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Case study of student diagnosed with dyslexia and ADHD- teaching intervention strategies

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Abstract

The present study deals with the complex phenomenon of dyslexia, as a case of specific learning difficulties, which appears to affect a significant portion of the student population, both in Greece and globally, as well as in cases of co-morbidity with Attention Deficit Hyperactivity Disorder (ADHD) or without it. The student in question, who serves as a reference point for this study, is a fourth-grade student in a primary school in Western Athens.

Keywords: Dyslexia; SEN (Special Educational Needs); Comorbidity; Intervention; Inclusion

1. Introduction

The role of the teacher is crucial in the inclusion of this student in the classroom context and in addressing the challenges arising from his dual diagnosis. In order to make the analysis and handling of this case possible, various ways will be proposed for the teacher to include this student in the core curriculum, using different techniques, taking into account the basic characteristics of these disorders, while simultaneously fostering empathy within the entire class to achieve comprehensive inclusion and harmonized teaching.

2. Definitions- basic terminology

To clarify the analysis of this phenomenon, it is important to provide a brief definition of dyslexia and outline the symptoms it causes. Over the years, many researchers have attempted to define dyslexia, describing it as a learning and cognitive disorder inherent to the individual. According to the Office of Special Education Programs (OSEP), the central concept of specific learning difficulties includes "disorders of learning and cognition that are inherent to the individual. Specific learning difficulties are specific in the sense that each individual with these disorders significantly affects a relatively limited variety of academic achievement outcomes" (Roundtable Learning Disabilities, 2002, as cited in Tzivinikou, 2015, p. 18).

Symptoms of dyslexia, as reported by various researchers, have been classified under the pedagogical approach to dyslexia. These symptoms include perceptual and motor deficits (visual and auditory perception, sensory integration, oculomotor skills, etc.), deficient memory, deficient phonological and phonemic processing, difficulties in decoding words, fluency issues, deficient syntactic, semantic, and lexical language function, difficulties in maintaining proper sequencing and ordering of written symbols (sequencing, etc.). Furthermore, children with dyslexia may struggle with phonemic awareness, phonological processing, decoding, fluency, vocabulary development, comprehension, and written expression. They may also have difficulty with tasks such as distinguishing right from left (Tzivinikou, 2015, pp. 30-31).

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Before analyzing the symptomatology of Attention Deficit Hyperactivity Disorder (ADHD), it is worthwhile to present the three main types or subcategories that distinguish the disorder, depending on the symptoms exhibited by individuals. Specifically, it mentions the type of ADHD or combined type, where individuals exhibit symptoms of inattention and hyperactivity/impulsivity with equal frequency. The second type is characterized by more intense and frequent symptoms of inattention, in contrast to the third type, where symptoms of hyperactivity and impulsivity seem to dominate. As indicated by the above differentiation, there are three main symptoms that children with ADHD can exhibit. These are "easy distractibility, pronounced impulsivity, and increased motor activity (hyperactivity)" (Karambatzaki, n.d.). Inattention, or easy distractibility, as described in Karambatzaki's article, refers to the inability of these children to focus their attention for extended periods, especially when it is necessary, such as in a classroom setting. It is characteristic that a child with ADHD "rarely can engage in the same activity for more than three minutes" (Roussou, 1988, as cited in Karambatzaki, n.d.).

The author Skaloumbakas (n.d.), in his article about possible symptoms in children with ADHD, organizes and presents a concise list of behavioral expressions related to inattention. In summary, these expressions include: difficulty in focusing attention on play and schoolwork, making careless mistakes due to inattention, difficulty in organizing tasks and often failing to complete assignments, not listening when spoken to directly, frequently losing items necessary for tasks and easily distracted by external stimuli (Skaloumbakas, n.d.). The second major symptom of ADHD is hyperactivity. Children with hyperactivity tend to exhibit intense physical activity and find it challenging to remain seated. They may fidget, tap their hands or feet, or talk excessively. The third and final symptom is impulsivity, which can be described as impatience in waiting for one's turn or completing a question asked to them. Additionally, they may frequently interrupt others or "invade others' personal space" (Babaletsi, n.d.). These symptoms collectively characterize ADHD, and individuals with the disorder may exhibit various combinations and levels of these behaviors. It's important to note that ADHD symptoms can vary among individuals, and a formal diagnosis typically requires a comprehensive evaluation by a qualified healthcare professional.

