

# **The effect of interior design on the dynamics of movement of children with learning disabilities within the educational space**

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## **Abstract**

The child uses movement from the early stages, and expresses his needs, feelings before the ability to speak. So, movement is a social means by which an individual deals with his world around him just like language; Movement occurs either by the influence of one body on another body, i.e. an external force, or it is inside the body by the influence of muscle strength, and the intended movement is the purposeful movement that leads to the noticeable activity of skeletal muscles.

The research deals with a study of the effect of interior design elements on the dynamic movement of a child with learning difficulties, by identifying the motor skills of children with learning difficulties in early childhood and the factors that affect this movement within the educational environment and the relationship of motor efficiency within the educational environment with the associated characteristics with learning difficulties and the accompanying attention deficit hyperactivity disorder, the researcher has listed some motor activities that can be integrated into the educational spatial environment to help develop the fine and gross motor skills of children with learning difficulties and their development.

Thus, the importance of the interior design of the educational environment for children with learning difficulties appears; To control his behavior, productivity, and learning to gain experience and skills, provide appropriate spaces, and devise a design for the spatial space for children with excessive activity on the basis of reducing the number of external stimuli they have, and providing them with the opportunity to direct this activity, and to benefit from the excessive movements by investing them in a motor activity which benefits the child's body and rid it of random excess activity.

## **Opening words:**

Interior design - movement dynamics - hyperactivity disorder - children with learning disabilities - educational spatial environment

## **Main themes**

Arts

**Search problem:**

- The lack of interior design in the educational spatial environment for children with learning difficulties for design determinants with psychological dimensions that have a positive impact on the development of the abilities of children with learning difficulties and their creative and educational skills.
- The marginalization of the role of interior design in the educational spatial environment for children with learning difficulties in light of modern technological developments, despite the fact that the prevalence of this disorder increases and is manifested in school-age children.

**Search objective:**

Develop a design for the educational spatial environment for children with learning difficulties, taking into account the characteristics of their motor and behavioral skills to develop their abilities and take advantage of the excess movements by investing them in a motor activity that benefits the child's body and saves him from random excess activity by employing the strong and preferred senses of the child in the educational process.

**Search assignments:**

We conclude from the introduction and the objective the importance of setting design determinants during the process of developing an idea for the interior design of the classroom for children with learning difficulties through the following assumptions:

1. Establishing a relationship between some psychological concepts for children with learning difficulties and the interior design of an educational leisure environment.
2. Achieving a design that positively affects the motor cognitive awareness of children with learning difficulties by integrating activities and games.
3. Incorporating motor activities into the design of the educational environment to help develop the fine and gross motor skills of children with learning difficulties.

**In order to achieve the research objectives, the student followed the following approaches:****Descriptive Analytical Approach:**

It includes a theoretical study of the psychology of children with learning difficulties and the dynamics of their movement and its relation to the interior design of the classroom and technology, and its psychological impact through an analytical study of schools and an evaluation of the interior design at the present time.

**Introduction**

The design of the spatial space within the educational spatial environment affects the child's abilities and control over his skills and the dynamics of his movement in the spatial space. Through the correct interior design of the environment of a child with learning difficulties, we can control his behavior and productivity. It also ensures the provision of security and safety aspects in the vacuum in which this group of children lives.

Children with learning difficulties suffer from attention deficit disorder with hyperactivity, which leads to many difficulties in the completion of their educational work, as the hyperactivity disorder is when the child shows a disturbance in the motor balance or walking

or difficulty staying in one place or difficulty in grasping things in the usual way than normal children who are similar to him at the chronological age, the child may sometimes be characterized by aggression and irritability.

Attention Deficit Hyperactivity Disorder is a psychiatric disorder. The type of neurodevelopmental delay begins in early childhood, which makes the child unable to follow, he finds it very difficult to pay attention to the laws, and thus he is in a state of distraction, always with the little things.

