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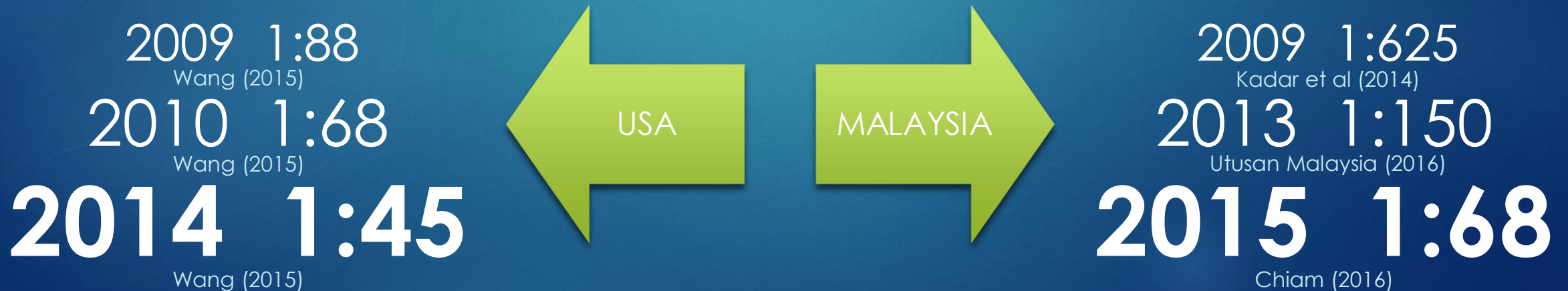
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Exploration on Sensory Design for Autism Children



Introduction

- Autism Spectrum Disorders (ASD) has occurs in every nation of the world . In United State, the prevalence of autism has been increasing in the last 40 years (Samadi & McConkey, 2011).
- While in Malaysia, the number has been increasing at 3% per year (Mansor, 2016; Chiam, 2016; Zuljadan, 2017).
- The Ministry of Health in 2004 found that autism prevalence rates were 1 case for 600 births, with an estimated 13,333 children aged 15 and under are having autism in the country. However, the prevalence rate is closer to the rates in developed countries such as 1 in 68 in the US and 1 in 100 in the UK (Chiam, 2016).



Introduction

- The tremendous increase in numbers, it gives impact to the country, community and family. The increasing rate of ASD prevalence is also a great challenge for the education system and needs national efforts to address the problems (Matin, Haghgoo, Samadi, Rassafiani, Bakhshi, Hassanabadi, 2017).
- In addition, it became a significant challenge to public education because many children with autism required intensive interventions to facilitate their participation and success in the educational setting (Kinnealey, Pfeiffer, Miller, Roan, Shoener, Ellner, 2012).



Introduction

- Non-Government Organization (NGO), private learning centres, and healthcare professionals has been recommended by the government to overcome the cases to equipped in treating and care for autistic individuals (Chiam, 2016).
- Autistic child can be developed independent living skills during the learning environment process (Cikili, Sari, & Deniz, 2015). This is because education is defined as the process of behaviour changing.
- Autistic child are encouraged to continue their education in different learning environments due to their difficulty impairments in social, communication, and behavioural skills (Cikili et al., 2015; Shaari & Ahmad, 2016).
- Autistic children develop skill, social interaction and develop their fullest potential in a quality of school environment and properly designed physical learning environment to improve school readiness among them (Shaari and Ahmad, 2016)



Introduction

- Designated learning environment for autistic children are unique. This is due to their impaired verbal and non-verbal communication and social interaction by showing themselves in repetitive behaviour, sensory issues, and cognitive delays (Chiam, 2016). Autistic children confront their problems in sensory processing which negatively impact their engagement in daily activities (Matin et al., 2017).
- Sensory processing resulted in poor engagement in academic tasks. Autistic children have a different model of sensory processing involving tactile, proprioceptive, vestibular, visual, and auditory processing which may lead to sensory issues and finally affect his/her educational achievement (Matin et al., 2017).
- Therefore, designing learning environment should consider the sensory issues to overcome critical set of human factors when designing built environments that effects of sensory stimulation on people who use the environment (Paron-Wildes, 2005).



What is



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What is



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Autism Spectrum Disorder (ASD) is a **neurological disorder** that affects a **child's developmental disability** causing **social, communication and behavioral** challenges (Yates, 2016). Individual with autism often affects a child's ability to communicate, understand language, play and relate to others (Boyce, Hunter and Howlet, 2013). They also identified that the symptoms as such repetitive activities, stereotyped movements, struggle to adapt in the environment and the daily routine and unusual responses to sensory experiences.