In addition to the three primary sources of symptoms characterizing this difficulty, experts highlight the existence of secondary or comorbid symptoms that may also emerge. According to Karambatzakis, these "comorbid or secondary symptoms" are briefly referred to as "conduct disorders" (Eisert, 1992, as cited in Karambatzakis, n.d.). Examples of these disorders include lying, deceit, theft, and violent disputes (Bezevegis, n.d., as cited in Karambatzakis, n.d.). Additionally, Karambatzakis mentions secondary symptoms such as "difficulties in school learning," "lack of self-esteem and low self-esteem," as well as "awkwardness in movements" (Karambatzakis, n.d.). Babaletsi, in her article, adds potential secondary symptoms, including the fear of failure, prolonged anxiety, frustration, disappointment, low self-esteem, and insomnia or sleep disturbances. Other possible secondary symptoms may involve learning difficulties, social awkwardness, poor memory, and a sense of unfulfillment (Babaletsi, n.d.). These secondary symptoms are essential to consider when planning educational interventions because ignoring them can significantly impact a student's learning and potentially lead to severe situations, including withdrawal from the educational process. Addressing both primary and secondary symptoms is crucial for effectively supporting students with these difficulties.

3. Comorbidity - epidemiological data

Regarding Attention-Deficit/Hyperactivity Disorder (ADHD), the definition includes the basic symptoms exhibited by individuals, and according to sources, these symptoms are apparent from the early stages of a child's development. Specifically, Bambaletsi defines ADHD as "one of the most common neurodevelopmental disorders characterized by difficulty maintaining focused attention and/or hyperactive-impulsive behavior at a level incompatible with the individual's developmental stage" (Bambaletsi, n.d.). As emphasized by experts, children with ADHD make up 5-7% of the total school population (Skounti, 2006, as cited in Skaloumbakas, n.d.). This percentage means that a significant number of children were marginalized and not given the opportunity to participate in academic life and development in the previous decades. The situation improved significantly with the official recognition of learning disabilities through Law 2817/2000, as well as the establishment of inclusion departments, diagnostic services, and the institution of parallel support (Tzivinikou, 2015, p. 40). It is worth noting that the disorders and their degree of manifestation vary from person to person, but according to experts, it is a disorder that continues to exist even after an individual reaches adulthood. Furthermore, many reports exist regarding the coexistence of ADHD with other neurodevelopmental disorders such as Learning Disorders, Speech Disorders, Coordination Disorders, or Autism Spectrum Disorder (Papadaniil, 2019)

It is noteworthy that Kakouros and Maniadaki (2000) state that, according to international literature, the rates of comorbidity between ADHD and learning disabilities range from 8% to 60% (Kakouros & Maniadaki, 2000). This fact demonstrates that the reference student is a common example of a student with comorbid ADHD and dyslexia, where the symptoms of ADHD often overshadow those of dyslexia, and many times dyslexia is marginalized or considered

secondary. According to the nature of ADHD as a developmental disorder, educators should be aware that it is a treatable but not yet curable condition, and its characteristics can cause problems in the child's personal, social, and academic life (Papadaniil, 2019). Additionally, Skaloumbakas recognizes and classifies ADHD as part of the group of Behavioral Disorders, alongside Autism, Conduct Disorder, and Oppositional Defiant Disorder. From all the above, it becomes evident that in order to design an intervention program, educators should be informed about the nature of these difficulties and the high prevalence of comorbidity.

Referring to the issue of comorbidity, researchers Antoniou and Polychroni (2011) mention the difficulty that specialists face in terms of differential diagnosis because many times there is an "overlap of symptoms of developmental problems" (Antoniou & Polychroni, 2011). In other words, in the attempt to assess and diagnose, those responsible for the diagnostic process encounter extreme difficulties due to both the intra-individual differences presented by each of these disorders and the discovery of the basis of these difficulties. Therefore, experts argue that in cases of comorbidity of two or more disorders, one disorder may "serve as the basis for the manifestation of the other" (Antoniou & Polychroni, 2011).

Another issue that poses a significant obstacle in determining the difficulties faced by a student with comorbid dyslexia and ADHD is whether there really is a neurodevelopmental disorder or if the symptoms of inattention, disorganization, or hyperactivity are simply a consequence of learning difficulties. This dilemma has been expressed by many researchers who have concluded that "due to the high frequency of ADHD symptoms that are found in the population of children with dyslexia, it was considered that ADHD is a secondary symptom of dyslexia, meaning that the child... is likely to have difficulties in concentration and impulsivity as a result of learning difficulties" (Antoniou & Polychroni, 2011).

In the case of the student under discussion, who is the subject of this work, there is a lack of information regarding the age of onset of ADHD symptoms. This information is essential for drawing conclusions about the basis of the symptoms and the source of the difficulties they face. In summary, due to the neurodevelopmental nature of ADHD, it becomes evident from an early age, in contrast to dyslexia, which mainly manifests itself during the school years with the child's exposure to written language.

4. Intervention

In order to mitigate the negative effects of learning difficulties on individuals and to achieve their academic progress, it is essential to explore ways that facilitate learning and knowledge assimilation since these children do not necessarily "lack the ability to learn" but rather "have difficulty learning through conventional methods and learn in a different way" (Tzivinikou, 2015, p.17).

