Evaluating the Impact of Multisensory Instruction on Dyslexic Learners' Writing Skills in English Language Learning

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Abstract

The objective of this research is to determine if the use of multimodal education may enhance the writing abilities and boost the self-assurance of dyslexic learners in the process of acquiring English language skills. The research was carried out in the Asir area of the Kingdom of Saudi Arabia. The study used a quasi-experimental approach and included pre-test and post-test evaluations. A cohort of sixty dyslexic learners were provided with multimodal teaching, whereas another cohort of sixty got conventional training. The data analysis, which included conducting ANCOVA and t-tests, revealed statistically significant enhancements in both the writing correctness and fluency of the experimental group. In addition, we observed a substantial increase in self-reported writing confidence among the individuals in the experimental group in comparison to those in the control group. These results suggest that the use of multimodal teaching may significantly enhance the writing abilities and self-confidence of dyslexic learners in English Language Learning (ELL) environments. These findings have significant ramifications for our educational approach.

Keywords: multisensory instruction, dyslexia, English language learning, writing skills.

Introduction

Possessing proficient writing skills is of utmost significance for achieving academic success and effectively conveying information in daily interactions. Mastering written English may provide significant challenges for those with dyslexia. The reason for this is because individuals with this condition have difficulties in the cognitive process of interpreting auditory stimuli and linking them to textual symbols and linguistic units (Shaywitz, 2003). Dyslexia is a cognitive disorder that impacts an individual's ability to accurately perceive and comprehend written language, as well as their proficiency in spelling. Dyslexia is a neurological disease that impairs individuals' ability to read and decipher words. This disorder is prevalent and may significantly affect the process of acquiring language skills (Lyon, Shaywitz, & Shaywitz, 2003).

The Simple View of Writing paradigm posits that proficiency in writing is contingent upon two primary factors: transcription, including handwriting and spelling, and text production, entailing the transformation of thoughts into articulate sentences (Berninger & Amtmann, 2007). Individuals with dyslexia often encounter difficulties in several domains, so it is crucial to use instructional approaches that are tailored to their unique learning needs (Graham, Harris, & Larsen, 2001).

Theoretical underpinnings of multisensory education for dyslexia, such as those proposed by the Orton-Gillingham method, emphasize the need of engaging several senses to improve reading abilities (Ritchey, 2011). I suggest that this strategy is founded upon the notion that the amalgamation of several senses may be very advantageous for those afflicted with learning impairments. It enables individuals to engage in many cognitive processes, which may greatly enhance their learning outcomes (Stein & Walsh, 1997).

It is important to mention that although multimodal approaches are often suggested for teaching reading, there has been little study on their impact on writing abilities for dyslexic persons learning English

(Berninger, 2000). Writing is a multifaceted activity that encompasses cognitive processes, linguistic skills, and motor coordination. Gaining insight into the efficacy of using several senses in writing instruction is crucial. The significance of this problem has been emphasized by scholars Graham and Hebert (2011).

Writing in a non-native language (L2) might provide more difficulties, particularly for those with dyslexia. The Linguistic Coding Differences Hypothesis posits that the skills required for acquiring literacy in one's native language are linked to the aptitude for acquiring a second language. Therefore, challenges encountered in the native language are likely to be comparable while learning a second language (Sparks & Ganschow, 1991). According to Kormos & Smith (2023), dyslexic learners encounter even greater difficulties when writing in English as a second language.

Furthermore, new research in the area of cognitive science suggests that instructional methods that correspond with the brain's innate capacity to absorb information using many senses might enhance learning results (Willis, 2008). Examining various pedagogical approaches that use multisensory techniques is crucial for enhancing writing skills, particularly among dyslexic English language learners (Shaywitz & Shaywitz, 2008).

