SENSORY WELLBEING SPACE THROUGH SHARED KNOWLEDGE

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LEARNING OBJECTIVES

- List aspects of the environment that are important to consider when designing sensory-safe spaces for individuals who are neurodiverse.
- Understand the correlation between the sensory needs of college students who are neurodiverse and environmental cues for effective social interactions and academic success.
- Describe how to engage the voices of individuals who are neurodiverse in advocating for spaces that support social-emotional and learning well-being.
- Understand the responsibilities of designers to modify interactions for those with different sensory needs in the learning environment.
- Understand how purpose-built design can dignify and fully support students with different sensory needs.
The Modulor is an anthropometric scale of proportions created by Le Corbusier in 1948.

What are compliant bodies?
What are non-compliant bodies?
What is an unfit body?
Who decides that?
How were we designing?

-Rob Imrie, Prof at the University of London, published a paper on Disability and Discourses of Mobility and Movement.
Disability Justice is the cross-disability (sensory, intellectual, mental health/psychiatric, neurodiversity, physical/mobility, learning, etc.) framework that values access, self-determination and an expectation of difference.

“Patty Berne, the Co-Founder, Executive and Artistic Director of Sins Invalid

Signed into law by Gerald Ford; it requires that all public schools provide equal opportunity to education for students with special needs (both physical and mental disabilities); education must be given in the least restrictive environment possible.
Architectural design for disabled people largely remains disconnected from any creative, poetic, meaningful, and aesthetic-emotional dimension beyond minimal code compliance.

(Boys 2014; 2017; Hall and Imrie 1999; Hamraie 2016; Pereira, Heitor, and Heylighen 2018).
## OUR RESPONSE

<table>
<thead>
<tr>
<th>Space Planning</th>
<th>Shape and Form</th>
<th>Furniture and Objects</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Task</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Crawl spaces, climbing obstacles</td>
<td>Soft edges and materials</td>
<td></td>
</tr>
<tr>
<td>Use of color as a way-finding device to distinguish classroom zones</td>
<td>Low-level curved and horizontal lines</td>
<td>Simplify classroom materials and visual information</td>
</tr>
<tr>
<td></td>
<td>Clear display of visual information</td>
<td>Beam bag chairs, ball pens</td>
</tr>
<tr>
<td>Vision</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Windows above eye level</td>
<td>Visual enter glass openings</td>
<td>Visual variances energizes</td>
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<tr>
<td>Observation rooms</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Divide classroom based on lighting and functional zones</td>
<td>Vertical and diagonal lines</td>
<td>Non glare objects</td>
</tr>
<tr>
<td>High ceilings</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Visual cues and boundary markers for wayfinding</td>
<td>Acoustically sound transition from hallway to classroom</td>
<td></td>
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<tr>
<td>Hearing</td>
<td></td>
<td></td>
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<tr>
<td>Sound-proof doors</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Buffers between classroom and hallway</td>
<td>Fully furnished areas</td>
<td>Desks placed in groups</td>
</tr>
<tr>
<td>Groupings of similar elements and objects</td>
<td>Balanced, repetitive elements</td>
<td>Close proximity of similar elements</td>
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<td></td>
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<td></td>
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<tr>
<td>Ventilation</td>
<td></td>
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<tr>
<td>Level flooring and emphasis on balance</td>
<td>Symmetrical visual balance</td>
<td>Receptive displays</td>
</tr>
<tr>
<td>Functional zoning</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Separate individual and group learning spaces</td>
<td>Intimate small scale spaces</td>
<td>Variety in small and large scale spaces</td>
</tr>
<tr>
<td>Preparation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Variety in small and large scale spaces</td>
<td>Flexible furniture arrangement</td>
<td>Use of technology and movement based interaction</td>
</tr>
<tr>
<td>Emotional Disturbance</td>
<td></td>
<td></td>
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<tr>
<td>Variety of teaching equipment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Space provides sense of control</td>
<td>Comfortable seating</td>
<td>Object that promote sharing and cooperation</td>
</tr>
<tr>
<td>Room for unstructured interaction</td>
<td></td>
<td></td>
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<tr>
<td>Integrated classroom within school</td>
<td></td>
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<tr>
<td>Private space for restoration</td>
<td></td>
<td></td>
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<tr>
<td>Intellectual Disability</td>
<td></td>
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<tr>
<td>Kneel height form of leading</td>
<td></td>
<td></td>
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<tr>
<td>Properly to the teacher</td>
<td></td>
<td></td>
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<tr>
<td>U-shaped desk arrangement</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sunspace / outdoor area</td>
<td></td>
<td></td>
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<tr>
<td>Quality ventilation</td>
<td></td>
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<tr>
<td>Nearby restrooms</td>
<td></td>
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<tr>
<td>Individuality</td>
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</table>

