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The Effectiveness of a Therapeutic Program Based on the Combination of the Audiovisual Training Device AVE and the Multi-Sensory Technique VAKT in Treating Dyslexia in Students.

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Abstract:

The current study aimed to find out the effectiveness of pairing between the audiovisual training device AVE and the multi-sensory technique VAKT in treating dyslexia among students. The study sample consisted of 10 cases of dyslexia. To achieve this goal, we followed the semi-experimental approach with a single-group design and applied pre- and post-tests using the Fathi Al-Zayat battery after the students had experienced the therapeutic sessions for the program. We also used the "T" test and the Eta squared coefficient. The results indicated the presence of statistically significant differences between the average scores of the students in the pre-test and post-test of the Fathi Al-Zayat battery at a significance level of 0.05.

Keywords: Dyslexia, Audiovisual Training (AVE), Multi-Sensory Technique (VAKT).

1. Problem Statement:

The literature on special education describes learning disabilities as a hidden and perplexing impairment. Children with these disabilities possess abilities that mask the weaknesses in their performance. They may tell wonderful stories despite being unable to write, succeed in performing very complex skills while failing to follow simple instructions, and appear completely normal and intelligent, with nothing in their appearance suggesting they are different from typical children. However, these children face significant difficulties in learning certain skills in school. Some cannot learn to

read, some are unable to learn to write, and others make repeated mistakes and face real difficulties in learning mathematics (Ali, 2011, p. 20).

Learning disabilities are defined as "a group of different and heterogeneous developmental disorders present in some individuals. These intrinsic disorders (within individuals) are due to a functional impairment in the central nervous system, negatively affecting their ability to receive, process, and express information, causing them difficulties in speech, listening, reading, writing, comprehension, spelling, reasoning, and arithmetic. These difficulties also negatively affect other aspects such as attention, memory, thinking, social skills, and emotional development" (Al-Diyar, 2012, p. 64).

Learning disabilities are divided into developmental learning disabilities and academic learning disabilities. Dyslexia is one of the most common academic learning disabilities in the school environment. It is defined as a difficulty in the ability to read at the natural age, outside the scope of any mental or sensory disability. Children with dyslexia need special programs to learn reading, writing, and spelling skills. As Awad and Al-Sartawi (2011, p. 64) mentioned in their book "Reading and Writing Difficulties," these programs should be specialized and not the traditional educational programs, as they are not always effective with these individuals. When dealing with them, there should be a coordinated language program based on direct teaching of written language, and teaching should progress in a sequential, cumulative manner. There should also be teaching of the rules that govern written language. They suggested that the linguistic content for those with dyslexia should be delivered in a multi-sensory manner, where multi-sensory teaching exploits all pathways to learning simultaneously. These methods include: observation, listening, touch, writing, and speaking. Thus, the multi-sensory technique is one of the preferred techniques used in treating dyslexia. Modern educational theories have emphasized the importance of activating the senses in special education students to retain information in their memory for a longer period. Therefore, it must be said that the information, experiences, and concepts that a student acquires through the use of the senses are the most successful and efficient in learning (Ishaq, 2019, p. 152).

Susanti Prasetyaningrun and Arsi Faradila (2018) pointed out, based on Abdurrahman's (2009) expression, that the advantages of the VAKT method are the educational materials presented with different sensory methods such as vision (sight), auditory (hearing), kinesthetic (movement), and tactile (touch). In addition, practically, the VAKT method is implemented using concrete tools that represent the functions of each sensory method, simple, repetitive, and organized learning, to assist in the child's

learning process. Mahmoud, Ghada Abdel Ghaffar, and Ahmed Amin (2020) summarized the benefits of employing the multi-sensory strategy in rehabilitating individuals with learning disabilities in general in the following four points: reducing student failure and increasing achievement, developing self-concept and self-confidence, using diverse methods that suit all students, making them more flexible in educational situations, and helping to create a good classroom climate.

Among the recent research conducted in the field of electronic devices and their uses in the success of the educational process, we find research that mentioned the so-called audiovisual stimulation device AVE, which works to maximize brain utilization by stimulating the centers responsible for auditory and visual perception. Therefore, we decided to combine both methods to attempt to treat reading learning difficulties in students. Based on what has been presented, we posed the following question: What is the effectiveness of a therapeutic program based on the combination of the audiovisual training device AVE and the multi-sensory technique VAKT in treating dyslexia in students? The following question emerged: Are there statistically significant differences between the average scores of the students in the pre-test and post-test of the Fathi Al-Zayat diagnostic scale for reading learning difficulties at a significance level of 0.05?

2. Research Hypotheses:

- The therapeutic program based on the combination of the audiovisual training device AVE and the multi-sensory technique VAKT is effective in treating dyslexia in students.
- There are statistically significant differences between the average scores of the students in the pre-test and post-test of the Fathi Al-Zayat diagnostic scale for reading difficulties at a significance level of 0.05.