Conducting research on the impact of multimodal training on the writing abilities of dyslexic students is of utmost significance. This study has the capacity to offer valuable insights for educational application, contribute to our comprehension of literacy progression and neurodiversity, and ultimately improve the educational experiences and results for this particular demographic (Fawcett & Nicolson, 2004; Fletcher et al., 2018). Studying the effects of multimodal education may provide educators and policymakers with valuable insights to make better-informed choices about teaching practices. This study aims to advance inclusive and effective teaching methodologies grounded on empirical data. Research of this kind has significance not only in enhancing educational methodologies but also in guaranteeing equity. Edyburn (2010) asserts that providing the necessary tools and education is essential in ensuring the success of all learners, including those with dyslexia.

The Problem of Study

The challenges faced by dyslexic learners in school, particularly in acquiring foreign languages, have been well investigated. Dyslexia is a neurodevelopmental disorder characterized by difficulties in reading and spelling with accuracy and fluency. It is seen as a cognitive impairment. Acquiring proficiency in the English language may pose difficulties, particularly for those with dyslexia, owing to its intricate characteristics. The English language exhibits irregular spelling patterns and has a vast array of vocabulary, so presenting an additional level of challenge for those with dyslexia. Dyslexic learners are often most impacted in their language competence by writing. Writing is dependent on linguistic, cognitive, and motor abilities, which are areas that dyslexic learners may find challenging. While multimodal teaching techniques may have potential benefits, there is insufficient quantitative data to demonstrate their successful improvement of writing skills in dyslexic learners who are concurrently engaged in English Language Learning (ELL). I propose doing a comprehensive research to determine the efficacy of using multimodal techniques in this particular educational domain.

Questions of the Study

1. How does multisensory instruction impact the writing accuracy of dyslexic learners in English language learning compared to traditional instructional methods?

2. What effect does multisensory instruction have on the writing fluency of dyslexic learners engaged in English language learning?

3. To what extent does multisensory instruction influence the self-reported writing confidence of dyslexic learners in ELL environments?

Significance of the Study

This research is noteworthy considering that it explores into a relatively unexplored area: the enhancement of writing abilities in individuals with dyslexia, particularly those for whom English is not their first language. Proficiency in writing is a vital aptitude for achieving academic excellence. Therefore, it is imperative to comprehend and provide assistance to dyslexic children in order to guarantee equitable education. The results of this research have the capacity to provide significant knowledge to educators and curriculum designers. Individuals have the opportunity to acquire knowledge about the benefits and drawbacks of using multimodal teaching tactics. This knowledge may enhance their educational methods and render them more efficient. Moreover, the findings of this research have the potential to provide useful understanding of the neurocognitive mechanisms behind writing abilities in persons with dyslexia. This would be a substantial addition to the domains of educational psychology and neuroscience. The primary objective of this study is to assist individuals with dyslexia in overcoming linguistic obstacles, enabling them to actively engage in both academic and social endeavors.

Terms of the Study

The research included a full academic year, a crucial timeframe for assessing growth and impacts over successive terms. This enabled a comprehensive evaluation of the effects of instructional interventions. The target demographic comprises dyslexic learners within a certain age bracket. These learners are presently registered in English language acquisition programs at specific educational institutions. The research was conducted in a controlled setting. Participants were randomized at random to either the intervention group, where they got training that engaged many senses, or the control group, where they received instruction using traditional techniques. This aids in guaranteeing that the discoveries are concentrated and pertinent, while also furnishing a framework for methodical examination.

Limitations of the Study

While this research seeks to provide significant insights into the impacts of multimodal training, it does include several limitations. An important factor to take into account is that the implementation of multisensory educational strategies may differ, thus affecting the consistency and dependability of the outcomes. Furthermore, the research presupposes the proper diagnosis of dyslexia and the participants' adherence to this diagnosis. However, this fails to include the many literacy challenges or other learning disorders that may occur simultaneously. Furthermore, it is crucial to acknowledge that the conclusions drawn from the research may not be applicable to other demographic cohorts or educational settings that were not part of the sample. Finally, it should be noted that the research was done only for a single academic year. The current duration may not provide sufficient time for a comprehensive comprehension of the enduring impacts and advantages of multimodal teaching. The impacts and advantages may become more evident with the passage of time.

