Designing Learning Environment for School Children Having Attention-Deficit/Hyperactivity Disorder

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Abstract: The goal of treating attention-deficit/hyperactivity disorder is to apply knowledge, not to acquire new skills. The prevalence of Attention-Deficit/Hyperactivity Disorder (ADHD) in children is rising daily around the world for a variety of reasons that have a direct impact on their mental health and hyperactive behaviour. The classroom atmosphere in the current ADHD schools is poorly maintained, which makes it difficult for the kids to focus on the specific task being done in class. As a result, the students have a variety of difficulties in their academic lives. This method aids in the pupils' mental stability as well as their academic success. This paper aims to suggest the best design strategies for the classroom environment in a school space for children with Attention-Deficit/Hyperactivity Disorder.
***Keywords*:** classroom environment, institutional space, mental health, overactive behaviour, design strategies, attention-deficit/hyperactivity disorder

1. Introduction

Every soul has a unique childhood story that stands alone. Everybody's formative years are enjoyable and unforgettable. This is the period of life that determines our future since it is the first time we can enjoy ourselves whatever we like. Some youngsters have a variety of issues during their formative years as a result of their parents' and their own neglect in taking specific safeguards. It was known in the 1980s that there is a handicap that impacts children's mental health and causes hyperactive behaviour. Hyperkinetic impulse disorder was another name for it (Holland, 2018). One of the most prevalent neuro-developmental diseases in children is ADHD. It is used to characterise kids with four different types of issues: hyperactivity (overactive conduct), impulsivity, difficulties focusing, and social issues. (Bornill, 2020). ADHD may make other mental health conditions more likely (Hinshaw & Ellison, 2017).

The incidence rate of ADHD in children under the age of 18 worldwide has been found to be 7.2% based on a systematic review and meta-analysis of 175 studies. Children with ADHD are primarily prevalent in Asia, Africa, Australia, Europe, and the US. It is a disorder that is frequently undetectable and a hidden impairment. ADHD symptoms can appear in youngsters between the ages of three and twelve, persist into adulthood, and get worse if left untreated. Its signs and symptoms might range from minor to severe. Genetics, the environment, and issues with the central nervous system are the causes of ADHD in children. Every part of the body can be impacted by ADHD (Chadd, 2020).

According to Kinman (2016), boys are 2-3 times more likely than girls to receive an ADHD diagnosis. Healthcare practitioners distinguish between three varieties of ADHD: combination inattentive and hyperactive-impulsive type, mainly inattentive, and mostly hyperactive and impulsive (Hopkins, 2021). Children with this disease frequently find it difficult to integrate with the other students in their school because of their poor self-esteem and other issues. Therefore, it is necessary to live in an atmosphere that is distinct from ordinary schools and to use particular child development techniques together with alternative teaching approaches. Because they get sidetracked easily, these kids are greatly impacted by the environment of the institutional setting. In order to improve students' focus in the classroom, the institutional space should be constructed to reduce distractions.

2. Symptoms and Causes of Attention-Deficit/Hyperactivity Disorder (ADHD)

2.1 Causes of Attention-Deficit/Hyperactivity Disorder

The Following are the main causes of Attention-Deficit/Hyperactivity Disorder:

- Genes and Heredity - Blood relatives, i.e., parents or siblings with ADHD or another disorder related to mental health.

- Environmental - Exposure to environmental toxins such as lead, found mainly in paints and pipes
- Prenatal Exposures - Maternal drug use, alcohol use, or smoking during pregnancy.
- Premature birth

2.2 Symptoms / Complications faced by children with ADHD – Inattention

The following are the main symptoms faced by children with Attention-Deficit/Hyperactivity Disorder:

- Unable to pay attention or make careless mistakes in class.
- Have trouble concentrating on a particular assigned task.
- They are not listening to the teacher.
- Have trouble in organizing tasks and activities according to the time.
- Tasks that require mental effort are mostly avoided or disliked by them.
- Lose items needed for tasks or activities.
- Can be easily distracted.
- Forget to do some daily activities.

2.3 Symptoms/Complications faced by children with ADHD - Hyperactivity/ impulsivity

Following are the main symptoms and complications of Attention-Deficit/Hyperactivity Disorder having hyperactivity impulsivity:

- Cannot stay in the same position for a long time.
- Have difficulty while playing or performing activities quietly.
- Talk too much.
- Always keep interrupting.
- Lack of patience.
- Continuously keep on tapping their hands or feet.

