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## EDITED BY

Farah El Zein,  
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## REVIEWED BY

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Yogyakarta State University, Indonesia  
Μαρία Ποντου,  
University of Peloponnese, Greece

## \*CORRESPONDENCE

Indina Tarjiah  
✉ itarjiah@unj.ac.id

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# Increasing the reading ability of a student with dyslexia in elementary school: an explanatory case study by using family support, remedial teaching, and multisensory method

Indina Tarjiah<sup>1\*</sup>, Asep Supena<sup>1</sup>, Sri Indah Pujiastuti<sup>2</sup> and Yuli Mulyawati<sup>3</sup>

<sup>1</sup>Department of Special Education, Faculty of Education, Universitas Negeri Jakarta, East Jakarta, Indonesia, <sup>2</sup>Department of Early Childhood Education, Faculty of Education, Universitas Negeri Jakarta, East Jakarta, Indonesia, <sup>3</sup>Department of Elementary Education, Pakuan University, Bogor, Indonesia

Dyslexia is a neurodevelopmental disorder that may lead to difficulties in reading and other language-related cognitive processes. Approximately 5 to 10% of students in public schools have this disorder, which requires specific learning strategies to improve their reading abilities. Therefore, this study aimed to explore the successful experiences of teachers in improving the reading ability of a student with dyslexia. To achieve this, a qualitative approach was used, with an explanatory case study method conducted in a public inclusive Elementary School located in Bogor City, Indonesia. This particular school was selected due to the presence of dyslexia and experienced teachers in handling students with disabilities. The participants comprised of four individuals, including a 3rd-grade student diagnosed with dyslexia, an experienced teacher, an assistant teacher, and parents of the diagnosed student. Furthermore, interviews were conducted with classroom teachers and the assistant, as well as parents. Document analysis and four-time classroom observation were also carried out to support the data. The result showed that there were four key factors in determining the success of reading in a student with dyslexia, namely (1) remedial teaching, (2) application of multisensory methods, (3) reading media use, and (4) parental support. It provided valuable insights for teachers dealing with the students with dyslexia, in order to improve their reading skills while considering the specific needs.

## KEYWORDS

dyslexia, remedial teaching, multisensory method, reading media, parental support, case studies

## 1. Introduction

Reading is an essential activity that should be practiced by students to acquire new knowledge in solving problems associated with daily life. Due to the significant benefits, it is introduced at the foundational level of education, where students are taught from an early age. Meanwhile, developing a good reading ability enables individuals to master different knowledge domains and other associated abilities.

The ability to read has a profound impact on individuals, as it enables them to gain new knowledge and access information. In the case of students, reading proficiency has a significant

influence on their language skills and overall academic success (Anderson et al., 2020; Andresen and Monsrud, 2022). For instance, when learning a foreign language, such as Korean or Chinese, reading is often the first step to acquiring new vocabulary (Evans, 2020; Eroğlu et al., 2022) and enhancing critical thinking skills (Butcher, 2017; Polat, 2020). In the 21st century, critical thinking is required to comprehend and analyze the situations and conditions of the surrounding environment. Therefore, reading can play a pivotal role in developing critical thinking skills and has a positive impact on students (Anderson, 2021; Andresen and Monsrud, 2022; Eroğlu et al., 2022). Effective communication requires good grammar and sound knowledge of language developed through reading articles or books. The activity can catalyze professional growth and development. In conclusion, reading plays a crucial role in enhancing language proficiency, critical thinking skills, and communication abilities, all of which are essential components of personal and professional development.

In addition to some of the positive impacts, reading ability influences the learning and cognitive development of students. Failure to read also has a major impact on academic achievement at the next level of education (Boyes et al., 2020; Whyte, 2020). The ability to read plays a fundamental role in the acquisition and mastery of knowledge, and individuals who struggle with reading may encounter difficulties in other academic areas. This can hinder their optimal development both academically and personally. It is, therefore, the responsibility of educational institutions to implement measures that ensure primary school students, particularly those in the lower grades, attain proficient reading skills. Building a strong foundation in reading at an early stage sets the stage for unlocking the full potential of children in subsequent stages of their education and beyond (Arthur et al., 2020; Snowling et al., 2020).

Reading dyslexia is a prevalent issue that affects many elementary school students in Indonesia. This problem poses a significant challenge, hindering their ability to read and comprehend written texts effectively (Arthur et al., 2020; Boyes et al., 2020; Snowling et al., 2020). Dyslexia is a complex neurological disorder that is typically characterized by challenges in recognizing and differentiating letter symbols, spelling, and comprehending written texts (Kirby, 2020; Moore et al., 2020; Gharaibeh and Dukmak, 2022). This condition is congenital and often associated with specific learning disabilities. Atypical brain development affects the ability to read effectively (Kühn et al., 2021; Zhang et al., 2021; Gharaibeh and Dukmak, 2022). Dyslexia is defined as a specific learning disability characterized by unexpected difficulties in reading skills. As a result, individuals with dyslexia often encounter difficulties in acquiring knowledge and experience negative impacts on other abilities (Boyes et al., 2017; Lazzaro et al., 2021).

There are several methods available to identify and provide justification for individuals in the category of dyslexia. One of the methods is the use of assessments based on the Diagnostic Statistical Manual V (DSM V) criteria. This approach can aid in determining the presence and severity of dyslexia, as well as help inform appropriate interventions and support (Lazzaro et al., 2021; Sümer Dodur and Altındağ Kumaş, 2021; Alkhadim, 2022). Dyslexia is a term used to describe a pattern of learning difficulties that includes challenges with reading, poor decoding skills, and weak spelling abilities. The diagnosis requires observations of these learning difficulties for a minimum of 6 months in affected students. However, there are

interventions available to improve these challenges and support individuals with dyslexia in their academic and personal endeavors (Artuso et al., 2021; Caldani et al., 2022; Hall et al., 2022). The second way to determine the diagnosis is to perform a supporting examination through a series of IQ tests (Artuso et al., 2021; Hall et al., 2022).

Another supporting way to diagnose this complication is to use four analyses, including a comprehensive test of phonological processing (CTOPP), Gray Oral Reading Test, Fifth Edition (GORT-5), Test of Word Reading Efficiency, Second Edition (TOWRE-2), and Woodcock Reading Mastery Tests Third Edition (WRMT-III) (Artuso et al., 2021; Banfi et al., 2021; Layes et al., 2021a; Caldani et al., 2022). The sub-tests play a crucial role in determining when an individual is afflicted with reading dyslexia. Professionals qualified to diagnose dyslexia include medical practitioners, psychologists, and educators who specialize in teaching at special schools.

