Improving the Reading Ability of Student with Mild Intellectual Disability through Sight Word Intervention: A Single Case

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Abstract
Reading ability is crucial for academic success, yet students with mild intellectual disabilities often struggle with early reading components. This single-case study aimed to evaluate the effectiveness of a sight word intervention on the reading ability of an 11-year-old female student with Mild Intellectual Disability (MID). Employing a single-case experimental design, the intervention utilized structured direct instruction with a constant time delay technique and high-frequency flashcards for 2- and 3-syllable words across baseline, intervention, and post-intervention phases. Visual analysis of the data revealed significant improvements in the participant's ability to read both 2-syllable and 3-syllable words, characterized by substantial level increases, positive and consistent trends, low variability, and minimal overlap between phases. Notably, reading gains were retained post-intervention. These findings suggest that structured sight word intervention, focusing on repeated practice and word recognition automation, is an effective strategy for enhancing foundational reading skills in students with MID, offering valuable implications for inclusive education.

Keywords: mild intellectual disability, sight word intervention, reading ability

Introduction

Reading ability is fundamental for academic success and functional independence; however, students with mild intellectual disability often face significant challenges in developing reading skills (American Psychiatric Association, 2022). Studies indicate that children with intellectual disabilities in Indonesia exhibit very low effective reading speeds, averaging 42-67 words per minute with comprehension levels of only 15.6-27% (Arnawa et al., 2023). Furthermore, 66% of a sample of 11-year-old students with intellectual disabilities in Indonesia showed a reading age four years below their chronological age (Munir et al., 2018). This condition is exacerbated by general literacy data in Indonesia, which ranked the country 60th out of 61 in 2016, with over 55% of 15-year-old students functionally illiterate in PISA tests.

These reading difficulties have serious long-term consequences. Low literacy in individuals with intellectual disabilities is strongly associated with less positive

outcomes in academic achievement, employment, independent living, and overall quality of life (Lindström & Lemons, 2021). The inability to read at an early age can hinder learning in subsequent grades, affecting cognitive development, motivation, and adaptive capabilities. In the Indonesian context, individuals with intellectual disabilities often face stigma and have limited social spheres (Handoyo et al., 2021). Thus, reading barriers not only affect academic achievement but also reduce participation in inclusive education and create significant obstacles in daily life, limiting their opportunities for full societal participation.

Conceptually, the reading performance gap in this population can be examined through the reading component framework (Dessemontet et al., 2021; Pujari, 2023). In the context of interventions for students with intellectual disabilities, *sight word instruction* is one of the most widely evaluated practices, consistently demonstrating the acquisition of functional written vocabulary, although generalization to new words is often limited without a phonics component. Early meta-analyses documented the effectiveness of sight word instruction using systematic fading/prompting procedures, while experimental studies comparing *picture-to-text matching* vs. *paired associate* strategies showed the superiority of the former for expanding sight word lexicon. Recent reviews also affirm *constant time delay* (Browder & Xin, 1998; Fossett & Mirenda, 2006; Horn et al., 2023).

In the Indonesian context, several research findings have reported improvements in early reading ability among students with intellectual disabilities through the use of local games and literacy traditions (Arumsari, 2021; Isroyati et al., 2024), adapted phonics approaches (Arumsari, 2021; Isroyati et al., 2024), as well as interactive multimedia, scaffolding methods, Picture Plus Discussion, Wordwall media, and mnemonic and Orton-Gillingham methods (Astinah, 2022; Revina et al., 2025; Yogantari et al., 2023). However, a review of the local literature indicates that structured sight-word interventions using the Constant Time Delay technique, an internationally proven practical approach, have not been widely explored or tested with MID students in Indonesia.

