

THE VAK METHOD FOR QUR'ANIC VOCABULARY MEMORIZATION IN A CHILD WITH SEVERE DYSLEXIA AND DYSPRAXIA: AN EMBEDDED CASE STUDY

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Abstract

This study analyzes the application of the Visual, Auditory, and Kinesthetic (VAK) method to improve Quranic vocabulary memorization in a child with severe dyslexia, dyspraxia, and superior intellectual ability. The primary focus was comparing the subject's ability to memorize concrete versus abstract nouns in Surah Al-Fil. Employing an embedded mixed-method single-case design, data were collected using the Observe-Participate-Discuss technique. This involved participatory observation with interactive PowerPoint slides and audio recitations as learning media while directly tracking the subject's responses. The results indicate that the VAK method helps twice-exceptional children discover new ways to store and recall information. Vocabulary concreteness heavily influenced the method's effectiveness. Concrete nouns (*al-fil*, *hijarah*, and *sijjil*) were memorized more easily, achieving a "very good" rating with an N-Gain score of 0.70. Conversely, the abstract noun *taqlil* yielded an N-Gain score of 0.16, falling into the "poor" category. Imaginative kinesthetic learning emerged as the most prominent modality aiding memorization. Ultimately, integrating the VAK method enhanced cognitive processing and provided crucial affective support, boosting the subject's self-confidence. These findings highlight the importance of multisensory, meaning-oriented instruction for Quranic learning among students with neurodevelopmental differences.

Keywords: *children with dyslexia; dyspraxia; Quranic vocabulary; VAK method*

1. Introduction

Education is a fundamental right for every individual to develop their potential, including for children facing learning disabilities or language disorders (Apriyani et al., 2022). One neurological disorder that clearly affects language processing ability is dyslexia (Ulpah & Tatang, 2024). Dyslexia is characterized by specific difficulties in phonological processing and word recognition, resulting in low pronunciation accuracy and difficulties in storing word sound information into long-term memory (Windasari et al., 2022). Previous neurocognitive studies suggest that this condition is associated with impaired function in the occipito-temporal cortex, temporo-parietal cortex, and inferior frontal cortex, which are responsible for processing visual word forms and articulation (Aziz et al., 2025). This condition is often

exacerbated by comorbid dyspraxia, which disrupts motor planning, creating dual barriers both in sound processing in the brain and in the execution of movements to produce sounds (Aziz et al., 2025).

In religious education, mastering the vocabulary of the Qur'an poses a significant challenge for children with dyslexia due to the complex phonological characteristics of the Arabic language (Son, 2025). Although children with dyslexia often possess intellectual potential at an average or even superior level, conventional methods that rely solely on the auditory channel frequently fail to yield optimal results (Tarjiah et al., 2023). This results in a gap between intellectual potential and actual memorization ability. Therefore, an intervention strategy using the VAK method is needed, which offers a multisensory approach by integrating vision, hearing, and physical movement into a single learning process.

For children with severe dyslexia and dyspraxia, the kinesthetic element in the VAK method serves as a memory anchor that stabilizes focus and facilitates the process of recalling memorized material (Primasari & Supena, 2021). In accordance with the *Dual Coding Theory* developed by Allan Paivio, human memory retention operates through verbal (*logogens*) and non-verbal (*images*) systems (Paivio, 1990). In children with dyslexia, the verbal pathway is often fragile, so the use of concrete nouns in the Qur'an—such as words with high visual imagery becomes crucial because they trigger visualization and understanding of the meaning of each word. Conversely, abstract vocabulary or words with complex phonetic structures tend to impose a heavier cognitive load on the subject (Paivio, 1990; Mayer, 2022).