The amount of dyslexia varies in each country, and the number of cases ranges from 5–20% of the school-age child population (Lopes et al., 2020; Banfi et al., 2021; Gran Ekstrand et al., 2021). Dyslexia children in China account for about 8% while in Malaysia it reaches 7% of the entire population. A Study conducted by the National Institute of Neurological Disorders and Stroke indicated that approximately 17% of children in the United States and 16% in Australia were affected by dyslexia (Lee and Tong, 2020; Peter et al., 2021a,b).

Reading dyslexia is also prevalent in Indonesia, and the inclusion school policy allows students with disabilities to study in public Elementary Schools. Based on several data from previous studies, there are more than five million Indonesians included in the reading dyslexia category (De Picker, 2020; Prasetyo et al., 2020; Casmana et al., 2022; Husen et al., 2022). Therefore, there needs to be special attention from the government and special strategies for inclusive primary school teachers in educating dyslexia students due to the same right to receive a quality education.

Untreated dyslexia can have several negative impacts on individuals or groups of students. For instance, children and adults with the condition are more likely to drop out of school, with a rate that is three to four times higher than non-dyslexia individuals (Lee and Tong, 2020; Peter et al., 2021a,b). Furthermore, they are also more likely to be below or near the national poverty line (Shaywitz and Shaywitz, 2020; Abu Rabia and Salfety, 2021). Longitudinal study data indicate that dyslexia young adults are only half as likely to pursue higher education as their non-dyslexia peers. They also face greater challenges with unemployment and have lower income levels compared to other students (Gibbs and Elliott, 2020; Shaywitz and Shaywitz, 2020; Abu Rabia and Salfety, 2021).

The bad impact experienced by students with dyslexia in different aspects is due to their low reading ability. Low reading ability is the cause of reduced academic achievement of students (Abbondanza et al., 2020; Smith-Spark et al., 2023). Therefore, the ability to read should be a central target in dealing with students with dyslexia. The reading ability must be optimally improved as a modality for broader learning activities. Students with dyslexia require specific experiences, learning tools, and dedicated time to enhance their reading ability optimally. Teachers must employ special strategies when teaching and interacting with students struggling with reading dyslexia.

Many learning strategies for students with dyslexia have been studied in recent years. The remediation strategy has been proven as an alternative strategy in teaching reading to affected students (Abbondanza et al., 2020; Gibbs and Elliott, 2020; Smith-Spark et al., 2023). This study is focused on developing alphabetic or

phonological strategies for reading. The efficacy of remediation was investigated using a single-subject case study method involving multiple baselines and repeated pre-and post-therapy measures. The results of the therapy show a significant improvement in phonological reading skills (Abbondanza et al., 2020; Layes et al., 2021b; Austin et al., 2022; Palser et al., 2022). Furthermore, remedial teaching has become one of the alternatives for teachers in inclusive Elementary Schools and can be used to educate students with reading problems. Some Elementary Schools still use this strategy as an alternative method to educate students about the problems.

Gibbs and Elliott (2020) conducted a study on the effectiveness of using the Gillingham Method in improving the reading ability of dyslexia students. In the study, children were presented with letter cards, and the teacher pronounced the sounds for children to repeat multiple times. The teacher then prompted students to reproduce the sounds of the letters and asked, "What is the sound of this letter?" In the subsequent stage, the teacher showed the shapes of the letters and provided explanations. Children were promoted to trace the letters with their fingers, reproduce them in writing, practice writing in the air, and ultimately reproduce the result without referring to any examples.

The next method used to help improve the problem of reading dyslexia is the multisensory approach (Lopes et al., 2020; Snowling et al., 2020; Whyte, 2020; Sümer Dodur and Altındağ Kumaş, 2021). The approach is believed to be an effective method to improve reading ability in students with dyslexia. Snowling et al. (2020) defined the sensory method as the process of presenting information in an integrated visual, auditory, kinesthetic, and tactile form to enable the acquisition of a more meaningful experience. Lopes et al. (2020) reported that the method was more effective in teaching students with dyslexia. Besides being effective in improving reading skills, the approach has also been shown to be effective in improving negative behavior. Recent studies showed that there was a significant change in the mean behavior of students with dyslexia (Sümer Dodur and Altındağ Kumaş, 2021; Layes et al., 2021a; Gharaibeh and Dukmak, 2022). Furthermore, the reading and writing skills of students with dyslexia have increased after taking lessons using the Simultaneous Multisensory Teaching (SMT) method for 6 months (Gibbs and Elliott, 2020; Layes et al., 2021b). Children have started to master the ability to recognize frequently confused letters, both in their pronunciation during reading and writing.

In addition to effective teaching methods, learning media plays a crucial role in supporting the success of reading in students (Laslo-Roth et al., 2020; Sarkadi et al., 2022; Candan and Başaran, 2023). Learning media can serve as a useful tool to cultivate interest in reading and facilitate the recognition of symbols, as well as enhance understanding of the reading material (Komarudin et al., 2019; Sarkadi et al., 2020; Muzani et al., 2022). According to Casmana et al. (2022), the implementation of letter block media can assist students in recognizing letters. Letter blocks are small cube-shaped boxes that feature six sides, displaying letters and pictures used in games for letter and word recognition. Children can recognize and distinguish the shapes and sounds of each letter, with each side representing a different letter.

## 2. Research questions

Based on the issues related to dyslexia and previous study on teacher strategies for supporting students with reading difficulties, the following questions have been formulated:

1. What is the assessment result of the students with reading dyslexia in Public Elementary School?
2. What are the key factors determining the success of learning to read for dyslexia students in Public Elementary School?
3. How effective is the use of multisensory methods and learning media in helping students with reading dyslexia?

## 3. Method

### 3.1. Study design

This study employs a qualitative approach using the explanatory case method to gain a thorough understanding of Reading Dyslexia in Elementary School student in Bogor City, West Java. The qualitative approach is useful in providing clear and comprehensive results, as stated by Creswell (2014). The explanatory case study method aims to provide detailed explanations of the case investigated, including the effective strategies employed by teachers in dealing with and educating student with Reading Dyslexia problems. As the direct participant is someone who experiences this disorder, this study necessitates the use of instruments and in-depth observation to obtain a detailed understanding of the challenges faced by student with dyslexia. The primary participants are an Elementary School student identified with dyslexia, a teacher, an assistance teacher, and a direct parent. The data collection techniques include observations and interviews with all participants to ensure optimal publication of the results.