Types of ASD:

1. Classic Autism

Classic Autism is a developmental disorder, which consists of significant impairments in the areas of language, social, and intellectual abilities. Additional impairments can occur in behaviour, sensory integration, restricted interests, cognitive functioning, and motor skills (Reynolds, 2015).

2. Pervasive Developmental Disorder (PDD)

Pervasive Developmental Disorder – Not Otherwise Specified (PDD-NOS), or Atypical autism is a less common term used to refer to individuals with slight challenges in social and communication areas. Repetitive behaviors and interests may be noticeable. In PDD-NOS, some features of autism are present; however, symptoms do not meet full criteria for a diagnosis of Classic autism. (Reynolds, 2015).

Types of ASD:

3. Asperger's syndrome (AS)

Asperger's syndrome is a term applied to high functioning individuals who display mild symptoms of ASD, such as social challenges, but have average or high average intellectual abilities (Reynolds, 2015). Children with Asperger's syndrome have average to above average development in language and cognition with characteristics of autism in social interaction and communication. Weaknesses are also present in executive functioning skills such as planning, organizing, and multi-tasking. Children with Asperger's syndrome typically have low thresholds for frustration and increased levels of anxiety (Reynolds, 2015).

People with Asperger syndrome generally develop spoken language in the same way as typically developing children, but have a tough time with social communication. These difficulties that become more obvious as they get older and social expectations rise.; Because people with Asperger syndrome are often very intelligent - but "quirky" - the disorder is sometimes nicknamed "geek syndrome" or "little professor syndrome." (Rudy, 2017)

Types of ASD:

4. Rhett's Syndrome

Rhett's syndrome is a rare disorder in which a child reaches major developmental milestones, but shows a regression or loss of skill between the ages of one and four years of age (Reynolds, 2015). Rett's syndrome is a genetic disorder that affects only girls. It is the only one of the former autism spectrum disorders that can be diagnosed medically (so far) and as of May 2013, it is no longer included in the Autism Spectrum (Rudy, 2017). Girls with Rett's syndrome develop severe symptoms including the hallmark social communication challenges of autism. In addition, Rett's syndrome can profoundly impair girls' ability to use their hands usefully (Reynolds, 2015).

5. Childhood Disintegrative Disorder (CDD)

Childhood disintegrative disorder (CDD is also a developmental disability in which a child experiences a significant loss of previously acquired skills in language, social function intellectual and motor abilities. CDD has been referred to as late onset autism as it does not have the same early detectible symptoms as autism (Reynolds, 2015; Rudy, 2017).

What is Autism?

Autism spectrum disorders (ASD) is characterized by social communication and social interaction (Yeo & Teng, 2015).



Pedantic or
odd speech patterns



Lack of joint attention



Difficulties interpreting
body language



Lack of social
problem-solving ability



Repetitive patterns
of behavior, interests
and activities



Poor eye contact

ASD are having difficulties in developing their language skills, hearing and communicating. They express themselves with exhibit unconventional behaviors (Yeo & Teng, 2015).