Preliminary case study findings indicate specific reading difficulties: written test scores frequently fall below the Minimum Mastery Criteria. Observations show that the subject often fails to complete assignments or homework, copies questions without providing answers, or gives irrelevant responses, indicating challenges in decoding,

sight-word recognition, fluency, and both explicit and inferential information processing from text. These patterns are consistent with literature emphasizing the need for intensive, explicit-structured, and continuous reading instruction for students with intellectual disabilities (Dessemontet et al., 2021; Reichow et al., 2019).

Building upon the theoretical foundation and empirical findings above, this study explicitly seeks to bridge the gap between established *sight word* intervention theory in international literature and its adaptation and implementation in local settings. The objective of this research is to evaluate the effectiveness of *sight word intervention* — operationalized through structured direct instruction procedures and the selection of high-frequency vocabulary to improve the reading ability of a student with MID. The intervention is expected to enhance word recognition accuracy/fluency (Browder & Xin, 1998; Dessemontet et al., 2021; Horn et al., 2023).

Research Methods

This study uses a single-case experimental design that monitors changes in the subject's reading ability across various phases/multiple baselines. Ability is measured at the baseline phase, the intervention phase, and the post-intervention phase. The research subject is a female student with an IQ of 69 (WISC scale), indicating that the subject falls within the category of mild intellectual disability (MID). She is in the 5th grade of elementary school and is 11 years old. Subjects were selected based on initial findings indicating significant difficulties in reading fluency and text comprehension.

The intervention was conducted using structured direct instruction with the constant time delay (CTD) technique, where the subject was given time to independently recognize the word before assistance was provided. High-frequency words appropriate for the subject's difficulty level were selected to be taught during the intervention sessions, with an informal reading test administered to the subject beforehand.

The subject's reading ability development was measured using a checklist observation method for vocabulary successfully read by the subject within the first 3 seconds. The flashcards contained 20 target words, consisting of 10 two-syllable words and 10 three-syllable words, which were presented to the subject one at a time. The selection of these 20 target words was based on an initial analysis of the subject's needs identified through informal tests and pre-intervention observations, and adapted from a list of high-frequency Indonesian words relevant to the subject's beginning reading

level. (Jones et al., 2018; Strauber et al., 2019) These words were chosen because they frequently appear in daily reading materials and align with the syllable complexity level that was the focus of the intervention. Error analysis during the baseline phase was also utilized to ensure that the selected words reflected the subject's specific difficulties in decoding and sight word recognition, thus making the intervention more focused. (Alberto et al., 2013; Lee & Wheldall, 2010) During the baseline phase, measurements were taken twice; in the intervention phase, measurements were taken four times; and post-intervention, measurements were taken twice

Data were analyzed using visual analysis to illustrate the changes in the number of words successfully read by the subjects in each phase. The research design used was a *reversal* design with pre-intervention assessment as *baseline* (Ledford et al., 2017; Lobo et al., 2017; Manolov & Moeyaert, 2016) (A1), intervention (B), and post-intervention assessment as evaluation (A2). The research results were then analyzed visually by observing the level change, trend, variability, and overlap. This visual analysis aimed to identify significant changes in the subjects' target behavior graphically, thus enabling the determination of a functional relationship between the intervention and the observed reading ability. Descriptive analysis was also used to describe changes in the subjects' reading abilities.

Results and Discussion

Informal Reading Ability Test Results

The development of this informal reading test is based on the development of the informal reading inventory by Western Oregon University. This test consists of graded reading texts. The criteria for the reading texts are as follows: 1) the reading texts are taken from textbooks with representative difficulty levels, content, and language; 2) the texts are selected randomly; 3) the texts begin with an opening sentence and end with a closing sentence; 4) they consist of an increasing number of words at each level. At the basic level (50 words), the beginner level (100 words), and the advanced level (200 words), the general estimate is; 5) provide an introduction for each reading text; 6) provide questions for each reading text, or children can be asked to retell the text they have read; and 7) children are given two opportunities to read, first reading aloud and then silently.

