

A HOME FOR AUTISTIC CHILD: RESIDENTIAL SPACES INTERVENTION IN MALAYSIA

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ABSTRACT

In Conventions on the Right for Children (CRC) 1995, Malaysia has highlighted the rights of children whom will be monitored from the aspects of survival, protection, development, and participation. This research will be focusing on one of the survival an aspect which is living spaces or accommodation for children with Autism Spectrum Disorder (ASD). The increasing number of children with Autism Spectrum Disorder (ASD) has alerted many on their education, health and safety, because these children are prone to injuries. Therefore it is very important to provide these children with homes that are educationally interactive, healthy and safe. Many studies emphasized on the importance of the learning environment for autistic children, but none have focused on the idea of inclusive and universal design in houses. This research will employ both qualitative and quantitative research methods based on environmental and behavioural studies. Additionally, this paper will discuss literature reviews from various aspects that are associated with this research. The aim of the study is to establish a relationship between the physical environment and the architectural factors that affect issues of daily living in order to recognize autism-friendly inclusive house designs. This research is beneficial for both children with autism and able-bodied children.

Keywords: Autism children, space intervention, residential, inclusive design, safe design

1. INTRODUCTION

Maslow's theory on the hierarchy of needs highlights the importance of adequate housings for positive children's development. According to Maslow (1948), one's physical need such as the need for shelter is the most basic of all. Unfortunately, many autistic children live in homes that are not suitable for their needs. The physical quality of most residences in Malaysia was designed for the basic family's needs without consideration of adults and children with special needs. The environments in which children spend most of their time have the greatest impact on their development and these environments vary for children at different stages. The physical quality of the residence would tend to affect infants more strongly than older children, while the characteristics of the broader neighbourhood become more important as children get older Vandivere, Hair, Theokas, & Cleveland (2006). Furthermore, a family living in a well-maintained home in a safe neighbourhood, which has access to high quality schools and safe outdoor play spaces throughout a child's life, will influence the child positively. This applied to autistic children more significantly. This research is based on the premise which implies that the performance of children with autism could be improved in an appropriate, inclusive, physical environment for living. Exploration of the architectural requirements for comfortable and positive living of person with autism will be beneficial for both children with autism and able-bodied children.

2. UNDERSTANDING CHILDREN WITH AUTISM

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 socialise and are prone to self-injuries (NASOM, 2015).

Based on statistics in the United State of America, 1 out of 68 children are autistic. In Malaysia, the National Autism Society of Malaysia (NASOM) has estimated that 9,000 children are born with ASD each year. According to NASOM (2014), the prevalence of ASD is approximately 1 case in every 600 births in Malaysia and the number continues to rise every year. In the mid-1960s, hypotheses were replaced by well-founded theories explaining what autism is about: a difference in information processing with a neurobiological cause (Rajendran & Mitchell, 2007). These theories united parents to fight for their children's rights, including better education and living circumstances. As a result, attention shifted from large institutions outside of the community to smaller domestic living arrangements within (Braddock et al., 2008, Venderbosch, 2008, Ahrentzen & Steele, 2009, Brand, 2010) (Heylighen, 2015). The growing number of children with Autism Spectrum Disorder (ASD) has alerted many on the importance of their education, health and safety, because these children are prone to injuries. These children with autism are adversely affected by the surrounding environment in which they live in. Therefore, it is very important to provide these children with homes that are educationally interactive, healthy and safe.

3. WHAT ARCHITECTURAL DESIGN SUITS AUTISTIC CHILDREN BEST?

According to Mostafa (2008), autism is mostly being ignored by the architectural community in many ways, including building codes and guidelines. She had pointed out that the United Nations also failed to outline building standards for autism in the Global Program on Disability. Basically, these children's sensory activities are highly sensitive (Grandin, 2007 and Mostafa, 2008). 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 reflect clarity in order to ease the stimulation of information in the children's brains (Mostafa, 2008).

According to Professor Temple Grandin (2007), a university professor who was diagnosed with autism, people on the autistic spectrum process both high-imagery and low-imagery sentences in the visual parts of the brain. She highlighted that autistic people think differently. However, they are very good in visualising images. Smith (2009) 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. The alteration of activities or functions from one space to another may cause conflict that is too excessive for their brain to compute, leading to a panic attack.

