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Sensory Adaptive Environment to Enhance Participation in Healthcare for Children with Autism Spectrum Disorder: An Interdisciplinary Design Thinking Approach

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Introduction/Background

- Participation in healthcare for children diagnosed with Autism Spectrum Disorder (ASD) can be overwhelming resulting in stressful responses safety concerns.¹
- Sensory features impact healthcare participation.
- Up to 84% of individuals with ASD experience atypical sensory features of :
 - Hyper or hypo reactivity to sensation.²
 - Unusual sensory interests in the environment.²
 - Poor sensory integration.²
- Families may refrain from participation in medical care to prevent negative experiences, contributing to occupational deprivation.¹
- Sensory Adaptive Environments (SAE) may improve participation for autistic persons.^{1,3,4}

Purpose

To design a sensory adaptive environment to improve participation in healthcare for autistic children.

Participants

- Parents of autistic children (n= 6:2 Spanish speakers, 3 English Speakers).
- Health care professionals at Nemours and professionals at Jefferson (n=20)

Eligibility criteria for parents:

- having a child with a diagnosis of ASD
- currently attending the Swank Autism center
- English or Spanish speaker

Table 1: Phase 1: Participants- Parents/Caregivers

Parents/caregivers	English speakers	Spanish speakers
6	3	2

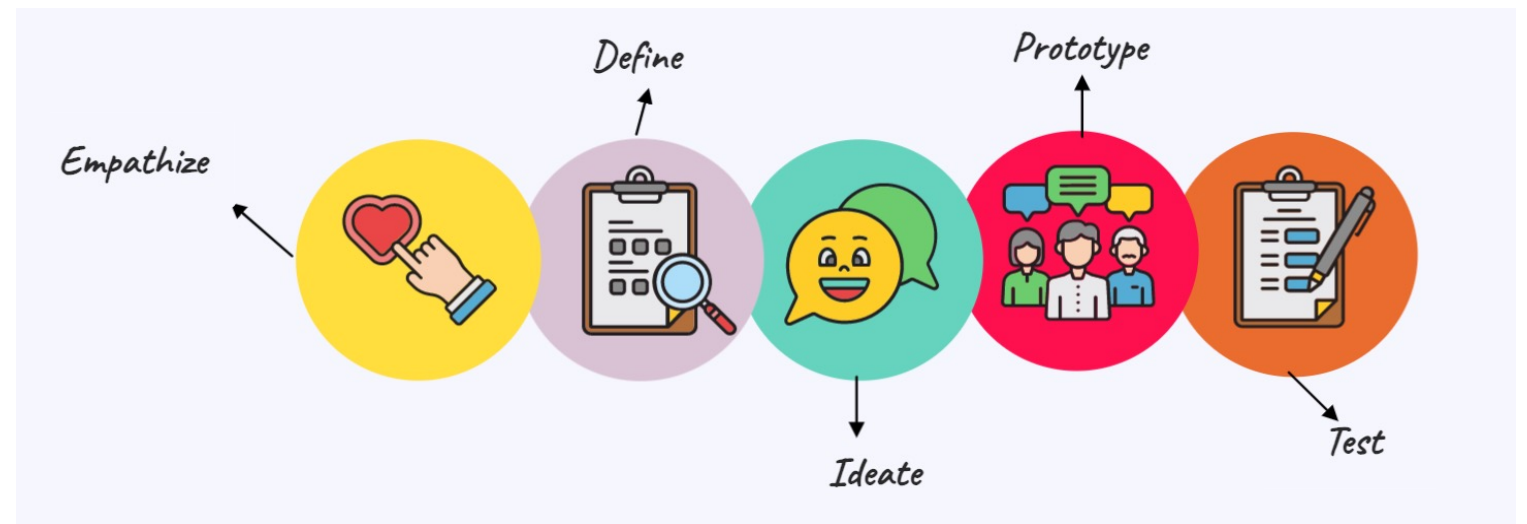
Table 2: Phase 2 : Participants- Professionals





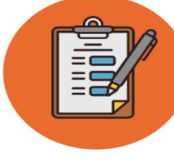
Disciplines	Participants
Occupational Therapy	9
Medicine	3
Interior Design	3
Architecture	2
Nursing	1
Psychology	1
Child life	1

Methods: Design Thinking Process- Phase 1

Design Thinking is a collaborative iterative process that seeks to understand the user's needs to identify solutions to solve a problem.

