Effectiveness of Teaching Strategies on Word Recognition and Phonological Awareness among School Students with Dyslexia in Tamil Nadu

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Abstract
Dyslexia is a specific learning disability that significantly disturbs reading abilities, particularly word recognition and phonological awareness. The present study investigated the effectiveness of English language teaching strategies in improving word recognition and phonological awareness among school students with dyslexia in Tamil Nadu. An experimental design with a pre-test and post-test control group was adopted. A total of 80 dyslexic students were selected and divided into experimental (40) and control groups (40). The experimental group received structured teaching strategies based on phonics and multisensory approaches, while the control group was taught using conventional methods. The data were analysed using One-way Analysis of Covariance (ANCOVA) with pre-test scores as covariates. The results revealed a significant difference in adjusted post-test word recognition scores between the experimental and control groups ($F = 240.240$, $p < .05$, $\eta^2 = .759$). Similarly, a significant difference was found in phonological awareness scores ($F = 95.280$, $p < .05$, $\eta^2 = .553$). The adjusted mean scores indicated that the experimental group outperformed the control group in both variables. The findings demonstrate that structured English language teaching strategies are highly effective in enhancing reading-related skills among dyslexic learners. The study highlights the importance of adopting evidence-based teaching strategies in inclusive classrooms to support students with dyslexia.
Keywords: Dyslexia, Word Recognition, Phonological Awareness, Teaching Strategies, Reading Skills.

1. INTRODUCTION

Reading is one of the most essential academic skills required for students' success in school. However, students with dyslexia experience determined difficulties in reading due to deficits in phonological processing, word recognition, and decoding skills. Dyslexia is recognized as a specific learning disability that affects an individual's ability to read, spell, and process written language despite adequate intelligence and educational opportunities. In school education, particularly in English language learning, dyslexic students struggle to recognize words and comprehend reading materials. These difficulties can affect their academic achievement and self-confidence. Research suggests that structured teaching strategies such as phonics instruction, multisensory approaches, and metacognitive strategies can significantly improve reading outcomes for students with dyslexia. In the context of Tamil Nadu schools, many teachers still rely on conventional teaching methods that may not adequately support dyslexic learners. Therefore, it becomes essential to implement effective teaching strategies specifically designed to improve word recognition

and reading comprehension skills among dyslexic students. The present study aims to examine the effectiveness of English language teaching strategies in improving word recognition and phonological awareness among students with dyslexia.

Conceptual Framework

The conceptual framework of the present study illustrates the relationship between teaching strategies and reading-related outcomes among students with dyslexia. In this study, teaching strategies are considered the independent variable, while word recognition and phonological awareness are treated as dependent variables. The framework assumes that structured instructional approaches such as phonics-based teaching and multisensory learning strategies positively influence the abilities of dyslexic students. Word recognition is a fundamental component of reading that enables students to identify written words accurately and fluently. When students develop strong word recognition skills, they can read texts more efficiently, which ultimately improves reading comprehension. The conceptual framework also considers **pre-test scores** as **covariates**, which are controlled during data analysis using Analysis of Covariance (ANCOVA). Controlling pre-test scores allows the researcher to examine the true effect of teaching strategies on students' reading performance. The framework assumes that effective teaching strategies enhance phonological awareness and decoding skills, which subsequently lead to improved word recognition. Therefore, the implementation of appropriate instructional strategies plays a critical role in supporting dyslexic learners.

Diagrammatic Representation of Conceptual Framework

Teaching Strategies
(Phonics + Multisensory + Metacognitive Strategies)
↓
Reading Skills Development
↓

| |
Word Recognition Reading Comprehension
↓
Improved Learning Outcomes
among Dyslexic Students

Covariate: Pre-test Reading Scores

Need for the study

Students with dyslexia face significant challenges in reading and language learning. In many Indian schools, especially government schools, teachers may not be adequately trained to address the specific needs of dyslexic learners. As a result, these students often lag behind their peers academically. Word recognition and phonological awareness are fundamental components of reading development. If these skills are not properly developed, students may continue to struggle with reading comprehension and overall academic performance. Despite growing awareness about inclusive education in India, there is limited empirical research on effective teaching strategies for dyslexic students in Tamil Nadu schools. Therefore, it is necessary to examine the effectiveness of structured teaching strategies that can support the reading development of dyslexic learners. This study seeks to address this

gap by evaluating the impact of English language teaching strategies on word recognition and phonological awareness among students with dyslexia.