Cunningham and Tabur (2012) referred to Figure 1, Hierarchy of learning space attributes by Fred Kent, which shows the importance of space characteristics that can make a space appealing and encouraging to people. He highlighted that the most basic space characteristic is access and linkages. This can be associated with autistic children in over calming their problems in changes of spaces and function in a building. Once they felt comfortable and clear with the flow and movement of the access and linkage in spaces, they will then attempt to engage themselves with functions and activities of the spaces. A space that can build comfort and confidence may lead them to develop social skills. Although autistic children tend to have deficiency in communication, socialization, interest, sensory integration and behaviour, it can be helped through communication strategies and transitioning routines (Grandin, 2007). However, accessibility issues are of primary concern to architects because there are no specific references made into mandate for individuals with developmental disorders, or autism (Mostafa, 2008).

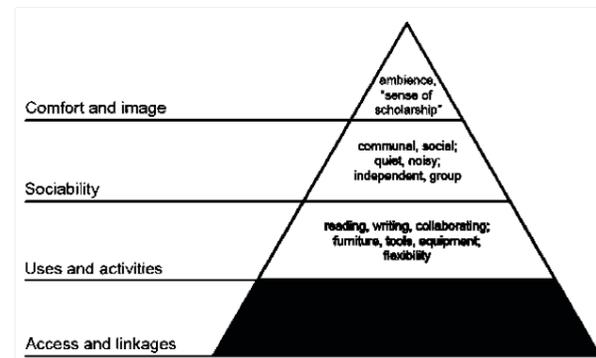


Figure 1: Hierarchy of Learning Space Attributes
(Source: Cunningham and Turban, 2012)

Mostafa (2008) has highlighted in his research that, “...autistic behaviour is credited to a form of sensory malfunction when assimilating stimulatory information from the surrounding physical environment.”

Therefore, she suggested that architects should design spaces for autistic individuals by altering the sensory input which will encourage the development of skills, enhance learning process, and building up their self-confidence.

3.1 Understanding Sensory Processing Disorder

Sensory modification requires architects’ understanding of sensory integration disorder which is usually found in autistic children (Figure 2). This is a condition in which sensory input is not organized properly in the brain. A positive sensory environment may help to calm a hyperactive autistic child,

or to activate the activity level for a passive autistic child. Sensory integration disorders are a critical part of autism. The apparent symptoms may vary between genders (Figure 3).

3.2 Integrating Sensory Intervention in Design

Architects are aware that there are individuals with different types and degrees of disabilities (mainly visual, auditory and physical). Architects plan and design spaces to allow them to be utilized. Therefore, it is not possible to design spaces for individual with “less visible” impairment such as autistic. However, various criteria needs to be considered when designing buildings for people with ASD. Architects could employ their understanding of positive sensory environment in their design. It is a common practice for architects to use a common pattern of cognition to guide and manipulate user behaviour in a space (Mostafa, 2008).

<p>Sensory Modulation Disorder</p>	<p>Sensory Discrimination Disorder</p>	<p>Postural-Ocular Disorder</p>	<p>Dyspraxia</p>
<p>Definition: A problem in regulating responses to sensory inputs resulting in withdrawal or strong negative responses to sensations that do not usually bother others.</p>	<p>Definition: A problem in recognizing/ interpreting differences or similarities in qualities of stimuli.</p>	<p>Definition: A problem with control of posture or quality of movements seen in low muscle tone or joint instability and/ or poor functional use of vision. It is often seen with vestibular and proprioceptive problems.</p>	<p>Definition: A problem with planning, sequencing & executing unfamiliar actions resulting in awkward & poorly coordinated motor skills typically seen with a sensory processing deficit. It is usually seen with difficulty doing new activities or those that are done infrequently. (May-Benson, Teasdale, & Koomar, 2006)</p>
<p>Common Signs</p> <ul style="list-style-type: none"> • Easily distracted by noises • Overly sensitive to sounds • Dislikes nail/ hair cutting • Dislikes clothing of certain textures/ fits/ or styles • Upset about seams in socks • Difficult time falling or staying asleep • Reacts defensively to tastes/ textures of food • Easily distracted by visual stimuli 	<p>Common Signs</p> <ul style="list-style-type: none"> • Jumps a lot on beds • Bumps or pushes others • Grasps objects too tightly or uses too much force • Frequently drops things or knocks things over • Mouths, licks, chews, or sucks on non-food items • Craves movement, e.g. likes to spin self around • Afraid of heights/ swings or slides • Has poor balance 	<p>Common Signs</p> <ul style="list-style-type: none"> • Seems weaker than other children • Fatigues easily • Frequently moves in and out of seat • Slumps while sitting • Difficulty making eye contact/ tracking with the eyes, e.g. reading • Falls and tumbles frequently • Feels heavier than anticipated when lifted • Has flat feet 	<p>Common Signs</p> <ul style="list-style-type: none"> • Problems with daily life tasks like dressing or using utensils • Eats in a sloppy manner • Difficulty following multistep directions • Strong desire for sameness or routines • Has an awkward pencil grasp • Has poor handwriting • Dislikes or reluctant to participate in sports