Although research on the Visual, Auditory, and Kinesthetic (VAK) method has been extensive in general special education, a significant empirical and theoretical gap remains concerning its application to Arabic Quranic vocabulary memorization for individuals with comorbid neurodevelopmental disorders. Existing literatures predominantly examine the VAK method within single-disability frameworks, mostly focusing on Latin-based languages that possess different orthographic and phonological structures. Consequently, current models fail to account for how multisensory interventions operate when a child faces a dual barrier: severe phonological deficits from dyslexia combined with articulatory motor planning impairments from dyspraxia, especially when dealing with the high phonetic complexity of Arabic sounds. Furthermore, there is a distinct lack of pedagogical research exploring how children who possess superior intelligence alongside these dual deficits utilize alternative cognitive pathways to process semantic meaning.

This study addresses these gaps by evaluating how the VAK method serves as a compensatory mechanism, redirecting the cognitive load from the fragile verbal pathway to a more stable sensorimotor matrix during Quranic vocabulary retention. Unlike previous studies that have primarily focused on VAK application for general learning disabilities, this research offers a distinct contribution by examining the dual cognitive barriers of severe dyslexia and dyspraxia within a single case study. By integrating multisensory interventions specifically tailored to bridge phonological deficits and motor planning impairments in a student with superior intellectual potential, this study addresses a critical gap in pedagogical literature. It provides a unique model for how alternative cognitive pathways can be leveraged to achieve Quranic vocabulary mastery when traditional speech-based methods are ineffective. Accordingly, this study seeks to answer the following questions:

1. How does the VAK method influence Quranic vocabulary memorization among a child with severe dyslexia and dyspraxia?
2. How do visual, auditory, and kinesthetic modalities contribute to vocabulary retention?
3. What psychopedagogical impacts emerge during the implementation of the VAK method?

2. Literature Review

2.1 Characteristics of Severe dyslexia and dyspraxia Comorbidity

Dyslexia is a neurologically based learning disorder characterized by specific difficulties in phonological processing and word recognition (Vellutino et al., 2004; Wolf et al., 2024). Neurobiologically, this condition is associated with dysfunction in the *occipito-temporal cortex*, *temporal-parietal cortex*, and *inferior frontal cortex*, which are responsible for processing visual word forms and articulation (Aziz et al., 2025). The primary challenge for individuals with dyslexia lies in the inability to consistently link phonemes with graphemes, resulting in inefficient pronunciation accuracy and the storage of sound information in long-term memory. The complexity of these challenges is often exacerbated by comorbid dyspraxia, which affects *motor planning* and the coordination of articulatory muscles (Aziz et al., 2025). This dual condition creates barriers to both sound processing in the brain and the physical execution of movements required to produce speech sounds.

2.2 Visual, Auditory, and Kinesthetic (VAK) Method

The VAK method is a multisensory approach that integrates the three primary pathways of information processing to strengthen memory pathways in the brain. For children with dyslexia, the involvement of the kinesthetic aspect is key to bridging phonological difficulties through sensorimotor stimulation (Primasari & Supena, 2021). Theoretically, children in the concrete operational stage (ages 7–11) learn most effectively through direct experiences involving physical movement (Piaget, 1952). While this foundational stage remains central to understanding cognitive development, contemporary research emphasizes that these developmental milestones are best achieved through active, multisensory construction of knowledge in adaptive learning environments (Maspul et al., 2023; Syarifuddin et al., 2024). For children with dyslexia, this implies that the transition from concrete to abstract conceptualization requires multisensory scaffolds that bridge the gap between their intellectual potential and phonological processing deficits.

2.3 The Power of Memorization through Dual Coding Theory

The theoretical basis for selecting material from Surah Al-Fil is grounded in Dual Coding Theory (DCT), which posits that memory retention operates through integrated verbal and non-verbal systems (Paivio, 1990). This theory has been significantly evolved by modern multimedia learning research, which demonstrates that combining imagery with verbal cues is an effective pedagogical strategy for mitigating cognitive load (Mayer, 2021; Mayer, 2022). In the context of students with severe dyslexia, this multisensory integration often referred to in recent literature as an essential compensatory mechanism for language disorders allows the brain to form stable mental representations before articulation, thereby enhancing recall accuracy (Gosiewska & Turek, 2025). In children with dyslexia, the verbal pathway is often fragile, making the use of concrete nouns such as *qitṭun* (قُطْن) and *jabalun* (جَبَلْن) crucial due to their high *concreteness*. On one hand, Surah Al-Fil is dominated by a group of concrete nouns that possess very high visual imagery (*imageability*). This

characteristic is crucial for children with dyslexia because it triggers *the Picture Superiority Effect*, whereby the brain’s non-verbal system (*imagery*) can easily process word meaning through visual representations and hand gestures before converting them into sounds (Primasari & Supena, 2021). Conversely, abstract nouns tend to impose a heavier cognitive load on the subject because they are difficult to visualize directly.

