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A LANDSCAPE FOR PLAY: AN EXPLORATION OF SENSORY ARCHITECTURE
SOLUTIONS FOR CHILDREN WITH AUTISM SPECTRUM DISORDER

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A LANDSCAPE FOR PLAY: AN EXPLORATION OF SENSORY ARCHITECTURE
SOLUTIONS FOR CHILDREN WITH AUTISM SPECTRUM DISORDER

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ABSTRACT

In the kaleidoscope of human experiences, the sensory realm unfolds as a tapestry that uniquely colors our perceptions of the world. For children navigating the intricate landscape of autism spectrum disorder (ASD), this tapestry takes on profound significance as their sensory sensitivities can both illuminate and obscure the path to understanding and learning. The concept of sensory architecture combined with the ‘neuro-typical’ approach presents an innovative and promising solution to developing inclusive spaces for children with ASD. Influenced by ‘the play of light’ and ‘the play of the waves,’ this thesis aims to create an understanding of dynamic interaction, freedom and flexibility, unfolding and discovery, and creativity through physical interaction with the spatial environment.

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Lastly, I want to thank my family, friends, and peers for standing by me throughout my educational journey. Their endless love and support have driven me to push through obstacles and strive for excellence.

DEDICATION

To the little girl who dared to dream. The world is your playground.

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LIST OF ABBREVIATIONS

ADDM	Autism and Developmental Disabilities Monitoring
ASD.....	Autism Spectrum Disorder
CDC	Centers for Disease Control and Prevention

1. INTRODUCTION

1.1. Problem Statement

In contemporary society, built environment professionals must create spaces that accommodate the diverse needs of all individuals. This standard is recognized as a fundamental aspect of social responsibility. One significant population that often faces challenges in navigating and engaging with their surroundings is children on the autism spectrum. According to Pankaj Sarkar (2024), editor for *ihear* Autism Management, “Autism spectrum disorder (ASD) is a complex neurodevelopmental condition characterized by challenges in communication, social interaction, and repetitive behaviors” (para. 1). As we continue to strive for a more inclusive society, it is a predominant need to address the unique and underinformed requirements of children with ASD in various settings, particularly those designed for education, play, and social interaction. How can design professionals confront the pressing need for considerate and intentional design strategies that foster inclusive spaces while ensuring that children with autism spectrum disorder have all the resources necessary to participate and thrive in all aspects of life fully?

1.2. Objective

This thesis aims to explore how sensory architecture solutions can be integrated into recreational play settings geared toward children on the autism spectrum. Additionally, the design process proposes a new methodology in which using an Artefact as an architectural tool can contribute to the meaning-making process of human design. Finally, there will be a study on the act of ‘play’ and the theoretical approach of the mind and body and how the body occupies space.

2. BACKGROUND

2.1. The Story of Autism

Autism is a complex neurodevelopmental spectrum condition that has a vast history beginning in the 1940s. The text *In a Different Key: The Story of Autism*, written by John Donvan and Caren Zucker, takes readers on a journey in search of the first-ever diagnosed child of autism, Donald Triplett.

2.1.1. Autism's First Child

In 1935, the world's first surviving quintuplets were born in Ontario, Canada. The mere odds of the girls' existence drew in many tourist visits and notable figures. Therefore, it was no surprise that the Dionne quintuplets would raise the brow of a little boy named Donald from Forest, Mississippi. Early on, Donald was able to recite their names: Emilie, Cecile, Marie, Yvonne, and Annette, but to Donald, these were not the names of little girls – they were colors inside of paint bottles. “Annette” contained blue paint, “Cecile” held red, and so forth. It was this reaction to the girls that his parents, Oliver and Mary Triplett, found quite peculiar:

Donald was uniquely drawn not to the girls' humanity but by the raw geometry of their sameness. They came in an identical set of five, just like the paint inside his bottles, yet they were each individually different. This paradox caught and held his attention.

(Donvan & Zucker, 2017)



Figure 2.1.1.1. The first American child to receive a diagnosis of Autism (Source: Triplett Family Archives).

During the summer of 1937, four-year-old Donald Triplett was admitted to a facility known as the Preventorium in Sanatorium, Mississippi. His parents were promised he would be “under constant, expert medical supervision.”

2.1.2. Case 1

In 1943, Dr. Leo Kanner, an Austrian American psychiatrist, became one of the pioneers in autism research. The doctor published a groundbreaking paper titled *Autistic Disturbances of Active Contact*, describing Donald’s case and others. Donald became the first child diagnosed with Autism and was referred to as “Case 1.”

Dr. Kanner’s observations laid the foundation for the conceptualization of autism as a distinct developmental disorder, and it marked the first time that a group of children sharing similar behavior characteristics was identified as having autism.



Figure 2.1.2.1. Donald Triplett yearbook photo (Source: Triplett Family Archives).

Despite the challenges he faced growing up, Donald Triplett went on to lead a relatively independent and fulfilling life. Donald's life exemplifies the resilience and potential for achievement for individuals with autism, and his case remains a crucial part of autism history (Donvan & Zucker, 2017).

2.1.3. Autism Spectrum Disorder

According to the Mayo Clinic, "autism spectrum disorder is a condition related to brain development that impacts how a person perceives and socializes with others, causing problems in social interaction and communication" (Pruthi, 2018, para. 1). Sensory processing differences are a hallmark of autism spectrum disorder, and often lead to hypo-responsiveness to sensory stimuli, impacting the way individuals perceive and engage with their environment. These sensory challenges can substantially affect the quality of life for children on the spectrum, influencing their ability to learn, socialize, and thrive within various contexts.

2.2. Sensory Architecture

2.2.1. Designing for Children

Today, architectural design is held to a series of standards and ethical codes that predominately overlook the necessities and comfortability of the users who will inhabit the spaces. This standard is especially true for children and the younger population. The architecture we encounter as children significantly impacts our perspective of the world and shapes the adults we become.



Figure 2.2.1.1. The “Flower + Kindergarten” project (Source: archdaily.com, 2016).

The most common places humans experience architecture as children are in schools and other learning environments. Although higher officials are moving towards more localized design for school systems, the Architect must consider vital principles such as creating social spaces for interactive and playful learning (Dobbins, 2018).

2.2.2. The Senses and Sensory Solutions

The physical environment plays a crucial yet often underestimated role in the lives of individuals with ASD. The concept of sensory architecture, encompassing the design and organization of spaces to accommodate diverse sensory needs, presents an innovative and promising approach. Sight, acoustics, touch, and the vestibular and proprioceptive senses all play a massive role in the experience of our environments. By understanding how architectural elements – such as lighting, acoustics, textures, and spatial organization – impact sensory experiences, it becomes possible to create spaces that support the unique sensory profiles of children on the autism spectrum.



Figure 2.2.2.1. Outdoor play landscape (Source: archdaily.com, 2018).

2.2.3. Designing for Autism

Design strategies for children with autism spectrum disorder is an ongoing cultural debate among specialists. Differences in autism design methodology have sparked the interest of architecture professionals, and today, two major design approaches are placed head-to-head: the sensory sensitive-approach and the ‘neuro-typical’ approach. Therefore, these design strategies must be studied to deliver the best possible solution that will both foster inclusive spaces and provide individuals with ASD with the resources necessary to participate and thrive in all aspects of life fully. A research paper titled *Design Approach for Autism Treatment Centers* by Andrei Pomana dives deep into these two prominent design strategies for autism.