Literature review and Previous studies

Dyslexia is a neurodevelopmental disorder characterized by challenges in reading and language abilities. Shaywitz & Shaywitz (2005) define dyslexia as a condition where individuals with high intelligence have difficulties in reading, despite their expected ability to read well. Snowling (2000) characterizes the condition as a difficulty in comprehending and articulating sounds, resulting in challenges with word recognition and reading.

Individuals who are learning the English language and who have dyslexia have a dual difficulty. Individuals with dyslexia must acquire the lexicon and syntax of a foreign language, while also managing the challenges associated with their dyslexic condition (Sparks, 2006). Individuals with dyslexia may encounter significant challenges while attempting to acquire proficiency in the English language, mostly because of its intricate spelling and writing conventions. These learners often need explicit training in comprehending phonetics and the syntax of language (Ganschow & Sparks, 1995).

Proficiency in writing is a crucial aptitude for achieving academic success. However, individuals with dyslexia have particular challenges in this area due to difficulties with spelling and expressing their ideas verbally (Berninger et al., 2002). Learning English as a second language might provide even greater

difficulties for dyslexic learners. They must navigate the intricacies of both the orthography and syntax of a foreign language (Cummins, 1984).

According to Henry (2010), using multimodal education, which combines visual, auditory, and kinesthetic-tactile techniques simultaneously, is often regarded as an effective approach for educating those with dyslexia. The Orton-Gillingham method is a longstanding framework. It employs multimodal techniques to facilitate the learning process. The method prioritizes systematic, step-by-step, and progressive learning (Ritchey & Goeke, 2006). The majority of research on multimodal education has focused on its potential to enhance reading proficiency. Research undertaken by Torgesen et al. in 2001 and Foorman et al. in 2003 has shown that the use of multimodal education may enhance the reading accuracy and fluency of individuals with dyslexia.

The majority of research on multisensory education has been focused on reading. However, there is an increasing body of data suggesting that it also has an influence on writing. Hulme et al. (2012) suggest that dyslexic children may enhance their mechanical writing abilities, such as handwriting and spelling, by using multimodal methods. Furthermore, a 2005 research done by Graham and Harris delved into the Self-Regulated Strategy Development (SRSD) paradigm. The study results indicate that offering strategy teaching, including multisensory approaches, may improve the writing skills of kids with learning difficulties. Despite the positive nature of these results, there is a dearth of research that particularly examines the impact of multimodal training on the writing abilities of English language learners with dyslexia. Research examining the impact of multimodal methods on the writing abilities of this specific population (Berninger et al., 2002) might be beneficial.

Methods

This research used a quasi-experimental methodology, using pre-test and post-test measurements, to evaluate the impact of multisensory training on the writing abilities of dyslexic learners in the Asir area of the Kingdom of Saudi Arabia. In this design, we conducted a comparative analysis of two groups. The experimental group was provided with multisensory teaching, whereas the control group got standard instruction techniques.

Participants

The research included dyslexic learners who were currently enrolled in English language learning programs at different schools in the Asir area. Accredited educational psychologists used recognized diagnostic criteria for dyslexia to identify individuals with the condition. Two cohorts were established for the research. The first cohort, referred to as the experimental group, had 60 pupils who were exposed to multimodal training. The control group, including 60 kids, was assigned to receive the regular curriculum.

Sampling Method

The participants were allocated to either the experimental or control group based on practical factors and with the approval of parents and educators. In order to enhance comparability, we conducted matching based on important demographic characteristics, including age, beginning English proficiency levels, and degree of dyslexia.

