ABSTRACT

Designing in a universal context allows for an environment to be accessible, innovative, and conducive to the success of the user regardless of physical, emotional, or mental capabilities. This project integrates evidence-based design in order to convey a meaningful and uniquely curated environment for children with developmental disorders and/or sensory impairments to thrive in the context of developmental education.

This research and design project focuses on the challenge of creating a space where children on the autism spectrum with learning disorders and/or sensory sensitivities feel educationally productive and comfortable with the stimuli around them at any given time. This project delves into the following areas:

Sensory stimulation: What colors, saturations, visual and physical textures, acoustical properties, olfactory considerations (i.e. off-gassing, VOCs, material selection and properties), temperature control, etc. are most suitable for these types of spaces? How do hypo- and hyper-sensitivities play a role in finish, furniture, and equipment selection?

Supplementary sensory stimulation: How do vestibular (inner ear balance) and proprioceptive (body/spatial awareness) play a role in the design process?

Color: How does color affect the visual weight, size, and distance of objects and surfaces? What stimulating response do certain interior colors have on occupants of a space?

Design as therapy: What therapeutic techniques may be integrated into the project to improve the physical, emotional, and mental wellbeing of the occupants? How will practices like Snoezelen, horticulture and garden therapy, and hydrotherapy factor into the layout of the design?

Spatial considerations: How do design elements such as proximity, proportion, physical and spatial intimacy and/or isolation, volume, perception, and flexibility play a role in the design process? What is the importance of safety and privacy in this context?

This developmental education project implements evidence-based design and integrates research and design solutions found in this area of design.

ICEBERG MODEL

BEHAVIOR

UNDERLYING DEFICITS	UNAWARE OF SOCIAL RULES
	UNAWARE OF OTHERS' FEELINGS
	SENSITIVE TO SOUND, LIGHT, ETC.
	FRUSTRATION FROM AN INABILITY TO COMMUNICATE APPROPRIATELY
	INAPPROPRIATE REACTION TO OTHERS
	ANXIETY/CONFUSION IN AN UNSTRUCTURED SETTING
	OVERLOADED BY SENSORY STIMULI
	MISINTERPRETATION OF EVENTS
	FEARS AND PHOBIAS
ENVIRONMENTAL FACTORS	SENSORY STIMULATION (COLORS, SATURATOINS, VISUAL AND PHYSICAL TEXTURES, ACOUSTICAL PROPERTIES, OLFACTORY CONSIDERATIONS, TEMPERATURE CONTROL, ETC.
	SUPPLEMENTARY SENSORY STIMULATION
	SPATIAL CONSIDERATIONS (PROPORTION, PROXIMITY, PHYSICAL AND SPACIAL INTIMACY AND/OR ISOLATION, VOLUME, PERCEPTION, FLEXIBILITY, ETC.
	THERAPEUTIC DESIGN (SNOEZELEN, HORTICULTURE AND GARDEN THERAPY, HYDROTHERAPY, ETC.)
	COLOR (VISUAL WEIGHT, SIZE, DISTANCE, ETC.)
	VESTIBULAR (INNER EAR BALANCE)
	PROPRIOCEPTIVE (BODY/SPACIAL AWARENESS)

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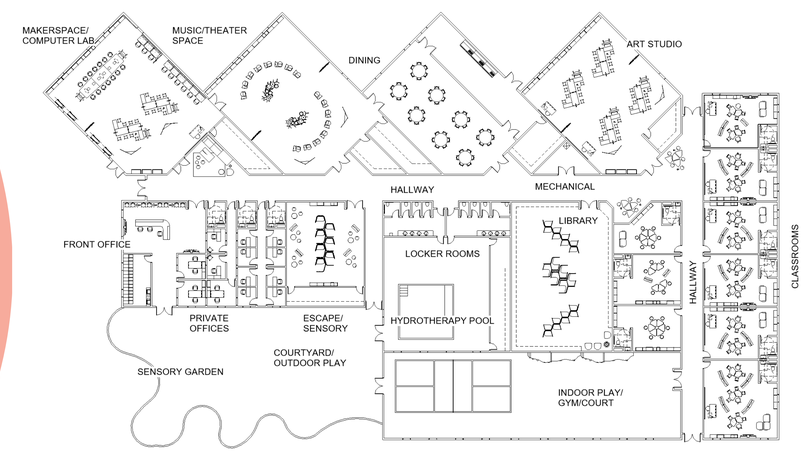
Shahmahommadian, H., & Shahmahommadian, H. (2020). Designing an Autism Healing Center with Emphasis on Nature Therapy. International Journal of Whole Person Care, 7(1), 53-54. https://doi.org/10.26443/ijwpc.v7i1.239. Ghaziani, R., Dr. (2020, March). School design with children: Promoting mental health and wellness in schools by incorporating biophilic design. Retrieved November 04, 2020, from https://associatedevelopmentsolutions.com/wp-content/uploads/2020/03/biophilic-design-for-schools-rokhshid.pdf. Paron-Wildes, A. (2013, October 22). Interior Design for Autism from Childhood to Adolescence. Retrieved November 04, 2020, from https://www.google.com/books/edition/Interior_Design_for_Autism_from_Childhoo/smzrAQAAQBAJ?hl=en. Jeon, K. (2017). Benefits of Multi-Sensory Environments. Retrieved November 13, 2020, from http://www.kijeongjeon.com/multi-sensory-environments.html.

