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EFFECTS OF MULTISENSORY TEACHING ON READING COMPREHENSION AMONG PRIMARY SCHOOL PUPILS WITH READING DISABILITY IN PANKSHIN LOCAL GOVERNMENT AREA OF PLATEAU STATE

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ABSTRACT
Reading comprehension remains a major difficulty for primary school pupils in Nigeria who have reading disabilities. But credible evidence of effective teaching practices to consider SE factors is lacking. The study examined the effect of the multi-sensory approach on reading comprehension of primary school students with reading disabilities in Pankshin Local Government of Plateau State. This study adopted a pretest-posttest, non-equivalent control group quasi-experimental design with 40 Primary 4 students with reading difficulties. Data collection involved using the Reading Comprehension Achievement Test and a Socioeconomic Status Questionnaire. Analysis of Covariance (ANCOVA) was used to analyze data at 0.05 level of significance. The results revealed that there was a significant main effect for multisensory teaching on pupil reading comprehension [$F(1, 37) = 259.59$, $p < .001$, $\eta^2 = .875$] which showed that this approach had a significant effect on the pupils' reading comprehension. In addition, socioeconomic status was a significant main effect on reading comprehension, [$F(1, 37) = 11.98$, $p = .001$, $\eta^2 = .245$]. The effect of multisensory teaching and socioeconomic status was not significant, however, [$F(1, 35) = 0.41$, $p = .526$, $\eta^2 = .012$]; this indicates that the intervention was effective across the various socioeconomic groups. The study results demonstrated that multisensory teaching is effective in improving reading comprehension for students with reading disabilities across socioeconomic status levels. Suggestions involve multisensory approaches in primary schools, teacher professional development, and development of intervention programmes, combining multisensory approaches with home literacy support activities.

Keywords: Reading Comprehension, Multisensory Teaching, Reading Disability, Socioeconomic Status, Primary School Pupils

Introduction

Reading comprehension, a key literacy skill, enables pupils to make sense of written texts, combine new information with what they already know, and apply what they have learned to both academic and practical contexts. Pupils who cannot comprehend the meaning of what they read are described as pupils with reading disability. They only read text but cannot make meaning out of what they read. This category of pupils cannot completely benefit from classroom learning. This is the ultimate goal of reading education. Due to the fact that textbooks, tests, and classroom activities require pupils to extract, understand, evaluate, and apply textual information, reading comprehension is therefore a necessary and vital academic skill. It is capable of predicting academic achievement across almost all school disciplines. As a result, pupils with reading disability frequently exhibit low self-esteem, decreased participation in class, academic underachievement, and a higher likelihood of dropping out of school.

One of the most common learning challenges among primary school pupils is reading difficulty. Despite sufficient intelligence, suitable educational resources, and traditional classroom training, reading disability is characterised by challenges with decoding, word identification, reading fluency, and comprehension. Musonda and Siame (2025) stated that learners with developmental disabilities often have deficiencies in vocabulary development, working memory, phonological processing, and comprehension monitoring. All these impede their capacity to understand written texts. A lack of implementation of specialised interventions for pupils with reading difficulties is capable of worsening the challenge of reading disability. As a result, many pupils advance through the elementary education system without achieving the minimal literacy skills required for their grade level.

The need for instructional strategies that can meet the various learning requirements of pupils with disabilities has expanded due to the growing emphasis on inclusive education. Conventional teacher-centered approaches frequently place a strong emphasis on visual presentations and aural explanations. This limits the options available to pupils who need tactile, kinesthetic, or multimodal experiences to develop reading skills. Multisensory instruction, on the other hand, combines tactile, kinesthetic, auditory, and visual modalities all at once to promote meaningful learning. By encouraging pupils to see, hear, talk, touch, manipulate, and physically interact with learning materials, multisensory instruction strengthens the brain connections linked to reading acquisition as opposed to delivering information through a single sensory channel.