### 3.2. Participants

The participants are integral elements in determining effective teaching strategies for educating student with Reading Dyslexia. Several key criteria must be met to ensure that this study obtains the maximum amount of data. These include (1) Elementary School students diagnosed with reading dyslexia problems, (2) mothers of students with reading dyslexia problems, (3) teachers who possess more than 15 years of teaching experience and have worked with affected students, (4) special assistant teachers assigned to accompany students in the learning process in the classroom, and (5) the school must be inclusive and should accept students with special needs, including individuals with Reading Dyslexia, on an annual basis. Based on these criteria, one Public Elementary School located in Bogor City, West Java Province, Indonesia, was selected. Demographic information about the participants can be found in the table below.

According to the data in Table 1, the total number of participants was four individuals. Furthermore, the primary focus in the realm of special education was centered on a single participant, specifically a student grappling with reading dyslexia challenges. This circumstance is unsurprising due to various factors, such as (1) the challenge of identifying students with special needs, including those diagnosed with reading dyslexia. (2) Students experiencing reading dyslexia exhibit unique characteristics that set them apart from their peers, rendering the results non-generalizable. (3) This study is highly particularistic, or exists only within specific cases, making finding suitable participants a formidable task. (4) Explanatory case studies can effectively be conducted on a single individual. In addition, it is reasonable to limit the number of participants to four individuals, allowing for a

comprehensive exploration of the challenges and strategies when instructing a student with reading dyslexia. This approach enables a detailed examination of the issue and provides valuable insights for teachers working with students experiencing similar difficulties.

Several steps were taken to recruit participants who were students with reading dyslexia. There are some criteria for the teacher who can participate in this study. Firstly, teachers who taught in inclusive Elementary Schools in Bogor City were approached to identify and recognize specific characteristics. In addition, the teacher also should have at least 10 years of teaching experience in and they also should have experience in dealing with students with dyslexia. Also, teachers should be qualified with Bachelor of Education focusing on primary education. These characteristics are required to get valid data in undertaking this study.

After identifying these characteristics, assessments of students under the dyslexia category were conducted in collaboration with teachers, according to the recommendations provided. The next step was to recognize the characteristics of the student with reading dyslexia, including (1) a student with difficulty speaking and listening when studying in class, (2) an example of learning difficulties when reading and recognizing words given in class, (3) having physical challenges such as difficulty in holding a pencil or in learning the rhythm of the music. Some examples and other characteristics can be seen in the assessment results. Based on the criteria, 3rd-grade student aged 9 years old diagnosed with dyslexia participated in this study.

TABLE 1 Characteristics of study participants based on roles.

No	Roles	Number of participants
1	Elementary School student with reading dyslexia	1
2	Teacher with more than 15 years of teaching experience	1
3	Assistant teacher	1
4	Parents of the student with reading dyslexia	1
Total		4

TABLE 2 Interview topic for this study.

No	Roles	Interview topic
1	Elementary school student with reading dyslexia	<ol style="list-style-type: none"> <li>Asking some short sentences from the book and magazine to see the response.</li> <li>The reason why the student has reading difficulties.</li> <li>The learning strategy at home to solve the problem</li> </ol>
2	Teacher with more than 15 years of teaching experience	<ol style="list-style-type: none"> <li>The teaching experience in dealing with the student experiencing reading dyslexia.</li> <li>The reason why the student has reading dyslexia.</li> <li>The key factors in solving the problem of the student with reading dyslexia.</li> <li>The teaching strategy in using a multisensory method for teaching the student with reading dyslexia.</li> <li>The learning media for the student with reading dyslexia.</li> </ol>
3	Assistant teacher	<ol style="list-style-type: none"> <li>The teaching experience in dealing with the student experiencing Reading dyslexia.</li> <li>The reason why the student has reading dyslexia.</li> <li>The key factors in solving the problem of the student with reading dyslexia.</li> <li>The teaching strategy in using a multisensory method for addressing the student with reading dyslexia.</li> <li>The learning media for the student with reading dyslexia</li> </ol>
4	Parent of student with reading dyslexia	<ol style="list-style-type: none"> <li>Parent experience upbringing the student with reading dyslexia</li> <li>The student's activity at home in solving reading dyslexia</li> </ol>

### 3.3. Data collection technique

Data collection techniques are essential in obtaining maximum data for a research study. In the case of investigating teacher strategies to enhance the reading skills of the student with reading dyslexia issues, three primary methods can be utilized, including in-depth interviews, observation, and document analysis.

The initial study technique is in-depth interviews used to gather information on teacher strategies to enhance the concentration of the student with reading dyslexia problems. Each participant is asked questions on different topics, and the following table shows the interviews used to obtain comprehensive details.

According to the data presented in Table 2, several questions and interviews require further development to obtain maximum results. The aim was to identify effective teaching strategies for the student with reading dyslexia difficulties during the learning process. To achieve this goal, individual interviews lasting between 30–60 min were conducted.

The second data collection technique involved observation to directly observe the teaching methods employed by teachers working with the student who had reading dyslexia problems. In addition, the observation process involved three sessions, each lasting approximately 45 min. The primary goal of the first observation session was to identify the use of multisensory strategies by teachers, while subsequent observations focused on identifying the learning media used to educate the student with reading dyslexia.

The third data collection technique employed was document analysis, which included the results of psychological assessments and student work. The psychological assessment provided the basis for teachers to determine reading dyslexia difficulties, while the results comprise the examination outcomes.

### 3.4. Study instrument

The primary instruments used for collecting reliable data include interviews, observations, and document analysis. These instruments help to obtain comprehensive and accurate data necessary for the study.



Furthermore, the interview instrument aims to identify key factors that determine the success of students with dyslexia in learning to read, focusing on remedial teaching, family support, and positive progress as the primary areas of investigation. It also identifies the multisensory methods and learning media to address reading dyslexia problems. The observation instrument involves direct observation of how teachers utilize different teaching methods and media to educate dyslexia student. Meanwhile, document analysis serves as a supplementary study instrument to gain a more profound understanding of the collected data and enhance the validity of the findings.

### 3.5. Data analysis technique

The data analysis technique in this study uses a method developed by Creswell (2014). To obtain maximum data on qualitative study, there are several steps considered regarding teacher strategies in educating dyslexia student. According to Creswell (2014), there are five steps to perform data analysis. First, conversion of raw interview data into narrative by retyping, hence, the results can be analyzed optimally. Second, the interview data is transcribed into narrative text and coded according to themes related to reading dyslexia, such as remedial teaching, family support, positive progress, multisensory methods, and learning media. Third, the data are reduced by eliminating any irrelevant information that does not relate to the study problem. The fourth step is to verify the data compiled with several codes to ensure the data analyzed is relevant to reading dyslexia. This verification is critical to ensure the data analyzed is consistent with the study question. Finally, the data are shown or presented according to the study question presented in a meaningful and organized manner.