Bad temper



Being aggressive



Injuring themselves



Autism Spectrum Disorder and Sensory Processing

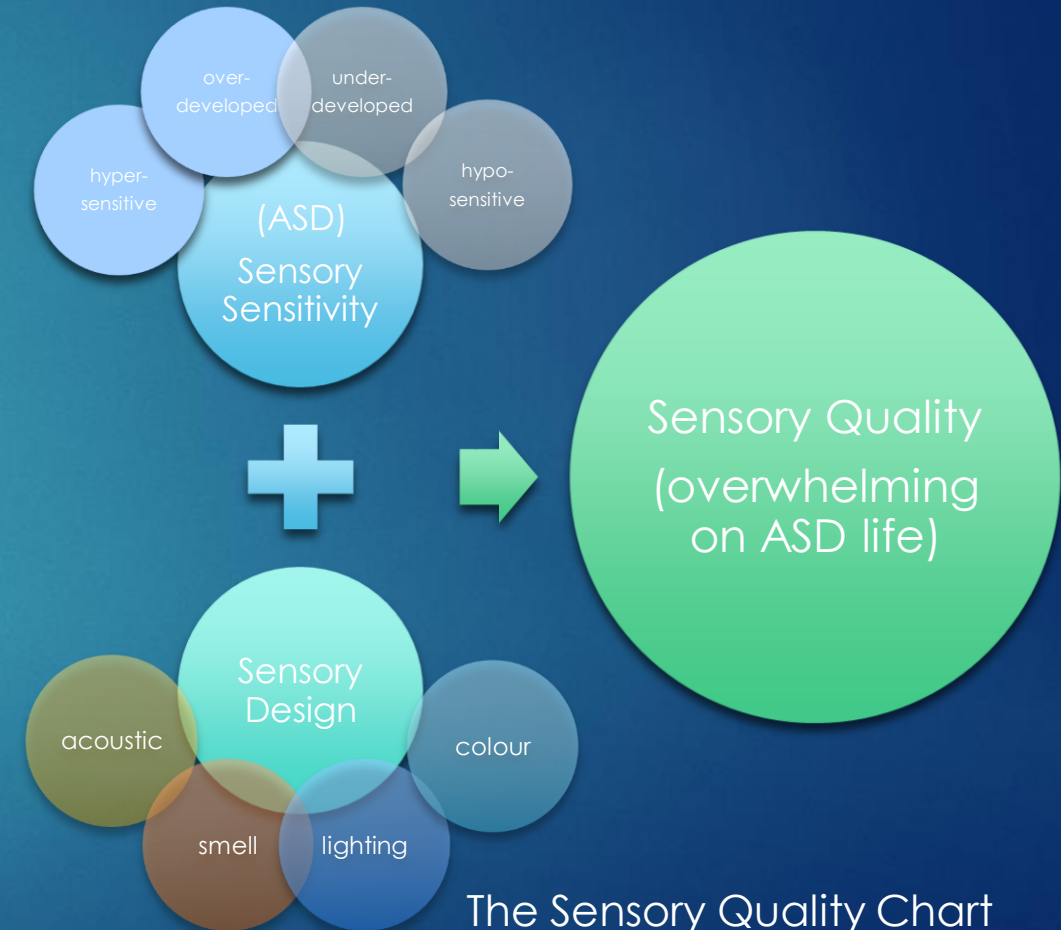
The term of Sensory processing refers to the method the nervous system in which the brain has trouble receiving and responding to information that comes in through the senses (Henshall, 2008; Phillips et al., 2011). The behavioral and emotional problems have been associated with sensory processing differences and sensory symptoms have been significantly related to stereotyped interests and repetitive behaviors in ASD (Phillips et al., 2011) .

Vision	The faculty of seeing.
Hearing	The faculty of perceiving sound.
Vestibular system	Refers to structures within the inner ear that detect movement and changes in the position of the head.
Vestibular system Olfaction (the sense of smell)	Perceiving odours or scents.
Gustation (the sense of taste)	Perceiving the sensation of a soluble sensation caused in the mouth and throat by contact with that substance.
Tactile system	Perceiving touch, pressure, pain, temperature.
Proprioceptive system	Perceiving stimuli produced within an organism, especially relating to the position and movement to the body.

Sensory Design

Sensory design is design for living which how a space feels, sounds, looks, smells and functions can be incredibly affecting one or more of the seven senses which can have an overwhelming effect on their life (Society, 2015).

