



Autism friendly classroom to stimulate learning setting

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Sensory integration provides a foundation for more complex learning and behavior. For most of us, effective sensory integration occurs automatically. For many people with autism, the process demands effort and attention with no guarantee of accuracy. Autism Spectrum Disorder (ASD) is referred to as a spectrum disorder because each individual has different symptoms, sensitivities and level of functioning. Each of the autistic children's sensory sensitivities differs from one to another. Specialized design of learning spaces for ASD children may unlock their full potential. Hence this research attempted to design sensory-friendly spaces for children with ASD to stimulate learning environment. The objectives of this research are in 3 folds; (1) to scrutinize the existing body of knowledge to ascertain relevant criteria exist to design space for ASD; (2) to evaluate three centres for children with ASD in relation to the body of knowledge examined; (3) to propose an inclusive design of spaces for children with ASD. Three case studies are chosen for these studies that are Calvary Victory Centre (Johor), Penawar Special Learning Centre (Johor) and National Autism Society Malaysia (NASOM) One Stop Centre (Selangor). Then, six components are identified to be considered in the design of the spaces and four stimuli consideration are identified that is needed to be implemented. So, designing a space that provide conducive environment for these children to use any of their senses comfortably, it may lead to effectiveness in learning process.

Keywords: autism, classroom design, learning difficulties, ASD

1. Introduction

Sensory defies can distress the student's aptitude to take in information, react to requests, partake in social situations, write, participate in sports, and maintain a calm and ready to work state. Research is still exploring the impact and factors associated with sensory challenges in autism [1]. Some research, anecdotal observa-

tions and personal accounts from people with autism have provided important insights. Either through internal imbalances, or in response to environmental sensations, the sensory and emotional regulation of a person with autism can become overwhelmed and result in anxiety and distress. Working to maintain a 'modulated state' is an effective strategy for maximizing his ability to learn, maintain focus and reduce reactive behavior [2]. A trained occupational or physical therapist can provide help with sensory modulation (appropriate responses in relation to incoming sensations) and treatment for sensory dysfunction using evidence-based practices.

Autism Spectrum Disorder (ASD) or used to be called as Autism is referred to as a spectrum disorder because each individual has different symptoms, sensitivities and level of functioning. This disorder typically appears during the first three years of life due to a neurological disorder that affects the functioning of the brain. Individual who suffer from this complex neurobehavioral condition are usually have problem with their social interaction, learning ability and communication skills combined with rigid, repetitive behaviors. Those diagnosed with autism are often described as being 'locked in their own world' and struggle to communicate with others [3]. They usually have heightened or lowered acuity of the senses and can display repetitive behavior. They often have other learning difficulties such as dyspraxia or may exhibit compulsive behavior. Autistic children perceive their environment differently, with most of the children having intensified sensitivities. Each of the autistic children's sensory sensitivities differs from one to another. Some might be disturbed by the light, and some might feel annoyed by sound. Therefore, the environment should be reflecting clarity in order to ease the stimulation of information in the children's brains. Therefore, there are significant differences between learning spaces for normal children and ASD children. Specialized design of learning spaces for ASD children may unlock their full potential.

2. Literature Review

Children with AHD process both high-imagery & low-imagery sentences in the visual parts of the brain and they think differently. However, they are very good in visualizing images. A learning space that can build comfort and confidence may lead them to develop learning skills. Autism is an abnormality in the development of the brain in the areas of social interaction and communication skills. Most children with autism have problems in verbal and non-verbal communication, social interactions and leisure or playing. Therefore, it is hard for them to socialize and are prone to self-injuries [4]. People with certain cognitive, sensory deficiencies, such as autism, which are less visible, have to struggle to understand the environment surrounding them, such as the composition and layout of their living spaces. Environments for individuals on the spectrum should prepare them for the challenges and problems they will face in everyday life: Cocooning the

ASD people from all external factors will not necessarily help them reach their full potential in life. Table 1 demonstrates examples of symptoms that individuals with autism may face related to sensory processing and whether the symptoms qualify as hypo-sensitive or hyper-sensitive. Out of the list of sensory processing deficits in Table 1, children with ASD appear to exhibit auditory and tactile processing difficulties the most

Table 1. Hyper- and Hypo-Sensitive Symptoms of ASD [5]

Sense	Hypo-sensitive	Hyper-sensitive
Auditory (Sound)	Does not respond when name is called; Enjoys strange noises; Enjoys making loud	Overly sensitive to loud noises; Appears to hear noises before others
Tactile (Touch)	Touches people and objects unnecessarily; Has abnormally high pain threshold	Avoids wearing certain fabrics; Becomes distressed during grooming
Visual (Sight)	Disregards people or objects in environment; Can see outlines of certain objects; Likes bright colors	Bothered by bright lights; Easily distracted by movement; Stares at certain people
Vestibular (Motion)	Moves around unnecessarily; Enjoys spinning in circles; Becomes excited on task involve movement	Seems unbalanced; Becomes distressed when upside-down or when feet leave the ground
Smell/Taste (Olfactory)	Some reports of Pica or eating non-food substances; “feels” objects with mouth; Seeks out strong smells; Oblivious to some scents	Picky eater; Will only eat foods with certain textures, with particular smells, or at a certain temperature
Proprioception (Sense of body’s location)	Unaware of body position in space and body sensations like hunger; Often lean against people or objects	Odd bodily posture; Uncomfortable in most positions; Difficulty manipulating small objects

Children and young people on the autism spectrum often need routine in order to help them understand the world around them. This means that they can find unstructured times such as lunch and break times particularly difficult. They need longer to process information and can also find socialising and communicating challenging. Many want to make friends, but find it hard as they lack the expected social skills. They are often bullied as their peers can lack autism awareness and acceptance. Some may have intense interests or lack organisation and planning skills that can affect their ability to take part in the school day [6].