2.2.3.1. The Sensory Sensitive Approach

According to Pomana (2014), sensory-sensitive design theory is meant “to provide the best situations for all the varieties of autism spectrum disorders” (para. 8). The sensory-sensitive approach for children with autism has been at the forefront of architectural design today. Sources such as *The Autism Friendly University Design Guide* and *The Autism ASPECTSS Design Index* by Magda Mostafa are the leading research-based strategies regarding sensory sensitivities.

Within her design guide, Mostafa says:

This guide takes the position of neurodiversity and ability as a spectrum. It advocates for viewing the human condition as a continuum of different but equally valid perceptual understandings of the world around us, with the consequent abilities resulting from those perceptions and differences. It advocates for looking beyond mere inclusion to aspire to a state of blurred boundaries between “normal” and “special” to see all users as human with equal rights. It calls for the provision of equal opportunity across that spectrum (Mostafa, 2021, p. 43).

The Autism Friendly University Design Guide highlights the *Autism ASPECTSS Design Index* and its primary solutions and potential for design frameworks. These design principles are acoustics, spatial sequencing, escape spaces, compartmentalization, and transitions. This sensory-sensitive approach aims to break down the barriers to learning for children with ASD.

2.2.3.2. The ‘Neuro-Typical’ Approach

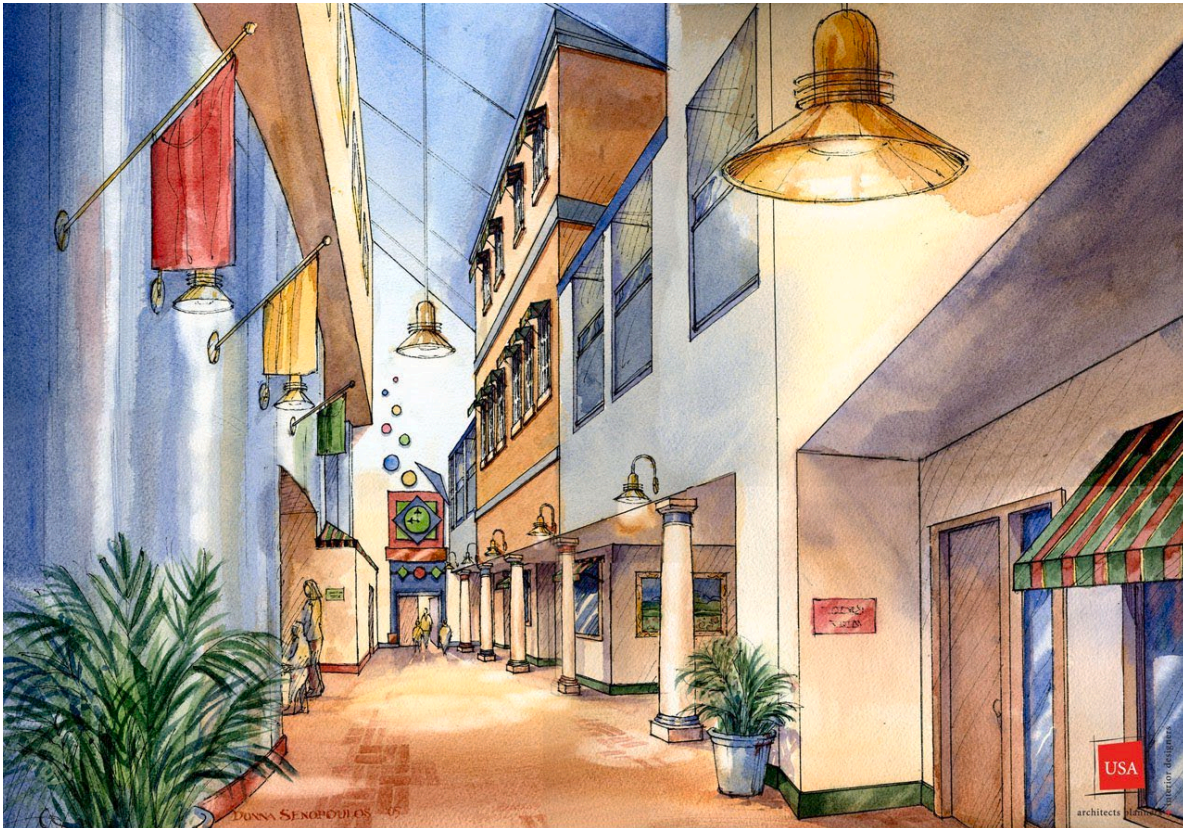


Figure 2.2.3.2.1. The Neuro-Typical Approach (Source: archdaily.com, 2011).

The neuro-typical approach works precisely as it sounds. This design strategy, in opposition to the sensory sensitive approach, places children with ASD within a ‘neuro-typical’ stimulated environment to “provide universal access and integration into the larger population” (Henry, 2011, par. 1). Because individuals on the autism spectrum have poor generalization skills, this design theory focuses on improving their ability to generalize space and its function.

Creating neuro-typical environments for the neuro-divergent population aids in further integration and familiarity with everyday environments and public places (Pomana, 2014).

2.3. Literature Review

2.3.1. Sensation as a ‘Unit of Experience’

Sight, acoustics, touch, and the vestibular and proprioceptive senses all play a massive role in the experience of our environments. At first thought, it might seem best to isolate these senses. However, French philosopher and phenomenologist Maurice Merleau-Ponty says otherwise. Within his text *Phenomenology of Perception*, Merleau-Ponty provides the background on why we must see “sensation as a unit of experience.” Regarding an example of understanding the sensation of oneself, Merleau-Ponty says:

The greyness which, when I close my eyes, surrounds me, leaving no distance between me and it, the sounds that encroach on my drowsiness and hum ‘in my head’ perhaps give some indication of what pure sensation might be. I might be said to have sense experience precisely to the extent that I coincide with the sensed, that the latter ceases to have any place in the objective world, and that it signifies nothing for me (Merleau-Ponty, 1974, p. 1).

Maurice Merleau-Ponty laid the foundation for the concept of keeping the senses together. It is safe to say that we experience the world wholly rather than in separate pieces.

2.3.2. Dynamics of Vision

Within his text *In Praise of Vagueness*, Juhani Pallasmaa (2012) states, “dynamic vagueness and absence of focus are conditions of our normal system of visual perception” (p. 2), although this often remains unacknowledged. The truth is that as humans, our vision is never fully focused; we only view a fraction of the world at any given time. Pallasmaa also takes note

of Merleau-Ponty in that “the presence, permanence, and continuity of our experiential world is established and maintained as an embodied and haptic understanding of ‘the flesh of the world’ that we share with our bodily existence” (Pallasmaa, 2012, p. 3). Ultimately, it can be assumed that “the sense of Self” and our place within the world can be included along with our sensory system.