Intervention Elaboration

The instruction provided to the experimental group was meticulously crafted to include a range of sensory encounters. This included using visual components such as utilizing color in reading and writing, as well as including visual assistance. Additionally, auditory activities such as listening exercises and phonetic exercises were included. In addition, the curriculum included kinesthetic-tactile components such as letter formation in sand and word tracing. The curriculum was revised to include a range of strategies aimed at enhancing students' writing proficiency. These strategies include letter-sound mapping, multisensory reinforcement exercises, and the use of manipulatives to strengthen phonological awareness and orthographic understanding. The techniques used in this approach drew inspiration from existing

programs like the Orton-Gillingham approach, but were modified expressly for the purpose of teaching English as a second language.

In contrast, the control group received a conventional English language program. This curriculum primarily focused on conventional pedagogical approaches such as rote memorization, grammar drills, and comprehension of texts without engaging different sensory modalities. The purpose of this study was to explicitly examine the effects of multimodal teaching on the advancement of writing abilities in persons diagnosed with dyslexia.

Measures Elaboration

In order to assess the precision of written language, we used a standardized examination known as the Test of Written Spelling (TWS). In order to assess writing fluency, students were assigned a timed writing assignment in which they were required to compose a brief essay on a designated subject. The TWS is an assessment that measures your spelling proficiency against a set standard. The timed writing activity was evaluated using a rubric that assessed the number of accurate writing sequences you generated.

An individualized survey was developed to assess the level of self-assurance that students had about their writing skills. The questionnaire consisted of inquiries that required students to assess their degrees of comfort and confidence in various writing assignments using a 5-point scale, where 1 indicated a high degree of discomfort/lack of confidence and 5 indicated a high degree of comfort/strong confidence. The questionnaire was verified for accuracy and reliability in a pilot study. This research included a distinct subset of individuals from the intended population, which was distinct from the primary investigation. Based on the input obtained from the pilot research, we made enhancements to the questionnaire. Our main objective was to enhance clarity, relevance, and consistency.

Data Collection Procedures Elaboration

We devised an effective approach to gather data at the commencement and conclusion of the academic year to assess the initial level and subsequent enhancements in writing proficiency and self-assurance resulting from the intervention. The pre-test was used to ascertain the participants' initial levels of writing skill and their self-perceived confidence. This aided in accounting for any variations among them at the individual level.

During the post-testing phase, we used identical methods to assess any alterations that were occurred. The educators who conducted the assessments and surveys were unaware of the students' group assignment (experimental or control). In addition, they received training on standardized administration techniques to ensure the uniform gathering of data for all participants. The educators who collaborated with dyslexic learners have previous expertise and underwent specific instruction on how to conduct the TWS and oversee the writing assignment. The significance of this training lies in its capacity to maintain uniformity and dependability in the process of scoring.

Data Analysis

The primary statistical analysis was conducted using Analysis of Covariance (ANCOVA). We choose this method in order to consider any pre-existing variations in writing precision, fluency, and self-assessed levels of confidence between the experimental and control groups. In order to address any disparities in the post-test results, we used pre-test scores as factors in the ANCOVA model. Considering the initial performance as a reference point, the modification allowed for a more accurate assessment of the effects of the multimodal educational technique.

We used repeated measures analysis to examine the changes occurring within each group over time and to evaluate the discrepancies between groups from the pre-test to the post-test. I thought this study to be quite interesting since it examined the effects within the same patients, while considering that data were performed at two distinct time points. The between-subjects effects provided us with a more comprehensive comprehension of the distinctions between multimodal training and standard teaching approaches.

We computed effect estimates for each significant discovery to facilitate comprehension of the magnitude of the observed changes. I computed Cohen's d as a measure of the intervention's effectiveness, using the post-test scores. In addition, I used Eta squared (η^2) and Partial Eta squared (η^2) derived from the ANCOVA findings to ascertain the extent of variation linked to the intervention.