### 50+

- **Interior design**
- **Architecture**
- **Special Education**
- **Environmental Psychology**

<table>
<thead>
<tr>
<th>Hypersensitive</th>
<th>Guidelines Related to Emotional Disturbance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hyposensitive</td>
<td>Guidelines Related to Intellectual Disability</td>
</tr>
<tr>
<td>Applies to All</td>
<td></td>
</tr>
</tbody>
</table>
## OUR RESPONSE

<table>
<thead>
<tr>
<th>Lighting</th>
<th>Color</th>
<th>Texture</th>
<th>Acoustics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soft, diffused ambient light</td>
<td>Cool, soothing shades</td>
<td>Smooth, absorbent surfaces</td>
<td>Soft, diffuse sound absorption</td>
</tr>
<tr>
<td>Direct, focused lighting</td>
<td>Warm, energizing colors</td>
<td>Textured, tactile materials</td>
<td>Reflective surfaces, hard surfaces</td>
</tr>
<tr>
<td>Task lighting</td>
<td>Bright, high-contrast colors</td>
<td>Glossy, reflective surfaces</td>
<td>High-frequency sounds</td>
</tr>
</tbody>
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- **Interior design**
- **Architecture**
- **Special Education**
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<table>
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<tr>
<th>Symptom</th>
<th>Guidelines Related to Emotional Disturbance</th>
<th>Guidelines Related to Intellectual Disability</th>
<th>Applies to All</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hyperactive</td>
<td>Incentive systems that require effort to help with motor skills</td>
<td>Controlled lighting</td>
<td>Controlled lighting</td>
</tr>
<tr>
<td>Hypersensitive</td>
<td>Provide moments of bright, stimulating colors</td>
<td>Bathe in soft, soothing colors</td>
<td>Bathe in soft, soothing colors</td>
</tr>
<tr>
<td>Hyperactive</td>
<td>Use soothing and calming colors</td>
<td>Use calming and soothing colors</td>
<td>Use calming and soothing colors</td>
</tr>
<tr>
<td>Hypersensitive</td>
<td>Use cool, calming colors</td>
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<td>Use cool, calming colors</td>
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<tr>
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<td>Use warm, energizing colors</td>
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<td>Use bright, energizing colors</td>
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</tr>
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*Note: The table represents a comprehensive approach to creating an inclusive and therapeutic environment, focusing on sensory input and emotional regulation.*
Development of special needs classroom prototypes to respond to the sensory needs of students with exceptionalities

Tina Pautl, Johann Dorff and Allison Baier
Kent State University, Kent, Ohio, USA

Abstract

Purpose: The description by the authors of their role in sensory experience in basic and special needs public schools is the topic of this research. The focus of the inquiry was to determine how the characteristics of the physical environment can be manipulated to enhance the well-being of students with special needs, particularly those with sensory impairments. The research was conducted in two phases: design development and evaluation. The design development phase involved the development of classroom prototypes that were tested in the field with students. The evaluation phase involved the assessment of the effectiveness of the prototypes in improving the sensory experiences of students.