- Design thinking encompasses five phases:



Design Thinking Phase	Definition	Implementation
 Empathize	Seeks to understand the user and the challenges.	<ul style="list-style-type: none"> • Semi-structured interviews conducted via zoom and audio recorded. • Journey map: visualization of the process to complete visits and analysis of the environment.
 Define	Frames the problem and the desired outcome.	<ul style="list-style-type: none"> • Analysis of the interviews and the journey map. • Theme identification.
 Ideate	Seeks to generate as many possible solutions to address the problem.	<ul style="list-style-type: none"> • Brainstorming session with multidisciplinary team via zoom involving ideation of solutions. • Presentation of the best available evidence to team. • Presentation of themes to team. • Online Miro whiteboard used for active collaboration.
 Prototype	Potential solutions are crafted and made tangible for testing.	<ul style="list-style-type: none"> • 2 prototypes emerged from the multidisciplinary team and additional data.
 Test	Tests the prototypes.	<ul style="list-style-type: none"> • Final identification of solutions to address the problem. • Implementing the solutions and evaluating efficacy (part II of project)

Methods: Design Thinking Process- Phase 2

Online brainstorming session:

Professionals met online for the brainstorming session:

- Participants were prompted with questions to identify self experiences and challenges when interacting with autistic children.
- Participants were presented with the themes identified from the parent interviews, the best available evidence in sensory adaptive environments, and the journey map.
- Participants were divided into two groups, each with a leader and were prompted to quickly create solutions.

Data analysis

Analysis of the data collected during each phase was completed using a qualitative thematic analysis approach.

- Software systems utilized: happy scribe & otter to complete interview transcriptions.
- NVivo software system was utilized to develop inductive codes and identify the final themes.
- Theory and data triangulation were completed to increase credibility.
- Reflexivity was addressed through critical self-reflection and acknowledgement of potential bias.

Results

Themes from caregiver/parent interviews:



Design thinking session :

Two final prototypes for sensory adaptive environments emerged from the brainstorming session. The data was further analyzed using the same methods, revealing the final sensory adaptive environment prototype and additional solutions to improve participation in healthcare.

Sensory Adaptive Environment prototype



Zone	Description
The calming/passive zone	This zone aims to assist children/patients with hyper-reactive sensations to sensory stimuli, providing calming, self-regulatory experiences to facilitate participation in healthcare.
The active/exploratory zone	This zone aims to assist with hypo-reactivity. Children/patients may seek sensations to process sensory stimuli and self-regulate to facilitate more effective participation in healthcare.
The midzone/transition zone	This zone is to be located in the middle of the two zones and room. The elements here can be both calming and exploratory. The midzone also serves as a transition zone between the calming and active zones.

Additional solutions to improve participation in healthcare

Analysis of data revealed additional solutions to assist with participation in healthcare for this population. These include:

- Training for all providers and staff about sensory integration.
- Supports during the full visit (before, during, after.)
- Cleaning Procedures for equipment use.

A SENSORY ADAPTIVE ENVIRONMENT TO ENHANCE PARTICIPATION IN HEALTHCARE FOR CHILDREN WITH AUTISM SPECTRUM DISORDER: AN INTERDISCIPLINARY DESIGN THINKING APPROACH



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Summary

In this study we aimed to learn more about the barriers and facilitators for successful participation in healthcare and aimed to develop solutions using the design thinking approach. Multiple professionals from two large hospital networks collaborated in a brainstorming session to learn about the barriers presented from parents, their own barriers, and used the information to develop potential solutions. A prototype was designed for a sensory adaptive environment with three zones developed for specific sensory needs. Additional solutions emerged from the data.

Implications for practice

The results of this study reveal the importance of stakeholder engagement to learn about barriers in participation in healthcare for the autistic population, and the benefits of interprofessional collaboration to develop innovative and effective solutions. Implementing non-traditional approaches in occupational therapy such as design thinking, leads to identification of multiple solutions to a complex problem that can significantly improve occupational participation and lead to improved health outcomes and increased quality of life.

References

1. Wood, E. B., Halverson, A., Harrison, G., & Rosenkranz, A. (2019). Creating a sensory-friendly pediatric emergency department. *Journal of Emergency Nursing*, 45(4), 415-424. <https://doi.org/10.1016/j.jen.2018.12.002>
2. Ben-Sasson, A., Gal, E., Fluss, R., Katz-Zetler, N., & Cermak, S. A. (2019). Update of a meta-analysis of sensory symptoms in ASD: A new decade of research. *Journal of Autism and Developmental Disorders*, 49(12), 4974-4996. <https://doi.org/10.1007/s10803-019-04180-0>
3. Hill, L., Trusler, K., Furniss, F., & Lancioni, G. (2012). Effects of multisensory environments on stereotyped behaviours assessed as maintained by automatic reinforcement. *Journal of Applied Research in Intellectual Disabilities*, 25(6), 509-521. <https://doi.org/10.1111/j.1468-3148.2012.00697.x>
4. Park, G., Nanda, U., Adams, L., Essary, J., & Hoelting, M. (2020). Creating and testing a sensory well-being hub for adolescents with developmental disabilities. *Journal of Interior Design*, 45 (1), 13-22. <https://doi.org/10.1111/joid.12164>