Figure 2: Sensory Integration Disorder Symptom – The complete list

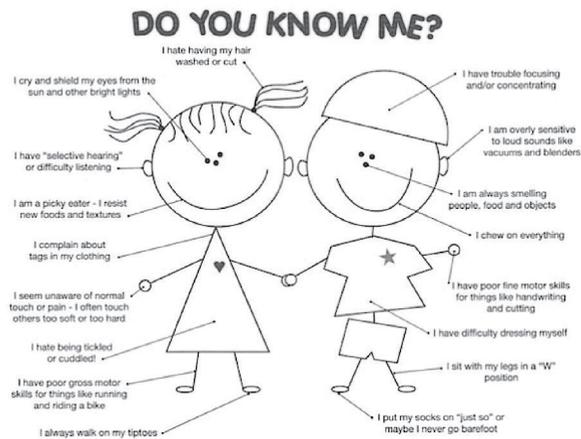


Figure 3: Problems with Sensory Integration between boys and girls (Source: <https://www.dealwithautism.com/sensory-integration-disorder-symptoms/>)

4. METHODOLOGY AND PARTICIPATIONS

For this research, the descriptive survey analysis method was adopted. According to Leedy, this method of research looks with intense accuracy at the phenomena of the moment and then describes precisely what the researcher's sees (Leedy, 1993). Descriptive studies describes and measures as precisely as possible one or more characteristics and their relationship in a defined group. In addition, the approach used by this research drew from post occupancy evaluation, the latter is the process of evaluating buildings in a systematic and rigorous manner after they have been built and occupied for some time. Post occupancy evaluations focus on building occupants and their needs, and thus they provide insights into the consequences of past design decisions and the resulting building performance. This knowledge forms a sound basis for creating better buildings in use (Preiser et al., 1988).

Designing a residence for an autistic child is subjective. It cannot be interpreted directly (Kinnaer et al, 2014). Sanchez (2011) emphasized that the design qualities should be flexible, non-threatening, non-distracting, predictable, controllable, sensory-motor attuned, safe and non-institutional. In order to recognize the suitable design interventions for autistic children in houses in Malaysia, respondents have volunteered from 'Autism Malaysia' group on Facebook (Figure 4).



Figure 4: Autism Malaysia Facebook (Source: Facebook)

Autism Malaysia group on Facebook is a parent support group for parents with autistic children. Two parents have come forward to share their experiences. Interviews were conducted via 'WhatsApp' application. The online interviews were adopted in order to respect their privacy and allow the respondents to share their experiences without any inhibitions and reserves. Responds from the parents were very encouraging.

Parent 1, is a mother of a 9-year-old boy diagnosed with mild autism and dyslexia and live in a terrace house in Gombak. Parent 2, is a father to a 7-year-old boy diagnosed with severe autism and Global Development Delay (GDD). They previously lived in a village house and have recently moved to a terrace house. These unstructured interview questions were based on various studies as mentioned earlier in the literature.

Photo documentation has been gathered from 'Autism Malaysia' Facebook. Since this is an 'open group', many parents have been sharing pictures of their kids' activities. The pictures have been selected based on the home environment in order to study the possibility of the parents modifying their houses to suit their children's needs, and activities. Photos collected were categorised based on the space attributes.

5. FINDINGS

The interview reveals that most parents prefer to have a minimal furniture layout or a large space to allow their children to utilise the space without injuring themselves. Various posts showcasing the situation of the children in their house were collected (Table 1) and categorised based on Hierarchy of Space Attributes (Figure 1), Theory of Sensory (Mostafa, 2008) and study by Sanchez (2011). From the interviews it was found that some parents did a vast modification on their residential unit, and some took passive design solutions. The photo documentation worked best in providing an insight on how parents in Malaysia modified their houses to suit with various types of problems faced by autistic children.

Table 1: Posts sharing the situation of children in their house categorised based on the Hierarchy of Space Attributes.

