CLASSROOM LIGHT AND IT'S IMPACT ON STUDENT CONCENTRATION WITHIN THE AUTISM SPECTURM DISORDERS

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Abstract

Autism, or autism spectrum disorder (ASD), refers to a broad range of conditions characterized by challenges with social skills, repetitive behaviors, speech and nonverbal communication. (Autism speaks, 2013). According to Autism Resource Centre, 345,600 people are estimated to be living with autism in Pakistan. However, the condition is severely underreported due to lack of facilities and awareness; hence the actual figure is thought to be considerably high. 1 in 88 children suffer from autism. (Autism Resource Centre, Pakistan, 2019)

Despite the overwhelming incidence of autism, it is ignored by the architectural community in Pakistan and excluded from building codes and guidelines. With such increasing incidence of autism in Pakistan, majority of the population and even families with autistic children are unaware of what it is. Brown of the International Code Council stated: *"I know of no building or accessibility code that incorporates requirements specifically to address children with autism."* (Brown, 2003, p. 143)

This research studies classroom lighting of elementary classroom meant for autistic children and their impact on concentration at a charted middle school located in Abbottabad, Pakistan. In recent years, research on autism has been done all over the globe, I plan to seek guidance from the previous research done on ASD friendly classrooms and move a step forward in my research. Most importantly in a country like Pakistan where autism still remains an unknown conception.

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Chapter 1: Introduction and Literature Review

Introduction:

Can classroom lighting design influence students' performance and concentration in the classroom within the autism spectrum diagnosis? Branigan-Pipe (2016) found that "being sensory sensitive and unable to integrate or communicate fully with others means that those with ASD can find the classroom a disorienting and even frightening place." For school children this is especially damaging. Any unwanted distraction can impact a child's ability to learn. The background and surrounding environment that most of us are able to ignore or cope with will actually act as a barrier between the child and teacher, further hampering the child's development. This research will focus on how and to what extent the child's classroom lighting play a significant role on their concentration. In a recent survey conducted by Tech Learning (2015), "92% of teachers believe classroom design has an impact on student learning." These teachers believe there is a direct link between classroom design and student performance and engagement. This survey also revealed that 79% of respondents believe it is important for student attendance. Ninety-nine percent of the teachers surveyed, which is a staggering number, believe that classroom design is important for creating a good learning environment. These same teachers also believe that the classroom environment can affect a child's academics and behaviors over a single year's progress by as much 25%. This statistic alone gives us reason for pause and reflection. If a single school environment or classroom can change a student's performance and concentration by as much as 25%, imagine what this could do for student engagement, student morale, and the stability we can bring to their learning just by being aware of classroom design. Recent research has begun to focus on how "space design impacts student

engagement and behaviors," with one study showing that "creative spaces featuring flexibility, a unique atmosphere, and inspiring aesthetics led to more engagement and less resulting behavioral needs" (Jankowska, & Atlay, 2007). As of recent, students have begun to have access to stand-up and flexible desks, bungee or wiggle chairs, integration of soft surfaces, private nooks, and sensory mindfulness, all contributing to higher engagement

Before further research on lighting it is important to first understand characteristics of autism and sensory difficulties, since light is a part of sensory design

Literature Review:

Characteristic of Autism Spectrum Disorders (ASD):

It is vital to understand the characteristics of an autistic child before conducting a research regarding their behavior. An individual with autism often affects a child's ability to communicate, understand language, play and relate to others (Boyce, Hunter, & Howlett, 2003). Common characteristics include poor eye contact, lack of joint attention, pedantic or odd speech patterns, lack of social problem-solving ability, lack of empathy, difficulties interpreting body language, restricted repetitive patterns of behavior, interests, and activities (Boyce et al., 2003). Children with ASD have difficulties in developing their language skills, hearing and communicating. Therefore, they express themselves with exhibit unconventional behaviors such as being aggressive or injuring themselves. Children diagnosed with autism have common symptoms and characteristics that affect school participation, including sensory processing difficulties, stereotyped behaviors, communication and language difficulties, low muscle tone, and sleep disturbances (Kinnealey, Pfeiffer, Miller, Roan, Shoener, Ellner, 2012). They may

have difficulty engaging in typical occupations of childhood, such as activities of daily living, social participation, play, and education (Phillips, Minjarez, Mercier, Feinstein, & Hardan, 2011).

Sensory Architecture, Processing and Design:

The term sensory processing refers to the method the nervous system in which the brain has trouble receiving and responding to information that comes in through the senses (Henshall, 2008; Phillips et al., 2011). Henshall added the sensory systems act as a route via which the brain receives information. The brain must then derive meaning from this information to develop and implement a response. Henshall explained that autistic individuals may actively seek out or avoid sensory information, for example by putting their hands over their ears to block out sounds. In addition, children may have difficulty engaging with others because of atypical sensory responses. Moreover, Phillips et al. (2011) also mentioned that behavioral and emotional problems have been associated with sensory processing differences and sensory symptoms have been significantly related to stereotyped interests and repetitive behaviors in ASD.

Architecture is the science of environment creation, the manipulation of spatial organizations to fit the needs of its users (Malik, 2005). Architects commonly use the sensory environment - i.e. the auditory, visual, tactile and air quality characteristics of space- to convey meaning and messages to users hence facilitating functions and activities within a space, particularly in the case of special needs users. (Malik, 2005).

Autistic behavior can be influenced favorably by altering the sensory environment, i.e. the stimulatory input resulting from the physical architectural surroundings of light, color,

texture, ventilation, sense of closure, orientation, acoustics etc. (Mostafa, 2003, Mostafa, 2008). Perhaps by altering this sensory input in a manner designed to accommodate specific autistic needs, behavior may be improved, or at least a more conducive environment created, for more efficient skill development. (Mostafa, 2016).

Research done by Paron Wildes (2005) explained that when designing children's environments, it is important to consider the needs of children with neurological disorders and to think through space as an experience. He explored with individuals suffering from problems with sensory integration or sensory defensiveness and revealed that autistic does not typically fall in the "normal" or "average" range of sensory values that are experienced. Therefore, an architect should consider designing spaces according to their sensory quality. This means grouping spaces into 'high-stimulus' and 'low-stimulus' areas with transition zones aiding the shift from one zone to the next (Society, 2015). It also mentioned that design spaces in a logical order based on the use to support routine and predictability. The use of one-way circulation so people can move between activities as seamlessly as possible with minimal distraction is important to autism.

Lighting for autistic children:

Light is the sensory system that one uses to see their surroundings, such as nature, objects, buildings and people. Gaines (2016) suggests that, Light is one of the most important components of design and one of the factors that greatly influence the perception of a space. This is because lighting allows various elements in an environment to be seen. All forms of light in an environment can be categorized as either natural or artificial light. Environments that only have artificial illumination and lack natural light increase stress and discomfort. Autistic individuals