DESIGN AS THERAPY

"The Dutch design therapy SNOEZELEN is a combination of two Dutch verbs "snuffelen" (to seek and explore) and doezelen (to relax). Unlike other therapies where there is a specific exercise and the desired effect, exploration in the SNOEZELEN room is the therapy. A lot of times people with autism are not able to interact with their environment; their senses are either overwhelmed with stimuli or so under-stimulated that they retreat into themselves. The point of SNOEZELEN is to provide the motivational stimuli to engage while at the same time inducing a state of calm. Moreover, other therapies can take place because the room is designed to support them." (Hatch-Rasmussen, C)

In partnership with a student of horticulture and landscape architecture, I devised a plan for a sensory garden within this project. A sensory garden is a unique solution to the overwhelming recommendation to increase views onto nature, increase natural light, incorporate living walls and indoor plants, and incorporate natural elements and references to nature in education design. "Biophilic design patterns can be used in schools for greater connectivity between architectural design and nature to provide enhanced mental health and wellness. Many children are now living in an environment with poor quality due to pollution, poor air quality, and lack of services. The integration of nature into the design of schools will ensure the children's experience and relationship with nature in their everyday learning. This will contribute to the children's psychological well-being (by using nature as a therapeutic medium for trauma healing)." (Ghaziani)



COLOR

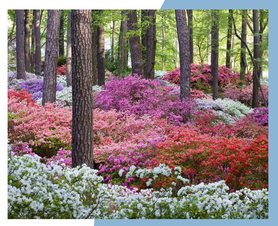
"An interior is a three-dimensional world that completely envelops you in color; color surfaces are all around you, above you, and beneath you. Interior surface color is dynamic energy. Advancing and receding color defines the structure and the space of the enclosure. Color can be used to increase or decrease the legibility of an interior, and is a prime instrument for creating an illusion. Color influences the visual weight, size, and distance of objects and surfaces. Hue and brightness differences separate objects and pattern motifs from their backgrounds and locate them in space, making it possible to see what things are and where they are located. Pattern not only intrigues the eye and enriches architectural surfaces, it can be more powerful than flat color in affecting the spatial quality of the enclosure." (Miller, M.C)

Color is a powerful tool in perpetuating a certain feeling or reaction in a closed environment. Warm colors increase energy levels and foster an underlying sense of dynamism. Cool colors are calming and docile in nature, and are great in areas of rest, study, or focus.

SENSORY FACTORS

"Good acoustic design begins with the building layout, considering adjacencies of spaces with similar noise outputs and limiting or graduating the transition between quiet and loud spaces. A holistic, collaborative approach to building services with engineers, acousticians, architects and the building users to evaluate the best choice of mechanical, passive or hybrid HVAC systems." "Improving the opportunity for increased personal space such as wider corridors, breakout spaces, an opportunity to retreat to a one-to-one room or withdrawal room, or the opportunity to access a secure external space such as an external courtyard. Limit the use of textured surfaces to floors, walls and furniture and use natural materials. Integration of sensory rooms and gardens, therapy rooms and hydrotherapy to help stimulate individuals who experience hypo-sensitivity to touch." (Healy, L)

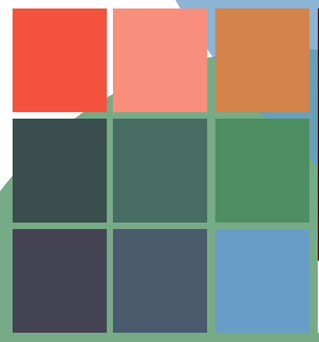
In this visual example, the Makerspace is an accommodation that allows children to participate in hands-on activities. Acoustic wood paneling helps to reduce sound transmission and dampen noise. Room dividing curtains help to reduce sound transmission and separate large spaces into smaller, more manageable areas. A warm color palette consisting of oranges, pinks, and reds perpetuates an energetic, creative, and dynamic environment. Small patterns and low-pile textures help to minimize visual confusion and tactile overload. Natural lighting illuminates the space and elevates the well-being and mood of its inhabitants.



SPATIAL CONSIDERATIONS

"Ceiling heights must be kept low, spatial volumes small and learning spaces intimately proportioned, especially when teacher-student interaction is primarily one-on-one. To adequately serve...pupils you need a larger area per child, about 460sqf per child. Those who advocate for larger spatial volumes claim that people on the autism spectrum can become more guarded and feel threatened in small spaces with other people in them. Each of us maintains a bubble of space to perceive, evaluate, and react to potential hazards. Many architects try to resolve these conflicting spatial desires with flexibility, a variety of spaces, or a mixture of the two." (Jeon, K)

Too much flexibility will throw off ASD students and their memorized visual of spaces. There is a lot of conflicting data surrounding spatial considerations in reference to spaces designed to serve those on the autism spectrum. Some data indicates that large, open spaces are more suitable for those with ASD, while some data implies the opposite. Throughout this design you will see a compromise between the two evidence-based viewpoints, with open spaces and high ceilings complemented by escape spaces, room dividers, acoustic features, and furnishings with semi-enclosed forms.



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DESIGNING FOR DEVELOPMENTAL EDUCATION

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