In addition to this, many will have difficulty processing sensory information. This can occur in one or more of the seven senses. Their senses can be intensified (hypersensitive) or under-sensitive (hyposensitive). The degree of difficulty will vary from one individual to another and according to other factors such as mood and levels of stress and stimuli. Trying to cope with the above during the school day can lead to anxiety, behaviour that challenges and meltdowns. Often, autistic pupils will not show the stress they are feeling while they are at school, leading to different behaviour between school and home.

The behaviour of some autistic children and young people can be challenging in school. This behaviour is often due to an underlying anxiety, frustration or sensory sensitivity. It's not always clear what has triggered it, making it hard to control the situation and identify useful strategies. It's helpful to monitor behaviour to see if you and the child or young person can start to recognise when anxiety or frustration is starting to build.

There are now many pupils in mainstream schools who have been diagnosed as being on the autism spectrum, including those with Asperger syndrome and those with a demand avoidant profile. Some may have accompanying learning disabilities or other conditions sometimes related to autism, such as ASD. As an education professional working with children and young people, you will come across pupils who you believe may be autistic but don't have a diagnosis. You can read more about recognising autism and planning the right support [7].

3. Methodology

- a) Semi-structured interview & background study – With the aid of secondary data such as research publications, academic journals, locally available design standards and semi-structured interview with person involved in nurturing autism children. 8 interviews were conducted
- b) Site observation – Three (3) autism centers had been visited to observe the learning settings and space planning. Three case study are Calvary Victory Centre (Johor), Penawar Special Learning Centre (Johor), Nasional Autism Society Malaysia (NASOM) One Stop Centre (Selangor).
- c) Design proposal – Design analysis of present autism centers and related design guidelines.

4. Analysis And Findings

Six components are identified to be considered in the design of the spaces as shown in Table 2.

Table 2. Design consideration at sites

Case Studies / Site & Space	Design Consideration						Score
	Safety and Security	Stability and Clarity	Sensory elements	Health and wellness	Durability	Affordability	
Classroom							
1. Calvary Victorian Centre, Skudai	✓		✓	✓	✓		4/6
2. Penawar Special Learning Centre	✓		✓				2/6
3. Nasional Autism Society Malaysia	✓	✓	✓	✓	✓		5/6
Common area							
1. Calvary Victorian Centre, Skudai	✓		✓		✓		3/6
2. Penawar Special Learning Centre	✓		✓				2/6
3. Nasional Autism Society Malaysia	✓	✓	✓	✓	✓		5/6
Eating area							
1. Calvary Victorian Centre, Skudai			✓				1/6
2. Penawar Special Learning Centre	✓				✓		2/6
3. Nasional Autism Society Malaysia	✓	✓	✓				3/6

Four stimuli considerations were identified that is needed to be implemented in the design as per shown in Table 3. Figures 1(a-f) show the design proposal of interior spaces for children with ASD which consists of hallway, art room, sensory room, therapy room, music and dance room and calm room.

Table 3. Total Score: Stimuli & Design Consideration

Case Studies	Stimuli	Design	Total Score
Classroom			
1. Calvary Victorian Centre, Skudai	3/4	4/6	7/10
2. Penawar Special Learning Centre	2/4	2/6	4/10
3. Nasional Autism Society Malaysia	4/4	5/6	9/10
Common			
1. Calvary Victorian Centre, Skudai	2/4	3/6	5/10
2. Penawar Special Learning Centre	2/4	2/6	4/10
3. Nasional Autism Society Malaysia	3/4	5/6	8/10
Eating Area			
1. Calvary Victorian Centre, Skudai	2/4	1/6	3/10
2. Penawar Special Learning Centre	1/4	2/6	3/10
3. Nasional Autism Society Malaysia	3/4	3/6	6/10



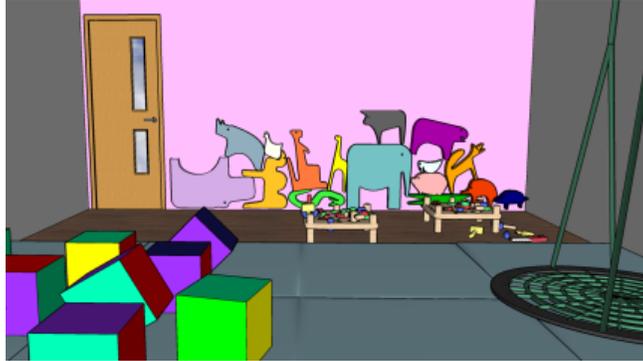
a. Hallway



b. Art Room



c. Sensory Room



d. Therapy Room



e. Music and dance room



f. Calm room

Figure 1. Design proposal of interior spaces for children with ASD

5. Conclusion

This research aims to design warm and friendly spaces for children with Autism Spectrum Disorder (ASD). With some improvement to the spaces, we will be able to provide spaces that help the development or learning process of ASD Children. Designing autism-friendly spaces can play an important role in providing buildings, spaces, furnishings and technologies that have the potential to improve the life of children with autism. Failing to consider the needs of this ASD group can easily result in more frequent episodes of behavioural incidents and social insulation.

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