3. Effect of Attention-Deficit/Hyperactivity Disorder on the Development of Students at School

Because education imparts discipline, morals, values, and other things, it is a vital aspect of life. Children with ADHD experience a range of difficulties in the classroom, such as difficulty focusing on a specific topic, difficulty paying attention, even when addressed directly, give off the impression that they are not listening, struggle to plan their schedule, and avoid or detest assignments that call for concentrated mental activity, like homework. Items required for tasks or activities are lost. These children are prone to distractions. Forget to do a few everyday tasks. Having trouble remaining sitting in class or in other settings, have trouble playing quietly or carrying out an activity, speak excessively, Never stop interjecting, Insufficient endurance, Continue tapping their feet or fists without stopping. Students typically display these symptoms both at home and at school, which makes learning tasks and social relationships extremely challenging. Verbal memory problems cause impulsive or aggressive behaviour in children with ADHD. Some persons who are not aware that they have ADHD mistakenly believe that they are mischievous while in fact they have the illness. Their annoyance or disruption is not their own doing; rather, it is a result of ADHD.

4. Need for Special Design Considerations in These Schools

The classroom serves as a constant learning environment and a place to practice negotiating and facing difficulties that come up in everyday life. Children with ADHD behave differently in school, at play, and in social situations depending on their environment. In order to improve focus on a specific task, treating ADHD requires avoiding stimulants and distractions. According to Ghazali, the learning environment and its components have been crucial in enhancing classroom instruction and have a big impact on students' learning. Students who are energetic can be drawn into the learning process by the learning environment. Some of the challenges that children with ADHD frequently experience have a direct impact on their mental health. Parents, schools, or other careers must take a variety of precautions to regulate the disorder, as there is no known treatment. Therefore, creating an environment that helps manage a child's symptoms of ADHD is necessary to aid in their recovery (Ghazali, 2018).

5. Impact of Classroom Environment on Children

Our surroundings, which include everything from the wall colour to the arrangement of the furniture, greatly affect our mental health. The way that the structure, colour, furniture, and other design components affect the occupant's mood is the

main focus of both Indian ideas like Vastu and Chinese theories like Feng Shui. Any space's interior design has a significant influence on a person's mental health, and even during therapy sessions, it can help the patient heal. As in primary schools for typical children, the environment of the schools varies with the age, behaviour, and needs of the students/users. For the purpose of making the youngsters feel comfortable and content, it is often recommended to utilize vibrant colours. Well-designed classrooms stimulate and support children's natural interaction and help them acquire a variety of abilities, such as social behaviour and language. Beyond just being aesthetically pleasing, lighting is a crucial component. In addition to enhancing the interior space's atmosphere, relaxing lighting can help people focus and stay away from distractions. Acoustics are crucial for this set of kids because quieter classrooms can boost student behaviour, lower teacher stress levels, and increase academic success because there are less distractions. In addition to helping kids move around and fit in, furniture also plays a big role in encouraging kids to have proper posture. Students' hyperactivity can be managed if the furniture is comfy for the users. Engaging in physical activity improves social behaviour, learning, mental health, and the development of cognitive skills in addition to being intellectually interesting.

6. Design Considerations for Attention-Deficit/Hyperactivity Disorder

When creating an institutional setting for kids with ADHD, there are six environmental considerations that need to be made. These elements include the environment's capacity for flexibility and adaptation, its lack of threat or distraction, its predictability, the size of the structure, its safety, and its controllability (Clare L. Vogel, 2008). These are the elements that affect the design's layout and zoning; other issues, such acoustics, colour scheme, lighting, smell, accessibility, and organization, need to be taken into account for the inside environment. Simple architecture is best for spaces intended for individuals with ADHD, as complicated architecture can exacerbate tension and anxiety in those who have it (Henry, 2011). The most effective architectural approach is one of simplicity. Its simple forms, straightforward predictability/wayfinding, lack of distraction, etc. make it the hallmark of minimization, refinement, and editing of design. The strategy that best fits the bill and satisfies all the previously mentioned requirements is simple design in order to produce this kind of environment.