## 4. Findings

### 4.1. The assessment result of student with reading dyslexia in Public Elementary School

Conducting an assessment is a viable approach to ascertaining the condition of the student experiencing dyslexia. The assessment can be performed by healthcare professionals such as doctors and psychologists, or by educational institutions, such as specialized school teachers. Various methods are employed, with the DSM V form being one of the most commonly used tools to ensure optimal results. After the assessment has been carried out, the condition of the student was determined, and the selection process can proceed accordingly. Therefore, a student, identified as ‘V,’ has been diagnosed with dyslexia by a psychologist, as detailed below.

The focus of this study was a third-grade student, identified as ‘V,’ attending a Public Elementary School that implemented inclusive education. The student exhibited challenges in reading under the observations of the classroom teacher, which indicated the presence of dyslexia. Despite having a normal intellectual capacity with an IQ of 110, ‘V’ struggled with reading, and the teacher provided the following account of the student as follows:

*"Since Grade 1, V's peers have demonstrated proficiency in reading, but V has struggled to read fluently. Even after*

*progressing to Grade 3, spelling remained a challenging task". Interview, teacher*

*"Recently, after a span of 6 months, I have observed progress in V's reading skills. With increased concentration, V was able to blend consonants and vowels, such as B-A (BA) and G-U-S (GUS), although the progress was not consistent". Interview, teacher*

*"When attempting to form words by joining letters such as J-A and S-A, V encountered difficulties and produced words like JALA. This process also required V to remain patient and focused to achieve better results". Interview, teacher*

“V” has difficulty or is slow in spelling, and often forgets rarely-used letters such as q, x, and z. Even though letters can be recognized, he struggles with reading words that are not commonly found in reading material. “V” also has trouble remembering words or spoken information, and often confuses letters with similar shapes, such as b/d, p/q, m/w, and u/n. At the beginning of 3rd grade, “V” only recognized vowels (a-i-u-e-o) and a few consonants, and was unable to string consonants with vowels or read words. Parents have confirmed and supported this assessment of “V,” as stated below:

*"The student has a good understanding of the vowels, namely a, i, u, e, and o, while the consonants prove to be more challenging for him. Specifically, he has difficulty recalling infrequently used consonants such as z, y, and x. Additionally, he struggles to differentiate between consonants and vowels, but can identify a, i, u, e, and o as vowels when they are not interchanged. Moreover, the student faces difficulties with several consonants, including the letters L and R, which he confuses frequently. Furthermore, he tends to misread certain letters, such as b/d, p/q, m/w, and u/n". Interview parents*

Therefore, the student has difficulty distinguishing letters with similar shapes. One of the most distinctive and striking difficulties experienced when reading is the frequent reversal of similar letters. The subject acknowledged this as a major issue when asked about the difficulties with reading.

*"It can be challenging to distinguish certain letters, but I recollect that the letter "b" has a prominent line at the front, while the letter "d" has a similar feature towards the back. Although writing can be perplexing at times, providing examples can facilitate understanding. The text in question may still be difficult to decipher. Specifically, I am referring to the letter that resembles a tripod and is often preferred in reverse order. The situation can be quite bewildering." Interview, student*

Despite encountering reading difficulties, it has been reported by parents that their child is verbally adept and able to speak fluently and confidently. Additionally, the subject has showed proficiency in mathematics, speech, and comprehension. According to the data provided, an IQ score of 110 was received, a measurement which was conducted twice, and the results of interviews with teachers stated:

*"According to the feedback obtained from interviews with teachers, 'V' has displayed strong academic abilities, particularly in the areas of memory and mathematics. The student has exhibited a high level*

*of proficiency in mathematics, as evidenced by the ability to quickly absorb and understand concepts, even when briefly explained by the teacher.” Interview, teacher*

The subject also showed confidence, specifically in tasks that did not involve writing activities. It has been reported that during an interview, ‘V’ shared his thoughts and actions when communicating with the teacher in the classroom, and stated:

*“In the classroom, I promptly raise my hand to address any questions posed by the teacher. In the event that the query is directed toward me, I strive to comprehend it promptly and provide an accurate response. However, in the case of an incorrect response, I acknowledge my mistake and do not allow it to hinder my academic progress. According to the advice of the teacher, promptness in answering questions is crucial. In situations where the teacher presents a written query, I often find myself struggling to comprehend the concept due to its length and complexity.” Interview, Student*

Reading difficulty in individuals is often attributed to hereditary factors, and in some cases, premature birth can also play a significant role. The subject was born prematurely with a gestational age of only 8 months and faced complications during delivery. Consequently, a cesarean section was performed, and such a condition can result in inadequate oxygen supply to the fetus, potentially causing damage to its brain structures. Parents stated:

*“V was born prematurely at the gestational age of 8 months. In comparison to the siblings, my first and second children were born through normal delivery and weighed over 3 kg. However, he encountered delivery complications, which necessitated a cesarean section. ‘V’ and the sister possess an aesthetically superior head shape, owing to their mode of delivery...” Interview, parents*

*“It has been observed that within the paternal lineage, three offspring experience challenges with reading. In certain instances, these individuals can only read proficiently at a level commensurate with fifth-grade elementary education.” Interview, parents*

In the preceding 6 months, ‘V’ has been accorded special attention by the class teacher, assistant teacher, and collaborative efforts with parents. The outcome of this approach has resulted in significant positive progress for ‘V’. Based on the interviews and observations, the student with reading dyslexia can exhibit notable progress when gaining proficiency in reading and spelling certain words. Birth factors can contribute to the development of reading dyslexia issues, as in the case of ‘V’, who was born prematurely at 8 months. Therefore, ‘V’ requires a designed educational approach to achieve optimal learning outcomes in the school setting.

## The key factors determining the success of learning to read for students with dyslexia in Public Elementary School

Students with dyslexia require specialized treatment to compete and succeed in achieving their future goals. Reading impacts several

other abilities, such as critical thinking, communication skills, and mastery of foreign languages. Given the importance of reading skills, teachers and parents must prepare effective strategies to help students with dyslexia succeed and compete with their peers. Furthermore, this study has identified three main factors that can support the success of affected students. These factors include remedial teaching, family support, and positive progress. By implementing these strategies, students with dyslexia can develop the skills required to compete and succeed alongside their peers.