Statistical analyses were conducted using the SPSS program. Prior to doing ANCOVA, we thoroughly examined the data for any instances of missing values or outliers. We ensured that certain assumptions, such as the presence of equal regression slopes, normally distributed residuals, and equal variances, were satisfied. In cases where the assumptions were not satisfied, we explored the possibility of using other statistical techniques, such as non-parametric testing or data transformation.

Results

Table 1: Descriptive Statistics for Writing Scores (Experimental Group)

Measure	Pre-Test Mean (SD)	Post-Test Mean (SD)	Change
Writing Accuracy	48 (9.5)	54 (8.8)	+6
Writing Fluency	47 (10.2)	55 (9.1)	+8

The data shown in the table demonstrates that the mean scores for writing accuracy and fluency in the experimental group exhibited enhancement subsequent to the intervention. The individuals exhibited a diverse range of starting skill levels, as shown by the pre-test mean scores being close to the midpoint of the scale. The participants' writing abilities seemed to improve and become more consistent after the implementation of multimodal teaching. This is seen by the rise in post-test averages, despite the somewhat reduced standard deviations.

Table 2: Descriptive Statistics for Self-Reported Confidence (Experimental Group)

Measure	Pre-Test Mean (SD)	Post-Test Mean (SD)	Change
Self-Reported Confidence	3.2 (1.0)	3.8 (0.9)	+0.6

Following the session, participants expressed an increased sense of self-assurance about their writing skills. This was shown by a rise in the average self-reported confidence on a 1 to 5 Likert scale, from the pre-test to the post-test. The comparatively low standard deviations suggest that the rise in confidence was consistently uniform across all subjects.

Table 3: Descriptive Statistics for Writing Scores (Control Group)

Measure	Pre-Test Mean (SD)	Post-Test Mean (SD)	Change
Writing Accuracy	47 (9.8)	48 (9.7)	+1
Writing Fluency	46 (10.1)	47 (10.0)	+1

The results pertaining to the control group demonstrates a marginal increase in writing scores. The observed enhancement may be attributed to the consistent acquisition of knowledge within the traditional classroom setting, rather than any particular intervention. Given the almost constant standard deviations, it seems that there was little fluctuation in the results. This implies that conventional education had a little effect on enhancing the writing abilities.

Table 4: Descriptive Statistics for Self-Reported Confidence (Control Group)

Measure	Pre-Test Mean (SD)	Post-Test Mean (SD)	Change
Self-Reported Confidence	3.1 (1.1)	3.2 (1.1)	+0.1

The individuals in the control group observed a marginal boost in confidence, but its statistical significance remains uncertain. The conventional instructional approaches seemed to have little impact on the pupils' self-assurance in their writing abilities.

Upon comparing the experimental and control groups, it is evident that the experimental group exhibited more substantial enhancements in both writing proficiency and self-assurance in comparison to the control group. The comparison between the multimodal instructional approach and conventional approaches implies that the multisensory approach is more efficient, especially for dyslexic learners in English language learning environments. The findings from the experimental group indicate a potential correlation between the use of many senses in instructional methods and enhanced writing abilities. In contrast, the findings from the control group provide evidence that the effects of the intervention are limited to certain domains.

Table 5: ANOVA Results for Post-Test Scores

Source	SS	df	MS	F	p-value	η^2
Group	2250.00	1	2250.00	14.50	< 0.001	0.20
Error	9000.00	118	76.27			
Total	11250.00	119				

The 'Group' column in this table displays the disparity between the experimental and control groups. The F-statistic is 14.50 and the p-value is less than 0.001, indicating a significant difference in the post-test scores between the groups. The eta squared (η^2) value of 0.20 suggests that about 20% of the variability in post-test results may be accounted for by the group membership. This indicates that around 20% of the variation in results may be attributed to the disparity in scores between individuals in the experimental and control groups. The row labeled 'Error' denotes the dispersion within each group, while the row labeled 'Total' denotes the total dispersion in the data.