Based on the steps for developing informal reading tests, the researcher provided a series of graded reading texts adapted from the thematic books used in the subject school. So that it is appropriate for the difficulty level, language, and content that are representative for each level. The texts used start from 1st grade reading, 2nd grade, 3rd grade, 4th grade, and 5th grade.

The researchers provided a series of reading texts with varying levels of difficulty according to the grade level. Subjects were asked to read the text aloud and then answer questions based on it. The texts provided include: 1) a 1st-grade reading text consisting of 43 words and 9 sentences; 2) a 2nd-grade reading text consisting of 87 words and 12 sentences; 3) a 3rd-grade reading text consisting of 3 paragraphs, 13 lines, and 117 words; 4) a 4th-grade reading text consisting of 5 paragraphs, 17 lines, and 174 words; and 5) a 5th-grade reading text consisting of 4 paragraphs, 24 lines, and 280 words.

The results of the reading ability were then categorized into 3 levels, namely: 1) Independent Level, students read easily and understand the reading without assistance. Students are able to recognize words > 98% and reading comprehension > 90%; 2) Guided Level, students read and understand with assistance. Students are able to recognize >85% of words for elementary grades and 95%-97% for higher grades. Students' reading comprehension is 70%-89%; and 3) Frustration Level, students are only able to recognize <95% of words or have comprehension <50% (Caldwell & Leslie, 2008).

The results from the informal reading test and reading comprehension assessment, as presented in Table 1 and Table 2, consistently show that the subject is able to read and comprehend texts independently only up to the second-grade level. Beyond this level, specifically with texts designed for grades 3, 4, and 5, there is a significant decline in both reading accuracy and comprehension, which consistently falls into the frustration level (Caldwell & Leslie, 2008). This profile indicates a clear need for intervention, particularly in the components of decoding and reading fluency.

Table 1 Informal Reading Test Results

Text	Percentage of Correct Words	Time	Speed
Class 1	100% (independent)	48 seconds	53,75 WPM
Class 2	100% (independent)	1 minutes 10 seconds	75 WPM
Class 3	92% (frustration)	1 minutes 57 seconds	60 WPM
Class 4	88,5% (frustration)	3 minutes 25 second	51 WPM
Class 5	92% (frustration)	5 minutes 8 seconds	54,5 WPM

As shown in Table 1, the subject achieved 100% word accuracy for both Class 1 and Class 2 texts, indicating an independent reading level. However, for Class 3, Class 4, and Class 5 texts, accuracy declined to 92%, 88.5%, and 92% respectively, consistently placing the subject at a frustration reading level. The recorded reading speeds varied from 51 WPM to 75 WPM (Stevens et al., 2017). Furthermore, the subjects' understanding of reading ability can be seen in the following table2.

Table 2 Reading Comprehension Results

Text	Percentage of Questions Answered Correctly
Class 1	100% (independent)
Class 2	100% (independent)
Class 3	40% (frustration)
Class 4	40% (frustration)
Class 5	43% (frustration)

Correspondingly, Table 2 reveals that reading comprehension for Class 1 and Class 2 texts also reached 100% correct answers, aligning with an independent comprehension level. Conversely, comprehension for Class 3, Class 4, and Class 5 texts plummeted to 40%, 40%, and 43% correct answers respectively, firmly placing these at a frustration level. This data confirms that the subject's baseline reading level, encompassing both accuracy and comprehension, is limited to second-grade level texts. The struggles with higher-grade level texts, particularly in comprehension, suggest an inadequate foundation of fluency for understanding.

The words the subjects misread tended to vary, ranging from two-syllable words, three-syllable words, four-syllable words, to five-syllable words. Therefore, based on the list of misread words, the subjects' baseline reading ability was two-syllable words.

Sight Word Intervention Implementation

The intervention applied to the subjects used the sight word method, which aims to improve reading ability by identifying whole words without spelling them. This technique is designed to help subjects recognize words more quickly and fluently, thereby improving overall reading ability. This intervention was carried out using flashcards containing words selected based on the subjects' difficulty. The flashcards were divided into three groups: two-syllable words and three-syllable words.