### 4.1.1. Remedial teaching

One of the methods employed by the teacher to enhance reading skills over the past 6 months is remedial teaching. This approach involves providing students with extra support outside regular school hours to assist in acquiring reading proficiency. Remedial instruction is structured differently from standard classroom instruction, employing diverse teaching methods and media to suit individual learning needs. The remedial activities are conducted 1–3 times per week, typically commencing at 09.00 am before the start of regular classes, and lasting about 60 min. The teaching is an auxiliary learning program outside the usual academic curriculum. In addition, the program is customized to cater to individual student needs, providing intensive and closely monitored assistance. The teacher utilizes unique teaching methods that incorporate repetition, varied media, and engaging games to enhance the reading capabilities of the student and prevent boredom. In one interview, a teacher elaborated on the implementation of the remedial program as follows:

*“As the teacher, I accompany the student up to three times per week. Despite the brevity of the sessions, I always endeavor to be present and attentive to his needs. To effectively engage in the learning process, I recommend playful activities, with added incentives such as cakes, stars, or additional points being utilized to further motivate him. It is important to note that the current school year is only in its second month, and there is limited time for improvement. Additional remedial learning hours have been made available, with a specific focus on improving reading skills. These sessions are carried out for approximately one hour, providing ample opportunity for targeted instruction and progress monitoring.” Interview, teacher*

The remedial learning program of the teacher has been established and consented to by parents of ‘V’. The teacher has proactively communicated with parents to discuss the program, and they agreed on the time and location of the sessions. The provision of additional time has brought about a range of benefits, including more practice time for the student who struggles with reading dyslexia, leading to improved mastery of new vocabulary and pronunciation. The willingness of the teacher to dedicate more time outside of normal working hours provides motivation and promotes them to obtain the highest quality of teaching and education. Despite these advantages, not all teachers possess the same level of dedication and social spirit to volunteer their time to guide students outside of normal working hours. Therefore, it is a remarkable feat that only certain teachers with exceptional dedication and strong social conscience take the time to educate the student with dyslexia. Parents also support this program, recognizing that earlier school attendance is one of the consequences, and parents of ‘V’ stated:

*“Special extra hours were provided for my child, including one hour of specialized reading instruction. Initially, Mrs. E, the class teacher of my child, was unaware of his special needs. However, after learning about them, Mrs. E expressed a commitment to help ‘V’ in improving his reading ability. She also advised that ‘V’ should not be integrated with the rest of the children. Consequently, my child was given an hour to socialize with their friends, and arrived one hour earlier than the others.” Interview, parents*

In addition to formal education, remedial learning is commonly conducted at home. Parents allocate their time to educating their children, specifically in reading, which requires repetitive practice to enhance the skills acquired in school. The teacher and parents recognize the crucial role of reading frequency in improving reading ability. However, parents have reported a challenge in implementing remedial learning at home, namely the influence of mood. They emphasize that a conducive atmosphere is vital for successful remedial learning. Parents must also exhibit positivity and exercise extra patience when dealing with children with dyslexia. Furthermore, fostering a positive mood in students before and during learning is crucial to support their academic journey. Concerning the implementation of remedial learning at home, parents of the student stated:

*“Daily, ‘V’ diligently rehearses reading lessons at home, and as parents, we accompany and assist him. In case of my unavailability, the brother aids him in the same. Furthermore, we create word cards at home identical to those produced by Mrs. E, the class teacher, but larger for better readability. Consistent repetition of spellings 4-5 times enables ‘V’ to enunciate words precisely, but reading long sentences remains a challenge. ‘V’ often voices his difficulty in reading lengthy sentences, which he finds challenging. Fluctuating moods tend to prolong the reading sessions, whereas an affable disposition leads to more productive sessions with better retention of the lessons learned. Conversely, an uncooperative mood can lead to erroneous responses despite repeated attempts. In these situations, we cease the teaching session, ensuring fruitful learning in the future.” Interview, parents*

To achieve success in educating students with dyslexia, a strong partnership between teachers and parents is needed. Teachers willing to devote extra time beyond regular class hours must be supported by parents with similar initiatives. Despite the material presented through reading practice, consistent repetition of exercises can be a crucial contributing factor toward the success of the student. This is exemplified in the case of ‘V’, whose progress in reading was made possible through the unwavering support of family and the dedication of the teacher. Over time, ‘V’ showed the ability to read and participate in the learning process effectively. Therefore, this remedial teaching method is a commendable approach to aid students in reading.

#### 4.1.2. Family support

One of the important factors that determine the success of the subject in reading is the positive support from the family, specifically the mother. In the early days of Elementary School, parents realized that their child had difficulty reading. Subsequently, the mother of the student has often communicated with the teacher to talk about the child. It means that parents communicate intensely with the teacher

to discuss subject developments and efforts to provide special assistance. The primary supporter is the mother, who plays the most active role in assisting. Although the sister and grandmother occasionally accompany him during his studies, their involvement is infrequent. The father is currently incapacitated due to a stroke and is unable to provide any support or contribute to the welfare of the family. The teacher considers the support of the mother as incredibly positive, which is evident in her unwavering dedication to his studies.

*“The mother has exhibited exceptional responsiveness right from the outset. Before the commencement of the new school year, she frequently informed me of the disability of the son and requested special attention.” Interview, teacher*

*“Since the mother has recently started working, she has requested that I focus on maximizing the learning of the child both at school and at home. Due to the incapacitation of the husband from a stroke, the mother has assumed the role of the primary breadwinner and caretaker for her son. Therefore, the child must receive the best possible education and support from all relevant parties.” Interview, teacher*

The assistant teacher also stated that the support of the mother was very positive and had lasted a long time since the child entered Elementary School:

*“The unwavering support of his mother in his academic journey is evident. Since ‘V’ began attending Elementary School, his mother has consistently liaised directly with his classroom teacher. She recognized that ‘V’ was a unique individual, whom she affectionately referred to as a special child, rather than one with special needs. In addition to learning to read under the tutelage of his teacher, ‘V’ received further instruction at home from the mother. Despite their best efforts, the most effective method for teaching ‘V’ to read had not yet been discovered during his first and second-grade years, and his progress may have been limited. The mother continued to devote her time to teaching ‘V’ at home, even while juggling her work responsibilities.” Interview, assistant teacher*

Parental support manifests through teacher consultations and in-home learning assistance provided to children. To ensure consistency with the teaching approach, parents adapted their teaching methods, using reading materials such as letter cards, blocks, puzzles, and similar resources. The reading curriculum synchronizes with the program implemented by the teacher. Parents also expressed their stance on the matter of supporting the reading education of their child at home by stating:

*“Every day, I accompany the student at their residence to practice reading lessons. In case I am accompanied by their sibling while working, I ensure to employ the use of word cards just like Mrs. E, the classroom teacher. However, the size of the word cards is relatively larger to enhance clarity.” Interview, parents*

The provision of educational support by mothers is not limited to reading activities but encompasses all aspects of learning, including

TABLE 3 The ability to read the subject before and after receiving special assistance for 6 months.