6.1 Selection of Colours

The choice of colour is significant and may influence how children with ADHD behave. Designers and architects should stay away from bold and jarring hues like neon, white, and red. Because they raise blood pressure, induce stress, anxiety, depression, and anger, these colours are not recommended for people with ADHD. Warm, soothing, and neutral hues work best in learning settings that are conducive to ADHD. Children with ADHD struggle in classrooms when there is an excessive amount of stimuli on the walls, doors, and desks. If two or more objects are in their line of sight, they become disoriented and find it difficult to focus. Consequently, the learning environment is crucial, and it must be simplified with the use of calming, natural colours to minimize the amount of stimulus.

6.2 Flexibility in Seating

Placing kids with ADHD at their desks is not sufficient; this is an important aspect of their education. Since it is the most structured and reliable alternative, students with ADHD typically prefer the traditional row sitting configuration in a classroom. Every student has to be within arm's reach of their teacher and should be seated close to them. The difficulties that an ADHD student faces may also be lessened by being close to the teacher. As is well known, different furniture types affect users in different ways. For every student, the majority of schools supply a set of wooden, steel, or plastic seats, desks, or tables (Figure 1). Students find it physically uncomfortable to sit on those rigid surfaces, which cause them to become disoriented and lose focus. Increasing positive classroom behaviours in children with sensory processing disorders, such as autism, ADHD, SMD, etc., can be accomplished through the use of dynamic seating alternatives (Alqahtani).

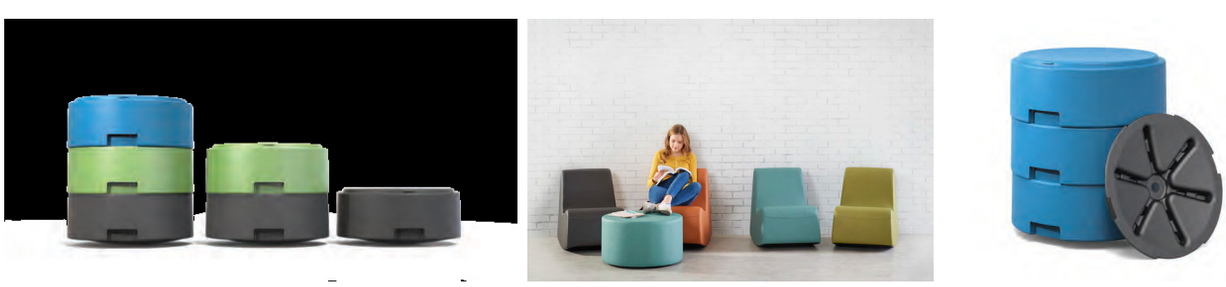

Figure 1. Dynamic seating options for children

6.3 Overall Layout

In order to minimize stimulation and distraction for users, architects typically favor simple architecture and simple geography for their sensory designs. In general, all architects prioritize ease of navigation in their designs. The primary guideline for special education design is utility, which allows the room arrangement to regulate overstimulation and distraction. Curved corridors are more enjoyable for those with sensory impairments, hence short, curved hallways should be used instead of long ones (Beaver). Giving students with ADHD and ASD their own space is crucial because there are times when they need it.

6.4 Acoustics

One of the most crucial aspects of building a school for kids with ADHD is acoustics. The way a space is designed, its form, and its finishes all affect how comfortable it sounds. Proper acoustics in the classroom are beneficial to all students, ADHD or not. Since they help kids with speech, attention, hypersensitivity, and auditory processing issues, acoustics are crucial. The primary sources of distraction for both typical and sensory-disabled children are background noise and reverberation. Both within and outside the building can provide background noise, including sounds from machinery, children playing and traffic. No noise level should be higher than 35 dBA. When background noise is present, hearing becomes difficult because the high pitch of the noise distracts the ears. The continuation of sound after the sound source has stopped is known as reverberation. It comes from a lot of reflected waves, which the brain interprets as a continuous sound.

An accumulation of noise and a direct impact on speech intelligibility can result from excessive reverberation. Children's learning may be adversely affected by this distraction. Therefore, there are many creative design considerations and strategies that can limit background noise and reverberations in order to guarantee complete acoustic comfort. Absorbent materials and those with a high NRC (Noise Reduction Coefficient) rating, such as polyurethane foam, plywood, gypsum wallboard, carpet with a foam pad, etc., should be used for the walls, ceiling, and floor in order to reduce reverberation in any given space (Figure 2). Since sealed insulation window units are good at cutting down on outside noise, they can be employed.