Each intervention session was conducted using a structured direct instruction approach, with subjects given a maximum of 3 seconds to correctly identify a word. If the subject failed within this time, the tutor provided assistance or prompts. Instruction

was conducted with repetition to ensure the subject could read the word accurately and quickly.

Each intervention session lasted for about 30 minutes, and the tutor monitored the subject's progress using an observation form that measured reading ability based on certain criteria, such as reading a word correctly three times in a row in less than 3 seconds.

The 10 two-syllable words presented via flashcards were: book, table, child, house, foot, tree, pencil, clothes, room, and write. The three-syllable words included food, school, friend, answer, trader, highest, flag, shopping, cooking, and library.

The intervention process began with thorough preparation by the researcher, who prepared a list of words and accompanying pictures. These words were selected based on words previously misread by the subjects in an informal reading test on a 5th-grade text. The goal of this intervention was to improve the subjects' ability to recognize and pronounce words correctly.

The tutor prepared two decks of flashcards, each containing two and three syllables. Each deck had a clear purpose and procedure to help the subjects achieve the predetermined achievement criteria. Before the session began, the tutor established mastery criteria: the subjects were considered to have successfully read correctly if they could correctly pronounce the words in each deck three times in a row, within a maximum of three seconds per word.

The session began with the tutor introducing the subject to the activity by saying, "I'm going to show you some flashcards." The tutor then showed the flashcard and instructed, "Look at the word (say the word)." The tutor expected a quick response from the subject. If the subject correctly read the word within three seconds, the tutor would provide positive reinforcement, "Yes, the word is (say the word)." However, if the subject made a mistake or hesitated, the tutor would provide further correction and direction, such as, "No, the word is (say the word)," or if the subject took longer than three seconds, the tutor would state the word with a prompt to repeat, "The word is (say the word). Say (the word)."

After the flashcards were presented, the tutor would reshuffle the cards and repeat. This procedure continued until the subject successfully met the achievement criterion in one deck of flashcards, then continued with the next deck. If the subject did

not reach the achievement criterion in one deck, the session would be repeated until the achievement criterion was reached.

The development of the subject's word recognition abilities from baseline, the intervention session, and post-intervention is presented in the following table 3.

Table 3 Number of Words Read Correctly per Session

Session	2 Syllables	3 Syllables
Session 1 *baseline*	3	2
Session 2 *baseline*	2	3
Session 3 intervention	3	3
Session 4 intervention	4	4
Session 5 intervention	6	5
Session 6 intervention	8	6
Session 7 post intervention	9	7
Session 8 post intervention	10	9

Furthermore, the researcher analyzed level changes, with level changes referring to shifts in the average performance between phases. The average number of words read correctly for each phase is as follows Table 4.

Table 4 Mean per Phase

Session	2 Syllables	3 Syllables
Session A1 *baseline*	2.5	2.5
Session B *baseline*	5.75	4.5
Session A2 intervention	9.5	8.0