2.3.3. The Bodily Experience

In the *Enigma of Health*, Hans-Georg Gadamer explains that sensitivity to perception and meaning is the best way Architects can contribute to healthy environments. Being sensitive to perception and meaning influences how individuals navigate and respond to the world around them. In conditions like autism spectrum disorder, heightened sensitivity to perception can result in sensory challenges. In contrast, sensitivity to meaning might lead to a deeper or different understanding of social interactions, language, or symbolic communication. Then Gadamer continues to explain embodiment and the bodily experience. By recognizing and addressing our needs consciously, Gadamer says:

The life of the body always seems to me to be something that is experienced as a constant movement between the loss of equilibrium and the search for a new point of stability.

What a remarkable thing it is that a slight pitch in balance counts as nothing, that we can tilt until almost falling and then swing back into equilibrium. Yet, on the other hand, whenever we go beyond this point of balance, we fall into irreversible misfortune. This seems to me to be the fundamental model for our bodily, and not merely bodily, existence as human beings (Gadamer, 2015, p. 78).

2.3.4. The Embodied Mind

While guided by the works of Merleau-Ponty, authors of *The Embodied Mind: Cognitive Science and Human Experience*, Francisco J. Varela, Evan Thompson, and Eleanor Rosch agree that “Western scientific culture requires that we see our bodies as both physical structures and as lived, experiential structures.” In other words, embodiment has outer and inner sides – a continuous circulation back and forth between the two. The theory presented in *The Embodied Mind* explores cognition and consciousness from an embodied and enactive perspective. The key points are as follows:

1. Embodiment: The mind is not separate from the body but deeply interconnected. They argue that the body plays a central role in shaping cognitive processes and experiences.
2. Enaction: Cognition is not just about mental representations or passive information processing. Instead, it arises through active engagement and interaction with the environment. They emphasize that the mind is enacted through an organism’s ongoing engagement with the world.
3. Embeddedness: Cognition is situated and inseparable from the context in which it occurs. The environment, social interactions, and cultural factors strongly influence it. The mind is not isolated but embedded within its surroundings.
4. Dynamic Systems: They propose that cognition is a dynamic system constantly evolving and changing through the interaction between the body, mind, and environment. The mind emerges from this complex, interdependent system (Varela et al., 1991).

2.3.5. The Act of “Play”

Gadamer’s (1986) essay and discussion on the act of play as a form of art within *The Relevance of the Beautiful* lays the foundation for what this thesis is attempting to accomplish.

Gadamer states that “play is so elementary a function of human life that culture is quite inconceivable without this element” (p. 22). The act of play consumes the everyday lives of human experience, and the Greeks and Aristotle have described “self-movement as the most fundamental characteristic of living beings” (p. 23). Therefore, when designing for children – both neurotypical and neurodivergent – potential strategies and solutions must consider the possibility of letting the act of play take over through the entirety of the design process as well as the architecture itself.

2.3.6. A Thousand Imaginations

In conjunction with play being an essential element of experience, the human mind and imagination run constantly with and without our knowing. Architectural professionals must activate and utilize their imaginative capabilities as tools for design. Lisa Landrum (2016) explains that “fully activating one’s architectural imagination requires not only consciousness but conscious practice” (p. 71). Landrum’s essay, *Varieties of Architectural Imagination*, studies a handful of imaginations among thousands that are “each vital and peculiar” (Landrum, 2016, p. 78).

3. METHODOLOGY

3.1. Project Type

This project aims to combine the two design strategies for autism by creating a sensory play landscape that acts as an alternative learning space. This space can provide a beneficial sort of recreational play therapy or gymnastics for children with ASD, as they can explore their body's capabilities while building connections and more significant life lessons. The project is a two-story recreational building for play.

3.2. The Artefact

This thesis is crafted and influenced using an Artefact as a representational tool. The Artefact uses theory and metaphor to generate a transitional project in a form that is not traditional architecture. This steppingstone between research and design helps tell better stories of the work we create. After the physical creation and examination of the Artefact, ideas of imaginative space and form are directly drawn upon the piece inspired by linguistic precedent.



Figure 3.2.1. The Artefact and the Interpreter (1 of 4)

This architectural Artefact presents the imaginative uses of space and the ideas of what could be. Influenced by “The Play of Light” and “The Play of the Waves” along with the beautiful words written by Gaston Bachelard in his essay *Water and Dreams*, I have created an interactive production in which individuals can engage in the physical act of “play.” The Artefact provides a theatrical experience in which the user fully engages with their senses. As previously said, “play stresses dialogical engagement between the interpreter and the subject” (Gadamer et

al., 1986), where the subject has become a series of overlapping fabrics that bear texture, color, and movement.



Figure 3.2.2. The Artefact and the Interpreter (2 of 4)

From afar, the Artefact is viewed as four separate parts or fabrics that make a single work of art. Gaping holes of various sizes were removed from the fabrics to allow the play of light to occur within the piece, and the fabrics were carefully chosen to represent the play of the waves

through color and textures. The viewer can then weave a ribbon through the installation and tug the fabrics in a wave-like motion.



Figure 3.2.3. The Artefact and the Interpreter (3 of 4)



Figure 3.2.4. The Artefact and the Interpreter (4 of 4)

3.2.1. Viewing Endless Possibilities

As we take a step closer to the Artefact, we are struck with a sense of discovery that unveils many ideas surrounding form and space. This single composition unfolds endless possibilities of conceptual plans, sections, and perspectives, and the interpreters can envision themselves within these visuals inspired by the Artefact.



Figure 3.2.1.1. The Artefact and the Discovery of Endless Possibilities (1 of 8)



Figure 3.2.1.2. The Artefact and the Discovery of Endless Possibilities (2 of 8)



Figure 3.2.1.3. The Artefact and the Discovery of Endless Possibilities (3 of 8)



Figure 3.2.1.4. The Artefact and the Discovery of Endless Possibilities (4 of 8)



Figure 3.2.1.5. The Artefact and the Discovery of Endless Possibilities (5 of 8)



Figure 3.2.1.6. The Artefact and the Discovery of Endless Possibilities (6 of 8)



Figure 3.2.1.7. The Artefact and the Discovery of Endless Possibilities (7 of 8)



Figure 3.2.1.8. The Artefact and the Discovery of Endless Possibilities (8 of 8)

3.3. Project Location



Figure 3.3.1. Reference Map of California, United States (Source: Nations Online Project).



Figure 3.3.2. Reference Map of San Francisco (Source: Harrison Godwin, 1927).

This thesis project, *A Landscape for Play*, is in San Francisco, California. According to the CDC's (2023) Autism and Developmental Disabilities Monitoring (ADDM) Network, California has the highest rate of children being diagnosed with autism spectrum disorder.