Recent developments in cognitive science and educational neuroscience have contributed to a growing understanding of the efficacy of multimodal instruction. Since complementary cognitive systems process information, simultaneous activation of several sensory pathways improves encoding, retrieval, retention, and transfer of learning. Pupils with reading disability are more likely to benefit most from multisensory teaching. This is because it strengthens learning through multiple senses to make up for deficiencies in one. As a result, pupils improve their vocabulary, phonological awareness, letter-sound correspondence, decoding accuracy, reading fluency, and eventually reading comprehension.

Statement of the Problem

Reading comprehension remains a critical literacy skill that determines academic success across all school disciplines. Despite the growing recognition of multisensory instruction as an effective approach for supporting pupils with reading disabilities, significant gaps exist in the empirical literature within the Nigerian educational context.

First, while numerous studies have examined the effects of multisensory approaches on foundational reading skills such as phonemic awareness, blending, decoding, and reading fluency, there has been insufficient attention to reading comprehension as the ultimate goal of literacy instruction. This gap is particularly evident when comparing research priorities across different Nigerian regions, where studies have prioritised varied reading outcomes without a consistent focus on comprehension.

Second, although some research has investigated multimodal strategies among pupils with reading impairments in certain Nigerian locations, there is a notable absence of empirical data on reading comprehension specifically in Pankshin Local Government Area of Plateau State. Existing studies have concentrated on urban centres like Jos Metropolis, limiting the generalisability of findings to rural and peri-urban contexts.

Third, previous investigations have predominantly assessed the direct effects of instructional interventions without considering learner factors that may influence treatment outcomes. Socioeconomic status, in particular, has received minimal attention as either an independent variable or a moderating factor in multimodal reading interventions. Most studies have employed quasi-experimental designs with limited attention to individual difference variables.

Furthermore, prior research has typically examined instructional methodologies and socioeconomic characteristics separately, leaving a critical gap in understanding their combined impact on reading comprehension. This separation prevents educators and policymakers from determining whether pupils from diverse socioeconomic backgrounds benefit equally from multisensory instruction.

Therefore, this study seeks to address these gaps by investigating the efficacy of multisensory instruction on reading comprehension among primary school pupils with reading disabilities in Pankshin LGA, while examining the moderating role of socioeconomic status.

Purpose of the Study

The main purpose of this study is to investigate the effectiveness of multisensory teaching on reading comprehension among primary school pupils with reading disability in Pankshin Local Government Area of Plateau State. The specific objectives are:

1. assess the main effect of multisensory teaching on reading comprehension among primary school pupils with reading disability in Pankshin Local Government Area of Plateau State.
2. determine the main effect of socioeconomic status on reading comprehension among primary school pupils with reading disability in Pankshin Local Government Area of Plateau State.
3. analyze the interaction effect of multisensory teaching and socioeconomic status among reading comprehension of primary school pupils with reading disability in Pankshin Local Government Area of Plateau State.

Hypotheses

The following hypotheses were tested at 0.05 level of significance:

H01: There is no significant main effect of multisensory teaching on reading comprehension among primary school pupils with reading disability in Pankshin Local Government Area of Plateau State.

H02: There is no significant main effect of socioeconomic status on reading comprehension among primary school pupils with reading disability in Pankshin Local Government Area of Plateau State.

H03: There is no significant interaction effect of multisensory teaching and socioeconomic status on reading comprehension among primary school pupils with reading disability in Pankshin Local Government Area of Plateau State.

Literature Review

Theoretical Foundations of Multisensory Instruction

The Orton-Gillingham Theory of Multisensory Structured Language Instruction, which was based on the groundbreaking research of Samuel Orton (1937) and Gillingham (1935), serves as the main theoretical cornerstone for multisensory instruction. The theory is premised on the assumption that when language training concurrently engages the visual, auditory, kinesthetic, and tactile sensory systems through clear, systematic, sequential, cumulative, and structured teaching, pupils with reading disability learn more efficiently. Learners actively manipulate letters, speak sounds, trace symbols, and carry out physical actions that reinforce phonological and orthographic representations rather than merely relying on visual recognition of printed words. This multimodal integration promotes more effective reading acquisition and fortifies memory pathways. Therefore, the theory offers a solid conceptual foundation for examining how multisensory teaching affects reading comprehension in pupils with reading disability.