One such way to facilitate learning for children with learning differences is through intervention programs or differentiated instruction. Dendaki attempts to define the concept of differentiation as "adapting teaching to meet diverse needs" (Thomlinson, 2000, as cited in Dendaki, n.d.). Later in the article, the definition of differentiated instruction is presented as "teaching through which we educate different students with various and hierarchical ways, means, processes, environments, in order to respond to the different needs of students coexisting in mixed-ability classes" (Kanakis, 1995, as cited in Matsagouras, 2000). This implies that the needs of the student are ranked hierarchically.

Therefore, the teacher should observe and record the behaviors and deficiencies of the student, classify them according to their severity, and consider how much they hinder the smooth coexistence of the student with other classmates. For the development of an intervention program for a student with comorbidity, the investigation of the causes of the problem is the first step. In this case, where there is a lack of this information, the educator should gather as much information as possible about the student from their family environment, previous teachers, in the case of both the first grades of elementary school and kindergarten if possible, and record them.

The next stage in designing an intervention program is the classification of difficulties by subject area and the detailed recording of the deficient areas, as identified through the teacher's assessment

5. Adaptation of an analytical program

A fundamental stage in intervention planning is the modification of the analytical curriculum for the entire class. Co-teaching children with and without special educational needs, as shown by numerous research studies, demonstrates

unquestionable results of such coexistence on both academic and social-psychological levels. This coexistence requires changes and adaptations in the teaching materials, classroom equipment, and the professional development of educators. The role of the teacher in the pedagogical approach is particularly important. The teacher serves as the connecting link between the child and the school, responsible for creating a pleasant learning process and an atmosphere of acceptance for all students without exception. Specifically, it can be emphasized that "school learning requires the adaptation of the curriculum to the needs of the student, enriching teaching practices with programs for behavior modification, empowerment, and self-esteem" (Papadaniel, 2019).

A crucial need for the student is to adjust their behavior within acceptable frameworks for coexistence in the classroom with their peers and, by extension, in a broader social context that requires adherence to rules. This is made more challenging due to the presence of Attention Deficit Hyperactivity Disorder (ADHD). Researchers have organized and suggested ways to address this disorder. In every case, the emphasis is placed on making the child "feel our acceptance and understanding" (Karampatzaki, n.d.). Furthermore, behavioral intervention is considered of paramount importance. Behavioral intervention programs use techniques that "modify the type of stimuli preceding a response and the type of consequences that follow it" (Papadaniel, 2019). Essentially, these programs present positive behavior that leads to positive results and reinforcement, while also indicating negative behavior that had negative consequences and is therefore punished. To ensure the success of this treatment, it should be applied simultaneously at school, at home, and individually with the child (Papadaniel, 2019).

In practice, the educator should adapt the environment and the curriculum to suit the specific needs of children with ADHD. Additionally, they should use techniques to regain the attention of a child with ADHD and help them organize their time. Overall, they should set small, achievable educational goals each time, with rewards for the student's effort upon completion. According to the results of the research by Willcutt et al. (2007), educators should modify or reduce tasks for students with co-morbidities, provide extra time for tests or timed assignments in the classroom, and arrange for the spatial placement of students with difficulties at the front of the classroom to minimize attention deficits.

The guidelines provided by Tzivinikou for educators working with children with proven ADHD (Attention Deficit Hyperactivity Disorder) are very useful. Important aspects include the simultaneous use of printed and recorded books, providing short and simple instructions with examples, using organizers, visuals, and graphics, employing colored highlighters for keywords, emphasizing self-regulation and attention control strategies, and allowing frequent but short breaks for the student. Other recommendations include using a calm and steady voice for instructions, taking advantage of morning hours for demanding cognitive tasks and tests. Additionally, techniques such as sports and athletic activities can be beneficial. It's also suggested to incorporate relaxation exercises and plan and execute specific activities (Karabatzaki, n.d.)..

Significant importance is placed on having technical equipment in the classroom, such as projection systems, computers, sound systems, interactive whiteboards, and various electronic devices, to facilitate personalized learning. The use of audiovisual materials is encouraged, benefiting all students. In the case of the referenced student, the use of specialized software can aid in maintaining their attention, as the computer environment can capture their interest. Additionally, special applications, such as spell checkers, can assist with their difficulties in written language. Software for text reading can also help them overcome reading challenges.

6. School readiness

The term "school readiness" refers to the phase of preparing a child to acquire knowledge and skills and to develop attitudes that will help them adapt smoothly to the school environment and successfully meet the demands of the curriculum (Porpodas, 2003). According to the same guide, school readiness is divided into two categories: reading readiness and mathematical readiness. Activities aimed at reading readiness include those that aim to develop logical thinking, enrich the child's experiences, stimulate interest in books, promote visual and auditory discrimination, enhance visual-auditory coordination, encourage oral language, and enrich vocabulary (Porpodas, 2003).

