelling instruction at different educational levels and the lack of comprehensive assessments for school-aged children prior to admission exacerbate the scarcity of empirical knowledge on dysorthography management. This study aimed to assess the impact of a multisensory spelling intervention on pupils with dysorthographia in Ibadan. A quasi-experimental design was employed, utilizing a pre-test – post-test control group design. A purposive sampling technique was used to select a school in Oyo State and 30 pupils with dysorthographia who made up the sample. The sample was assigned to either the experimental or control group. Participants in the experimental groups were exposed to six weeks of spelling intervention using multisensory approach. Data were analysed using analysis of covariance. The findings of the study revealed that There was a significant main effect of multisensory approach on the spelling abilities of pupils as the post-test scores of the experimental group were significantly different from that of the control group. Multisensory approach was effective in enhancing the spelling skills of pupils with dysorthography in Ibadan. The study recommended that multisensory approach should be used in schools to teach pupils with dysorthography.

Keywords: *Dysorthography, Kinesthetic, Multisensory Approach, Tactile, Visual.*

Introduction

Spelling ability is a revered skill in the modern world. It is considered a crucial academic as effective written expressions and communications are dependent on spelling (Staden, 2010). Good spellers can express their thoughts on paper without unnecessary interruptions. Poor spellers are hampered in their ability to communicate freely through written words. Spelling is a traditional element of the elementary school curriculum where a considerable amount of time and energy are devoted to its mastery, and the public often associates correct spelling with educational attainment, accuracy, neatness, and cultivation, while the inability to spell is frequently linked with illiteracy (Warda, 2005; Personkee & Yee, 1971). The significance of spelling proficiency is emphasized by both the public and the educational community, and the inability to spell correctly can have negative consequences on a person's educational and professional standing. Regrettably, numerous children of school age encounter challenges when it comes to acquiring spelling skills. (Al-Jarf, 2010). Most students who are presently labeled handicapped exhibit spelling problems. According to Miller and Graham (1979), Learning disabilities, mental retardation, emotional disturbance, and other health impairments may unfavorably affect spelling performance. Unsatisfactory spelling progress may be attributed, in part, to inadequate contemporary classroom instruction, poorly designed commercial materials, and the absence of spelling programmes based on research findings. Further, contemporary classroom instruction rarely accounts for individual student differences.

Dysorthography can be defined as a specific dysgraphic disorder of spelling that accompanies dyslexia as a direct consequence (INSERM Collective Expertise Centre, 2007). Dysorthography is characterized by bizarre spelling and a disconnection between the letters in a word and the sounds they make. For example, a student with dysorthography might spell the word ‘exhibition’ as ‘esbtl’ or ‘escape’ as ‘xkayp’. Grammatical errors can include issues with tenses, contractions, punctuation, or correct word usage. When paired with the spelling impairment, extreme disruptions might look like ‘eye gode two skull’ instead of ‘ I go to school’. Grammatical and spelling interruptions are also severe in these students, and it makes it tough to follow them in their writing. Timing issues compound the problem for students who have dysorthography. For example, a word that most students could spell in seconds might take a student with dysorthographia five or ten minutes or more. This makes it difficult for afflicted students to complete assignments on time and can add to the overall decrease in performance.