The Dual Coding Theory, propounded by Paivio (1971; 1986), which holds that learning is more successful when information is processed through both verbal and non-verbal cognitive systems, provides additional support for the current investigation. The theorist assumes that while verbal and visual representations are encoded separately, they are related in long-term memory, improving retrieval and comprehension opportunities. Compared to training that only uses one sensory channel, multimodal instruction uses spoken language, printed text, visual graphics, body movement, and tactile manipulation to help pupils create numerous memory traces that promote deeper learning. Therefore, Dual Coding Theory offers cognitive support for the superiority of multimodal teaching methods in enhancing reading comprehension.

Multisensory Instruction and Reading Comprehension

Recent empirical research has increasingly demonstrated the effectiveness of multisensory approaches to literacy training. In a quasi-experimental study conducted among primary school pupils in Ilorin, Abdulquadri (2022) found that multimodal instruction significantly enhanced reading abilities compared to traditional teaching methods. Similarly, Balami and Bassi (2026) employed a pre-test-post-test control group design with dyslexic pupils in Maiduguri primary schools, revealing that multisensory instruction significantly improved reading proficiency. While Abdulquadri's study focused on general primary school populations, Balami and Bassi's research specifically targeted pupils with identified reading challenges, suggesting differential effectiveness across learner populations. Gomwalk and Bok (2024) extended this line of inquiry to Jos Metropolis, Plateau State, using a similar experimental design and demonstrating that multimodal instruction greatly enhanced the reading performance of pupils with reading difficulties, thus confirming the strategy's efficacy within the Nigerian educational context.

Studies focusing on specific components of multimodal training have yielded further evidence. Abdulkadir (2025) investigated technology-based auditory-kinesthetic strategies among Primary III pupils in Kaduna South, finding significant improvements in reading comprehension. Extending this work, Abdulkadir and Hunkuyi (2025) examined technology-based visual-kinesthetic learning in Kaduna North and reported significant gains in both reading comprehension and reading fluency. The latter study's inclusion of fluency as an outcome

measure provides additional evidence of the comprehensive benefits of technology-enhanced multisensory approaches. Mustapha et al. (2024) conducted a comparative study examining visual-auditory-kinesthetic instruction against single-modality approaches, demonstrating that the combination of multiple sensory channels produces significantly greater literacy gains, thereby strengthening the theoretical claim that multimodal integration enhances learning more effectively than unisensory instruction.

Multisensory Instruction and Other Reading Skills

Research focusing on specific reading sub-skills has reinforced the broader evidence base for multisensory instruction. Iluezi-Ogbaudu and Sopekan (2023) employed a quasi-experimental design with lower basic pupils in Ogun State, revealing significant improvements in phonemic awareness following synthetic multisensory training. In a parallel study, Iluezi-Ogbaudu and Omotuyole (2023) demonstrated similar improvements in blending skills among the same population, suggesting that multisensory approaches effectively target foundational decoding abilities. While both studies shared similar geographical and demographic contexts, their complementary outcome measures provide converging evidence for the comprehensive impact of multisensory instruction on early literacy development.

Okechukwu et al. (2023) conducted a study in Anambra State specifically targeting dyslexic children, demonstrating that multimodal intervention programmes significantly improved fluid reading skills. Although their sample size was relatively modest compared to larger-scale studies such as Gomwalk and Bok (2024), their focused population of dyslexic learners provides important evidence for the effectiveness of multisensory approaches with specific reading disability populations.

The benefits of structured, learner-centered literacy training have also been demonstrated through related intervention studies employing evidence-based strategies. Adesokan and Olatunji-Olawepo (2024) and Olawepo (2024) investigated visual phonics approaches with hearing-impaired pupils, demonstrating significant improvements in reading comprehension. These studies, which employed single-group pre-test-post-test designs with relatively small samples, complement larger quasi-experimental studies by demonstrating the adaptability of multisensory principles across diverse learner populations with different sensory impairments.