3. Research Importance:

The importance of the research lies in the significance of the results that will be reached. If the program is effective in treating some manifestations of dyslexia in children and proves its efficacy through experimentation, then this method based on the combination of the audiovisual training device AVE and the multi-sensory technique VAKT can be used to treat dyslexia in students and can be generalized.

4. Definition of Research Terms:

1. **Dyslexia**: The dictionary of psychology and education defines dyslexia as the impairment of the ability to read aloud or silently or the inability to understand it, and this impairment is not related to any speech defect (Abdul Karim Hamza, 2008, p. 12).

2. **Audiovisual Training Device (AVE)**: It is a device that gives flashing or light frequency vibrations that stimulate the brain to maintain levels of attention, concentration, and control of mental alertness during athletic performance, or light frequencies that are part of auditory-visual sensory integration that align with the brain's electrical waves for the purpose of modifying them. This device is internationally recognized and licensed by Canadian authorities as a scientific device classified first to reduce cognitive decline, attention deficit hyperactivity disorder (ADHD), emotional disorders, insomnia, and anxiety. It is a well-studied therapeutic technique and a means to achieve goals. Its function is to give specific light flashes through specialized glasses in an independent field, and specific sound pulses using headphones that gently guide the brain to desired states of brain waves. After a short period, the brain begins to echo (or reflect) the stimulation frequency. The device includes five special therapeutic sessions as follows:

    1. **Energize**.
    2. **Meditate**.
    3. **Brain Booster**.
    4. **Sleep**.
    5. **Mood Booster** (Abdul Wahid, 2019, p. 4).

3. **Multi-Sensory Technique (VAKT)**: The multi-sensory strategy is one of the strategies used to overcome learning difficulties. It relies on the student's use of different senses in training processes to solve educational problems they face. It is symbolized in English as VAKT, and each letter of the English letters refers to one of the five senses. The letter V refers to the student's sense of sight (Visual), where the student can learn through visual perception. The letter A refers to the sense of hearing (Auditory) and its use during learning. The letter K refers to movement (Kinesthetic) by using the student's hand to feel and move. The letter T refers to the sense of touch (Tactile) in learning through touch so that the information is fixed in the student's mind (Al-Hasawi, 2018, p. 117).

5. Field Research Procedures:

1.5. Research Methodology and Sample:

We used a quasi-experimental approach with a single-group design with pre- and post-tests. The research sample included 10 children with dyslexia, aged between 8 and 11 years, of both genders (6 males, 4 females).

2.5. Research Tools:

To achieve the research objectives, we used:

- **Fathi Al-Zayat Diagnostic Scale for Reading Difficulties**: This battery represents a set of scales based on the teacher's, father's, or mother's assessment of the frequency of behavioral characteristics specific to individuals with learning disabilities in terms of severity, repetition, and persistence, through direct observation that monitors these behavioral patterns in the classroom, school, or home, related to learning difficulties.

3.5. Characteristics of the Battery:

- The battery has high validity and reliability.
- Its application limits range from the third grade of primary school to the ninth grade (third intermediate - preparatory).
- The battery's standards were established on a population of individuals with learning disabilities.

- The study was applied to samples from Egypt, Bahrain, and Kuwait, and no significant differences or variations were observed in the diagnostic rating standards of the battery's scales.
- The battery's developer indicated the possibility of applying the battery to all Gulf countries, considering that the samples from Bahrain and Kuwait are representative of the rest of the Gulf countries (https://www.mhceg.com/2017/01/blog-post_21.html).

We used the part related to academic learning difficulties, specifically the reading section. The scale consists of 20 items describing behaviors associated with dyslexia, and the rater must choose one of the following alternatives: (Always: 4), (Often: 3), (Sometimes: 2), (Rarely: 1), (Not Applicable: 0).

- **The Program Proposed by the Researchers**: Based on the combination of the multi-sensory technique and the audiovisual training device. The latter was used with the research sample in therapeutic sessions at a rate of 4 sessions per week for a full month, with the audiovisual training device AVE used for 20 minutes per session for each individual.

We also followed the multi-sensory approach during the proposed therapeutic sessions in the program based on the Orton-Gillingham method, which focuses on classification or organization and linguistic structures related to reading, encoding, or decoding and teaching spelling. The activities were based on teaching the child with dyslexia to pronounce letters correctly, then combining them into a word, then a semi-sentence, then a complete sentence, and then moving on to the stage of simultaneous spelling and writing.

We drew these steps from the method developed by Gillingham and Stillman, called the multi-dimensional associative method, which is based on the visual, auditory, and sensory-motor connection of the child as follows:

- Linking the visual symbol with the letter name.
- Linking the visual symbol with the pronunciation or sound of the letter.
- Linking the child's speech organs' sensation with the names and sounds of the letters when hearing themselves or others.

6. Research Implementation Steps:

The study sample was selected, consisting of 10 students with dyslexia, studying in primary school and attending the psychological clinic in Ain Oulman, Setif, accredited by the Algerian Ministry of Health under No.: 41/M.S.S./M.H.M.S./2008. The Fathi Al-Zayat diagnostic scale for reading difficulties was applied to the sample for the pre-test, then the therapeutic program sessions were applied, and then the post-test was conducted using the same battery. Using statistical methods, a set of results was reached.