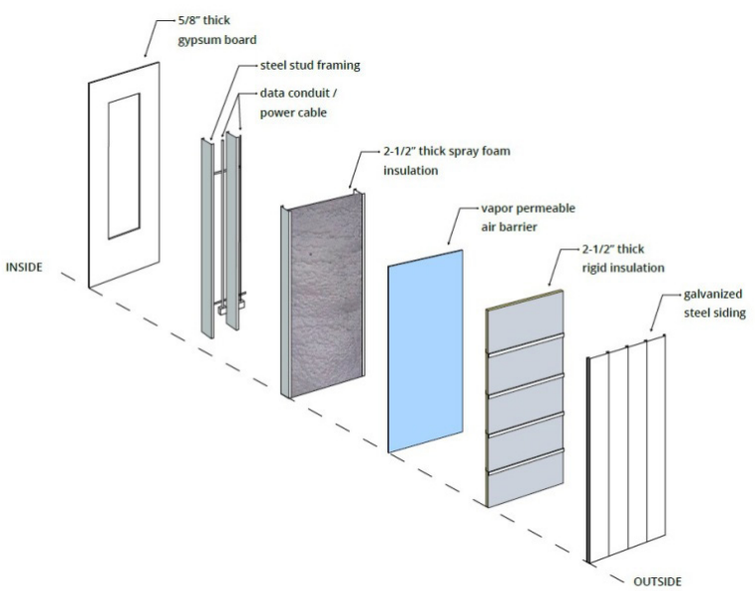

Figure 2. Insulated window units for the classroom

6.5 Interior Lighting

The most important element of any design is the lighting. Any room can be divided into functional zones based on the lighting design by using different lighting levels. Zones of activity, relaxation, formality, and informality can all be created by lighting. For those with ADHD, lighting is very crucial since they have a great sensitivity to bright light, a condition known as photophobia. The interior space designer of an institutional structure housing children with ADHD needs to pay close attention to the reflections, glare, and shadow patterns. If artificial lighting is used in an ADHD-affected space, it should be configured with dimming controls or an indirect light source to provide a luminous interior and an environment that is not distracting (Figure 3).

The ideal way to create artificial lighting is to conceal the light source when creating pelmet lighting. Because natural lighting can be distracting, people with ADHD don't usually prefer it. Sunlight glare and solar gain, however, should be avoided as they may cause issues for those with ADHD. To prevent youngsters from being distracted by their surroundings, windows should ideally be kept at a higher level of the room or with shades placed between the glasses. A lack of natural light can make children with ADHD depressed, and different coloured lighting can have an impact on moods. Kids diagnosed with autism and ADHD are particularly vulnerable to mood swings brought on by changes in illumination. Calm hues such as blue and yellow in lights can aid in a child's relaxation and foster creativity. Conversely, bright lights that flicker, buzz, or change colour might confuse or even harm them.

Figure 3. Higher-level window interior lighting

6.6 Recreation

Children should spend more time outside during the summer months playing in parks, going on hikes through forests, or exploring the wilds. Spending time in nature improves attention spans and reduces stress and anxiety in both adults and children (Robbins, 2020). There are other ways to manage their symptoms, such as playgrounds and sensory gardens. By utilizing a variety of plants and materials, a sensory garden can enhance vision, touch, taste, and auditory perception. These sensory gardens provide a secure and encouraging setting for kids with ADHD to develop their senses. Children can explore their senses without becoming overwhelmed by them thanks to the sensory garden.

7. Conclusions

This paper presents a comprehensive study the best design strategies for the classroom environment of the institutional space for children with Attention-Deficit/Hyperactivity Disorder. ADHD students frequently struggle to focus on their given work, adjust to the regimented educational environment, and identify what is important. They are readily sidetracked by other pupils or by goings-on around the classroom. The aim of the study is to investigate the best practices for educational space furnishings and other elements that help contain students with ADHD and help them overcome learning challenges. This essay examines the practical, technological, and aesthetic needs along with contemporary furniture catalogues and design procedures for contemporary classrooms and environments. There are certain inexpensive adjustments that can help students in the physical and educational environment of the classroom. Furthermore, a number of visual distractions, such as wall murals and decorative pieces, impede and divert students from their learning objectives. This makes it evident that the physical layout of the classroom needs to be redesigned to take into account the various psychological and physiological needs of the students. Finally, we can state that a clear plan is desperately needed to improve both the mentality of children and the effectiveness of school performance. This approach must help create a unique learning environment that enhances the behaviour of the enclosed pupils.

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