Udele et al. (2025) conducted a study in Kaduna State combining the Orton-Gillingham method with assistive technology, finding substantial improvements in reading abilities among dyslexic pupils. This research employed a larger sample than many previous studies and incorporated technology-based supports, representing an important methodological advancement in the field. Dauda et al. (2026) demonstrated that semantic mapping instruction increased reading comprehension among secondary school pupils, while Okonkwo et al. (2024) established the positive impacts of audio-visual materials on pupils' reading ability using a mixed-methods design that incorporated both quantitative and qualitative data. These studies, though varying in their specific instructional approaches, collectively support the broader principle that evidence-based, multimodal teaching techniques enhance literacy among struggling readers.

Broader Applications of Multisensory Approaches

Multisensory teaching methods have demonstrated effectiveness across various learning domains beyond literacy. Adewunmi et al. (2023) conducted a study focusing on pupils with dysorthography, finding that multimodal intervention significantly improved spelling skills. Their research employed a within-subjects design that controlled for individual differences, providing robust evidence for the efficacy of multisensory approaches in spelling instruction. In

the mathematics domain, Olota and Olekanma (2025) and Olota and Ossai (2025) employed quasi-experimental designs with elementary school pupils, demonstrating that the TouchMath multisensory curriculum significantly improved mathematical computation skills. These studies, conducted with different sample populations within similar geographical contexts, provide converging evidence for the cross-curricular applicability of multisensory principles.

Samaila et al. (2025) investigated multisensory mathematics instruction among pupils with dyscalculia in Jos, finding significant improvements in mathematical performance. This research, which employed a pre-test-post-test control group design with a relatively small sample of identified dyscalculic pupils, complements the larger-scale studies of Olota and colleagues by focusing specifically on a population with mathematical learning disabilities. Fagbemi et al. (2025) extended this line of inquiry by examining assistive technology and peer tutoring interventions for gifted learners with dyscalculia, demonstrating significant mathematics achievement gains. This study's inclusion of both assistive technology and social learning components represents a more comprehensive intervention approach than single-strategy studies.

Technology-Enhanced Multisensory Learning

Emerging technologies have created new opportunities for multimodal learning. Akinwande and Daso-Akintunde (2025) demonstrated the efficacy of virtual reality in teaching English spellings, employing an experimental design with a technologically sophisticated intervention that allowed for immersive multisensory experiences. Their study, though limited by a relatively small sample size, represents an important methodological innovation in the field. Ikwen et al. (2025) investigated novel digital tools for improving phonemic awareness among pupils with mild cognitive impairment, finding significant improvements through technology-enhanced instruction. This research, conducted with a specialised population, extends the evidence base for technology-based interventions to learners with cognitive challenges.

Gassa (2026) employed a quasi-experimental design in early childhood education settings, demonstrating that audio-visual rhymes significantly improved learning outcomes. This study's focus on early childhood represents an important extension of the multisensory literature to younger learners. Integrative studies by Ekpete and Blessing (2025) and Oludare and Akinrinola (2026) have emphasised the growing need for evidence-based teaching strategies that can accommodate learner diversity through multimodal interaction. These review studies, which synthesised findings from multiple empirical investigations, provide important contextual frameworks for understanding the broader significance of multisensory research.

Socioeconomic Status and Literacy Development

The socioeconomic status (SES) of pupils is crucial for the development of literacy, even though instructional strategies have a significant impact on reading achievement. The combined effects of parental education, employment, income, learning resource accessibility, home literacy environment, and educational opportunities are reflected in socioeconomic status. Children's learning outcomes result from interactions between individual traits and various environmental systems, especially the home and school, according to Bronfenbrenner's Ecological Systems Theory (Bronfenbrenner, 1979). Compared to pupils from economically disadvantaged households, pupils from higher socioeconomic backgrounds typically have more access to books, digital learning materials, parental academic assistance, enhanced language experiences, and stimulating literacy surroundings. As a result, socioeconomic status may both moderate the efficacy of educational interventions and independently affect reading comprehension.