Rationale of the study

Dyslexia affects approximately 5–10% of school-aged children worldwide. These students require specialized instructional strategies that focus on phonological processing, decoding, and word recognition skills. Traditional teaching methods often emphasize rote learning and may not address the specific learning needs of dyslexic students. Research indicates that structured literacy approaches such as phonics instruction and multisensory learning are highly effective in improving reading abilities. In Tamil Nadu, inclusive education policies encourage the integration of students with learning disabilities into mainstream classrooms. However, teachers often lack the necessary training and resources to support dyslexic learners effectively. Therefore, the present study aims to evaluate the effectiveness of teaching strategies designed to enhance word recognition and phonological awareness among dyslexic students. The findings may provide valuable insights for teachers, curriculum developers, and policymakers in improving educational practices for students with dyslexia.

2. REVIEW OF RELATED LITERATURE

Research on dyslexia has emphasized the importance of effective teaching strategies to improve reading skills such as word recognition, phonological awareness, and reading comprehension. Several scholars have highlighted the role of structured literacy instruction and evidence-based teaching strategies in supporting dyslexic learners. **Alevizos et al (2024),** explored machine learning analysis of handwriting patterns and showed that reading disabilities such as dyslexia are closely linked to phonological processing difficulties and language processing deficits. **Serrya, Furlong & Snow (2025)** examined the descriptive study of reading instruction in primary schools, reported that evidence- based reading instruction improves reading and spelling outcomes in school learners. **Torgesen (2020)** studied experimental early reading intervention and reported that early intervention programs significantly improve word recognition among struggling readers. **Snowling (2013)** explored the cognitive basis of dyslexia and found that phonological deficits are the primary cause of reading difficulties. The study recommended phonological awareness training as a key instructional strategy to improve decoding and word recognition abilities among dyslexic students.

Variables of the study

Independent Variable- Teaching strategies in English language instruction.
Dependent Variables- Word Recognition, Phonological Awareness
Covariate- Pre-test scores of word recognition and phonological awareness.

3. Aims & Objectives

1. To examine the effectiveness of teaching strategies on word recognition among dyslexic students.
2. To analyze the impact of teaching strategies on phonological awareness among dyslexic students.

Operational Definition

Dyslexia: A specific learning disability characterized by difficulties in accurate and fluent word recognition and poor spelling abilities.

Word Recognition: The ability of students to identify written words quickly and accurately.
Phonological Awareness: The ability to recognize and manipulate sound structures in spoken language.
Teaching Strategies: Instructional techniques such as phonics-based instruction and multisensory learning are used to improve reading skills.

Hypothesis of the study
H_{01}: There is no significant difference in the adjusted post-test word recognition scores between the experimental and control groups of dyslexic students when pre-test scores are considered as covariates.
H_{02}: There is no significant difference in the adjusted post-test phonological awareness scores between the experimental and control groups of dyslexic students when pre-test scores are considered as covariates.

4. METHODOLOGY

Research Design- Experimental design with pre-test and post-test control group.
Sample- The study included 80 dyslexic students selected from schools in Tamil Nadu.
- Experimental Group: 40 students
- Control Group: 40 students

Tools Used: Word Recognition Test**,** Phonological Awareness Test
Conducted
- Pre-tests were conducted to assess baseline reading skills.
- The experimental group received structured teaching strategies.
- The control group received conventional teaching methods.
- Post-tests were conducted after the intervention.

Statistical Technique- Analysis of Covariance (ANCOVA) was used to analyse the data.

5. Analysis and Interpretation
Testing the Hypothesis Related to the Effectiveness of Teaching Strategies in English on Word Recognition among Dyslexic Students Using ANCOVA (Pre-test as Covariate)
Hyptoehsis-1: There is no significant difference in the adjusted post-test word recognition scores among Dyslexic students belong to the control and the experimental group by considering their pre-test word recognition sores as covariate.
Table: Summary of One-way ANCOVA for adjusted post-test word recognition scores among Dyslexic students belong to the control and the experimental group by considering their pre-test word recognition sores as covariate

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	η^2
Pre-test achievement	2.116	1	2.116	.459	.500	.006
Group	1106.846	1	1106.846	240.240	.001	.757
Error	354.759	77	4.607			
Total	112703.000	80				
Corrected Total	1474.388	79				
a. R Squared = .759 (Adjusted R Squared = .753)						

Effect of Covariate - Pre-test Word Recognition:

The F value is .459 and p value is .500 for pre-test word recognition mean scores as covariate for post-test word recognition mean scores for Dyslexic students belong to the control and the experimental group. Here, obtained *p*-value is higher than .05 level of significance. It indicates that, pre-test word recognition is not explains a substantial proportion of variance in the post-test word recognition scores, confirming that, pre-test word recognition mean scores is not a covariate for post-test word recognition mean scores of Dyslexic students at .05 level of significance, F (1, 79) = .459, p = .500.