Aspect	Before treatment	The result after 6 months of treatment
Single vowel	Mastering all vowels (a-i-u-e-o)	Mastering all vowels
Double vowel (ai, au, oi)	Does not understand and does not recognize double vowels	Can read double vowels
Single consonant letters	<ul style="list-style-type: none"> <li>Does not recognize all consonants.</li> <li>Often reversed (swapped) for some similar letters (b/d, p/q, n/u, w/m)</li> <li>Difficult to recognize rarely used letters (v,x,y,z).</li> </ul>	Already knows all the letters A-Z and can write them
Double consonants (ng, ny, kh, sy)	Not yet able to recognize double consonants (ny, ng)	Already starting to recognize and be able to read double consonants (ng, ny), although sometimes there is still a little confusion
Syllables	Very difficult to recognize syllables (combining two letters into a syllable)	Able to combine any syllables
Words	Only able to recognize (read) some words that are often encountered such as 'table, book, milk, cupboard', and several other words. It also relies more on memory.	Any words can be read, although some are still spelt out
Sentences	Has not been able to read sentences because there are still many difficulties in recognizing letters, syllables, and words.	Already in the stage of reading the sentence directly (spelling it silently) then expressing the words in a sentence directly

academic assignments. Notably, the COVID-19 pandemic has resulted in an escalation in the degree of maternal learning assistance. The implementation of distance learning allows many academic tasks to be conducted from home, thereby amplifying the significance of parental involvement in the learning process. This responsibility of parents in facilitating the education of their children has been acknowledged by the teacher, who stated that:

*“The mother is currently assisting her son with completing his homework at their residence. In instances where certain tasks cannot be accomplished, the mother regularly reaches out to me for guidance. The child must receive the support of both parents and the teacher to ensure their academic success.” Interview, teacher*

The findings suggest that familial support, particularly from mothers, plays a critical role in the education of students with reading dyslexia. Parents can devote time and effort to teaching and facilitating reading practice, which significantly enhances their learning outcomes. Parents and children may encounter challenges, such as negative moods, during the learning process. Therefore, parents must provide designed motivational support to maintain a positive and conducive learning environment for their children.

### 4.1.3. Positive progress

After receiving specialized mentoring for 6 months, ‘V’ showed notable advancements in his reading skills. At the onset of the program, the student lacked proficiency in identifying consonants. While some of the letters are now familiar, there are still instances of spelling errors and confusion due to similar shapes, such as the letters p, b, and d. The spelling of the student was initially challenging and significantly slow, with some words proving difficult to read. According to parents of the student, there has been a discernible improvement in the reading ability of the student:

*“During the initial stages of third grade, ‘V’ was only able to recognize a limited set of vowels (a-i-u-e-o) and a few consonants.*

*The student struggled to combine consonants and vowels to form words, and experienced difficulty in reading.” Interview, parents*

After undergoing a treatment regimen spanning 5–6 months, the subject showed remarkable proficiency in spelling and was even able to read fluently without resorting to spelling, albeit at a moderate pace. In an interview conducted with the teacher assistant to gauge the subject’s progress in reading, she reported the following:

*“The significant progress made by ‘V’ is highly noticeable. At the onset of the academic year, the student only recognized a limited number of consonants and struggled with several errors. I am pleased to report that, with time and effort, ‘V’ has achieved mastery in all letters, but with occasional errors in distinguishing similar ones. The comprehensive treatment provided for 5-6 months has yielded positive results. I am delighted to note that ‘V’ can now spell and read fluently, experiencing difficulty on rare occasions.” Interview, assistant teacher*

The mother also acknowledged the progress made in the reading ability of the child. She observed a marked improvement in the reading ability of her child 6 months ago and stated:

*“After 6 months during which ‘V’ received special attention and support, notable and affirmative progress has been observed. Specifically, ‘V’ has showed proficiency in identifying all letters of the alphabet, with only occasional lapses in recalling some of the less frequently utilized ones. ‘V’ has acquired the ability to read words, particularly those commonly encountered...” Interview, parents*

The progress of reading ability on the subject can be seen in [Table 3](#).

[Table 3](#) presents the progress made for 6 months, as a result of the special treatment provided by teacher and parents to assist the student with reading dyslexia. The findings indicate that consistent remedial teaching, implemented at home and school, has yielded a highly



positive impact on the development and reading ability of the student. For instance, “V,” an elementary school student with reading dyslexia, received consistent support, resulting in significant progress and the ability to read. Therefore, it can be inferred that remedial teaching is an effective means of addressing reading dyslexia in students.

## 4.2. The use of multisensory methods and learning media in helping student with reading dyslexia

This study endeavors to determine the specific methods employed by Elementary School teachers to assist the student with reading dyslexia. It has been observed that the teacher uses two primary approaches when providing specialized learning and teaching to educate the student, namely the multisensory method and learning media. These methods are implemented continuously and consistently to ensure that the student can obtain maximum benefits and results.

### 4.2.1. Multisensory method

To assist ‘V’ in learning to read, the teacher employs a specialized multisensory approach, distinct from the methods used with students. The goal of this approach is to facilitate the recognition of reading symbols, including letters, syllables, and words, through various sensory experiences. Visual media in the form of pictures are presented to the students and observed through their eyes. Additionally, wooden blocks and written letters or words on the blackboard are used to further enhance the recognition of symbols. The teacher also facilitates careful listening to the sounds of letters and words, repeating them multiple times to connect the sounds with the corresponding symbols. They provide opportunities for students to engage in movements or activities to strengthen the recognition of letters, words, or sentences. All sensory experiences, specifically sight, hearing, and movement, are integrated through these activities. The teacher responded when inquired about the reading learning method used for ‘V’:

*“The initial approach implemented involves a multisensory method that introduces letters through the utilization of cardboard letter paper, allowing student to both see and hold the letters. Student are prompted to read a word, recite it, and then arrange the prepared letters to construct the word.” Observation note*