Examples of mathematical readiness activities primarily involve activities for the development of thinking skills, such as classification, ordering, sequencing, matching, recognizing similarities and differences, object categorization, and substance comparisons (Porpodas, 2003). All of these activities are recommended because students in the fourth grade of primary school are expected to have developed basic communication skills, a system of written language, and mathematical thinking skills in accordance with the requirements of their age level.

In the book published by the organization to facilitate educators in creating a comprehensive program for developing basic skills, it suggests the creation of exercises based on oral language, psychomotor skills, cognitive abilities, and

emotional organization as individual exercises aimed at school readiness. Specifically, in the area of oral language, exercises related to phonological awareness, distinguishing sounds, and how they can be combined to form words are recommended. There are also exercises to decode a word into its constituent sounds, which may not have been mastered by the reference student in previous grades. Another skill targeted by the program is semantic development, which emphasizes the correct use of vocabulary and its timing.

Finally, oral language includes syntactic development, involving the use of words to form sentences that follow syntactic rules. Therefore, it is quite useful to teach basic text management skills, both for reading and writing, to all students in the class. Teaching can be enriched by using sensory teaching methods and mnemonic techniques, which will benefit the entire student population. Specifically, in the area of working memory, students with dyslexia and specific learning disabilities face challenges (Parke et al., 2015), which the educator should focus on.

Another equally interesting area that educators should focus on is teaching metalinguistic skills to students. Metalinguistic skills include simple and practical advice on how to learn the material prescribed by the curriculum. Adopting such strategies is essential in the education of children with learning difficulties because they help them "master the process of learning on their own, bypass areas of weakness when facing specific academic or other problems that cannot be bridged, and encourage them to become as independent learners as possible" (Panteliadou, n.d.).

In the area of psychomotor skills, there are exercises aimed at familiarizing children with space, time, and their own bodies. Activities in this area involve coordinated movement of hands, eyes, fingers, and other parts of the students' bodies. Such activities include cutting, sewing, sculpting, painting, as well as rhythm recognition and maintenance. Cognitive abilities refer to various mental processes that occur in students' minds during the learning process, which may pose challenges for children with learning difficulties. Activities in this category aim to enhance visual memory, working memory, attention, logical-mathematical thinking, and reasoning.

Finally, emotional organization refers to the psychological development of children, their personality development, and their social development. A targeted activity in emotional organization is self-esteem, which corresponds to the child's self-image. Another such activity could be generating interest in learning. It is considered quite important for a child to have motivation for learning and interest in the learning process in order to achieve the best possible results. Additionally, collaboration, as a readiness activity, is an integral part of the learning process. Activities that enhance students' social relationships, from which they benefit in the short and long term, fall into this category.

7. The ICT's role

Concluding, we have to emphasize the significance of all digital technologies in the field of education and in ADHD intervention, which is highly effective and productive and facilitates and improves assessment, intervention, and educational procedures via mobile devices that bring educational activities everywhere [21-24], various ICTs applications that are the main supporters of education [25-44], and AI, STEM, and ROBOTICS that raise educational procedures to new performance levers [45-52]. Additionally, the development and integration of ICTs with theories and models of metacognition, mindfulness, meditation, and the cultivation of emotional intelligence [53-86], as well as with environmental factors and nutrition, accelerates and improves more than educational practices and results, especially in special education, treating domain and its practices like assessment and intervention.

8. Conclusion

As seen from the above analysis, the nature of dyslexia in combination with the presence of Specific Learning Disabilities (SLD) in the same student is quite common and requires extremely careful handling to improve the student's situation. The primary step in the intervention program planning process is a detailed assessment of the student's abilities and difficulties. Once this process is completed successfully, the educator should prioritize the student's needs according to their level and age range, giving priority to skills that need to be developed or that hinder smooth integration with others in the classroom.

After this initial step, the educator should seek as much assistance as possible from the available technical equipment that can help in their work, and then make changes to the detailed curriculum. The curriculum should necessarily include short and frequent breaks, as well as exercises to enhance school readiness, to allow the student to meet their school obligations. Due to the nature of the coexisting condition, it is very likely that additional time will be needed for learning new concepts, both linguistic and mathematical. The responsible educator should stay informed and

collaborate closely with the local Special Education and Support Center to gather additional information when necessary.

Furthermore, the educator should understand the importance of family involvement in this effort. In the context of inclusive educational policies, children with difficulties should not be viewed as a threat to the educator's work but rather as a challenge. With appropriate help and a genuine passion for the subject matter, educators can significantly change both a student's school experience and their future development in various areas.

Compliance with ethical standards

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