Research examining the relationship between SES and literacy outcomes has revealed consistent disparities across socioeconomic strata. Studies conducted in Nigerian educational contexts, such as those by Gomwalk and Bok (2024) in Jos Metropolis and Balami and Bassi (2026) in Maiduguri, have noted variations in baseline reading performance that may be attributable, in part, to socioeconomic differences among participants. However, these studies have not systematically examined SES as a moderating variable, representing a significant gap in the literature. The absence of SES-focused analyses in most Nigerian multisensory intervention studies limits our understanding of whether these instructional approaches are equally effective across different socioeconomic groups.

Methodology

Research Design

This study used a 2 × 2 factorial matrix with a pretest–posttest, non-equivalent control group quasi-experimental design. The quasi-experimental approach was deemed adequate because the study used intact classes in regular school settings, making random assignment of individual pupils to treatment regimens unfeasible. The design allowed the researcher to assess the impact of multisensory instruction on reading comprehension while controlling for initial variations in reading ability through pretesting. The study also investigated the effect of socioeconomic status and its interaction with instructional strategy.

The independent variable was instructional strategy (conventional versus multimodal teaching), the dependent variable was reading comprehension, and the moderator variable was socioeconomic status (high versus low). Both groups took pretests before and posttests after the intervention, with pretest results used as covariates during analysis.

Population of the Study

All Primary 4 pupils with reading disabilities enrolled in public primary schools in Pankshin Local Government Area of Plateau State during the 2025/2026 Academic Session constituted the population. Primary 4 pupils were deemed suitable as they are expected to have mastered fundamental word recognition and decoding skills, transitioning from learning to read to reading to learn. At this stage, reading comprehension becomes crucial for mastering all subjects.

Sample and Sampling Technique

The study sample comprised 40 Primary 4 pupils with reading disabilities, deemed sufficient for the quasi-experimental design and 2 × 2 factorial arrangement. Two public primary schools were purposively selected from Pankshin LGA based on accessibility and willingness to participate. From these schools, 40 Primary 4 pupils with reading disabilities were purposively sampled using the Informal Reading Inventory for screening. Pupils who met the inclusion criteria were selected. Selected pupils were then randomly assigned by ballot to either experimental or control groups. Participants were further categorised into high and low socioeconomic status groups using data from the Socioeconomic Status Questionnaire, resulting in four treatment conditions.

Instruments for Data Collection

The Reading Comprehension Achievement Test (RCAT) and the Socioeconomic Status Questionnaire (SESQ) were employed. RCAT comprised 30 multiple-choice questions measuring literal understanding, inferential comprehension, vocabulary in context, main idea identification, sequencing, and drawing inferences. The maximum score was 30 marks, with higher scores indicating better comprehension. The same instrument was used for pretest and posttest, with item order rearranged for the posttest.

The SESQ gathered data from parents/guardians on occupation, education, household income, access to digital learning tools, availability of reading materials, and home literacy environment, enabling classification into high and low socioeconomic groups.

Validity of the Instrument

The Multisensory Teaching Manual, SESQ, and RCAT underwent face and content validation by three experts in special education, educational psychology, and measurement and evaluation. Validators examined language clarity, item appropriateness, relevance to the study aim, content coverage, suitability for Primary 4 pupils, and alignment with study variables. Their recommendations were incorporated before pilot testing.

Reliability of the Instrument

A pilot test involving Primary 4 pupils with reading difficulties in Mangu LGA established RCAT reliability. The Kuder-Richardson Formula 20 (KR-20) yielded a reliability coefficient of 0.84, indicating adequate internal consistency. The SESQ was assessed using Cronbach's Alpha, producing a coefficient of 0.81, confirming sufficient reliability for categorising participants.

Treatment Procedure

The eight-week treatment programme covered the same reading comprehension topics from the Primary 4 English curriculum for both groups. Research assistants (regular classroom teachers) were trained on treatment procedures to ensure consistency and fidelity.