The F-statistic indicates that the multimodal teaching intervention likely had a beneficial effect on the writing scores of the experimental group in comparison to the control group, who received conventional instruction.

Table 6: Paired t-test Results for Experimental Group

Test	t-statistic	p-value	Mean Difference	Cohen's d
Pre-Test vs. Post-Test Scores	5.89	< 0.001	5	0.76

This table displays the outcomes of a paired t-test, which compares the scores before and after the experiment for the experimental group. The t-statistic of 5.89 and a p-value less than 0.001 indicate a substantial improvement in writing scores from the pre-test to the post-test. The mean difference between the post-test scores and the pre-test scores was 5 points greater on average. The Cohen's d value of 0.76 suggests a substantial effect size, indicating that the multimodal educational strategy had a noteworthy influence on the writing skills of the participants.

Table 7: ANCOVA Results for Post-Test Scores Controlling for Pre-Test Scores

Source	df	Sum of Squares	Mean Square	F-value	p-value	Partial η^2
Pre-Score	1	900	900	90.00	< 0.001	0.45
Group	1	250	250	25.00	< 0.001	0.17
Error	117	1100	9.40			

The 'Group' line in this table represents the variation between the various teaching approaches (experimental vs. control) that may be ascribed to the groups. An F-value of 25.00 with a p-value less than 0.001 indicates a substantial difference in the post-test scores between the experimental and control groups, even when considering the pre-test scores. The partial eta squared (Partial η^2) of 0.17 indicates that about 17% of the variability in post-test results may be explained by the group component.

The 'Pre-Score' line indicates the significance of pre-test scores in assessing the impact of the group factor on the post-test results. It is essential to account for the pre-test results in order to precisely assess the

influence of the group factor. The 'Error' line indicates the unaccounted for variation among the groupings. This variability is not explained by the pre-test scores or the group membership.

These findings indicate that the intervention (multisensory teaching) provided to the experimental group is successful in improving post-test scores compared to the control group. The substantial partial eta squared values indicate that both the pre-test scores and the group factor have a considerable influence on the post-test results.

Discussion

Multisensory Instruction Compared to Traditional Instructional

By integrating the statistical data with the relevant literature, it becomes evident that the use of multimodal training may significantly enhance the writing accuracy of dyslexic learners. The research revealed that the experimental group, which was exposed to multisensory teaching, had a noteworthy improvement in their post-test writing accuracy scores in comparison to the control group. The ANCOVA analysis verified this, with a significant F-value of 25.00 and p-value less than .001. Research has shown that the use of multimodal teaching tactics may greatly benefit individuals who have learning challenges, such as dyslexia. This corroborates the findings of the earlier study conducted by Berninger et al. (2002).

Moreover, the statistical analysis emphasizes that the inclusion of visual, aural, and kinesthetic-tactile aspects not only improves the accuracy of writing but also facilitates a more seamless writing process. This suggests that there has been an improvement in the ability to write smoothly and effortlessly. Torgesen et al. (2001) found that including multimodal involvement into therapies may significantly enhance the writing abilities of individuals with dyslexia.

The paired samples t-test findings indicated a substantial enhancement in self-reported writing confidence for the experimental group (t(59) = 5.89, p < .001). Utilizing multimodal techniques seems to enhance both the proficiency of students' writing and their self-perception of their writing talents. Developing a heightened sense of self-assurance is crucial since research has shown a substantial correlation between self-belief and academic success (Pajares, 1996).

The results of this research have significance for the current discourse on the most efficient methods of assisting individuals with dyslexia. The research indicates that the use of multimodal educational strategies might be advantageous and should be implemented on a broader scale. Empirical research is increasingly supporting the use of the Orton-Gillingham approach and comparable methodologies. This provides a stronger rationale for include them in teacher training and curriculum development (Ritchey, 2011).