2.4 The Importance of Noun Vocabulary in Quranic Learning

Vocabulary mastery is the smallest component of language that plays a crucial role in literacy skills (Tarjiah et al., 2024). For children with dyslexia, adequate vocabulary mastery helps overcome difficulties in semantic processing, ensuring that religious messages can still be conveyed despite conventional reading barriers. The use of strategies involving physical movement has been shown to strengthen long-term memory of linguistic information (Kiswanto et al., 2023). The focus on nouns in Surah Al-Fil aims to assess the effectiveness of the VAK method as a compensatory approach for subjects’ motor limitations, improving pronunciation accuracy while reinforcing the memorization structure of Qur’anic vocabulary (Gani & Al Farisi, 2022).

Based on the literature reviewed, severe dyslexia and dyspraxia create interconnected phonological and motor-planning barriers that hinder vocabulary acquisition. The VAK method, supported by Dual Coding Theory, provides an alternative cognitive pathway by combining visual imagery, auditory reinforcement, and sensorimotor experiences. This theoretical integration forms the conceptual framework underpinning the present study.

3. Research Method

3.1 Research Characteristics and Design

This study employs a mixed method approach through an embedded case study design, focusing in-depth on a single subject with a highly specific cognitive profile. This design allows for the systematic integration of quantitative evaluation specifically pre-test and post-test N-Gain scores within a predominantly qualitative case analysis framework. The research subject is an elementary school child diagnosed with severe dyslexia and dyspraxia hereafter referred to as ADDS. The clinical diagnosis of severe dyslexia and dyspraxia was officially established based on medical records certified by a medical doctor who also serves as the head of the specialized department at the subject's school. Due to strict institutional confidentiality policies and privacy protocols concerning special education records, further granular access to the subject's comprehensive medical history was restricted by the school. The unique characteristic of this subject lies in the contrast between his intellectual potential, which falls within the superior range, and clear neurological impairments in phonology and motor coordination.

Table 1.

Subject’s Identity and Intellectual Profile

Education	Age	Gender	Competencies	Health History
3rd Grade	10 years	Male	Already knows the Arabic alphabet and can read the Quran at the Iqro 4 level	Severe dyslexia, dyspraxia, superior IQ

As this study involves a minor with neurodevelopmental disorders, strict ethical protocols were maintained to ensure the subject's well-being and privacy. Formal research authorization was obtained from the head of the specialized department at the subject's school, and the subject's identity was fully anonymized using the pseudonym 'ADDs'. Furthermore, all data collection procedures were designed to be non-invasive and integrated into the school's existing pedagogical framework to ensure no psychological or physiological distress was imposed upon the subject.

3.2 Data Collection Process: Observe-Participate-Discuss Technique

Data in this study were collected using the Observe-Participate-Discuss technique, in which the researchers served a dual role as the instrument. The researchers actively listened to every detail of the subject's articulation to map phonetic changes, fully engaged in providing interventions through the VAK method, and established dialogic interactions to explore the subject's psychosocial and cognitive responses to the memorization material. The data collection process began with participatory observation by having native speakers of read Surah Al-Fil via an audio recitation, followed by the delivery of VAK method interventions using interactive PowerPoint presentations while observing the subjects' sensorimotor responses and focus. The entire intervention process was documented using audio-visual equipment to obtain authentic data that could be replayed to ensure the accuracy of observations regarding kinesthetic movements and pronunciation errors that might have been missed by the naked eye.