Main Effect of Intervention/Treatment:

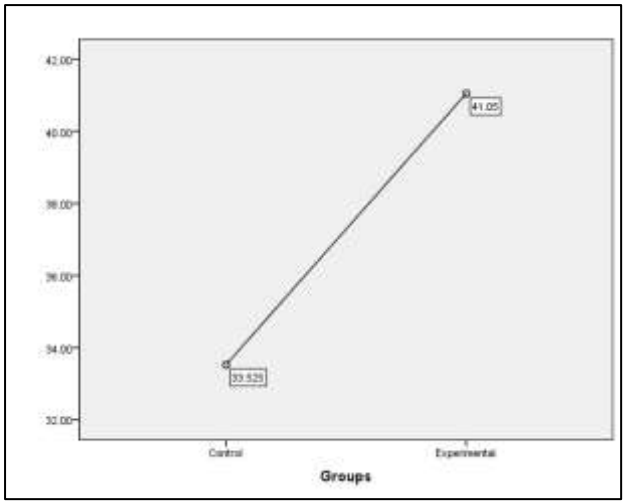
The F value is 240.240 and *p*-value is .001 for adjusted mean scores of word recognition scores of Dyslexic students belong to the control and the experimental group. Hence, null hypothesis is rejected and research hypothesis is accepted. It means, there is a significant difference in the adjusted post-test word recognition scores among Dyslexic students belong to the control and the experimental group by considering their pre-test word recognition sores as covariate at .05 level of significance (1, 97) = 240.240, p = .001, η^2 = .759. The partial eta-squared i.e., η^2 = .759 indicate large effect size.

Further, the adjusted mean scores of word recognition scores of control group is 33.525 and the adjusted mean scores of word recognition of experimental group is 41.050. The adjusted mean scores of word recognition scores of experimental group is significantly higher than that of control group. It may therefore, be said that, the students of experimental group taught through English language teaching strategies accomplished significantly higher word recognition compare to the students of control group taught through conventional method. The detail of pre-test word recognition, post-test word recognition and adjusted mean scores are reported in the following table.

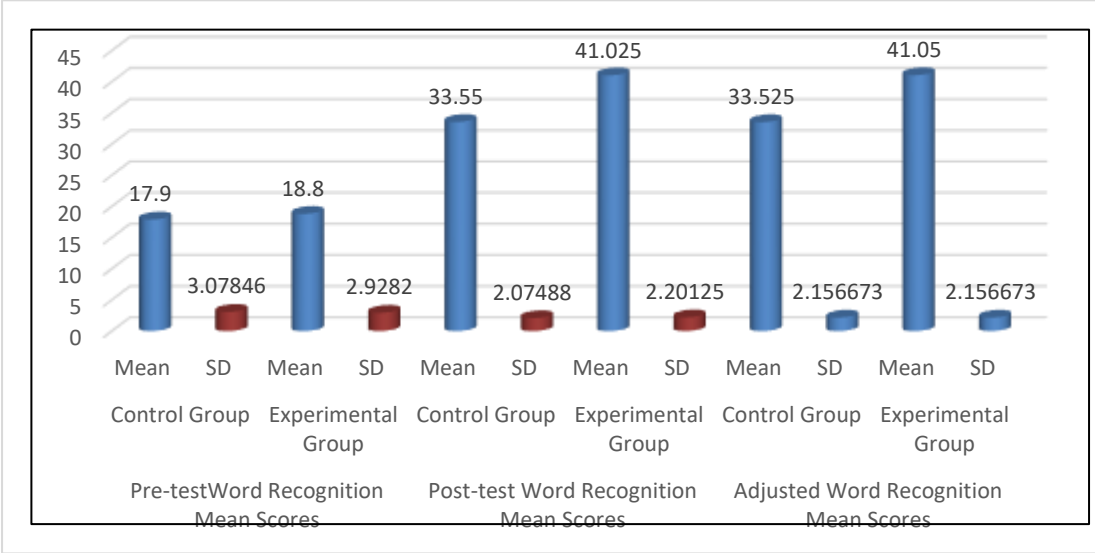
Table: Descriptive Statistics for pre-test, post-test and adjust word recognition mean scores of experimental group and control group