The experimental group received Multisensory Teaching based on the Orton-Gillingham approach, combining tactile, kinesthetic, auditory, and visual experiences. Activities included reading aloud, acting out concepts, tracing letters and words, manipulating materials, observing illustrations, listening to demonstrations, and participating in guided and independent practice. Instruction was systematic, sequential, explicit, cumulative, and highly interactive.

The control group received traditional teacher-centered instruction with minimal pupil involvement and no structured multisensory activities. Both groups received instruction from qualified teachers using the same lesson materials for the same duration.

Data Collection and Ethical Procedure

Approval was obtained from school heads and educational authorities, with informed consent from parents/guardians. Both groups completed RCAT as a pretest before the eight-week intervention. At the conclusion, the posttest was administered under similar conditions. Completed instruments were scored using the provided marking guide.

Method of Data Analysis

Analysis of Covariance (ANCOVA) was used to test hypotheses at 0.05 significance level, adjusting posttest scores for pretest differences. Effect size was used to determine the main and interaction effects on reading comprehension.

Results

Hypothesis 1 (H01): Main Effect of Multisensory Teaching

Table 1: Main Effect of the Treatment on Reading Comprehension of the Participants

Tests of Between-Subjects Effects

Dependent Variable: Posttest

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	2925.075^a^	2	1462.538	132.730	.000	.378
Intercept	118.092	1	118.092	10.717	.002	.225
Pretest	18.050	1	18.050	1.638	.209	.042
Treatment	2860.418	1	2860.418	259.592	.000	.475
Error	407.700	37	11.019			
Total	28183.000	40				
Corrected Total	**3332.775**	**39**				

^a^ R Squared = .878 (Adjusted R Squared = .871)

Table 1 presents the Analysis of Covariance (ANCOVA) results for the main effect of multisensory teaching on the reading comprehension of primary school pupils with reading disability, controlling for pretest scores. The results revealed that the covariate (pretest) did not have a statistically significant effect on posttest reading comprehension scores, [$F(1, 37) = 1.64$, $p = .209$, partial $\eta^2 = .042$], indicating that initial differences in reading comprehension did not significantly influence the posttest outcomes. However, there was a statistically significant main effect of treatment on pupils' reading comprehension, [$F(1, 37) = 259.59$, $p < .001$, partial $\eta^2 = .475$]. The effect size was very large, suggesting that approximately 47.5% of the variance in posttest reading comprehension scores was attributable to the instructional treatment after controlling for pretest scores. Furthermore, the overall ANCOVA model was statistically significant, [$F(2, 37) = 132.73$, $p < .001$], explaining 37.8% of the variance in posttest scores (Adjusted $R^2 = .471$). Based on these findings, the null hypothesis stating that there is no significant main effect of multisensory teaching on the reading comprehension of primary school pupils with reading disability in Pankshin Local Government Area of Plateau State was rejected. This implies that multisensory teaching significantly improved pupils' reading comprehension.

Hypothesis 2 (H02): Main Effect of Socioeconomic Status

Table 2: Main Effect of Socioeconomic Status on Reading Comprehension of the Participants

Tests of Between-Subjects Effects

Dependent Variable: Posttest

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	863.846^a^	2	431.923	6.473	.004	.259
Intercept	115.118	1	115.118	1.725	.197	.045
Pretest	20.935	1	20.935	.314	.579	.008
SES	799.189	1	799.189	11.977	.001	.245
Error	2468.929	37	66.728			
Total	28183.000	40				
Corrected Total	**3332.775**	**39**				

^a^ R Squared = .259 (Adjusted R Squared = .219)