People with this condition face difficulty in integrating in school classes and learning from their teachers, and they do not abide by the rules of class. which leads to a deterioration in the school performance of these children because of their inability to focus and not because they Unintelligent, the majority of people think that they are naughty by nature, and these children are usually hyperactive, impulsive, and unintelligent. They can focus on a matter for more than just minutes, which affects three to five percent of students. Schools are in this condition, and males are more affected than females.

The movement contributes to giving children with learning difficulties an opportunity to develop their senses, and their motor and cognitive abilities, and to open a set of phases in which they meet his physiological and mental desire.

## 1. Learning difficulties

Due to the multiplicity and different problems that children with learning difficulties show as a heterogeneous group, until there is an agreement by the majority of those working in the field of special education to classify learning difficulties into two basic groups of learning difficulties; Developmental and academic learning difficulties, where each group includes many special difficulties in learning. Kirk notes that developmental learning difficulties affect the skills and abilities necessary to learn academic subjects, and thus this results in academic learning difficulties. <sup>(13)</sup>

The Kirk and Calvent classification of learning difficulties is one of the most widely used classifications by those working in this field. The field, which divides it into two main types:

### 1-1 Developmental learning difficulties

Developmental learning difficulties mean the difficulties that deal with pre-academic processes related to brain functions represented in the Cognitive issues related to attention, perception, thinking, memory and language, on which academic achievement depends. <sup>(7)</sup>

Developmental learning difficulties are described as difficulties related to the following aspects:

- a. Attention disorders: These include hyperactivity, distraction, and impulsivity.
- b. Language disorders: These include difficulty with oral, receptive or integrative language, and a delay in growth and development. The semantics of the appropriate words, and the construction or use of words in sentences.
- c. Memory disorders: These include deficiencies in auditory, visual, and tactile memory, in addition to short-term memory, or long-term memory.
- d. Disorders of sensory perception and kinesthetic perception: These include a deficiency in one or more of the auditory discrimination processes or Auditory or visual closure, visual modeling, shape perception, and perceptual speed.
- E. Thinking disorders: These include the ability to solve problems, form concepts and other related cognitive functions.

Disorders of social concepts: Represented in the inability to know the behavior of others through physical contact or Verbal communication, and the inability to know distances or dimensions. (17)

### **1-2 Academic learning difficulties**

Academic learning difficulties mean the academic cognitive performance difficulties, which are represented in reading or writing difficulties, or spelling, or written expression, or arithmetic (11). These difficulties are closely related to developmental learning difficulties. Learning to read requires proficiency in the ability to understand and use language, (5) and perceptive skill. Auditory to recognize the sounds of the letters of words (phonemic awareness), and the ability to distinguish and identify letters and words. Therefore, reading, writing, and arithmetic difficulties are a consequence and outcome of developmental learning difficulties. (30)

## **2- Types of motor skills for children with learning disabilities and the extent of their shortcomings:**

### **2-1 Gross motor skills:**

They are the skills that require the movement of the major muscles in the body. These skills require the elements of compatibility and balance. The development of most of these skills begins in childhood, and its development is completed at the end of early childhood.

### **2-2 Fine Motor Skills** (22)

Those motor skills that relate to dealing with small things, such as writing, drawing, decoding and installing small toys, and the like of works that require motor control and accuracy. Often the development of some of the subtle skills begins.

Movement disorder in children with learning disabilities varies from complete immobility, to excessive movement, to repetitive movements and rituals that take an abnormal character and ambiguous special situations.