For 2-syllable words, there was a significant increase in level from the *baseline* phase (mean 2.5) to the intervention phase (mean 5.75). This level increase continued and was even more substantial in the post-intervention phase (mean 9.5), demonstrating a positive and sustained effect of the intervention. Similarly, for 3-syllable words, the average level increased from 2.5 in the *baseline* phase to 4.5 in the intervention phase, and then jumped to 8.0 in the post-intervention phase. This pattern indicates that the intervention successfully increased the reading ability of both types of words drastically after its introduction.
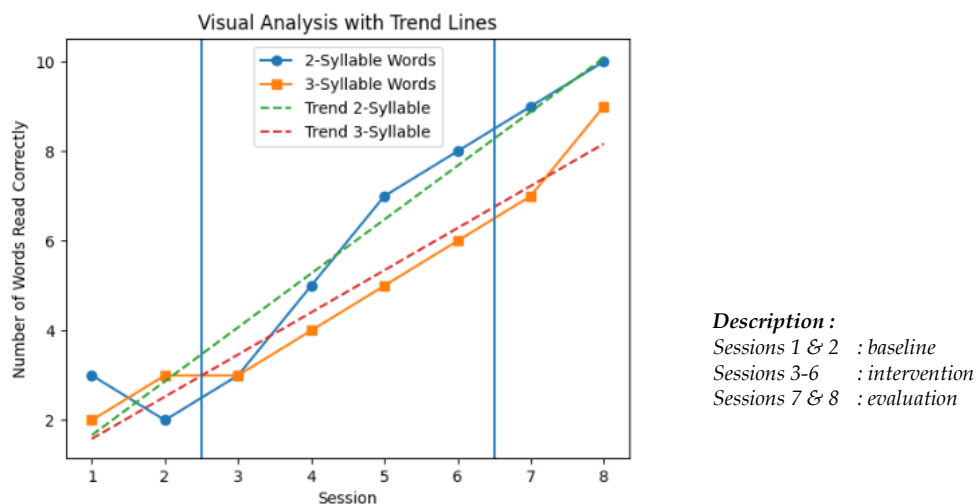
Description :
Sessions 1 & 2 : baseline
Sessions 3-6 : intervention
Sessions 7 & 8 : evaluation

Figure 1 Visual Graph of Subject Word Reading Ability

Trend describes the direction and slope of the data over time within a phase. In the *baseline* phase, for both 2-syllable words and 3-syllable words, the trend tended to be flat or slightly increasing (2-syllable words from 3 to 2, 3-syllable words from 2 to 3), indicating relatively stable performance without intervention. However, immediately after the intervention began, both types of words showed a very strong and consistent increasing trend. The data lines showed a clear positive slope, continuously rising through the intervention phase and extending into the post-intervention phase. This consistent positive trend is a strong indication that the intervention effectively promoted an increase in word reading ability.

Variability refers to the spread of data within a phase. In this data, for both 2-syllable words and 3-syllable words, low variability was observed across all phases. Data points were relatively concentrated around the trend line, without large, unexpected fluctuations. This indicates that the participants' responses to the intervention were quite stable and predictable, without significant inconsistencies that could obscure the intervention's effect. This low variability supports confidence in the intervention's effectiveness.

Overlap measures the extent to which data from one phase extends beyond the data from the preceding phase. For 2-syllable words, the *baseline* score range was 2-3, while the intervention scores were 3-8 and post-intervention scores were 9-10. There was minimal overlap between the *baseline* phase and the intervention phase (only at a score of 3), and almost no overlap between *baseline* and post-intervention. This indicates that

the intervention successfully pushed performance beyond the *baseline* level. Similarly, for 3-syllable words, the *baseline* score range was 2-3, intervention scores were 3-6, and post-intervention scores were 7-9. Overlap between the *baseline* phase and the intervention phase was also minimal (at a score of 3), and there was no overlap between *baseline* and post-intervention. This low degree of overlap between the *baseline* phase and the intervention/post-intervention phases strongly supports the argument that the intervention has produced significant and desirable behavioral change.

Overall, visual analysis of the data shows strong evidence that the sight word intervention effectively improved 2-syllable and 3-syllable word reading ability in participants, characterized by substantial level increases, positive and consistent trends, low variability, and minimal overlap between the *baseline* and intervention/post-intervention phases.

Word Recognition Automation in Students with Intellectual Disabilities

The results of the informal reading test showed that the subject's functional reading ability was still at the 2nd grade reading level. In 1st and 2nd grade texts, the subject was able to read with correct word accuracy and comprehension reaching 100% each, thus being included in the independent category based on the Informal Reading Inventory (IRI) criteria. However, when faced with 3rd, 4th, and 5th grade reading texts, reading accuracy dropped to 92%, 88.5%, and 92%, respectively, while reading comprehension only ranged from 40-43%. All three reading texts were at a frustration level, indicating that the subject could only comprehend readings that were far below his level of difficulty.