Table 2 presents the Analysis of Covariance (ANCOVA) results for the main effect of socioeconomic status on the reading comprehension of primary school pupils with reading

disability, after controlling for pretest scores. The results showed that the covariate (pretest) did not have a statistically significant effect on posttest reading comprehension scores, [$F(1, 37) = 0.31$, $p = .579$, partial $\eta^2 = .008$], indicating that pupils' initial reading comprehension levels did not significantly influence their posttest performance. However, socioeconomic status had a statistically significant main effect on reading comprehension, [$F(1, 37) = 11.98$, $p = .001$, partial $\eta^2 = .245$]. The effect size was large, indicating that approximately 24.5% of the variance in posttest reading comprehension scores was explained by pupils' socioeconomic status after controlling for pretest scores. In addition, the overall ANCOVA model was statistically significant, [$F(2, 37) = 6.47$, $p = .004$], accounting for 25.9% of the variance in posttest reading comprehension scores (Adjusted $R^2 = .219$). Based on these findings, the null hypothesis stating that there is no significant main effect of socioeconomic status on the reading comprehension of primary school pupils with reading disability in Pankshin Local Government Area of Plateau State was rejected. This implies that socioeconomic status significantly influenced the reading comprehension of the pupils.

Hypothesis 3 (H03): Interaction Effect

Table 3: Interaction Effect of the Treatment and Socioeconomic Status on Reading Comprehension

Tests of Between-Subjects Effects

Dependent Variable: Posttest

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	2952.594^a^	4	738.149	67.955	.000	.486
Intercept	106.142	1	106.142	9.772	.004	.218
Pretest	23.255	1	23.255	2.141	.152	.058
Treatment	1948.162	1	1948.162	179.351	.000	.437
SES	18.759	1	18.759	1.727	.197	.047
Treatment*SES	4.460	1	4.460	.411	.526	.012
Error	380.181	35	10.862			
Total	28183.000	40				
Corrected Total	3332.775	39				

^a^ R Squared = .886 (Adjusted R Squared = .873)

Table 3 presents the Analysis of Covariance (ANCOVA) results for the interaction effect of multisensory teaching and socioeconomic status on the reading comprehension of primary school pupils with reading disability, controlling for pretest scores. The results indicated the interaction effect between multisensory teaching and socioeconomic status was not statistically significant, [$F(1, 35) = 0.41$, $p = .526$, partial $\eta^2 = .012$], indicating that the effectiveness of multisensory teaching did not differ significantly across socioeconomic status groups. The overall ANCOVA model was statistically significant, [$F(4, 35) = 67.96$, $p < .001$], explaining 48.6% of the variance in posttest reading comprehension scores (Adjusted $R^2 = .486$). Therefore, the null hypothesis was not rejected, indicating that there was no significant interaction effect of multisensory teaching and socioeconomic status on the reading comprehension of primary school pupils with reading disability in Pankshin Local Government Area of Plateau State.

Discussion of Findings

The study revealed a strong main effect of multisensory teaching on reading comprehension, with results showing [$F(1, 37) = 259.59$, $p < .001$, partial $\eta^2 = .475$]. This

supports earlier research that highlights the benefits of multisensory approaches. For instance, Abdulquadri (2022) found that multimodal instruction significantly boosted reading skills among primary school students in Ilorin. Likewise, Balami and Bassi (2026) discovered that multisensory instruction led to notable improvements in reading proficiency for dyslexic students in Maiduguri primary schools. Gomwalk and Bok (2024) echoed these findings in Plateau State, showing that multimodal instruction helped enhance reading performance for students facing reading challenges in Jos Metropolis.

In addition, Mustapha et al. (2024) reported significant gains in reading skills following visual-auditory-kinesthetic instruction. In contrast, some studies offer different insights. Okechukwu et al. (2023) indicated that while multimodal intervention did improve reading skills, their emphasis was more on reading fluency rather than comprehension itself. Similarly, Iluezi-Ogbaudu and Omotuyole (2023) showed advancements in blending skills, which are essential but don't directly equate to comprehension. These findings suggest that while multisensory teaching can enhance various aspects of reading, its specific impact on comprehension might differ depending on the context. The current study aims to fill this gap by focusing specifically on reading comprehension outcomes.

