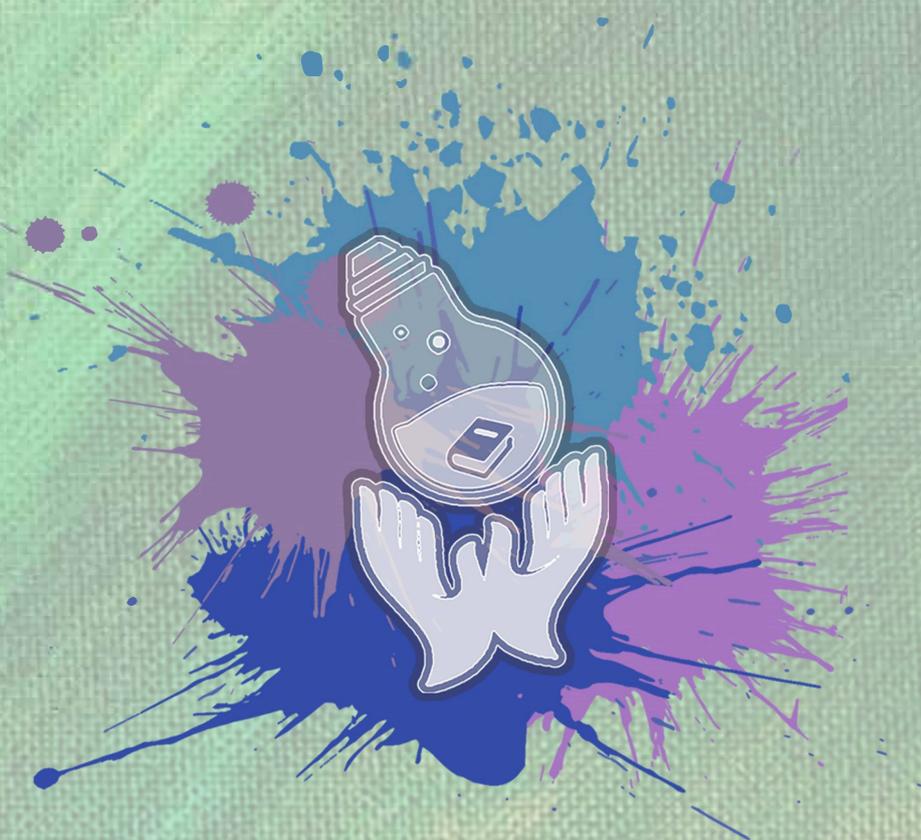




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# SENSORY-FRIENDLY SPACES FOR CHILDREN WITH AUTISM SPECTRUM DISORDER (ASD) TO STIMULATE LEARNING ENVIRONMENT

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## **Abstract:**

Autism Spectrum Disorder (ASD) is referred 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 study are chosen for this study 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:**

*Space Management; autism; ASD; learning space; multi sensory; design*

## **1.0 INTRODUCTION**

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 (Khare and Abir, 2009). 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 (Mostafa, 2008). Those diagnosed with autism are often described as being 'locked in their own world' and struggle to communicate with others (Preiser, 1998). They usually have heightened or lowered acuity of the senses and can display repetitive behavior (Beaver, 2006). Autistic children perceive their environment differently, with most of the children having intensified sensitivities (Cunningham and Tabur, 2012). 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 (Sánchez et al., 2011). 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.

## **2.0 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. Mostafa (2014) stated that 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. McCallister (2010) states that 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

| 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                  |

### 3.0 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.

### 4.0 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 |
|-------------------------------------|---------|--------|-------------|
| <b>Classroom</b>                    |         |        |             |
| 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        |
| <b>Common</b>                       |         |        |             |
| 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        |
| <b>Eating Area</b>                  |         |        |             |
| 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        |

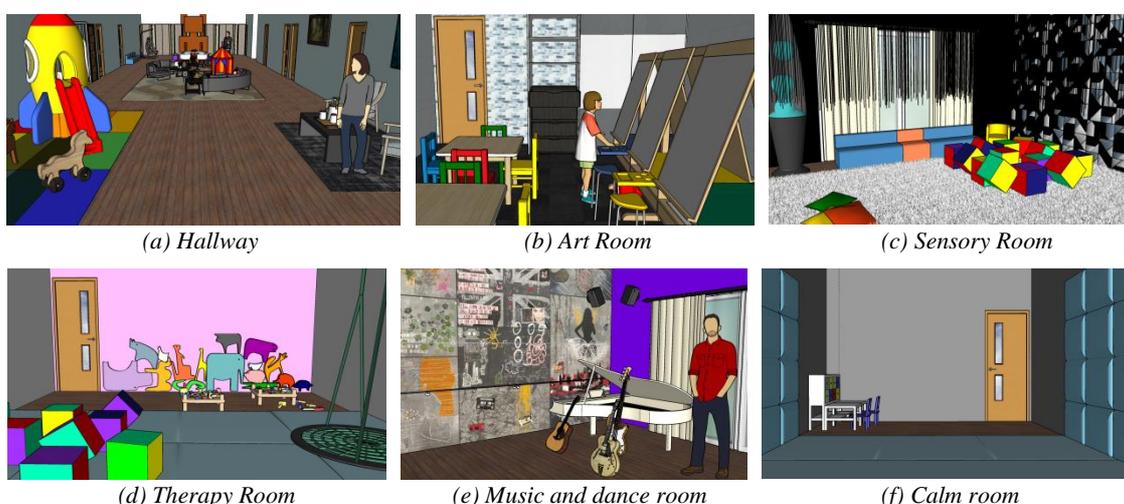


Figure 1: Design proposal of interior spaces for children with ASD

## 5.0 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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