Multisensory Instruction on the Writing Fluency of Dyslexic Learners

The experimental group demonstrated substantial improvements in writing fluency (F(1, 117) = 25.00, p < .001), building upon the strong groundwork previously established. This compellingly demonstrates the efficacy of multimodal education. These results are consistent with the theoretical framework of the Simple View of Writing, which posits that the fluency of writing plays a crucial role in the ability to produce high-quality text (Berninger & Winn, 2006). Based on our research, it seems that using several senses throughout the learning process enhances our capacity to utilize language effortlessly. Mastering this skill is crucial for achieving a seamless and articulate writing style (Ehri, 2014).

The data from this research corroborates the findings of Torgesen et al. (2001), which highlight the need of providing dyslexic learners with explicit, direct education that often incorporates multimodal techniques. Richards et al. (2015) found that these instructional tactics had a positive impact on the development of reading and writing abilities. Their comprehensive approach to literacy is very significant in influencing educational methods.

The significant enhancement of self-reported writing confidence further emphasizes the broader impact of multimodal education. The observed rise in self-reported confidence is statistically significant (t(59) = 5.89, p < .001), suggesting that students' self-efficacy has improved. The augmentation of self-efficacy is

significant since it is widely recognized as a crucial element in achieving good learning outcomes. Additionally, it is linked to enhanced academic drive and achievement, as shown by studies conducted by Bandura (1997) and Pajares (1996).

The study results have profound ramifications for our approach to education, particularly in the context of teaching English to those with dyslexia. Based on the available research, it is advantageous to include multimodal educational methods into the curriculum. This implies that increasing the frequency of using these techniques might potentially enhance the literacy abilities of those with dyslexia. (Ritchey, 2011; Moats, 2009).

The extent of multisensory instruction influence the self-reported writing confidence of dyslexic learners in ELL environments

The statistical analysis of the research revealed that learners who were exposed to multimodal education shown a noteworthy improvement in their self-confidence ($t(59) = 5.89$, $p < .001$). The findings are consistent with Bandura's (1997) self-efficacy theory, which posits that having confidence in one's own capabilities to initiate action is essential for attaining success. Enhancing self-assurance in writing is of utmost significance for those with dyslexia. According to Pajares (2006), this may enhance their motivation in language acquisition and foster a more optimistic attitude towards academic difficulties.

Furthermore, the observed rise in self-reported confidence may potentially influence students' motivation, resulting in a more engaged and autonomous learning process (Schunk & Zimmerman, 2012). The incentive to practice and use our newly acquired language abilities is crucial in the process of language learning. The level of motivation we possess may significantly impact our achievement in the learning process (Dörnyei & Ushioda, 2021). The results of this research indicate that educational practices should prioritize student involvement and self-efficacy when designing a learning environment for individuals with dyslexia. This citation from Graham and Harris (2003) provides evidence that these elements have a significant role in their performance.

Recommendations

The study's results underscore the significant enhancement in writing abilities and self-assurance among dyslexic English learners with the use of multimodal education. The study's findings indicated that those who received multimodal education had superior levels of writing accuracy and fluency in comparison to those who were exposed to conventional teaching approaches. This provides evidence that integrating visual, aural, and kinesthetic-tactile components in teaching has positive results. The notable surge in self-reported writing confidence demonstrates the favorable impact of the multisensory method on learners' self-efficacy, a vital factor for achieving success in language acquisition and academic pursuits.

The study provides compelling data endorsing the use of multimodal instructional strategies in the education of dyslexic learners. It is essential to modify our educational practices in order to provide enhanced assistance for kids with dyslexia. This entails using pedagogical approaches that are customized to address their individualized learning requirements, so enabling them to get optimal outcomes in the acquisition of language skills. Educators and policy-makers should consider incorporating multimodal techniques into their teaching plans to assist dyslexic pupils in overcoming challenges encountered in conventional learning environments.

Acknowledgments

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