3.3 Classification of Vocabulary as the Research Object

Vocabulary derived from Surah Al-Fil was proportionally classified into two main categories: concrete nouns and abstract nouns. This distinction aimed to determine the extent to which neurological barriers resulting from severe dyslexia and dyspraxia comorbidity could be minimized through multisensory stimulation on different word types.

Table 2.

Categorization of Nouns in Surah Al-Fil

Concrete	Abstract
رَبُّكَ	كَيْدِهِمْ
أَصْحَابِ	تَضَلُّلٍ
الْفِيلِ	
ظُفْرًا	
أَبَابِلَ	
حِجَارَةً	
سِجِّيلٍ	
عَصْفٍ	
مَآكُولٍ	

The complexity of learning in children with dyslexia is often exacerbated by comorbid conditions such as dyspraxia. This condition affects motor planning as well as the coordination of the articulatory muscles required for pronunciation. Therefore, this study

distinguishes subjects' responses to concrete and abstract nouns to determine the extent to which these neurological barriers can be minimized through multisensory stimulation.

3.4 Supporting Instruments and Assessment Metrics

To ensure the accuracy and objectivity of the data, the researchers utilized a series of audiovisual stimulus instruments, including an audio recitation of Surah Al-Fil by Sheikh Abdul Qadir Al-Utsmani as the primary auditory reference, as well as a PowerPoint presentation integrating Arabic text with representative visual images. Performance assessment of memorization refers to the indicator evaluation standards (Sugiyono, 2013), which are then analyzed in depth. To ensure the validity and reliability of the data collection, the research instruments, including the pre-test and post-test assessments for vocabulary mastery, were reviewed and validated by two educational experts specializing in Arabic language teaching and special education pedagogy. In the retention measurement procedure, subjects undergo a 45 minute memorization session, followed by a short-term memory test after a 1- to 2-hour interval without additional intervention. The researchers also used field notes to capture specific, unexpected phenomena during the learning process.

3.5 Data Processing and Thematic Analysis

The data processing procedure followed the interactive model proposed by Miles, Huberman, and Saldaña (2014), consisting of three interconnected stages: data reduction, data display, and conclusion drawing/verification. These stages were conducted iteratively throughout the study to ensure systematic interpretation and analytical rigor.

3.5.1 Transcription and Listening

All recorded data obtained during the intervention sessions were transcribed and repeatedly reviewed through intensive listening procedures. The transcription process aimed to identify linguistic and articulatory patterns associated with dyslexia and dyspraxia.

Indicators of dyslexia included difficulties in retaining and retrieving vocabulary, repetition of words, incomplete pronunciation of phonological units, and challenges in recalling complete sound sequences. Meanwhile, indicators of dyspraxia focused on difficulties related to speech motor planning and articulatory coordination, including limited control over oral motor movements involving articulatory organs such as the tongue, lips, and jaw.

Repeated listening and cross-checking procedures were employed to increase the consistency and trustworthiness of data interpretation.

3.5.2 Thematic Analysis

After transcription, the data were analyzed using thematic analysis to identify recurring patterns and construct meaningful categories related to the implementation of the Visual–Auditory–Kinesthetic (VAK) method. The analysis focused on five major themes:

- a. Patterns of Vocabulary Retention Improvement Following VAK Implementation
- b. Responses to Visual Modality
- c. Responses to Auditory Modality
- d. Responses to Kinesthetic Modality
- e. Psycho-pedagogical Impacts of VAK-Based Intervention

Themes were generated through repeated coding, categorization, comparison across sessions, and interpretation of participants' behavioral and linguistic responses during the intervention process.