Group	**N**	**Word Recognition**					
		Pre		Post		Adjusted Mean Scores	
		Mean	**SD**	**Mean**	**SD**	**Mean**	**SD**
Control Group	40	17.9000	3.07846	33.5500	2.07488	33.525	.341
Experimental Group	40	18.8000	2.92820	41.0250	2.20125	41.050	.341

The above table presents the pre-test and post-test word recognition scores of control and experimental group. The adjusted mean scores represent the post-test mean values after controlling for the covariate, namely pre-test word recognition scores for both groups. The mean comparison indicates that, adjusted mean achievement scores of the experimental group (M = 41.050) is significantly higher than that of the control group (M = 33.525). Thus, findings of the study revealed that English language teaching strategy was more effective in enhancing word recognition of Dyslexic students of experimental group than the conventional method used in the control group. The data also reported dint he falling figure.



Graph-1: Comparison of adjusted word recognition scores of Dyslexic students belong to the control and the experimental group



Graph: Comparison of pre-test, post-test and adjust word recognition mean scores of experimental group and control group

Hyptoehsis-2: There is no significant difference in the adjusted post-test phonological awareness scores among Dyslexic students belong to the control and the experimental group by considering their pre-test phonological awareness sores as covariate.

Table: Summary of One-way ANCOVA for adjusted post-test phonological awareness scores among Dyslexic students belong to the control and the experimental group by considering their pre-test phonological awareness sores as covariate

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	η^2
Pre-test achievement	3.106	1	3.106	1.356	.248	.017
Group	218.269	1	218.269	95.280	.001	.553
Error	176.394	77	2.291			
Total	19206.000	80				
Corrected Total	417.550	79				
a. R Squared = .578 (Adjusted R Squared = .567)						

Effect of Covariate - Pre-test Phonological awareness:

The F value is 1.356, and the p value is .248 for pre-test phonological awareness mean scores as covariate for post-test phonological awareness mean scores for Dyslexic students belonging to the control and the experimental group. Here, the obtained *p*-value is higher than .05 level of significance. It indicates that pre-test phonological awareness does not explain a substantial proportion of variance in the post-test phonological awareness scores, confirming that pre-test phonological awareness mean scores are not a covariate for post-test phonological awareness mean scores of Dyslexic students at the .05 level of significance, $F(1, 79) = 1.356$, $p = .248$.

Main Effect of Intervention/Treatment:

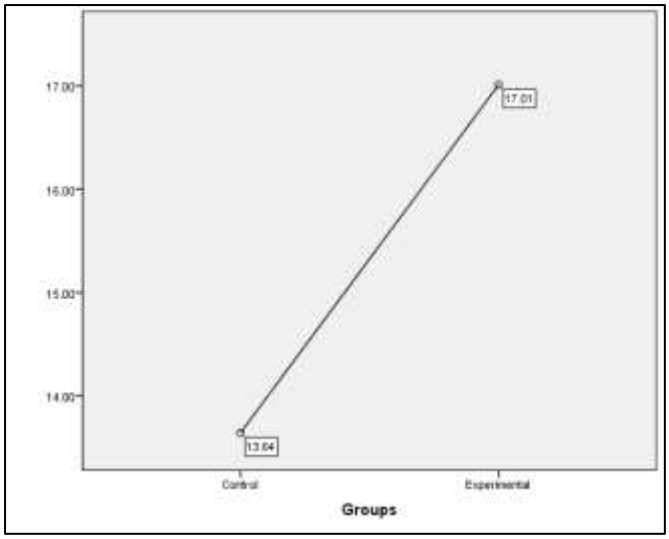
The F value is 95.280 and *p*-value is .001 for adjusted mean scores of phonological awareness scores of Dyslexic students belong to the control and the experimental group. Hence, null hypothesis is rejected and research hypothesis is accepted. It means, there is a significant difference in the adjusted post-test phonological awareness scores among Dyslexic students belong to the control and the experimental group by considering their pre-test phonological awareness sores as covariate at .05 level of significance (1, 97) = 95.280, p = .001, $\eta^2 = .553$. The partial eta-squared i.e., $\eta^2 = .553$ indicate moderate effect size.

Further, the adjusted mean scores of phonological awareness scores of control group is 13.640 and the adjusted mean scores of phonological awareness of experimental group is 17.010. The adjusted mean scores of phonological awareness scores of experimental group is significantly higher than that of control group. It may therefore, be said that, the students of experimental group taught English language teaching strategy accomplished significantly higher phonological awareness compare to the students of control group taught through conventional method. The detail of pre-test phonological awareness, post-test phonological awareness and adjusted mean scores are reported in the following table.