3.4. Site Selection

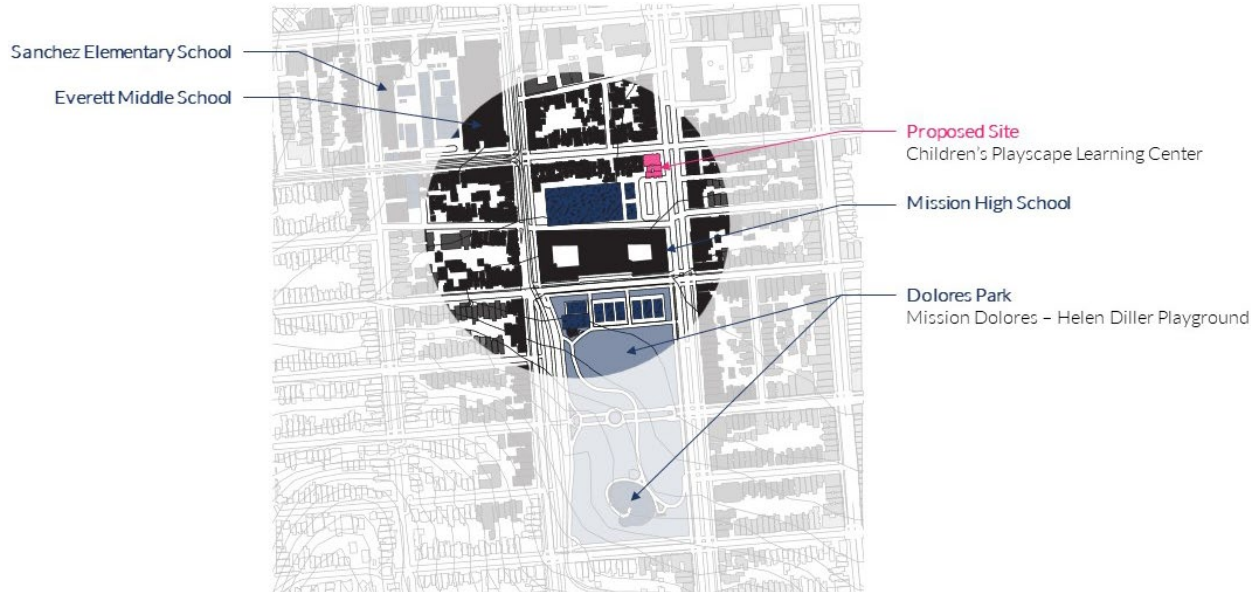


Figure 3.4.1. San Francisco Unified School District Site Map

The thesis program will be adjacent to Mission High School in the heart of San Francisco, California. Sanchez Elementary School and Everett Middle School are one block from the proposed site. The selected site is in the perfect location to aid the school district's special needs programs and autistic population.

3.5. Precedents

Alongside my research, I spent a great deal of time studying a handful of successful works that inspired my thesis and further pushed my design ideas, thoughts, and theories. The following precedents combine architectural projects, a theatrical installation, and an inspiring linguistic piece.

3.5.1. St. Mary's Roman Catholic Church

St. Mary's Roman Catholic Church was Architect Douglas Cardinal's first building, completed in 1968. This was a project in which Cardinal was inspired by and worked very

closely with Father Werner Merx on this project. Thus, the design of the church revolves fully around the new liturgy (Belogolovsky, 2020, para. 5).



Figure 3.5.1.1. St. Mary's Roman Catholic Church (Source: St. Mary's Parish).

St. Mary's Church emphasizes the idea of hidden architecture and the feeling of discovery within. This work sets a perfect example for Martin Heidegger's concept of *Stimmung* – which translates to attunement, mood, and atmosphere – in other words, designing the user's mood and background (Pérez-Gómez, 2016, p. 227).

3.5.2. Endless House

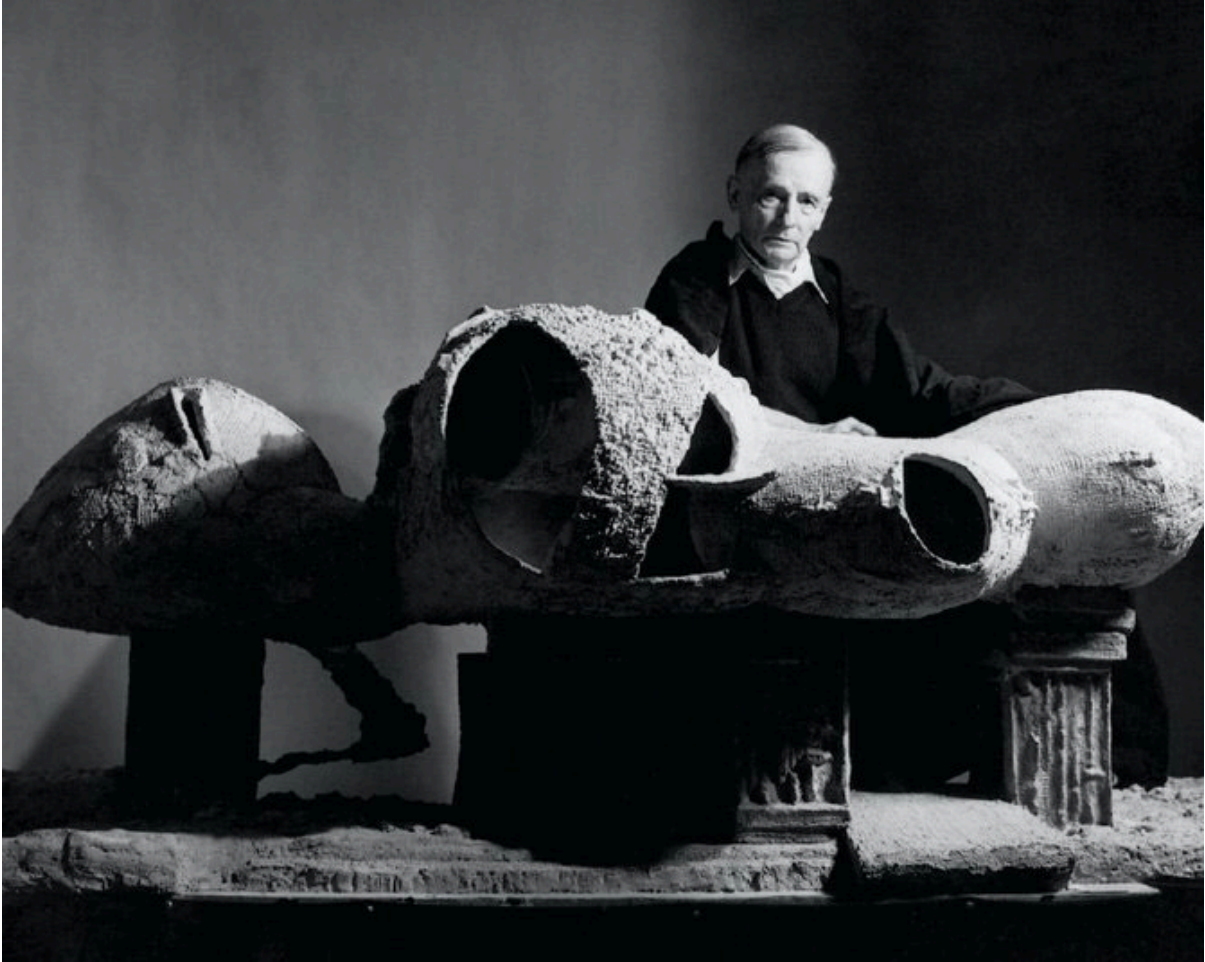


Figure 3.5.2.1. Endless House (Source: archdaily.com, 2011).