3.5.1 Descriptive Data Analysis:

The success of the intervention and the participant's memory strength were measured descriptively and qualitatively using two main instruments: a pronunciation rating scale and a gain test calculation category. The rating scale was used to categorize the quality of the subjects' sound production into a range of values from 1 to 100 using indicators (Sugiyono, 2013) with qualitative criteria ranging from very good to very poor. To calculate the effectiveness of the memory improvement, the N-Gain score was determined using the following formula (Hake, 1999):

$$N\text{-Gain} = \frac{\text{Posttest} - \text{Pretest}}{\text{Maximum Score} - \text{Pretest}}$$

Furthermore, the researchers applied a descriptive N-Gain test to calculate the success of memory improvement between *pre-test* and *post-test* scores. The results of these calculations were classified into the categories of very good ($g > 0.70$), good ($0.30 < g < 0.70$), poor ($g < 0.30$), and very poor ($g < 0$), where these categories were adjusted to align with the indicators; they serve as objective benchmarks for the success of the VAK method in enhancing the subjects' memory.

3.6 Data Validation and Research Ethics Protocol

The validity of the data in this study was ensured through cross-checking from various sources and transparent documentation of all research stages. Additionally, to comply with research ethics regarding children with special needs, the subjects' real identities were fully anonymized to protect their privacy.

4. Results and Discussion

The results of the study indicate that the application of the VAK method has a positive effect on the ability to memorize Quranic vocabulary among subjects with ADDS. This improvement did not occur uniformly across all learned vocabulary words but was influenced by the characteristics of the vocabulary and the subjects' responses to visual, auditory, and kinesthetic modalities during the learning process. These findings indicate that the memorization process in children with severe dyslexia and dyspraxia does not rely solely on the ability to recall sounds but also involves the ability to build mental imagery, understand meaning, and connect kinesthetic experiences with the information being learned.

To provide a more comprehensive overview, the discussion begins with an analysis of the patterns of vocabulary memorization improvement following the implementation of the VAK method. Subsequently, the discussion focuses on the subjects' responses to the visual, auditory, and kinesthetic modalities as the primary components of the VAK method, as well as the psychopedagogical effects that emerge during the learning process.

4.1 Patterns of Vocabulary Retention Improvement Following the Application of VAK

Table 3.

Retention Results and Memory Scores

Vocabulary Al-Fil	Memorization		N-Gain Score	Memory
	before	after		
الفيل	40	90	0.83	Very Good
حجارة	60	90	0.75	Very Good
سجّيل	60	90	0.75	Very Good
أصحاب	60	90	0.75	Very Good
مأكول	80	90	0.50	Good
أبائيل	90	95	0.50	Good
رُبّك	90	95	0.50	Good
ظيّر	75	85	0,40	Good
عصف	70	80	0,33	Good
كئيدهم	70	75	0,16	poor
تضليل	70	75	0,16	poor

The application of the VAK method showed an improvement in the subjects' vocabulary memorization ability, as measured using the N-Gain Test to assess the success of the intervention. Based on these parameters, memory performance results were obtained by comparing pre and post-intervention recall scores, which encompassed phonological integrity, vocabulary recall ability, and the alignment between recall and the kinesthetic responses demonstrated by the subjects.

The findings in Table 3 indicate that improvements in recall were not uniform across all vocabulary items. Concrete vocabulary such as al-fil (الفيل), hijarah (حجارة), and sijzil (سجّيل) showed the highest improvements, with N-Gain values of 0.83, 0.75, and 0.75, respectively all falling into the "very good" category. This high retention success with concrete vocabulary through multisensory stimulation aligns with the findings of Coskun dan Mitrani (2020), who emphasize that vocabulary interventions for children with dyslexia are far more effective when using words with strong physical representations, as this reduces the phonological workload on the child's fragile system. These results are further supported by Baddeley's (2003) working memory model, which states that the coordination of visual and phonological stimuli assists children in consolidating new information into long-term memory.

Conversely, vocabulary that is harder to visualize, such as *kaydihim* (كيدهم) and *taḍlīl* (تضليل), showed more limited improvement, with N-Gain scores of 0.16 and 0.16, respectively. This limited improvement with abstract words aligns with research by Pietro et al. (2025), which confirms that vocabulary interventions for children with language processing disorders often hit a wall of semantic abstraction, requiring longer and more repetitive intervention time because they lack a direct visual anchor in the subject's brain. To validate these metrics, data triangulation was conducted through behavioral observations and teacher interviews. When memorizing concrete words like *al-fīl*, the subject spontaneously used synchronized hand gestures that stabilized his articulation. Conversely, abstract words triggered visible motor planning anxiety and prolonged phonetic pauses. The teacher noted: *'With concrete nouns, ADDS's superior IQ instantly converted the visual slide into a physical gesture, bypassing his speech-motor barriers. However, for abstract terms like kaydihim, the lack of an internal image overloaded his working memory, causing his dyspraxia to trigger phonetic errors.'* This qualitative evidence explains the low N-Gain (0.16) for abstract vocabulary.