SPACE ATTRIBUTES	PARENT 1	PARENT 2
Information	<p>A 9-year-old boy diagnosed with mild autism and dyslexia.</p> <p>Inclined to climb high furniture and rails.</p> <p>Does not suffer severe sensory issues, but he is sensitive to loud noise.</p> <p>Although he suffers from speech delay, his speech is improving.</p>	<p>A 7-year-old boy diagnosed with autism and GDD.</p> <p>After attending 3 session of kinetic and colour capsule therapy, he managed to stand on his feet at the age of 6.</p> <p>Due to speech delay he did not speak until the age of 6.</p> <p>Due to temporary sensory problems, he wore artificial lenses for some time. His sensory and motor development improved after attending colour and vibration therapy.</p>
Access and Linkages (Porch, staircase and etc.)	<p>Since he likes to ride the staircase railing, the parent decided to attach the rail to the wall.</p> <p>Provide sufficient light to all access and linkages for safety.</p>	<p>The first 2 weeks after moving to the house, he kept playing on the staircase. Therefore the parent decided to convert the upper level into their store and office.</p> <p>Lights were removed to avoid him from accessing upstairs.</p>
Uses and Activities	<p>The house layout was minimalistic because he moved a lot when he was younger.</p> <p>However, when he grew older, the parent decided to renew house environment by dividing the spaces into smaller area. This is to familiarize him with the spatial organization of a house.</p> <p>Although now he is doing most of his activities, he is still being supervised to avoid any injuries</p>	<p>Previously staid in a village house which was spacious and had big lawn. Now, living in a terrace house has limited his activity to the porch only.</p> <p>Most of the occupational therapy (OT) conducted at home needs a conducive environment. However, most of the sensory intervention needing a bigger space are conducted at the nearby playground.</p> <p>Every weekend he is brought to the beach, 6km away from their house to do activities like waves catching, swimming and building sand castle.</p>
Sociability	<p>When he was young, he made no eye contact. It is difficult to develop his social skill. Spending time at the front yard allows him to see more people passing by. Sometimes, they would open the gate and let him cycle in front of the house.</p>	<p>The parent prefers him to play at the porch due to safety and the limited space ease them to monitor him. They assist him in the playground to avoid him being bullied or injured due to his slow movement and poor balancing.</p>
Comfort and Images	<p>His parent preferred simple and comfortable house. They are trying their best to ensure that he cannot injure himself.</p>	<p>The parents prefer to have minimal furniture to allow space for movement in the house and reduce self-injuries. They also covered the entire glass window with the furniture to prevent him from throwing things and breaking the glass.</p>



Figure 5: Railings have been provided to ease the autistic child with GDD movement within his home. (Source: Facebook Autism Malaysia)

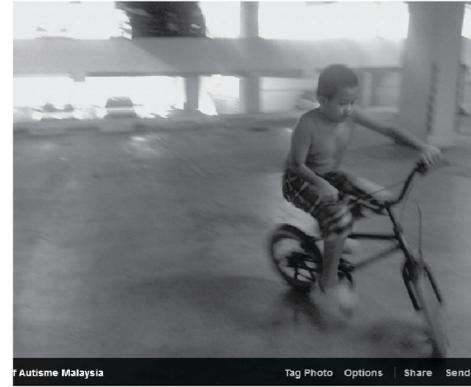


Figure 7: Space for outdoor activities are difficult to achieve for families that live in a high-rise residential. (Source: Facebook Autism Malaysia)

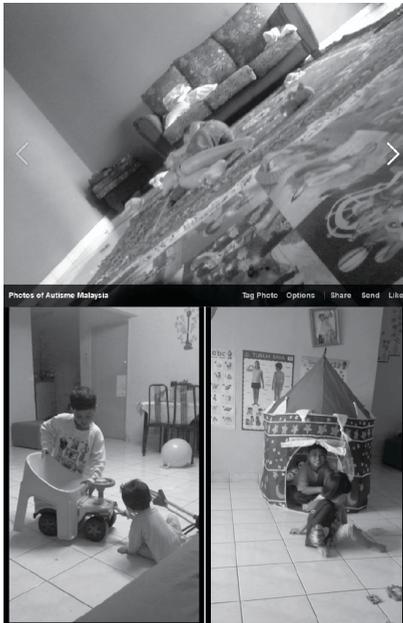


Figure 6 (a, b & c): Since these children are prone to injuries, many parents opt for an open plan approach with simple furniture layout. (Source: Facebook Autism Malaysia)