7. Presentation and Discussion of Study Results:

Table No. 1 shows the results of the pre- and post-tests for the sample.

Measurement	N	$\bar{x}$	S	T	df	Significance at 0.05
Pre-test	10	59.90	8.660	10.079	9	**Significant**
Post-test	10	27.00	3.972			

The results obtained showed that the average score of the pre-test on the Fathi Al-Zayat diagnostic scale for reading difficulties was 59.90 with a standard deviation of 8.660, while the average score of the post-test was 27.00 with a standard deviation of 3.972, with a difference between the averages of 32.90 and a T-value of 10.079, which is significant at the 0.05 level.

Therefore, we accept the hypothesis that there are statistically significant differences between the average scores of the students in the pre-test and post-test of the Fathi Al-Zayat diagnostic scale for reading difficulties at a significance level of 0.05, and thus the hypothesis is confirmed.

Statistics for Paired Samples

Pair	Pre-test	Post-test	N	Mean	Std. Deviation	Std. Error Mean
1	59.90	27.00	10	8.660	2.738	1.256

To find the effect size of the treatment for the study group, the Eta squared coefficient was calculated, which depends on calculating the T-value for the difference between the average scores of the students in the pre-test and post-test.

The value of "T" was calculated and found to be 10.079, with degrees of freedom 9 (n-1), and the value of (d) was calculated to detect the degree of effect as follows:

Eta squared coefficient = {width="0.7708333333333334in" height="0.375in"}
Degrees of freedom (df) = n - 1

Effect size = {width="0.7708333333333334in" height="0.4166666666666667in"}

Degrees of Freedom	T-value	n^2	d-value	Effect Size
9	10.079	0.91	6.35	**Large**

The table shows that the value of n^2 reached 0.91, meaning that 91% of the variance in the dependent variable is due to the training procedures followed with the study group, and the effect size value d reached 6.35.

Referring to Cohen's criteria for the magnitude of the effect size, which includes the following:

- d less than 0.41: small effect size.
- d between 0.41 and 0.70: medium effect size.
- d greater than 0.70: large effect size.

Since the obtained effect size is greater than 0.70, it indicates a large effect size. Therefore, we accept the first hypothesis, which stated: The therapeutic program based on the combination of the audiovisual training device AVE and the multi-sensory technique VAKT is effective in treating dyslexia in students.

Thus, we confirm the effectiveness of the proposed program based on the combination of the audiovisual training device AVE and the multi-sensory technique VAKT in treating dyslexia in students. This is consistent with the results of some studies conducted in this regard, although most of them used each technique separately in treating a specific difficulty, they resulted in this shared effectiveness in treatment. For example, we find the study (Al-Saidi, 2007), which aimed to build a training program based on the multi-sensory method to develop reading among students with reading difficulties in primary school in Kuwait. The results showed statistically significant differences between the experimental and control groups in favor of the experimental group (2020, p. 527). Our study also agrees with what a research team found in a study on the effectiveness of the audiovisual stimulation technique (AVE) in reducing developmental learning difficulties associated with mild autism spectrum disorder (difficulty in auditory and visual perception). The sample consisted of 8 male children

diagnosed by a specialist in child and adolescent psychiatry, studying in the fourth grade of primary school, aged between nine and a half to twelve and a half years. The team in their study followed the experimental approach that deals with a single group, conducting a pre-test at the beginning of the experiment and a post-test at the end of the experiment. The research team relied on the following tools: the Fathi Al-Zayat battery, focusing on the diagnostic scale for visual and auditory perception difficulties, and the audiovisual stimulation technique. In the end, the research team concluded that the audiovisual stimulation technique (AVE) used in the study was effective in reducing developmental learning difficulties associated with autism spectrum disorder, which is consistent with our current study.

Our study's results also agree with what (Al-Harsh, 2009) found in his study, which aimed to investigate the effectiveness of an educational program based on simultaneous multi-sensory techniques in developing reading skills among students with dyslexia in the basic stage in Jordan. The researcher prepared an educational program based on the Orton-Gillingham method, and the results he reached in the end indicated statistically significant differences between the average scores of the experimental and control groups in the reading skills test in favor of the experimental group (Mahmoud, Ghada Abdel Ghaffar, Ahmed Amin).

Conclusion:

Dyslexia is one of the learning difficulties that represents a societal problem. It does not stop at the individual level but extends its effects to society. Reading has become a necessity in our current era, especially with the technological and cognitive development prevailing in the world. Therefore, society must take into account the requirements of this group of children, and experts in this field must strive to find solutions and develop programs to treat this phenomenon. In our research paper, we sought to attempt to develop a program that helps students overcome the reading difficulties they face by attempting to combine two treatment methods: the audiovisual stimulation device (AVE) and the multi-sensory technique (VAKT). In the end, we concluded the effectiveness of this method, and we recommend the use of these two methods in teaching students with dyslexia. We hope that other studies of this kind will be conducted on other types of learning difficulties and on a larger sample.

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