Methods: The participants were students with special needs who were enrolled in the two public schools in which the research was conducted. The classroom prototypes were developed through the use of semi-structured interviews with students and teachers, observations of classroom settings, and literature reviews. The prototypes were evaluated using feedback from students and teachers, and through the use of surveys and questionnaires.

Findings: The results of the study showed that the prototypes were effective in improving the sensory experiences of students. The feedback from students and teachers indicated that the prototypes provided a more inclusive and accommodating environment for students with special needs.

Practical implications: The study showed that the prototypes developed in this research can be used by educators and designers to create more inclusive and accommodating environments for students with special needs. The results also highlighted the need for further research on the relationship between design factors and sensory needs of students with exceptionalities.

Keywords: Sensory, design, special needs, education, research, classroom, prototypes.

Paper type: Research paper

1. Introduction

Children with disabilities (e.g., special needs) are typically served in a different classroom in public schools and special needs classroom is a classroom for a student with a severe disability. The study examined the impact of sensory factors on the development of classroom prototypes for students with special needs. The impact of sensory factors was assessed through a series of experimental design studies. The results of these studies were analyzed to determine the effectiveness of sensory factors in improving the learning environment for students with special needs.

2. Literature Review

Research has shown that sensory factors play an important role in the development of classroom prototypes for students with special needs. The literature review revealed that the design of the classroom environment can significantly impact the learning outcomes of students with special needs. The review also highlighted the need for further research on the relationship between the design of the classroom environment and the sensory needs of students with special needs.

3. Methodology

The research was conducted in two phases: design development and evaluation. The design development phase involved the development of classroom prototypes that were tested in the field with students. The evaluation phase involved the assessment of the effectiveness of the prototypes in improving the sensory experiences of students. The evaluation was conducted through the use of feedback from students and teachers, and through the use of surveys and questionnaires.

4. Results

The results of the study showed that the prototypes were effective in improving the sensory experiences of students. The feedback from students and teachers indicated that the prototypes provided a more inclusive and accommodating environment for students with special needs.

5. Discussion

The results of the study highlighted the importance of sensory factors in the development of classroom prototypes for students with special needs. The results also showed the potential of classroom prototypes to improve the sensory experiences of students with special needs.

6. Conclusion

The study showed that the prototypes developed in this research can be used by educators and designers to create more inclusive and accommodating environments for students with special needs. The results also highlighted the need for further research on the relationship between design factors and sensory needs of students with exceptionalities.

7. References

The references section includes a list of relevant research articles and books on the topic of sensory factors in the development of classroom prototypes for students with special needs.
Can we create adaptable sensory-supportive wellbeing hubs on university campuses to cater to the unique needs of diverse learners?

Addressing these questions calls for collaboration among designers, researchers, educators, and the wider community to explore interior design as a tool for understanding the educational environment and accommodating all learners (Zingoni, 2019).
Exclusion happens when we solve problems using our own biases.

Learning how people adapt to the world around them means spending time understanding their experiences from their perspective.

As designers, it’s our responsibility to know how our designs affect these interactions and create mismatches.
How can we give agency to the neurodiverse students?

How can we include their voices?

What tools can we use?

Participatory design is a human-centered approach to research and design that advocates active user and community engagement at all stages of the design process.

-Martin & Hanington, 2012
Nine neurodiverse college students from undergrad through doctoral levels participated.

The purpose was to understand their diverse sensory needs and identify interior design attributes and strategies that could best meet their sensory needs and promote engaged learning and well-being.
100% responses were verbal and visual choice, few chose to write their response, while a handful decided to draw or use clay.
100% responses were verbal and visual choice, few chose to write their response, while a handful decided to draw or use clay.
OUTCOMES_visual preferences

**Spatial**

1. Spatial Activity: 44%
2. Quiet Space: 44%
3. Play Music: 22%
4. Space to quietly work/or reading: 55%
5. Playing Games: 44%
6. Conversation with friends: 11%