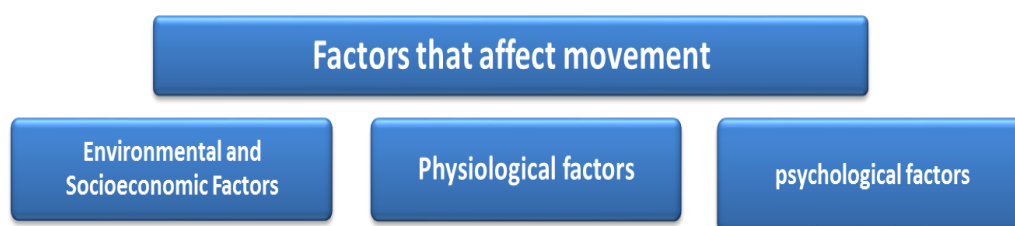
The motor behavior of children with learning disabilities is ritualistic, stereotypical, and complex, and appears to be involuntary, and appears continuously, or intermittently. (8)

## **3- Manifestations of deficiencies in the motor skills of children with learning difficulties:**

A child with learning difficulties has a deficiency and poor flexibility in the large and fine muscles, which leads to a delay in motor skills, as the maturity of the large muscles precedes the small muscles in the hands and feet.

The movement of a child with learning difficulties in the cradle during the first months is low, and the motor development (sitting, crawling and standing) may be delayed for these children, and they also have an imbalance in some motor functions.

## **4- Factors that affect movement:**



**4-1 Environmental and Socioeconomic Factors:**

Movements are also affected by the environmental and social factors that the child experiences.

**4-1-1 Attracting the attention of children with difficulties through environmental stimuli:**

People who suffer from attention-deficit hyperactivity disorder cannot control themselves and cannot attract attention, their interest only through environmental stimuli.

**4-1-2 The space of the educational space enhances the values of social interaction <sup>(36)</sup>**

The overall size and design of the learning space for children with learning disabilities seriously affect their ability to learn. Small, narrow areas provide little space for activities or for children and teachers to move around freely, and space that is too large or too spacious allows students to spread out too much. This can cause a disruption in the learning community, making it difficult for the teacher to facilitate peer-to-peer interactions, lectures, and group discussions.

**Table (1): The minimum space for a semester according to international standards**

The number of students + the teacher	The area of the space in square meters
10	50.13
11	52.45
12	59.24
13	63.80
14	68.36
15	72.91
16	77.47
17	82.03
18	86.58
19	91.14
20	95.70

The dimensions of the classroom are determined according to the expected number of classroom space, taking into account several conditions, which are <sup>(25)</sup>:

Each student is allocated not less than 1.2 m<sup>2</sup> and the classroom density not exceeding and the classroom area not less than 45 m<sup>2</sup> according to Egyptian laws. Thus, the student's share of the classroom size is 3.6 cubic metres.

-Existence of safe corridors between the classrooms to ensure that students do not crash into the seats and taking into account the physiological characteristics of this category of impulsiveness and excessive movement.

The distance between the first seat and the board is not less than 2 m.

The distance between the last seat and the board is not more than 7-9 meters.

The separation height is not less than 3.2 m to ensure adequate lighting and ventilation.

**4-2 Psychological factors:**

The psychological state of children with learning difficulties plays a very important role in the accuracy of performing movements, especially if the movements are sporty, because most of the psychological phenomena that a living organism is exposed to affect the movement.

The effect of psychological aspects of children with learning difficulties on the dynamics of their movement <sup>(18)</sup> :

Children with learning disabilities suffer from ADHD and sleep difficulties at different levels, which can be ranging from feeling drowsy or falling asleep for a long time or falling asleep in a deep sleep complete stillness without fluctuating (this is also classified as a type of insomnia associated with ADHD). A child who does not get enough sleep may begin to suffer from behavioral problems such as Hyperactivity, aggressiveness, and short attention span. Mood swings can also be linked to a lack of sleep. Exhausted children are irritable, or they may suffer from anxiety or tension.

**5- Classification of Attention Deficit Hyperactivity Disorder in children into categories, three sub-types emerge, namely** <sup>(16)</sup>:

- The one who suffers from a lack of attention.
- Which is dominated by excessive motor activity and impulsivity.
- The complex in which the lack of attention, excessive motor activity, and impulsivity combined at the same time.