Interviews with the supervising teacher reinforced these findings. The teacher emphasized that a lack of understanding of the meaning makes it difficult to connect kinesthetic elements with the vocabulary being memorized. Therefore, adequate contextual explanation is required before the VAK method is applied. The importance of contextual meaning comprehension before memorization confirms the approach proposed by Islam et al. (2025), who argued that integrating a constructivist approach at the beginning of the session is an absolute prerequisite for students with special needs. In general, the positive effectiveness of the VAK learning model in enhancing memory is consistent with Mabruroh's (2024) research, which demonstrated that the VAK model significantly improves Arabic vocabulary mastery compared to traditional methods.

Based on the average calculation of 11 vocabulary words in Surah Al-Fīl, the memorization score before the intervention was 69.55 and increased to 85.91 after the application of the VAK method. which was obtained by averaging the individual N-Gain scores of all 11 vocabulary items (total N-Gain 5.17 divided by 11), falling into the moderate/good category. This pattern indicates that vocabulary characteristics are a key factor influencing the success of applying the VAK method to subjects with ADDS. These findings indicate that the effectiveness of the VAK method is determined by the extent to which the learned vocabulary can be understood, visualized, and connected to the subject's learning experiences. This multisensory integration involving real sensorimotor experiences aligns with a comparative study by Ali et al. (2023), which found that the use of physical strategies provides a crucial space for children with dyslexia to manifest word understanding into their muscle memory, thereby facilitating information recall.

4.2 Visual Modality Response

Based on the results of participatory observation, ADDS demonstrated a very positive response to visual stimuli presented through interactive PowerPoint media. Throughout the learning process, the subject's attention was consistently focused on the visual elements and text displayed. This high visual focus was particularly evident when the subjects were learning vocabulary with concrete forms that were easy to visualize, such as *al-fīl* (الفيل), *ḥijārah* (حجارة), and *ṭayran* (طيور). Thus, by viewing the displayed visuals, ADDS

were aided in visualizing them. This strong and dominant visual response from ADDS aligns with the findings of Sarajar dan Pratiwi (2024), who found that children with dyslexia have a very high dependence on visual learning media to compensate for their reading difficulties, where visual stimuli act as an essential trigger for focus during the intervention process.

This finding indicates a strong alignment between the cognitive potential of subjects in the superior category and the visual stimulation provided. The subjects' focus on visual elements confirms the Picture Superiority Effect theory (Paivio, 1990). For children with dyslexia who face barriers in the verbal processing pathway, visual stimuli are not merely illustrations but the primary means that help subjects understand the meaning of vocabulary before memorizing it.

These findings also align with the Dual Coding Theory, which states that information is more easily remembered when processed through both verbal and nonverbal channels simultaneously. In the case of ADDS, visual stimuli function as a compensatory channel that allows understanding of word meanings to form first before the subject faces the demand to recall the sounds of the Arabic language. Therefore, successful memorization of concrete vocabulary can be understood as the result of the strong mental imagery formed in the subject's mind with the aid of visual stimuli. This role of visual integration in meaning formation is consistent with Zhou's (2021) research, which demonstrated that visual representations can accelerate the acquisition of foreign vocabulary in children before they engage in phonological production.

In addition, the superior intelligence possessed by ADDS appears to play a role in accelerating the formation of connections between real objects and the vocabulary being learned. Once the meaning of a word has been understood through visual stimuli, the process of recalling the word becomes easier. Thus, the visual modality serves as the foundational basis supporting the success of other components within the VAK method. The importance of these visual stimuli aligns with Sepsita dan Wijaya (2024), who state that structured visual elements effectively activate right-brain functions to compensate for the letter-processing deficits in children with dyslexia.