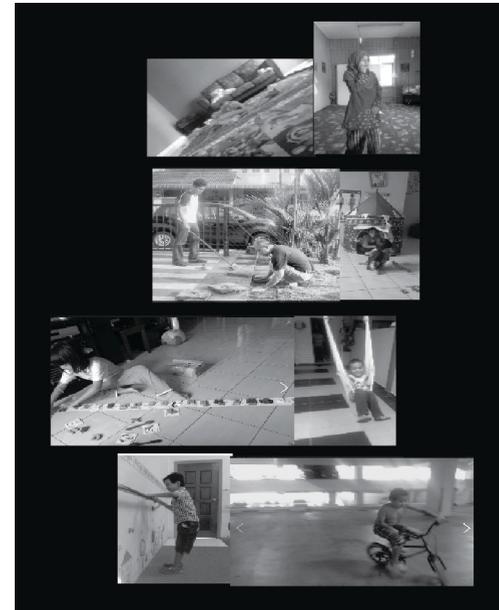


Figure 8: Utilization of spaces in residential (Source: Facebook Autism Malaysia)

6. DISCUSSION AND RECOMMENDATION

These discussions have been structured based on the association between space attributes and the autistic sensory needs. It has been decided earlier that this study will be focusing on the issues by considering the common residential type, the economical aspect and the community in Malaysia.

Autism has a wide range of symptoms which differ from one individual to another, and these differences make it difficult for architects to customize a public space for autistic children. However, it is possible to create a calm and conducive living environment in a residential building. Some suggestions highlighted are focusing on sensory modification (Mostafa, 2008; Sanchez et.al, 2011).

6.1 Access and Linkages

In general, many families stay in linked houses, especially in urban areas. Therefore, the houses have very limited outdoor space. Access and linkage are very simple with not many corridors, but staircases were used as linkages between the ground floor and upper floor. The design should consider the smooth flow from a space to another to reduce confusion and avoid panic attacks. Some parents provide rails to aid the child movement within the residence.

Other than that, parents avoided excessive details in the spaces, which can reduce focus and create confusion to the autistic child. Focus is crucial to the brain's ability to process information, which influences their attitude and decision. Light is important, especially in access and linkages. This is to reduce the possibility of self-injury. However, the brightness of the light might be considered based on the child needs because some autistic children are sensitive to bright colours, whilst some are afraid of the dark.

6.2 Uses and Activities

Many parents preferred spaces with a minimal setting to provide room for their children to move. Since these children are prone to injuries, areas with less furniture are more suitable. The selection of materials is important to ensure that they will not slip on the wet floor or injure themselves on a rough texture. Design proportion is very important to prepare a space that meets their comfort. Some might prefer bigger spaces because they feel confined in a smaller space. However, some might prefer smaller space to feel secure and safe.

Therapy based activities were always conducted by the parent at home to help their children improve their weaknesses. Therefore, lighting intensity is important to ensure the children are not disturbed by the light and focus on their activities. The architects should understand their user preferences before providing the lighting system that can give them comfort. However, some activities are not suitable to be conducted indoor. Many parents have put an effort to take them to nearby parks. However, too much crowd put them in uncomfortable conditions.

Occasionally, to build the children confidence, they need a space for them to walk and practice their activities on their own while the parents can still supervise them. Architects should creatively design spaces which do not make the children feel confined, but make them comfortable enough to carry on their activities freely. The supervision should not create excessive intrusion in the child's activities or interactions. A good acoustic in a space should be considered because, there are Autistic children whom are very sensitive to noise; it is difficult for them to differentiate sounds when a space has a great deal of noise. Therefore, it is important to take into consideration acoustic issues.

6.3 Sociability

Autistic children have problems with social interaction. However, parents need to encourage them to build up their confidence before subjecting them to social situations in public. Some autistic children are physically weak, needing the parents to assist them. Moreover, it is important to include a space that is suitable for them to play with friends at home.

6.4 Comfort and Image

Comfort is not an issue to the parents as long as the house conditions meet the needs of their children. Most parents opt for spacious and safe residences. Priorities are more towards providing spaces that can be utilised for the children therapeutic activities at home. Architects are professionals who are responsible for creating environments that accommodate the needs of all types of users. Individuals with special needs should not be exempted from such accommodation. They are special individual whom Sanchez (2011) remark as people who perceive space in a unique, different style: with the "eyes of the mind".

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