**Furniture**

1. Rocking: 22%
2. Hardback Chairs: 55%
3. Swing Chair: 66%
4. Floor Mat Seating: 55%
5. Movable Chair: 33%
6. Gaming Chair: 22%
7. Bean Bag Chair: 22%
OUTCOMES_preferences

Shape & Form

1. Horizontal: 66%
2. Vertical: 11%
3. Curved: 77%
4. Diagonal: 0%
5. Variety of Shapes & Forms: 66%

Pattern

1. Solids: 44%
2. Geometric: 11%
3. Animal: 22%
4. Floral: 44%
5. Abstract: 0%
6. Traditional: 22%

Lighting

1. Natural Light: 66%
2. Artificial Light: 11%
3. High Contrast Light: 22%
4. Low Contrast Light: 55%
5. Colored Light: 11%
6. Lights with Lens/Covering: 11%
7. Controls with Light: 22%
COMMON THEMES

SPATIAL: sensory zones (rest, play, read)
FURNITURE: multiple forms of seating but definitely something soft and provides different postures
SHAPE AND FORM: curved forms and shapes but not plastic and rigid
LIGHTING: control the ambient light
ACOUSTICS: prefer white noise, semi quiet spaces
COLOR: prefer soothing with accents
PATTERN: organic shape
TEXTURE: something that is soft, smooth and doesn't make one overstimulated
SMELL: clean smell

Liked to see planters in the space
A SENSORY WELLBEING SPACE_SHARED KNOWLEDGE

Planning Principles:
Sensory Zones
Enclosure
Variety of furniture
Curved Forms
Lighting-removed existing/dimmable lights

disHUBility, Kent State University
An existing 10’ x 16’ space
A SENSORY WELLBEING SPACE

QUIET SPACE

LOW SENSORY SEATING

GROUP ACTIVITY

STUDY SPACE

QUIET SPACE
A SENSORY WELLBEING SPACE

QUIET SPACE

GROUP ACTIVITY

SENSORY SEATING

STUDY SPACE

SPACE FOR BOOKS

PEGBOARD FOR ORGANIZING SENSORY OBJECTS

QUIET ENCLOSURE

STUDY SPACE WITH VISUAL ORGANIZERS

SPACE FOR RELAXATION & ACTIVITIES WITH ORGANIC FORMS
SHARED KNOWLEDGE_ARTISTS AND DESIGNERS
“We touch things to assure ourselves of reality. We touch the objects of our love. We touch the things we form. Our tactile experiences are elemental.”

Anni Albers
Social Sensory Architectures is an ongoing research project led by Sean Ahlquist at the University of Michigan to design technology-embedded multi-sensory environments for children with autism spectrum disorder.  
http://www.materialarchitectures.com/social-sensory
Leanne Zilka is an Architecture Lecturer at RMIT’s School of Architecture and Design. Her research spans the multi-disciplinary areas of fashion, textile design, aerospace engineering, material science, business and government research bodies to broaden the advances in material technologies to architectural problems.
SHARED KNOWLEDGE_ARTISTS AND DESIGNERS

Jennifer Meakins
SHARED KNOWLEDGE_ARTISTS AND DESIGNERS

Seat Cushion

Alternative uses of the same knit panel structure
THE PROTOTYPE_sensory seating
THE PROTOTYPE_quiet space
THE PROTOTYPE study space
THE PROTOTYPE_group activity
FEEDBACK

Post occupancy evaluation
Narrative Inquiry
Exit Response
15% to 20% population is considered to be neurodiverse

When neurodivergent people are understood, valued, and empowered, we all stand to benefit from their important and unique contributions.

Need to rethink the design processes, to center people who are normally marginalized by design, and use collaborative, creative practices to address the deepest challenges our communities face.

-by Sasha Constanza-Chock
With Gratitude:
To research assistants
To collaborators
To colleagues
To students
To Kent State University
To Brain Health Research Institute and the Neurodiversity Research Initiative, Kent State University