The multisensory approach is not exclusive to teachers in the classroom, as parents also employ various methods and media when teaching reading to their children at home. They provide letter cards, promoting active participation and enthusiasm for learning. The techniques have been previously discussed between teachers and parents, with parents endeavoring to apply the same strategies used in the classroom to the home environment. In respects to learning to read at home, parents have expressed that:

*“To acquire the skill of reading, it is recommended to employ the use of letter cards. The method involves creating a card for each letter. While Mrs. E, the teacher, fashioned a set of such cards, it is worth noting that the cards were comparatively smaller in size. The approach utilized at home is similar to the one used by Mrs. Ely. In the event that there are no school assignments, I usually*

*take it upon myself to teach my children the basics of reading.” Interview, parents*

Parents frequently assist their children in learning to read at home, despite having a flexible schedule. Typically, they are the primary companions for their children while studying at home. In rare cases, when parents are unavailable, the responsibility may fall upon older siblings or grandparents. However, the student prefers the company of his parents over siblings or grandparents. This is because parents possess greater patience and understanding when guiding their children. On the other hand, siblings may be more assertive, causing the subject to feel intimidated. Parents also shared their involvement and assistance in helping their child complete tasks when inquired about their study routine:

*“I frequently accompany ‘V’ during the study sessions. In cases where I am unavailable, the brother may occasionally accompany her, but this is a rare occurrence. Additionally, the grandmother may assist, but due to her high blood pressure, she is unable to accompany ‘V’ frequently. It is noteworthy that ‘V’ prefers my company over her grandmother’s when studying.” interview, parents*

At the time of the study, the pandemic situation was in a transitional phase, necessitating the adoption of two modes of learning in schools, namely online and offline. This dual approach has also been extended to cater to the needs of dyslexia students. Teachers and students have been engaged in online learning, while adhering to stringent health protocols, and occasionally in-person classes are conducted at schools. Furthermore, home visits have been arranged for students with special needs, including those with dyslexia. The rationale behind the implementation of this learning strategy during the transition period is elucidated by the teacher as follows:

*“During face-to-face interactions, health protocols are strictly observed, requiring the use of masks and maintaining a safe physical distance. Furthermore, designated spaces are equipped with a blackboard, tables, and chairs, ensuring that only one person occupies each table. Face-to-face activities also enable close monitoring of the progress of students. In contrast, online learning poses challenges in terms of tracking and assessing academic performance. For students with special needs, additional learning opportunities are offered in the form of offline sessions and limited home visits. Online learning is conducted through video conferencing from Monday to Wednesday, while on Fridays, offline learning is conducted through home visits.” Interview, teacher*

The tasks assigned to students with special needs share fundamental similarities with their peers without special needs. Individuals affected with dyslexia may encounter difficulties with reading activities while being relatively proficient with other tasks. The teacher implements supplementary learning approaches, tailored to enhance the reading skills of the student with dyslexia. Furthermore, when queried about the differences between the assignments given to the student dyslexia and those without special needs, the teacher elaborated:

*“I believe that the situation remains unchanged in this situation. In my opinion, children can engage in home learning with the guidance of their parents. However, for subjects such as mathematics,*

*particularly those involving units of measurement, I typically supplement online instruction with offline learning opportunities to enhance comprehension. Offline learning has also proven beneficial as children often experience difficulties with reading, which is the primary obstacle to their understanding of the subject matter.” Interview, teacher*

According to the findings, the implementation of multisensory techniques can enhance the reading proficiency of the students with dyslexia. Various approaches can be employed to implement this technique, such as using cards or other strategies. The utilization of cards can promote enthusiasm and enjoyment in the process of acquiring vocabulary. However, students must receive adequate support and assistance from their teachers and families to facilitate the efficacy and assessability of the learning process.

#### 4.2.2. Use of learning media

Learning media plays a crucial role in the learning process by serving as a tool to engage and captivate students. By utilizing effective learning media, student, including those with reading dyslexia, can achieve optimal comprehension and understanding of the material presented by the teacher.

The teacher employs a range of instructional materials when guiding ‘V’ in the process of acquiring reading skills. These include letter cards, word cards, large alphabet media (LMA), letter blocks, and word blocks. Depending on the specific learning objectives and needs, these materials may be used individually or in combination. The teacher makes use of these materials regularly, particularly during remedial sessions with the student with dyslexia. The teacher recognizes the significant value of these materials in supporting the reading acquisition process. Firstly, they facilitate the recognition of reading symbols and enhance student engagement and motivation in learning to read. Concerning the use of word block media, the respondent stated:

*“It is undoubtedly more engaging to learn using word blocks, and the process entails aligning them to form words. The rotatable feature and the abundance of letters only add to its appeal, making it easier to read and comprehend text quickly.” Interview, the student with dyslexia.*

The benefits of using word blocks were also felt by the parents of the student. This form of media can enhance the enthusiasm of students towards learning to engage in an enjoyable activity. Consequently, this condition can effectively promote greater participation amongst students during learning, leading to improved academic outcomes. Concerning this matter, parental feedback indicated that:

*“Subject matter acquisition has been noted to pique the interest of individuals, particularly in reading, due to the prevalence of media. During a recent conversation, the individual referred to as ‘V’ expressed satisfaction with their progress in reading, remarking on its coolness. It has been two months since the individual embarked on this learning journey, and the results have been encouraging. ‘V’ has achieved fluency in reading, and the issue of letter reversals no longer presents a challenge. However, for lengthier sentences, some degree of hesitation remains in their reading.” Interview, parents*

According to the findings, the teacher employs various instructional media to promote and inspire the student to engage in the learning process. The student endeavors to comprehend, recollect, and interpret information. The card medium is the most commonly and extensively used teaching tool, enabling the student to become more acquainted with new vocabulary. Parents also endorse the use of cards as a preferred educational medium for the children.

## Discussion

The results indicated that the participant was identified as a student with dyslexia and encountered difficulties in recognizing and distinguishing symbols of letters, syllables, and words. Additionally, the student faced challenges in spelling, often confusing letters, and exhibited difficulty in remembering verbal and visual information. At the age of ten, the student was enrolled in the third grade at Elementary School and was expected to read fluently at the same level as their peers. Data analysis shows that despite possessing normal intellectual intelligence (IQ 110) and displaying satisfactory performance in oral, mathematical, and other cognitive tasks, the reading abilities of the student lag behind their intellectual capabilities. This disparity highlights the presence of difficulties not caused by intellectual barriers or obstacles to sensory functions, such as hearing and vision, or environmental factors. The findings of the student with dyslexia in reading are noteworthy because the student exhibited normal IQ levels and performed well on other learning materials. However, experts identified the student as belonging to the reading dyslexia category (Anderson et al., 2020; Boyes et al., 2020; Quercia et al., 2020). According to Anderson et al. (2020), even though students with reading dyslexia exhibit normal IQ levels, significant difficulties and discrepancies are shown in various assessments related to reading. As a result, they are categorized as reading dyslexia and require specialized interventions to facilitate learning progress.