Frederick Kiesler's "Endless House" is a visionary architectural concept that challenges traditional notions of form and function. Kiesler envisioned a structure that transcends the conventional boundaries of a house, with fluid, continuous spaces that seamlessly blend indoor and outdoor environments. The design emphasizes flexibility and adaptability, allowing inhabitants to personalize and reconfigure the space according to their needs and desires. Kiesler's "Endless House" embodies his belief in architecture as a dynamic, organic entity that interacts harmoniously with its surroundings and catalyzes human creativity and expression.

While the "Endless House" was never fully realized, it remains an influential symbol of avant-garde architectural innovation and a testament to Kiesler's revolutionary ideas (Sveiven, 2011).

3.5.3. Social Sensory Architectures

U-M architect and associate professor at the University of Michigan's Taubman College of Architecture and Urban Planning, Sean Ahlquist and MSU playwright Dionne O'Dell created a sensory theatre experience for children with autism spectrum disorder (ASD) challenges (Harrouk, 2019).



Figure 3.5.3.1. Social Sensory Architectures (Source: archdaily.com, 2019).

Harrouk (2019) explains that the pair utilized Ahlquist's "computational design knowledge and material systems expertise to create a soft, stretchy surface for kids with ASD to interact with" (para. 2), and the final product joined the disciplines of architecture and theatre – "creating new possibilities in the realm of sensory performance and presentation" (para. 4).

3.5.4. Water and Dreams: An Essay on the Imagination of Matter

In *Water and Dreams*, Gaston Bachelard explores water's symbolic and psychological significance in human intelligence and dreams. Bachelard explores how water as a symbol embodies fluidity, depth, and transformative qualities, serving as a mirror for the unconscious mind. He argues that water serves as a metaphor for the dynamic processes of the unconscious, inviting readers to contemplate its multifaceted meanings and role in shaping human consciousness. Bachelard writes:

The song of the river is likewise cool and clear. The noise of the waters quite naturally takes on the metaphors of coolness and clarity. Laughing waters, ironic streams, and waterfalls with their noisy gaiety are all found in the most varied literary landscapes. These laughs, these babblings are, it seems, the childhood language of Nature. In the stream, the child Nature speaks (Bachelard, 2006, p. 32).

Bachelard's essay is in line with previously studied literature. How he describes water is harmonic with Gadamer's thoughts on the act of play.

4. RESULTS AND CONCLUSIONS

4.1. Final Project Description

The overall goal of this thesis was to explore how sensory architecture solutions can be integrated into recreational play settings for children with ASD and to examine how a new methodology of the Artefact as an architectural tool could contribute to the meaningfulness of human design. In addition, another objective was to develop a greater understanding of play along with the theoretical concept of mind and body and how the body occupies space.

The creation of the Artefact provided me with a new realization of discovery. A multitude of imaginative architectural iterations and ideas were unfolded before my eyes – ideas such as perspective, form, and space. The fundamental act of play within and out of the Artefact has not only consumed this bridging point between research and architecture – play has become the creation of architecture. I propose the Artefact to be the architecture.

I have crafted a series of examples of layering to display the morphing of the Artefact to the imagined space and realistic ideas of space. Beginning with the outer perspective, I reiterate an iteration of imaginative space in which we can place ourselves. The architecture then designs and unfolds itself through the playful process of creating the mood and atmosphere of physical space. Again, this emphasizes Heidegger's concept of *Stimmung* and presents the beautiful transitions of human experience.

4.2. Imagination of Space and Form



Figure 4.2.1. Sensory Play Landscape One (Phase 1 of 6)



Figure 4.2.2. Sensory Play Landscape One (Phase 2 of 6)

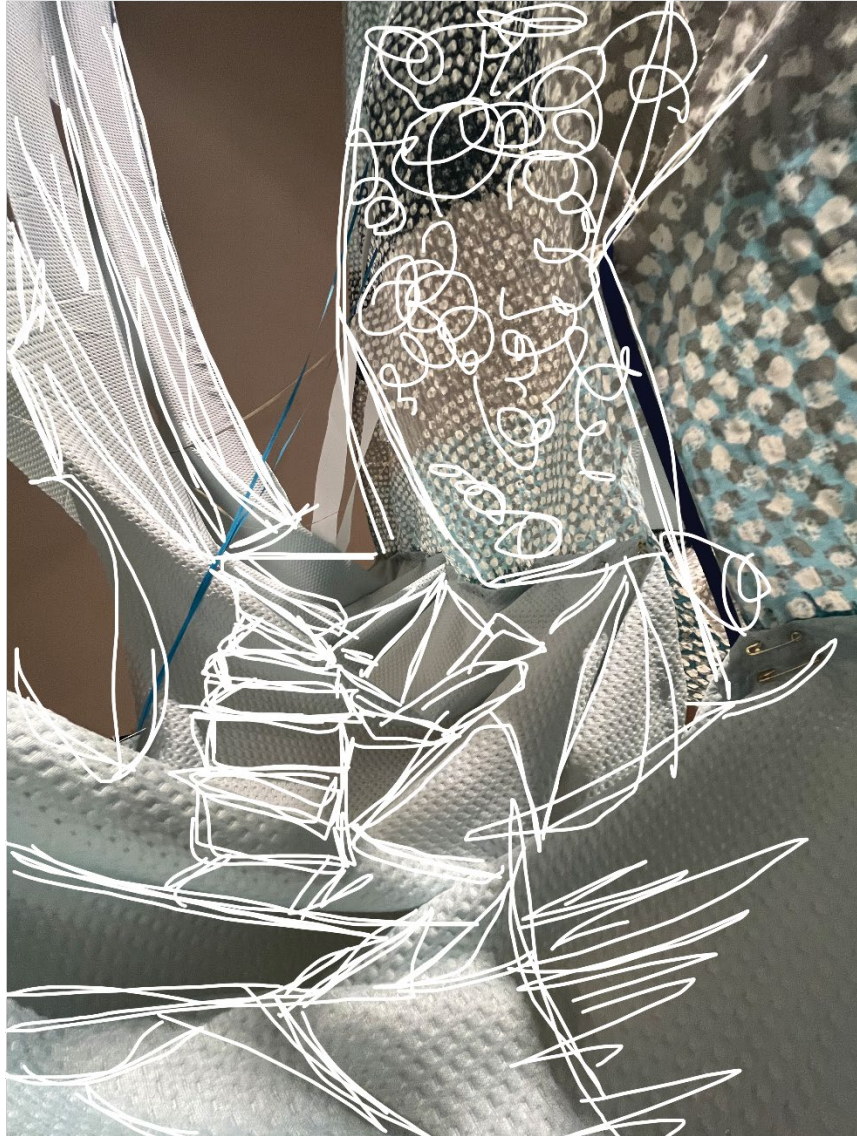


Figure 4.2.3. Sensory Play Landscape One (Phase 3 of 6)



Figure 4.2.4. Sensory Play Landscape One (Phase 4 of 6)



Figure 4.2.5. Sensory Play Landscape One (Phase 5 of 6)



Figure 4.2.6. Sensory Play Landscape One (Phase 6 of 6)



Figure 4.2.7. Sensory Play Landscape Two (Phase 1 of 6)