These findings align with the characteristics of intellectual disability as described in the Diagnostic and Statistical Manual of Mental Disorders (American Psychiatric Association, 2022), namely the presence of significant limitations in intellectual and adaptive functioning that directly impact academic ability. Children with intellectual disabilities generally experience difficulties in conceptual domains such as reasoning, problem-solving, and academic learning. This condition causes them to lag behind in basic literacy skills despite attending regular school (Dessemontet et al., 2021). This pattern was also evident in the subjects of this study, who demonstrated a discrepancy between chronological age and the reading level they were able to master independently.

In terms of reading fluency, the subjects' reading speed ranged from 51–75 words per minute (WPM), well below the normal standard of 100–140 WPM for elementary school age. This indicates that the word recognition process is not yet automatic and still requires high cognitive effort. Recent studies on the science of reading emphasize that word recognition accuracy and speed act as a key bridge between decoding and comprehension (Petscher et al., 2020). When readers still have to focus on spelling each word, working memory capacity is consumed, leaving little room for understanding the full text. The pattern that emerged in these subjects aligns with these findings: as long as the text is simple, comprehension is maintained; but as word count, sentence length, and syntactic complexity increase, comprehension declines sharply.

In the context of the DSM-5-TR, this reflects the intellectual and adaptive functioning limitations typical of children with intellectual disabilities. Impairments in sustained attention, working memory, and self-regulation often prevent them from efficiently processing long, complex written information. As a result, good reading performance occurs only with short texts with simple sentence structures, while complex texts quickly lead to declines in accuracy and comprehension (Nilsson et al., 2025).

To address these barriers, this study implemented a sight word intervention using flashcards containing two- and three-syllable words that were previously frequently misread in fifth-grade texts. The intervention was delivered through structured direct instruction with a maximum time limit of three seconds for naming words, positive reinforcement for correct answers, and immediate correction for errors. The success criteria were strict: subjects had to correctly name all the words in a deck of cards three times in a row.

The intervention results showed clear and consistent improvement. Initially, subjects were only able to read 2–3 words correctly out of 10 two-syllable words during the baseline phase. During the intervention, the number of correct words gradually increased to 3, 4, 6, and 8, then reached 9 and 10 words in the post-intervention phase. A similar pattern occurred for three-syllable words, increasing from 2–3 words at baseline to 7–9 words in the post-intervention phase. The visual graphs show a clear change in ability level, a steady upward trend across each intervention session, and no overlap between baseline and post-intervention data. This indicates that the sight word intervention was not only effective in improving word recognition immediately but also had a retention effect after the intervention was discontinued.

This improvement can be explained through the concept of word recognition automation. Repeated sight word practice with short response times promotes the formation of stable and easily accessible orthographic representations, allowing words to be recognized immediately without the need for spelling (Aspiranti et al., 2023). In children with intellectual disabilities, this strategy reduces working memory load and allows focus to shift to understanding the meaning of the text. Thus, the sight word intervention in this study served as an initial foundation for developing reading fluency, which is often a major challenge in this group.

The findings of this study reinforce previous findings demonstrating the effectiveness of sight word training on reading skills. Bibi and Pujari (2023) reported that four weeks of Dolch sight-word training significantly increased the number of correctly recognized words and accelerated reading time in students with learning disabilities. Similar results were found by Aspiranti et al. (2023), who found that the use of iPad-based digital media improved the rapid mastery of sight word phrases in students with intellectual disabilities. These positive effects not only improved reading accuracy but also strengthened students' motivation and confidence when reading texts.