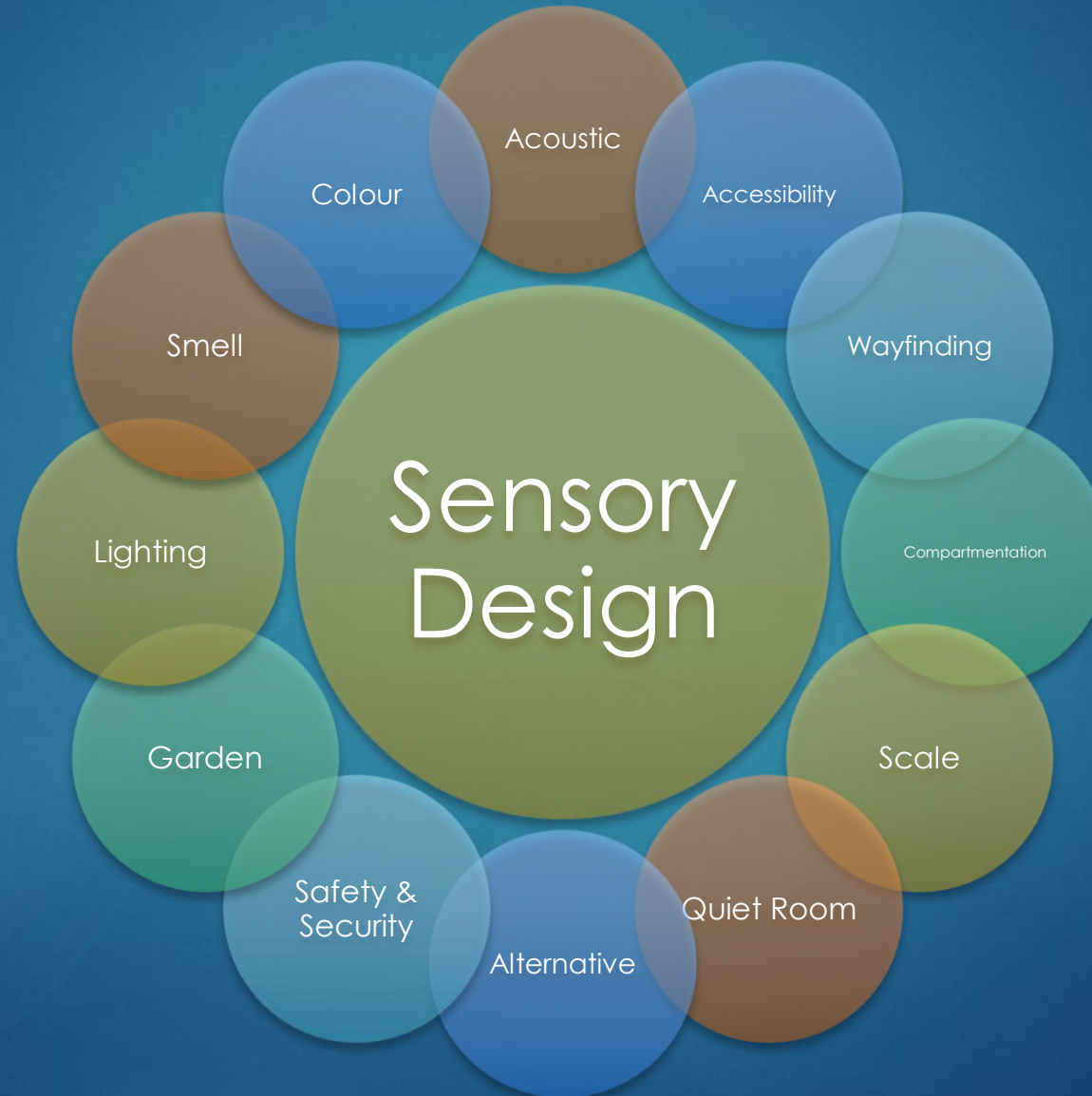
The environment gives a huge impact on a child with Sensory Sensitivity; also known as Sensory Processing Disorder or Sensory Integration Difficulty. Their senses can be either over-developed (hypersensitive) or under-developed (hyposensitive) which can result in feelings of anxiety, stress & occasionally, physical pain. Both can have an impact on how a child handles different environments (Barker, 2014).



The Sensory Quality Chart

The sensory quality chart explain the relation of both situation that beneficial to autism learning environment.

6.0 Literature Review



The Theoretical of
Sensory Design Chart

6.0 Literature Review

Acoustic

Acoustics is one of the most important issues in the interior design requirements for autistic children. Children with autism are afraid of noise and needs a quiet environment for their comfort (Mostafa, 2014; Nazri & Ismail, 2016; Altenmüller-Lewis, 2017).

Smell

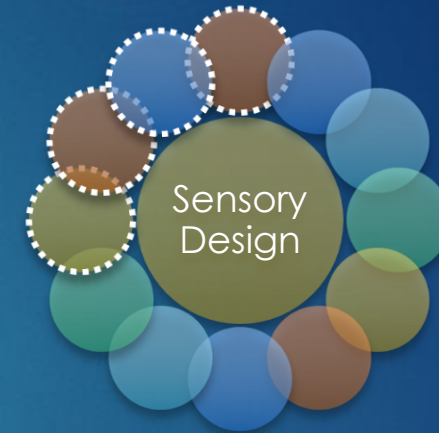
Autistic children having difficulties and problematic with strong smells and even odours. McNally et al. (2013) addressed that school kitchens, dining halls, swimming pools and bin areas are all potentially problematic sources of strong smells.