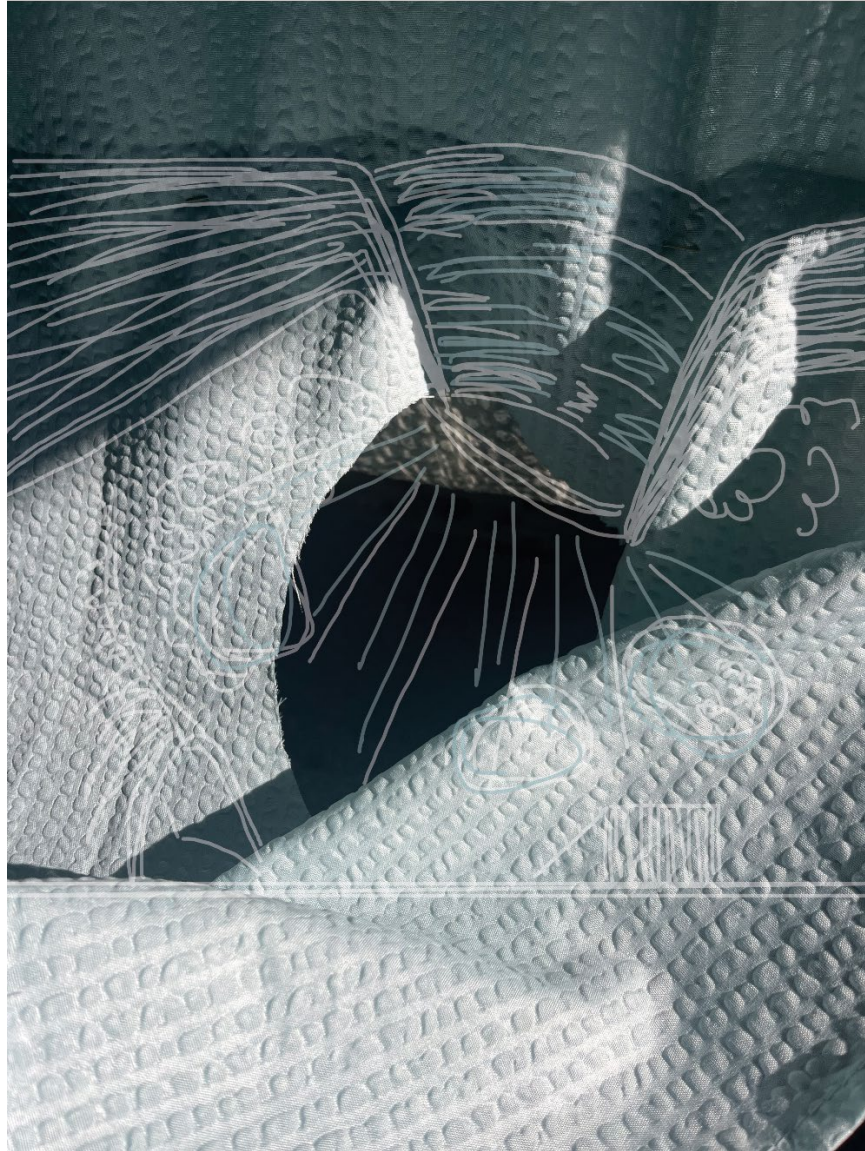


Figure 4.2.8. Sensory Play Landscape Two (Phase 2 of 6)

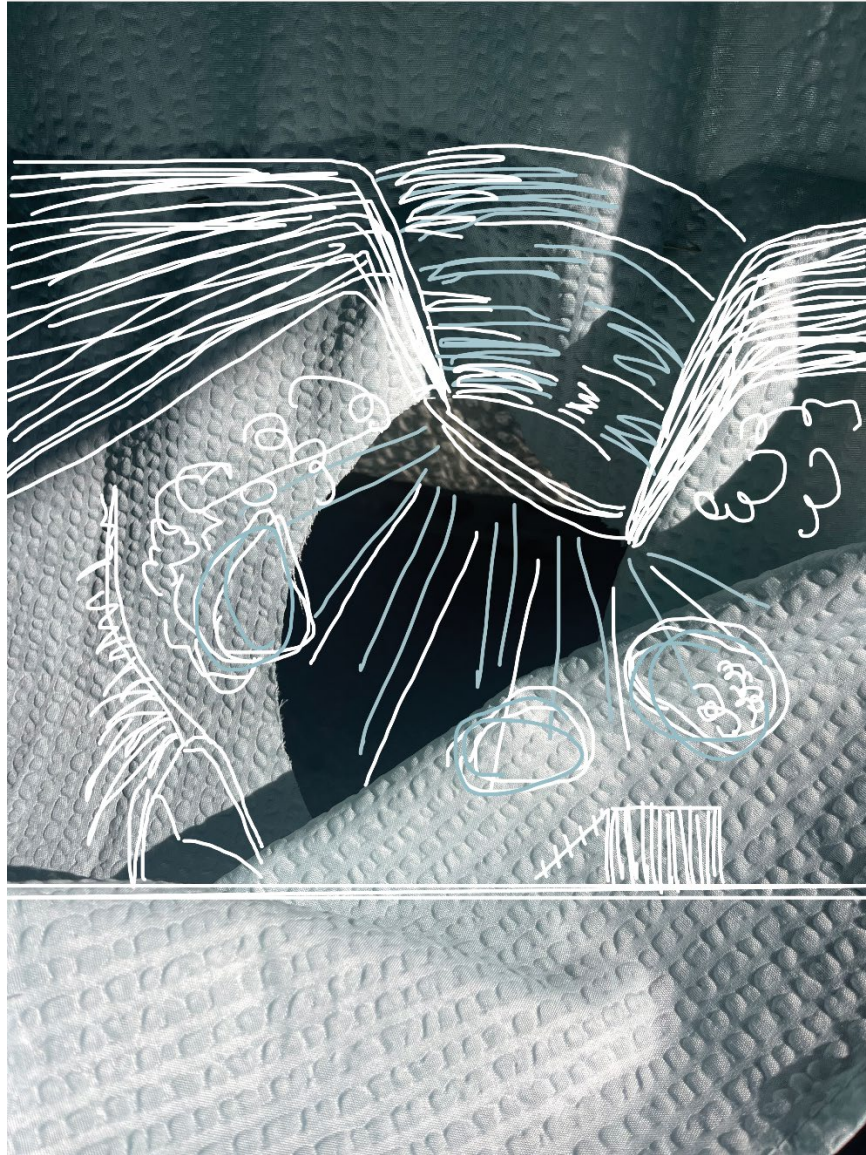


Figure 4.2.9. Sensory Play Landscape Two (Phase 3 of 6)



Figure 4.2.10. Sensory Play Landscape Two (Phase 4 of 6)



Figure 4.2.11. Sensory Play Landscape Two (Phase 5 of 6)



Figure 4.2.12. Sensory Play Landscape Two (Phase 6 of 6)