**5-1 The type dominated by hyperkinetic activity and impulsivity (Type I) includes the following symptoms:**

- Anxiety and restlessness in the seats.

Constant movement, constantly moving everywhere, touching anything or playing with everything that falls on the hands of the patient.

- Difficulty sitting still while eating, at school and getting ready for bed.
- Difficulty performing tasks or activities calmly.

**5-2 The type that predominantly lacks attention (the second type) includes the following symptoms:**

Easily distracted, not paying attention to details, forgetting, and constantly moving from one activity to another.

Getting bored of doing one activity after just a few minutes, unless that activity is fun.

- Difficulty focusing attention on organizing and completing a job or learning something new.
- Does not listen when you are talking to him. Daydreams and becomes easily confused and moves slowly.
- Difficulty following instructions.

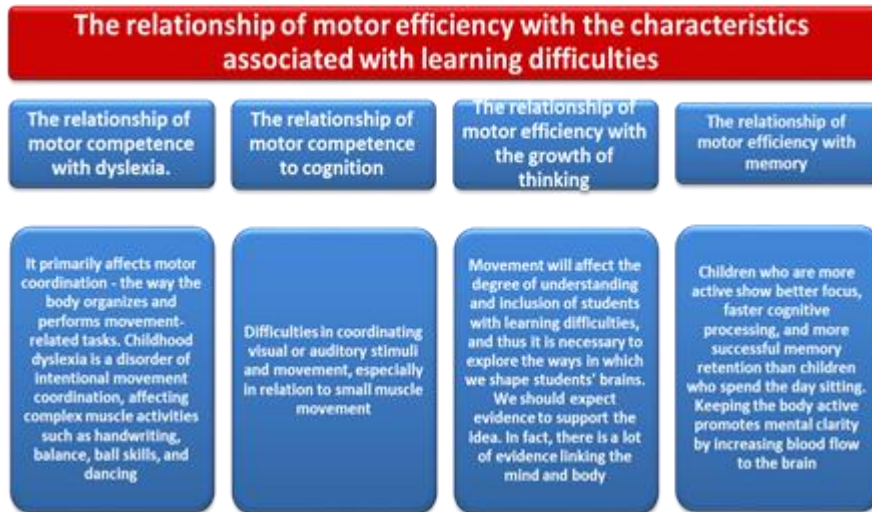
The following symptoms also refer mainly to impulsivity: <sup>(18)</sup>

The inability to be impatient.

- Difficulty waiting for them to get the things they want or waiting for their turn to play.

One of the studies conducted in 2009 proved that children who suffer from Attention Deficit Hyperactivity Disorder move more than the limit because this helps them to increase the period of concentration to complete the tasks assigned to them.

٦- علاقة الكفاءة الحركية بالخصائص المرتبطة بصعوبات التعلم



**7- Integrating motor activities into the design of the educational environment to help develop fine and gross motor skills for children with learning difficulties (12):**

Some studies indicate that students with learning disabilities enhance academic learning through games and activities, and many researchers ignore motor activities within the educational spatial environment, assuming that it has nothing to do with intellectual development, they were wrong. Many play-oriented movements have the ability to improve cognition (23) by:

**7.1 Treatment of movement dyslexia:**

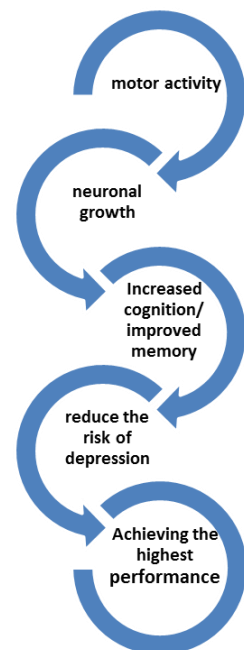
A study by Reynolds and colleagues (2003) found that children with dyslexia were helped by movement. Those in the intervention group showed a significant improvement in dexterity, reading, verbal fluency and semantic fluency.