In the case of dysorthography, multisensory techniques used as learning interventions for persons with special needs can be effective in addressing these difficulties by providing targeted instruction that incorporates visual, auditory, and kinesthetic modalities to improve spelling accuracy and reduce grammatical errors, ultimately enhancing writing proficiency and alleviating timing challenges commonly experienced by students with this disability. Literature supporting the use of multi-sensory interventions for individuals with special needs identifies several areas of positive evidence. Collier and Truman (2008) explored the use of multi-sensory activity for individuals with neurological disabilities as a leisure resource. Their findings indicated that multisensory environments when used as a companion for routine daily activities enhanced the sensory awareness of individuals with neurological disabilities and assisted with many of the problems (aggression, agitation, wandering, poor-coordination, and other difficulties) to enhance individual engagement and participation and to reduce environmental barriers. Chan and Chien (2007) reported mixed results from their research efforts to evaluate the clinical effectiveness of multisensory therapy on individuals with severe learning disabilities within a hospital setting. Their findings suggest that multisensory intervention environments have a leisure resource effect of promoting psychological well-being rather than therapy for reducing maladaptive behaviors. However, their study findings also revealed that positive effects of multisensory therapy were evidenced in profound or severely impaired individuals rather than in mildly impaired individuals and the authors suggest that reliability, predictability, relaxation, and freedom from demands rather than sensory input may be key contributors of multisensory therapy. A meta-analysis of 28 research studies focused on examining the effectiveness of multisensory environments for individuals with intellectual disabilities conducted by Lotan and Gold (2009) concluded that the multisensory approach is effective for improving individuals’ adaptive behaviors in daily life if considered as an individual intervention for use with individuals with intellectual and developmental disabilities. These results parallel earlier studies focused on the effectiveness of multisensory environments used with people with special needs. Research efforts so far have not really been directed toward using multisensory approach to enhance the spelling skills of pupils with dysorthographia. This discrepancy in previous studies on multisensory approach has led to this study. Poor spelling skills may affect school achievement in many areas beyond reading, including written expression, mathematics, and performance in content subjects such as social studies and science. This is a great challenge for pupils with dysorthographia. Therefore, the primary objective of this study is to improve the

spelling abilities of pupils with dysorthographia through multisensory approach. The present study responded to the need for high-quality quantitative research affiliated with measurable outcomes.

Statement of the problem

In Nigerian educational institutions, children who have learning disorders often receive a late diagnosis, which puts them at a significant disadvantage compared to their peers in terms of fundamental academic skills such as reading and spelling. This delay in identification negatively impacts their self-confidence. The lack of early intervention programs means that children who are at risk of developing learning disorders like dysgraphia and dysorthography do not receive adequate support. Students with dysorthographia face significant challenges when it comes to spelling words and learning new words through written and visual recognition. These difficulties in spelling have a detrimental effect on their ability to comprehend written texts and their overall performance in subjects such as writing, mathematics, social studies, and science. The negative experiences that pupils with dysorthography encounter during their early attempts to learn to read can lead to frustration and a pattern of failure that persists throughout their academic years. Therefore, this study aims to explore how a multisensory approach can be employed to enhance the spelling skills of pupils with dysorthographia.

Hypotheses

There is no significant main effect of treatment (multisensory approach) on spelling abilities of pupils with dysorthography (participants)

Methodology

This study employed a pre-test, post-test, control group, quasi-experimental research design to investigate the effects of a spelling intervention on a population of pupils aged seven to nine (7-9) years with dysorthography in Ibadan, Oyo State. The sample consisted of 30 primary two pupils with dysorthography, purposefully selected by the researcher from a randomly selected school in Ibadan.

Instruments

Slosson Intelligence Test SIT-R3 and the Spelling Achievement Test were the instruments used in this study.

Validity and reliability

The face and content validity of the instruments for this study were determined through expert judgment and a Test-retest method was used to measure the reliability of the instrument within a three-week interval.

Procedure for data collection

Participants for the study were identified through the administration of SIT-R3 and the spelling achievement test. The test consisted of questions 1 – 10 in which the pupils were required to choose the correct spelling of the words from a group of written words. Pupils who scored between 1 and 4 became participants for the study. Those that scored below 3 were placed in the experimental group while those that scored between 3 and 4 were placed in the control group. The participants comprised of pupils of both genders.

Treatment

In this study, a treatment intervention was implemented over a six-week period, consisting of a pretest in the first week, four weeks of treatment sessions, and a post-test in the final week. The

treatment group, consisting of fifteen pupils with spelling difficulties, received multisensory activities three times a week for forty minutes per session, while the control group, also consisting of fifteen pupils with similar difficulties, did not receive any treatment but participated in the pretest and post-test. The multisensory approach involved visually presenting the word, audibly spelling and pronouncing it, and engaging the participants in tracing the word on cut-out cardboards to facilitate their understanding of letter movement. Each week, the participants were exposed to a minimum of nine new words, and after the third session of each week, the previously learned words were reviewed. At the end of the six weeks, the post-test was conducted to assess the impact of the treatment intervention.