The findings show that remedial learning is a crucial approach adopted by teachers to enhance the reading abilities of students. The concept denotes a distinct teaching technique in which the teacher offers extra learning services customized to meet the unique needs of the student. During remedial learning, special time is allotted outside the standard school hours to provide reinforcement or repetition of the concepts taught in class, primarily concerning reading skills. Furthermore, teacher employs exclusive methods and media different from those used in typical classroom learning to cater to the needs of the student. The data collected indicates that a particular schedule is established outside of the regular class hours to reinforce the reading abilities of the student, typically an hour before the general lesson schedule. Additionally, the learning is carried out by teacher assistants and parents at home, highlighting the significance of collaborative efforts to support reading success. Therefore, the results strongly suggest that remedial learning is a critical factor in promoting the reading abilities of dyslexia student (Abbondanza et al., 2020; Sümer Dodur and Altındağ Kumaş, 2021; Peter et al., 2021a,b; Hall et al., 2022).

This finding yields two critical points that merit attention. Firstly, it is insufficient for teachers to rely solely on regular classroom instruction to enhance the reading ability of students with dyslexia.

Additional learning opportunities beyond school hours, using diverse methods and media, are necessary to optimize improvement. Secondly, to yield superior outcomes, it is essential to supplement in-class instruction with additional learning opportunities at home. These results align with a prior study conducted by Hall et al. (2022), where remedial learning is an effective approach for students with dyslexia. It is imperative for both teachers and parents to provide special attention and support for students with dyslexia to facilitate progress. Neglecting this condition may impede reading development, leading to poor academic performance (Boyes et al., 2017, 2020; Lopes et al., 2020; Andresen and Monsrud, 2022).

Another key factor that determines the success of improving reading skills in these students is the use of multisensory methods. It is known as the VAKT method, which stands for visual, auditory, kinesthetic, and tactile (Abbondanza et al., 2020; Gibbs and Elliott, 2020; Abu Rabia and Salfety, 2021). The method uses visual, auditory, kinesthetic, and tactile modalities to provide students with meaningful experiences. This approach involves teachers facilitating students to see, hear, feel, and physically interact with the material. This study shows that teacher and parents employed a diverse range of strategies to support the reading development of the affected student. Pictures or symbols of letters and related words were used to enhance visual recognition when teaching reading skills. Additionally, the teacher played the sounds of letters or words, asking the student to recite them aloud. Tactile learning was also incorporated through the use of touchable symbols of letters or words, and blocks to engage kinesthetic learners. In a dice game, the student assembled words from the letters, providing another interactive learning experience. The effectiveness of the method in improving the reading ability of dyslexia students has been shown in several previous studies to provide greater opportunities for reading success (Boyes et al., 2020; Kühn et al., 2021). Boyes et al. (2020) reported that the multisensory method was more effective in teaching dyslexia students. The results showed that the reading and writing abilities of the students had increased after using the Simultaneous Multisensory Teaching method (Banfi et al., 2021; Peter et al., 2021a,b).

Another key factor that determines the success of improving reading skills is the use of learning media during mentoring to read. The result shows that both the teacher and parent always used the media when coaching the student on how to read. There were several media used, namely letter cards, syllable cards, letter blocks, word blocks, letters presented in 3 dimensions, stationery, whiteboards, and pictures related to letter or word symbols. In addition, the teacher also used playing media in the form of dice or letter blocks. The use of this media seems to be very significant in improving the reading ability of the student. Furthermore, the effectiveness of using media to support learning success has been supported both theoretically and empirically. Previous studies found the importance of using media in learning to read in dyslexia students (Zid et al., 2020; Zid and Casmana, 2021; Rachmawati et al., 2022). Rachmawati et al. (2022) also proved the importance of using visual and real media as well as a multisensory approach in supporting the success of learning to read. The method supports the effectiveness of learning outcomes, namely to arouse the interest of students and facilitate their understanding of the concepts.

Another key factor that promotes the improvement of reading skills is parental support. The results show that parents provide very positive support and assistance to their children through guidance. They provide tutoring for their children, related to school assignments and also specifically to guide learning to read. Parents are also attuned to the needs of their children who struggle with reading, and this awareness motivates them to establish a positive and collaborative relationship with the teacher. This includes maintaining open and consistent communication from the outset, with the shared goal of providing special attention and support.

## Conclusion

Based on the findings and discussions, it can be concluded that Elementary School students with reading dyslexia receive assistance through various means to achieve optimal results during their learning process. To identify the dyslexia traits of such students, a comprehensive evaluation conducted by medical practitioners, psychologists, and educational specialists, such as exceptional school teachers, is required. The results can serve as primary documentation for teachers to administer tailored instruction, enabling students to reach their full potential. Therefore, difficulties in reading manifest as an inability to comprehend each word promptly, and exhibit a delay in processing the material presented. A qualified diagnosis by a psychologist is also necessary to identify students with reading dyslexia problems.

Students diagnosed with dyslexia can still achieve success despite their condition. This study has identified three key factors that can contribute to their success, namely remedial teaching, family support, and positive progress. Remedial teaching is an additional program designed to provide extra learning hours specifically for students with dyslexia. The method typically involves one hour of instruction every day and is reinforced by parents at home. This study found that significant progress can be achieved over months through this method. Therefore, it is imperative to provide remedial teaching to students with reading dyslexia to support their academic success.

Another crucial factor is the utilization of multisensory teaching methods and learning media. The use of these techniques has been shown to play a vital role in supporting the learning process of students with dyslexia. In this study, teachers used cards as a tool and medium to motivate and engage the student in his learning. Cards are an easy-to-use medium effortlessly replicated by parents at home to support the effective learning of their child. Therefore, the effective partnership between teachers and parents, through the use of multisensory teaching methods and learning media, can provide a solution to the challenges associated with reading dyslexia.

## Data availability statement

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author.



## Ethics statement

The studies involving human participants were reviewed and approved by Ethical Committee of Faculty of Education Science, Universitas Negeri Jakarta. The patients/participants provided their written informed consent to participate in this study.

## Author contributions

All authors listed have made a substantial, direct, and intellectual contribution to the work and approved it for publication.

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## Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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