**7-2 Treatment of depression by movement (23):**

Motor activity increases the growth of new neurons. Additionally, studies link this increase in neurogenesis to increased cognition improved memory, and a reduced risk of depression (28).

Develop a design for the educational spatial environment that maintains the motor activity of children with learning difficulties, to maintain their high energy levels and provide their brains with the oxygen-rich blood needed to achieve the highest performance. Purposefully integrating motor activities into learning, raising blood pressure and epinephrine levels among drowsy children, reducing anxiety among bored children, and enhancing content. Use the body of the child with learning disabilities in motion to measure objects around the room.

**A diagram showing the relationship between motor activity and performance**



**7-3 Optical-motor synergy support:**

It is to support the ability to perform activities that require the integration of visual and motor skills for the purpose of learning, as one of the problems of this category is the lack of skills that require visual motor coordination, such as the difficulty of performing tasks that require

coordination between the eye and the hand and the problems of excessive movement and inconsistent with the requirements of the situation or task that the child is performing. Thus, the space for children with hyperactivity must be designed on the basis of reducing the number of external stimuli they have, and providing them with the opportunity to direct this activity.

Carrying out synergistic activities between eye movement and hand in dealing with objects. The motor exercises



for children with special needs aim to help them acquire skills that facilitate the learning process.

From here it becomes clear to us the importance of benefiting from the excess movements by investing them in a motor activity that benefits the child's body and rids him of random excessive activity, anxiety, speed and a lot of movement and impulsivity, while improving the muscular abilities that greatly help in controlling the balance of the body, and developing deficiencies in the visual kinetic synergy processes.

#### **7-4 Perceptual support <sup>(13)</sup>:**

It is the interpretation or translation of sensory stimuli such as (touch, knowledge of the position of body parts in space, balance, visual tracking).

And support the gross and fine motor skills of children with learning difficulties. By employing the strong and preferred senses of children with learning difficulties.

#### **7-5 Space design to support kinesthetic synergy and reduce hyperactivity <sup>(12)</sup>:**

Movement exercises have been developed to develop visual motor synergy and reduce hyperactivity by occupational specialists, physiotherapists, and cognitive scientists such as Kephart, Barch, Getman, and Frostig. The development of exercises depends on the degree of the child's disability and on the type of movement, and the degree of injury in cognition whose presence was verified by tests, as well as explained by the child's behavior.

These specialists have developed training procedures to alleviate the difficulties of motor-visual synergy in fine motor skills, as well as in activities that require motor perception skills to correct motor perceptual difficulties. For this purpose, they used designs for floors and furniture units equipped with perceptual and motor activities .

Many of these activities have been incorporated into the program developed by Kephart et al, which includes activities such as:

- Markers on the floor to train the child in directions, the process of standing and balance.
- Incorporating movements and rhythms in the process of designing space through the prominent and recessed texture of surfaces and colors to influence his weaknesses and enrich his motor skills.



Floor designs and furniture units supplied with kinesthetic activities



Activities based on kinetic education and the active participation of children with learning difficulties in the space and integrating with the educational environment, stemming from the needs and areas of strength.



**7-6 Activities based on kinetic education and the active participation of children with learning difficulties in the space and integrating with the educational environment, stemming from their needs and areas of strength, through:**

A - Using balance games to help the child determine the center of gravity and help him achieve balance for the body, physical coordination and proper balance, and performing bodily rhythmic movements that benefit in the process of physical synergy using tactile, visual, and auditory rhythms.

b- Providing opportunities for self-motivation; a child with learning difficulties needs motor saturation according to the areas of movement emanating from the brain, such as the typical repetitive movements of parts of the body, or the whole body.