4.3 Auditory Modality Response

In the auditory modality, the subjects exhibited a distinctive learning pattern. During the learning process, children with ADHD required repetition two to four times for each word before being able to recall it effectively. Interestingly, the subjects did not immediately imitate the sounds they heard but first listened to them deeply before attempting to memorize them. This tendency to listen deeply before imitating sounds aligns with Mettler et al. (2024), who noted that children with dyslexia require a slower auditory processing interval to internally map phoneme structures before articulating.

The need for relatively high repetition indicates the presence of a Phonological Core Deficit, a characteristic commonly found in children with dyslexia. The subject requires more time and higher exposure frequency to build understanding of the sounds heard. In this context, the process of deep listening functions as a compensatory strategy to ensure that the received sounds have been accurately understood before being stored in memory. This constant need for repetition aligns with the conception proposed by Wolf et al. (2024), who state that phonological processing difficulties in dyslexia require consistent auditory repetition as an accommodation to establish stable neural memory pathways.

This phenomenon demonstrates that the primary obstacle in ADDS does not lie in auditory ability but in the processing of linguistic sounds. Each word must undergo a process of repeated listening before it can be effectively remembered. Therefore, repetition in this study cannot be viewed as a learning weakness but rather as a neurological need that must be facilitated. The importance of facilitating this need for repetition aligns with the findings of Hidayah et al. (2025), who noted that in foreign language learning for children with special needs, clear and repeated auditory stimuli are absolutely necessary to maintain the accuracy of their oral pronunciation.

Although the subjects' phonological pathways were relatively weak, the auditory modality still played a crucial role as the primary source of correct Arabic sound models. In other words, the visual modality helps build meaning comprehension, while the auditory modality provides the sound models that form the foundation of the memorization process.

4.4 Kinesthetic Modality Response

The most notable finding in this study pertains to the kinesthetic modality. During the intervention process, the subject demonstrated high enthusiasm when given the freedom to create kinesthetic responses based on their own imagination. Unlike approaches that require students to imitate specific movements, the subject was given the space to create kinesthetic responses deemed most appropriate for the meaning of the learned vocabulary.

This freedom was shown to enhance the subjects' self confidence and engagement in learning. Kinesthetic responses born from personal imagination form stronger memory anchors because they involve motor memory. For children with dyspraxia, the incorporation of kinesthetic elements helps reduce barriers in the motor planning process, making the recall of vocabulary easier to perform. The success of this self-directed movement modality aligns with the study by Ali et al. (2023), which highlights that the incorporation of self-directed physical strategies provides a crucial outlet for children with dyslexia to manifest their understanding of words into their muscle memory.

This finding is reinforced by the results of interviews with supporting teachers who stated:

“Hand movements, being multisensory, certainly aid learning. The consideration of dividing vocabulary into concrete and abstract categories is also excellent because such detailed analysis is rarely done.”

The teacher also explained that:

“The subjects used hand movements spontaneously, especially with concrete vocabulary such as *abābil* (أبواب) and *ṭayran* (طيور), although this was not done for all words.”

This statement confirms that kinesthetic elements have become a strategy that emerges naturally in the subject when attempting to recall a vocabulary word.

The accompanying teacher also confirmed that ADDS finds it much easier to visualize vocabulary with tangible forms that are easy to visualize. This ease of visualization is directly proportional to the subject's ability to reinforce memorization and retrieve information stored in their memory. The process of recalling vocabulary is often initiated by

spontaneous kinesthetic responses that serve as triggers for the emergence of accurate recall. Salamah et al. (2025) conducted research on the *Total Physical Response* method, in which gross motor movements act as a bridge to activate children's receptive language abilities when their expressive oral production faces neurological barriers.