Furthermore, research by Ulriksen et al. (2023) emphasized the importance of a multi-component approach in literacy interventions for students with intellectual disabilities. Through the Reading for All protocol, they integrated exercises in phonological awareness, letter-sound relationships, sight words, decoding, and shared reading. This approach was explicit, systematic, and gradual, with intensive repetition to reinforce the transfer of reading skills. The study also highlighted that many reading programs for children with intellectual disabilities place too much emphasis on sight words alone, even though recent empirical evidence supports the need to incorporate multiple literacy components for more comprehensive and sustainable outcomes (Ulriksen et al., 2023).

In this context, the research conducted can be seen as the initial stage of an evidence-based literacy program. Improvements in two- and three-syllable word recognition skills demonstrate that even a single component, when taught explicitly and in a structured manner, can have a significant impact. This supports the argument that systematically designed reading instruction tailored to students' cognitive needs can produce significant progress, even for children with intellectual disabilities who were

previously considered to have limited ability to acquire functional reading skills (Dessemontet et al., 2021).

Overall, the results of this study demonstrate that the subjects' primary weakness lies not in oral language comprehension, but rather in the automation of word recognition at an age-appropriate reading level. When the decoding load is low, the subjects are able to comprehend the text; however, when the decoding load increases, comprehension declines rapidly. The sight word intervention has strengthened the basic foundation of reading, namely rapid and accurate word recognition, which recent research suggests is a prerequisite for developing advanced reading fluency and comprehension (Nilsson et al., 2025; Petscher et al., 2020).

The implication is that advanced intervention programs need to integrate sight word practice with training in phonological awareness, letter-sound relationships, decoding within the context of whole texts, and reading comprehension strategies. With a gradual and explicit approach, established word recognition skills can be optimally utilized to build deeper understanding and support academic independence in children with intellectual disabilities.

Limitation

This study, while providing valuable insights into the effectiveness of sight word intervention, has several limitations that should be acknowledged. Firstly, as a single-case design involving only one participant, the generalizability of the findings to a broader population of students with mild intellectual disabilities is inherently limited. The unique characteristics and responses of this individual participant may not be representative of others. Secondly, rigorous controls for all potential external factors, such as other learning activities or educational support the participant might have received concurrently at school or home, were not fully implemented. These uncontrolled variables could have potentially influenced the observed outcomes. Thirdly, the intervention primarily focused on measuring isolated word accuracy. It did not assess the participant's ability to generalize their word reading skills to contextual reading (e.g., in sentences or passages) or to deeper comprehension tasks. Therefore, the extent to which improved isolated word reading translates into broader literacy gains remains an area for further exploration. Finally, there was no long-term follow-up conducted to evaluate the retention of the acquired word reading skills after several

weeks or months post-intervention. This prevents conclusions regarding the sustained effects of the intervention over an extended period. Future research should address these limitations by employing larger sample sizes, incorporating more stringent experimental controls, assessing generalization and comprehension, and including long-term follow-up measures

Conclusion

This study aimed to evaluate the effectiveness of a sight word intervention in improving the reading ability of a student with Mild Intellectual Disability. The visual analysis of the data provides strong evidence that the sight word intervention effectively enhanced the participant's ability to read both 2-syllable and 3-syllable words. This effectiveness was consistently demonstrated through several key indicators: substantial increases in performance levels from baseline to intervention and post-intervention phases, a clear and consistent positive trend in reading accuracy, low variability across all phases indicating stable responses, and minimal overlap between the baseline and intervention/post-intervention phases. Furthermore, the retention of improved reading skills post-intervention suggests a lasting effect (Improving the Reading Ability of Student with Mild Intellectual Disability through Sight Word Intervention: A Single Case, 2025). These findings support the argument that structured direct instruction with a constant time delay, utilizing high-frequency sight words, is a promising intervention strategy for improving fundamental reading components in students with MID, laying a crucial foundation for enhanced reading fluency and comprehension.

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