### **8- Statistical methods used in analyzing the questionnaire:**

To perform the statistical analysis, the statistical group (SPSS) was used, and the following methods were used:

-Pearson correlation coefficient to calculate the internal consistency coefficient for the questionnaire statements.

K2 test. Averages, frequencies, and percentage .

-Cronbach's alpha coefficient to find the reliability coefficient of the questionnaire.

### **Verifying the validity of the questionnaire and the reliability of the research tools:**

**First: A survey of the opinions of the specialists in the field of furniture and faculty members "interior design and furniture:"**

The results of the internal consistency validity of the questionnaire: (15 specialists and a faculty member).

To verify the internal consistency of the questionnaire, to calculate the correlation coefficient between the scores of each phrase and the total scores of the questionnaire, the researcher used the Pearson correlation coefficient.

Questionnaire reliability results:

The results came as shown in Table (5), where the researcher verified the reliability of the questionnaire through the Cronbach's alpha coefficient method .

	Number of phrases	Cronbach's alpha coefficient
<b>Questionnaire for specialists</b>	<b>7</b>	<b>0.89</b>

Table No. (5): For the reliability of the questionnaire, it shows the results of the Cronbach's alpha test.

Where it reached (0.89), which reassures the researcher of the results of applying the questionnaire, as the percentage of stability is high.

**Second: A survey of parents' opinions**

The results of the validity of the internal consistency of the questionnaire. (20 parents).

To verify the internal consistency of the questionnaire, to calculate the correlation coefficient between the scores of each phrase and the total scores of the questionnaire, The researcher used the Pearson correlation coefficient.

Questionnaire reliability results:

Where the researcher verified the reliability of the questionnaire through the Alpha Cronbach coefficient method.

	Number of phrases	Cronbach's alpha coefficient
<b>Parents Survey</b>	<b>4</b>	<b>0.91</b>

Table No. (7): For the reliability of the questionnaire, it shows the results of the Cronbach's alpha test.

Where it reached (0.91), which reassures the researcher of the results of applying the questionnaire, as the percentage of stability is high.

**Second: Parents' evaluation (20 parents) of the proposed designs for furniture pieces:**

The necessity of reaching an interior design that matches the dynamics of movement of children with learning difficulties within the educational spatial environment and their physiological characteristics, and finding non-traditional solutions that achieve student comfort and efficiency. Functional and as a creative source serving the field of interior design and furniture.” Where the agreement transactions ranged between (93.33% - 100%), and the weighted average ranged between (2.80 - 3), which indicates the agreement of the opinions of specialists and faculty members about the phrases, as they all fell at the level of (agree) based on the triple gradation of weighted weight, and the evaluations of quality coefficients were high for all phrases.

## 9- Conclusion:

- From the research and its results and the consensus of the opinions of specialists and scholars on (the necessity of arriving at an interior design commensurate with the dynamics of movement of children with learning difficulties within the educational spatial environment and their physiological characteristics, and finding non-traditional solutions that achieve comfort for the student, functional competence, and as a creative resource serving the field of interior design and furniture).
- And the feasibility of finding a design style that is functionally and aesthetically appropriate in the educational environment for people with learning difficulties and to reach the highest standards of values benefit of the child.

### - **Among the most important findings of the research:**

Develop a design for the educational spatial environment for children with learning difficulties, taking into account the characteristics of their motor and behavioral skills to develop their abilities and take advantage of the excessive movements by investing in a motor activity that benefits the child's body and saves him from random excess activity through the employment of strong and preferred senses of the child in the educational process. Through the practice of motor activities; Where she works on:

- **Increase attention spans.**
- **Directing the behavior towards the performance of the task.**
- **Increase the level of physical performance.**
- **Control of inappropriate behaviors associated with learning difficulties (aggression, self-agitation, hyperactivity, anxiety).**
- **Activate the heart and blood vessels.**
- **Achieving enjoyment, and recreation for children with learning difficulties.**
- **Increase the level of correct response.**

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