Colour

Neutral, calming colours and the use of natural materials are best suited for autism-friendly learning environments (Altenmüller-Lewis, 2017; Nazri & Ismail, 2016).

Lighting

Natural and artificial lighting need to compose throughout educational facilities. The lighting levels can create active and calm zones throughout the schools and should design appropriately to suit their activities. (Nazri & Ismail, 2016; Altenmüller-Lewis, 2017).



6.0 Literature Review



Accessibility

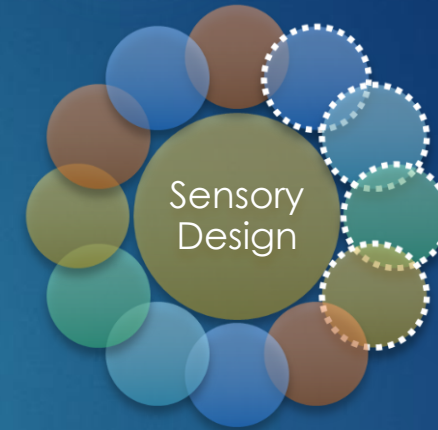
Arrival at the school is an extremely important moment for all children. Children with autism, having difficulties to deal with, when they change environment from the comfort of home moving to the hustle and bustle of the school environment can be distressing. (Mcnally et al., 2013).

Compartmentation

Compartmentation is to organise a space or building into compartments with clear functions and sensory qualities that help define the user. Separate spaces using furniture, floor covering, floor level or lighting to organize the space. Using transition zones helps the individual recalibrate their senses as they move from one level of stimulus to the next. These spaces may be anything from a distinct node that indicates a shift, to a full sensory room (Society, 2015).

Wayfinding

Circulation areas can be potentially distressing for pupils. Becoming disorientated or lost can cause great stress to a child with ASD. Complex layouts, long corridors and frequent changes of level can contribute to a feeling of disorientation and create a sense of anxiety.



Building Scale

Children with ASD will be most calm in an environment that they can easily comprehend. Small-scale schools or those with simple building layouts offer the most basic surroundings for easy comprehension. The scale of a large school can be daunting for a pupil with ASD. The sheer number of buildings, doors, windows, staircases and the variety of classrooms, corridors, offices and countless other rooms that go to make up the landscape of any large school can present an stimulating yet sometimes disorienting universe for most children (Mcnally et al., 2013).

6.0 Literature Review



Quiet Room

Children with ASD can begin to demonstrate disrupting behaviour when they become tired, distressed or over-stimulated. It needed to allow the children to calm down and in effect 'recharge their batteries.' A quiet room will be an area acoustically separated from but directly accessed from the classroom (McNally et al., 2013; Mostafa, 2014).

Garden

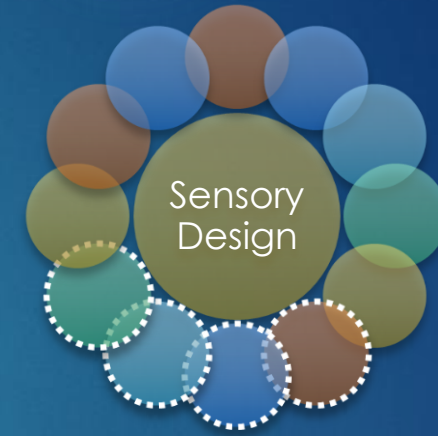
Autistic children responded positively in the garden. Exercise in a natural environment may promote directed attention and social interactions among autistic, which may positively influence exercise intentions (Hansen, Blakely, Dolata, Raulston, & Machalick (2014); Rogerson, Gladwell, Gallagher & Barton (2016))

Safety & Security

An architect and designer should aware of the need to design the so-called 'architectural barriers'. Annaiz, Segado, & Albaladejo (2011) mentioned that behavioural problems related to cases of ASD and they would be aggressive at any time.

Alternatives Therapy

Art therapy & Pet therapy as alternative therapy for autistic through increased social interaction and communication as well as reduced problem behaviors, autistic severity, and stress (O'Haire, 2013).



Conclusion

Perhaps this research could contribute to architects and designers to use during design stage and create a quality environment for autistic children within the Malaysian context.

Therefore, future research is needed to measure on conduciveness of autism environment and also creating conducive learning environment not only optimises the classroom environment but also upon parent's and interventionist's satisfaction.



Thank you