Method of Data Analysis

Data collected was analysed using analysis of covariance (ANCOVA) statistic to test the data collected for the study. ANCOVA was used to test the null hypotheses at 0.05 level of significance, mean score and standard deviation also show the direction of the result in each group. A post-hoc analysis was used to determine if the mean differences were significant.

Results

There is no significant main effect of treatment on the spelling abilities of pupils with dysorthography.

Table 4.1 Summary of 2 x 2 Analysis of Covariance (ANCOVA) showing the effect of Treatment and gender on Achievement in spelling test.

Source	Type III		Mean Square	F	Sig.	$\eta^2_{\text{partia}_1}$
	Sum of Squares	df				
Pretest	.025	1	.025	.003	.959	.000
Treatment	37.820	1	37.820	3.964	.05	.084
Gender	.009	1	.009	.001	.976	.000
Treatment * Gender	1.725	1	1.725	.181	.673	.004
Error	410.287	43	9.542			
Corrected Total	498.667	47				

a. R Squared = .177 (Adjusted R Squared = .101)

From the hypothesis, it is evident as shown in Table 4.1 that the effect of treatment as indicated on the post-test scores of participants is significant ($F_{(1,43)} = 3.96$, $\eta^2_{\text{partial}} = .08$, $p < 0.05$). This shows that there is a significant main effect of treatment on the spelling ability among pupils' with dysorthography. The result demonstrates that treatment is significant in the improvement in the Achievement in spelling abilities among pupils' with dysorthographia, A significant size effect of partial $\eta^2_{\text{partial}} = .08$ was recorded. The treatment contributed a significant 8% change observed in the improvement in the Achievement in spelling test among pupils' with dysorthography after the intervention. Based on this finding, the null hypothesis one which states that there is no significant main effect of treatment on spelling ability of pupils' with dysorthography is hereby rejected, and the alternate hypothesis is accepted that there is a significant main effect of treatment on the spelling abilities of pupils with dysorthography.

Table 4.2: Marginal Means of Post-Test Achievement in spelling test scores by Treatment LSD

Treatment	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
Experimental group	5.264 ^a	.646	3.961	6.566
Control group	2.473 ^a	1.035	.385	4.561

a. Covariates appearing in the model are evaluated at the following values: Pretest = 1.0833.

The marginal means reveal that the experimental group exposed to multisensory approach intervention recorded the higher achievement in spelling test means scores ($\bar{x} = 5.26$, S.E = 0.65), compared to the control group ($\bar{x} = 2.47$, S.E = 1.04).

Summary of Findings

The findings revealed that Multisensory approach is effective in the improvement of the spelling abilities of pupils with dysorthography.

Discussion of findings

The results revealed that there is significant effect of multisensory approach on the spelling skills of the participants. The observed improvement in spelling abilities can likely be attributed to the fact that individuals in the multisensory group were consistently exposed to various situations that necessitated the application of spelling skills, both in formal and informal contexts. Thus, this finding acquiesced the finding of Shahni Yeylagh, Karami, Shokrkon, and Honorand (2003) who conducted a study to investigate the efficacy of the application of multisensory method and its impact on the improvement of educational performance in students with dysgraphia. The obtained results demonstrated that using this method significantly decreased spelling mistakes, and the results of the intervention were relatively stable. This study also lends credence to Mahnaz and Elahe's (2014) report that learning outcomes are greater for multi-sensory groups as it enhances students' recall and comprehension. This finding supports the study of Coats, Britten, Utley, and Astill (2015) who reported that multi-sensory significantly improves the performance of children with dyspraxia / developmental coordination disorder.

Conclusion

Multisensory approach has been proven to be an effective strategy for enhancing spelling abilities of pupils with dysorthography.

Recommendation

- i. Multisensory approach should be used in schools to teach pupils with dysorthography because it will engage the pupils with four senses which are visual, auditory, kinesthetic, and tactile.
- ii. Multisensory approach should not be based on primary schools alone but should also be introduced into secondary schools.
- iii. There is a need for trained regular and special teachers in all the schools with the knowledge to teach children with learning disabilities the proposed intervention strategies which is the multisensory approach.

- iv. There should be early identification of pupils with dysorthography, so that intervention can be introduced early.

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