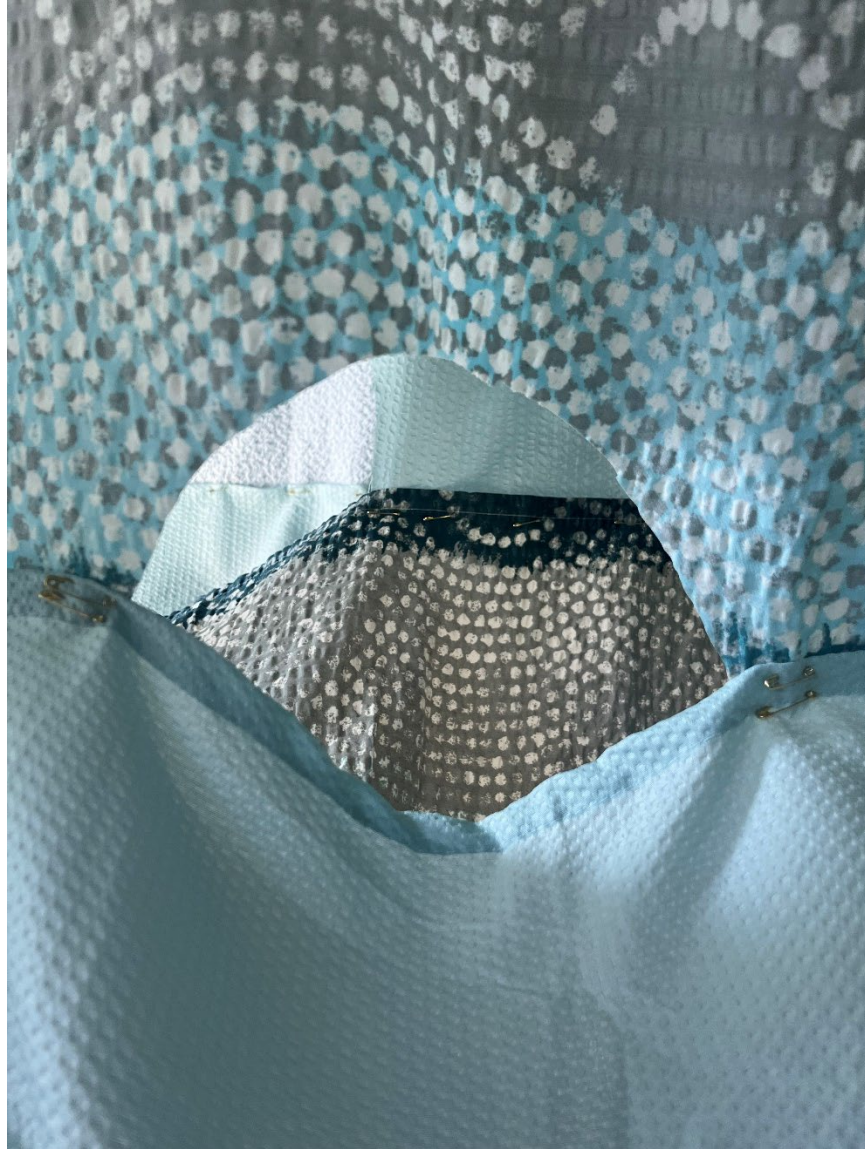


Figure 4.2.13. Sensory Play Landscape Three (Phase 1 of 6)

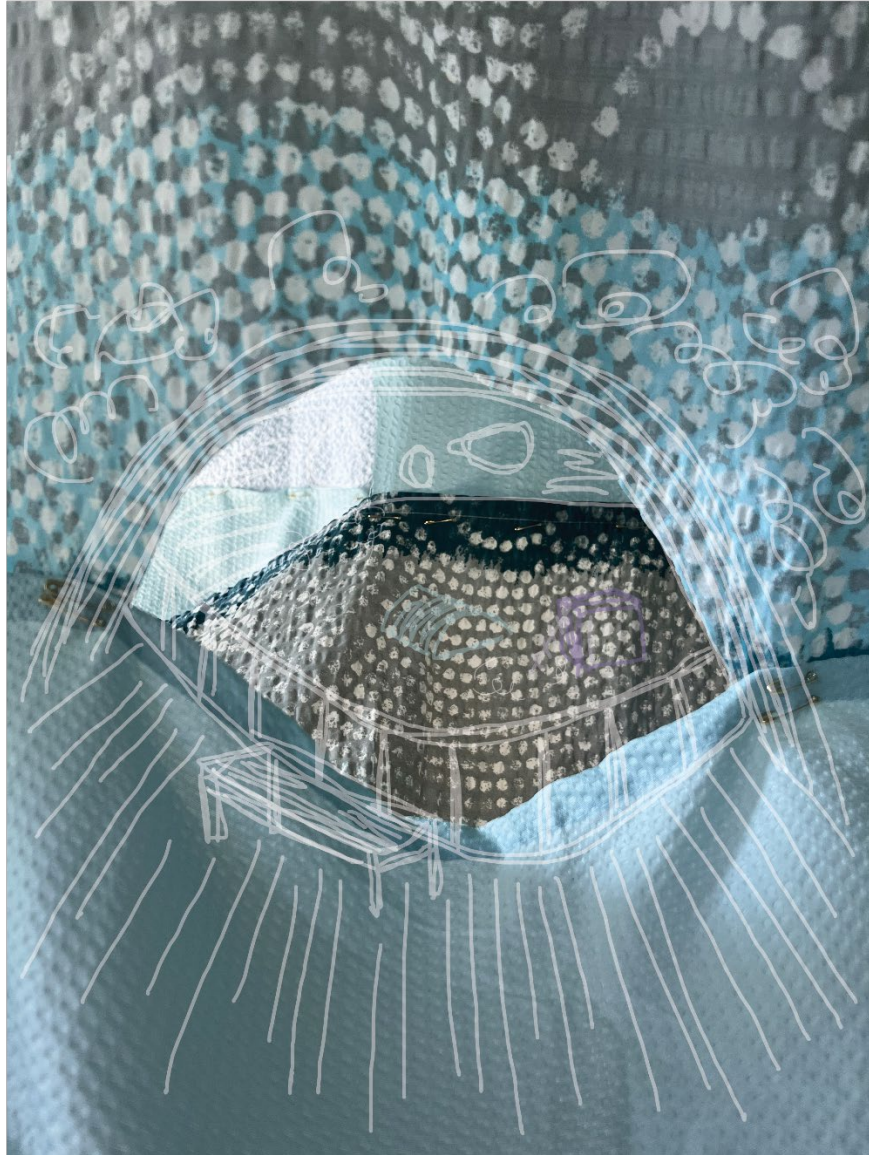


Figure 4.2.14. Sensory Play Landscape Three (Phase 2 of 6)