This improvement in memory occurs because the VAK method creates alternative memory pathways by simultaneously integrating visual, auditory, and kinesthetic modalities. The superior intellectual potential possessed by ADDS enables them to automatically establish logical connections between kinesthetic elements and word meanings, such as the kinesthetic response of flapping wings for the word *ṭayran* (طير). Because gross motor coordination is relatively more stable than speech muscle coordination, kinesthetic elements serve as memory triggers that help the subject recall vocabulary more effectively (Tarjiah et al., 2023).

Neurologically, a positive response to kinesthetic modalities indicates activation of motor pathways as a form of compensation for weak phonological pathways. Multisensory integration allows subjects to learn in a low-pressure environment, enabling them to focus more on the process of recalling vocabulary rather than fixating on articulation difficulties. Structured physical movement elements have proven to be a highly tool for memorizing the Qur'an among children with dyslexia (Muslim & Mohamed 2025 effective compensatory).

4.5 Psychopedagogical Impact of Applying the VAK Method

Based on observation results during the intervention, the subject demonstrated positive learning responses in both cognitive and affective aspects. Cognitively, the subject was able to maintain focus during the learning process and showed better comprehension of the material when kinesthetic activities were involved compared to verbal instruction alone. The ability to recall vocabulary for approximately 45 minutes indicated that the intervention aligned with the subject's working memory capacity.

On the affective aspect, the subject demonstrated a high interest in learning as well as positive emotional responses. During the learning process, ADDS appeared able to speak, joke, and laugh freely without showing excessive stress. A review by Hidayah dan Hidayati (2023) found that children with dyslexia are prone to decreased *self-esteem* due to repeated failures; thus, an adaptive multisensory approach effectively restores their emotional comfort, which explains why the active responses demonstrated by ADDS indicate that the VAK method possesses significant psychopedagogical advantages.

The active responses demonstrated by ADDS indicate that the VAK method possesses significant psychopedagogical advantages. For children with dual neurodevelopmental challenges, the demands to memorize and recall sounds accurately often trigger learning anxiety. However, the incorporation of kinesthetic elements in the VAK method serves as a mediator, helping learners engage through more meaningful and enjoyable experiences. These meaningful activities through physical movement align with Son's (2025) findings that integrating movement into instructional learning has been shown to positively impact students' cognitive engagement and learning motivation.

The superior intelligence possessed by students with special needs also plays a role in fostering positive emotional responses. Regarding this emotional regulation, Pratisti (2022) emphasizes that multisensory methods can trigger positive emotions and intrinsic motivation because students with special needs feel in control of their learning process, enabling them to recognize the success of the kinesthetic strategies they have developed

themselves and connect it to the memorization success achieved. This awareness generates learning satisfaction, which then develops into internal motivation to continue learning.

Thus, the VAK method not only functions as a cognitive aid in improving the memorization of Quranic vocabulary but also as an affective support instrument that strengthens the subject's self-confidence amidst the neurological challenges they face. The success of the multisensory intervention is reflected not only in improved memorization scores but also in the creation of an inclusive, comfortable learning environment that supports the psychological development of the students.

5. Conclusion

This study demonstrates that the application of the VAK method in teaching Qur'anic vocabulary to a child with severe dyslexia and dyspraxia is determined not only by the multisensory approach but also by the characteristics of the vocabulary. Concrete and easily visualized vocabulary yielded better memorization outcomes, indicating that successful retention in children with neurodevelopmental disorders is influenced by the ability to connect vocabulary to meaningful learning experiences. Furthermore, the VAK method serves as a compensatory strategy for phonological processing and motor planning deficits by creating alternative cognitive pathways for storing and recalling information, thereby reducing reliance on traditional verbal-only instruction.

While the VAK method proved highly effective for this subject, as a single-subject case study, these findings represent a focused exploration of cognitive pathways rather than a universal pedagogical protocol. Future research should adopt longitudinal designs and larger, more diverse samples to assess the generalizability of these results across different age groups, Qur'anic chapters, and special needs profiles. Investigating the interaction between vocabulary characteristics, Arabic phonological complexity, and individual neurological profiles will enable the development of more tailored and context-specific multisensory learning models.

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