The study established a significant main effect of socioeconomic status on reading comprehension, with results showing [$F(1, 37) = 11.98$, $p = .001$], and a partial η^2 of .245. This aligns with Bronfenbrenner's Ecological Systems Theory (1979), which suggests that children's learning outcomes stem from the interplay between their individual characteristics and their surrounding environments, especially at home and in school. Supporting this, research by Abdulquadri (2022) indicates that access to learning resources differs among socioeconomic groups. Additionally, studies by Balami and Bassi (2026) and Gomwalk and Bok (2024) found that while multisensory instruction proved effective, the home literacy environment and parental support, both of which closely tied to socioeconomic status played a crucial role in shaping reading outcomes. Iluezi-Ogbaudu and Sopekan (2023) observed improvements in phonemic awareness across various socioeconomic backgrounds, hinting that targeted interventions can help bridge some gaps. However, Adesokan and Olatunji-Olawepo (2024) pointed out that socioeconomic factors still significantly impacted reading comprehension among hearing-impaired students, suggesting that the influence of SES remains strong even with specialized instruction. This current study contributes valuable evidence that socioeconomic status has an independent effect on reading comprehension for students with reading disabilities.

The interaction between multisensory teaching and socioeconomic status didn't show any significant differences, with results indicating [$F(1, 35) = 0.41$, $p = .526$, and a partial η^2 of .012]. This suggests that the effectiveness of multisensory teaching remains consistent across different socioeconomic groups. In a similar vein, Gomwalk and Bok (2024) found that in Jos Metropolis, multimodal instruction was beneficial for students, regardless of their background. Balami and Bassi (2026) also noted that structured multisensory experiences helped improve reading skills among dyslexic students from various socioeconomic settings.

In contrast, Abdulquadri (2022) pointed out that socioeconomic factors could influence how effective interventions are, as students from wealthier backgrounds often have better access to books and learning resources. Musonda et al. (2025) highlighted that learners with developmental disabilities frequently encounter challenges that are intertwined with their environment. Nevertheless, the findings from the current study indicate that multisensory teaching offers equal advantages across socioeconomic groups. This suggests that thoughtfully designed instructional strategies can effectively tackle reading challenges, no matter the

socioeconomic status of the students. The absence of a significant interaction reinforces the idea that evidence-based teaching methods can help bridge educational gaps.

Limitations of the Study

The purposive selection of pupils with reading disabilities limits the generalisability of findings to the broader population of primary school pupils without reading difficulties. Additionally, the sample was drawn from only two schools in Pankshin LGA, which may not represent the diverse educational contexts across Plateau State or Nigeria. The relatively small sample size of 40 participants, while adequate for the factorial design, restricts the statistical power to detect smaller effect sizes and limits the generalisability of results to other populations and settings.

Conclusion

This study investigated the effectiveness of multisensory teaching in improving reading comprehension among primary school students with reading disabilities in the Pankshin Local Government Area of Plateau State. The results showed that multisensory teaching made a significant difference in reading comprehension, with a large effect size that highlights its importance as a teaching method. Moreover, socioeconomic status played a crucial role in reading comprehension outcomes, confirming that factors like home environment and access to resources can impact literacy development. Interestingly, the interaction between multisensory teaching and socioeconomic status did not show significant differences, indicating that the benefits of the intervention were similar across different socioeconomic groups. These findings suggest that multisensory instruction can effectively tackle reading challenges while also helping to bridge educational gaps. The results align with theoretical frameworks such as the Orton-Gillingham Theory and Dual Coding Theory, which stress the value of engaging multiple senses in the learning process. For educators and policymakers, this study offers solid evidence that structured, multisensory methods can boost reading comprehension for students with reading disabilities, regardless of their socioeconomic background, paving the way for more inclusive and effective literacy education in Nigerian primary schools.

Recommendations

In view of the findings of the study, the following recommendations are imperative:

1. There is need to implement multisensory teaching strategies in primary schools across Pankshin Local Government and in Plateau State to improve reading comprehension among pupils with reading disabilities.
2. Provision of professional development training for primary school teachers in Pankshin Local Government and in Plateau State on evidence-based multisensory literacy instruction techniques is germane.
3. The Universal Basic Education Board in Pankshin Local Government should develop reading intervention programmes that combine multisensory approaches with home literacy support activities.

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