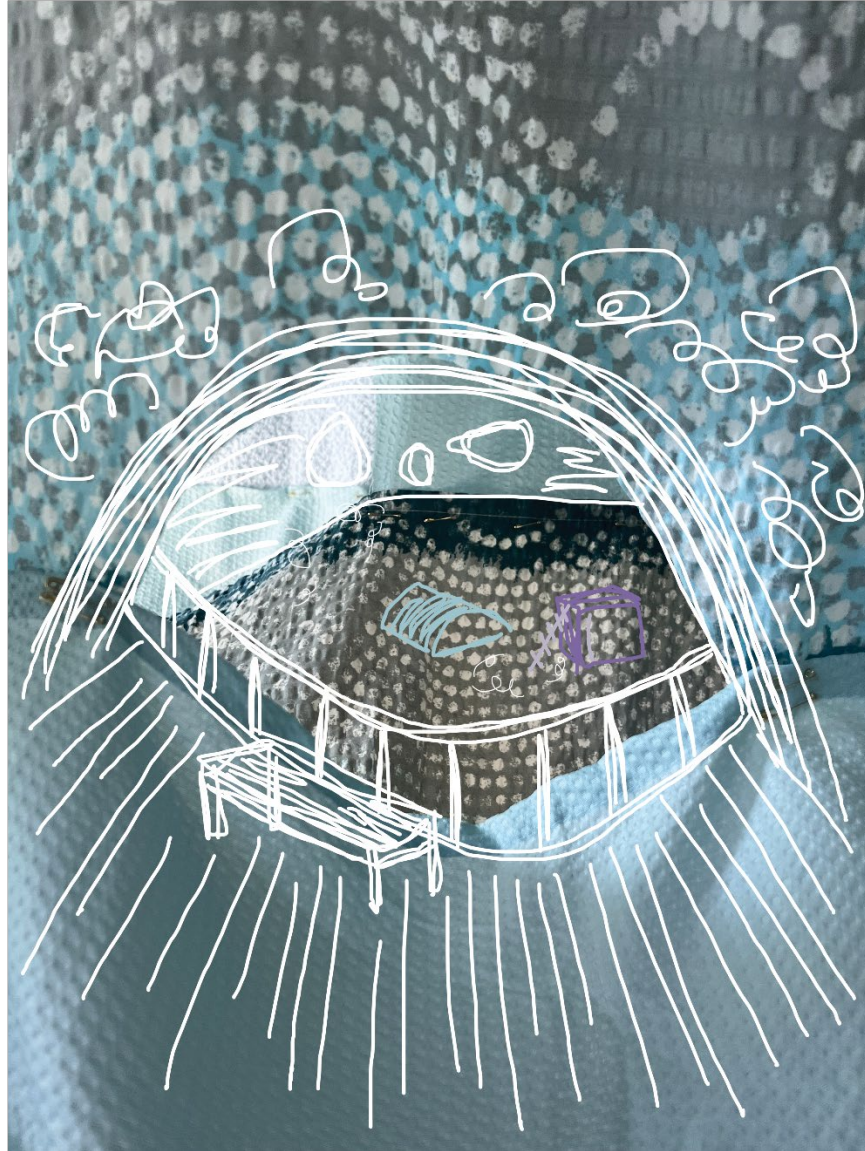


Figure 4.2.15. Sensory Play Landscape Three (Phase 3 of 6)

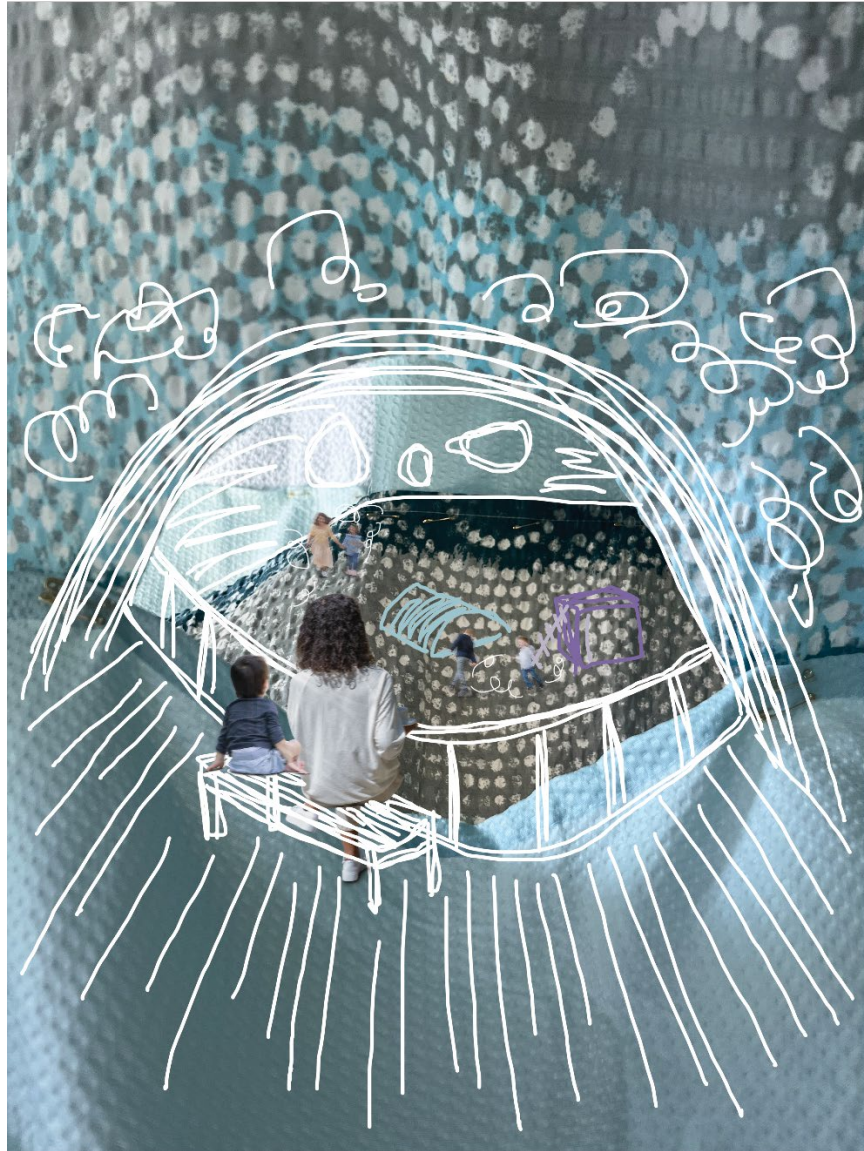


Figure 4.2.16. Sensory Play Landscape Three (Phase 4 of 6)



Figure 4.2.17. Sensory Play Landscape Three (Phase 5 of 6)



Figure 4.2.18. Sensory Play Landscape Three (Phase 6 of 6)

4.3. Conclusion

This thesis has highlighted the significance of sensory architecture solutions in creating inclusive play environments for children with autism spectrum disorder (ASD). With a great focus on the act of play, this research has emphasized the importance of designing spaces that engage multiple senses and cater to the specific needs of children on the autism spectrum.

By integrating principles of both the sensory sensitive and neuro-typical approaches, designers can create environments that promote sensory engagement, social interaction, and emotional well-being for children with ASD. The act of play serves as a vital medium for exploration, communication, and self-expression, and by prioritizing play in the entirety of the design process, architectural professionals can facilitate positive developmental outcomes for both the neurotypical and neurodivergent.

Subsequently, future research and practice need to continue exploring innovative approaches to sensory architecture that prioritize the act of play and foster inclusivity and accessibility for autistic children. Using an Artefact as a representational tool to facilitate the imagination is a step in the right direction for designing celebratory spaces that acknowledge the unique abilities of children with autism spectrum disorder and enhance their quality of life.

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