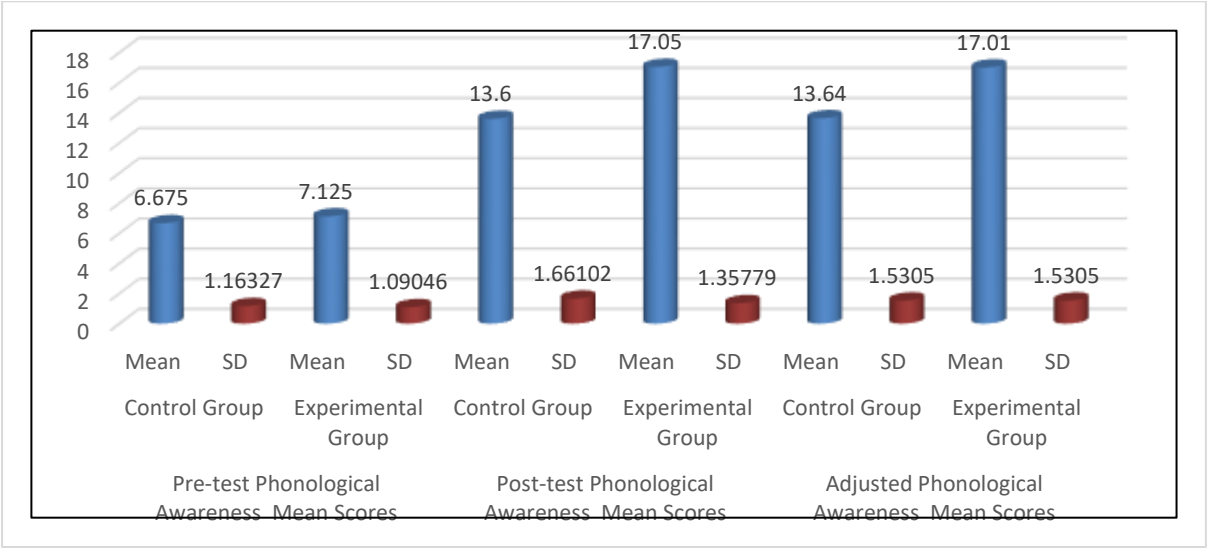
Table: Descriptive Statistics for pre-test, post-test and adjust phonological awareness mean scores of experimental group and control groups.

Group	**N**	**Achievement in Science**					
		Pre		Post		Adjusted Mean Scores	
		Mean	**SD**	**Mean**	**SD**	**Mean**	**SD**
Control Group	40	6.6750	1.16327	13.6000	1.66102	13.640	.242
Experimental Group	40	7.1250	1.09046	17.0500	1.35779	17.010	.242

The above table presents the pre-test and post-test phonological awareness scores of control and experimental group. The adjusted mean scores represent the post-test mean values after controlling for the covariate, namely pre-test phonological awareness scores for both groups. The mean comparison indicates that, adjusted mean achievement scores of the experimental group (M = 17.010) is significantly higher than that of the control group (M = 13.640). Thus, findings of the study revealed that English language teaching strategy was more effective in enhancing phonological awareness of Dyslexic students of experimental group than the conventional method used in the control group. The data also reported in the falling figure.



Graph-1: Comparison of adjusted phonological awareness scores of Dyslexic students belong to the control and the experimental group



Graph: Comparison of pre-test, post-test and adjusted phonological awareness mean scores of the experimental group and the control group

6. CONCLUSION

The study concludes that structured teaching strategies significantly improve word recognition and phonological awareness among dyslexic students. The experimental group demonstrated higher performance compared to the control group. Therefore, teachers should adopt evidence-based instructional strategies to support dyslexic learners in mainstream classrooms. Training programs for teachers and curriculum reforms are essential to ensure inclusive and effective education for students with dyslexia.

7. DISCUSSION

The findings of the study confirm that structured teaching strategies are effective in improving reading abilities among dyslexic students. The significant improvement in word recognition and phonological awareness among the experimental group supports the effectiveness of phonics-based and multisensory teaching methods. The results align with

previous studies, which suggest that explicit instruction in phonological processing can significantly enhance reading performance among struggling readers. The large effect sizes observed in this study indicate that the intervention had a substantial impact on students' reading skills.

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