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Shifting the Architectural Body: Designing Sensory Ecologies Across Scales

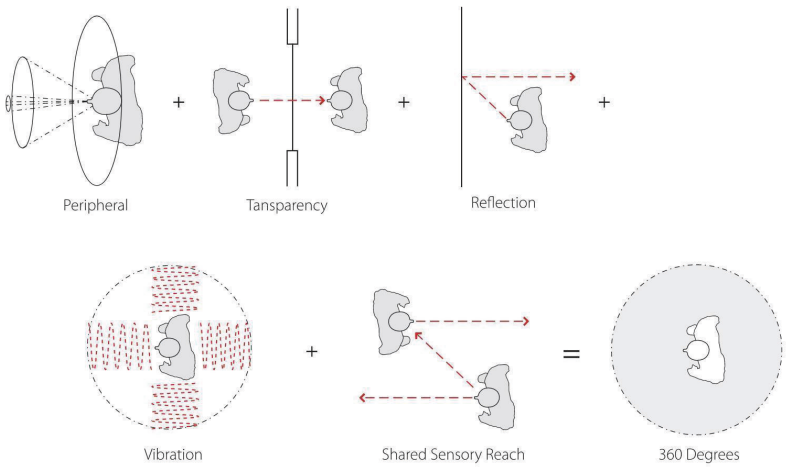

Fig. 01. Deafspace Diagrams.
Source: Hansel Bauman, 2010.

Introduction

The design of accessible and inclusive spaces for Deaf communities calls for a thoughtful understanding of various "assets of deafness" (Hendren, 2020, p. 115). In "What Can a Body do?," Sara Hendron writes that "DeafSpace isn't a plea to 'make room' for deafness. It's an unapologetic and joyous expression of the integrity and beauty of deaf experience" (Ibid.). In this article, she describes the implementation of the *Deafspace Design Guidelines,* written in 2010 by Hansel Bauman Architects at Gallaudet University. (Fig. 01) Gallaudet, founded in 1864, is a school where deaf students mostly communicate through English and American Sign Language or ASL. Hansel Bauman Architects describes that "the Deaf community is a diverse one in which many people inhabit a rich sensory world with a heightened visual-tactile means of spatial orientation and visual language" (Bauman, 2010, p. 10). During Hendren's visit to the school, she noticed this "heightened visual-tactile" environment describing "how deafness produces a distinct sensory ecology" (Hendren, 2020, p. 114). The environment might include the reverberation of a tabletop or floor to call another person's attention, the organization of furniture to see all the gestures of all participants in a room, the lighting and surface color of space to reduce visual fatigue and distraction, the extra-wide hallways that allow for continuous movement and

sustained conversations, and wayfinding to scan for barriers and changes in direction. These considerations call for empathy, attention, and design research for different types of users rather than the ideal singular user type. Instead of addressing an imagined ideal such as the *Vitruvian Man* or Le Corbusier's *Modulor Man*, this paper shifts the focus to other bodies critical to making spaces work better for all people. (Fig. 02) In an essay titled "Human, All Too Human," Federica Buzzi argues that "the ideal normative body of the Modulor Man has more to do with the schemes of domination of a given society, than with an objective statistic of physical average. To various degrees, this norm is harmful for all the bodies: although favoring some over others, it generally introduces a restricted notion of what accounts as human." (Buzzi, 2017)

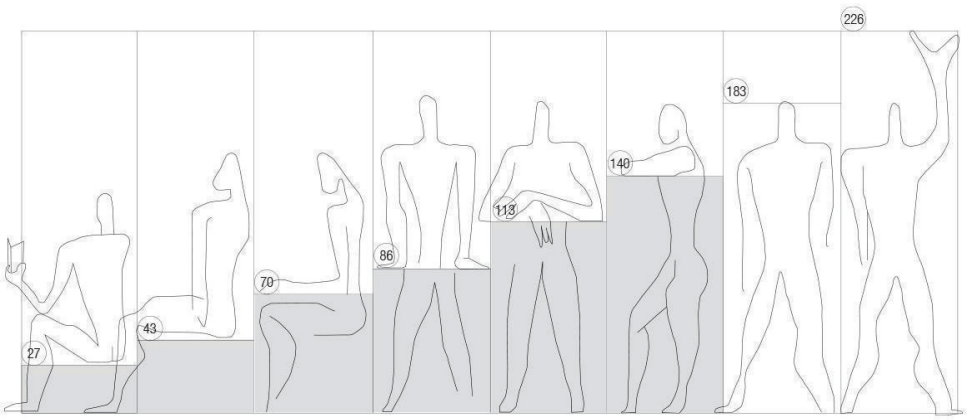

Fig. 02. Modulor Man.
Source: Studio 27, 2015.[1]

These standards limit the ability for architecture to resonate and represent those who make up everyone else, including most female, non-binary, disabled, and non-European groups. Studio 27, an architectural firm that has worked on multiple projects with the Gallaudet community, depicts a more pluralistic scenario with images of different types of bodies directly contrasting the *Modulor Man*. (Fig. 03)

There is an urgency for traditional curricula and design pedagogies to expand and adjust to respond to these more inclusive perspectives. With this in mind, the authors of this paper developed a seven-week architectural studio project for sophomores to consider the lived experiences and "distinct sensory ecologies" of the anticipated users of a new proposed community center located in the Allston/Brighton neighborhood of Boston near the existing Horace Mann School for the Deaf and Hard of Hearing.

[1] StudioTwentySevenArchitecture. *Fragment 04: Gallaudet University.* [online] Available at: https://www.studio27arch.com/casestudy/fragment-04-gallaudet-university/ [Accessed 1 Jun. 2023].

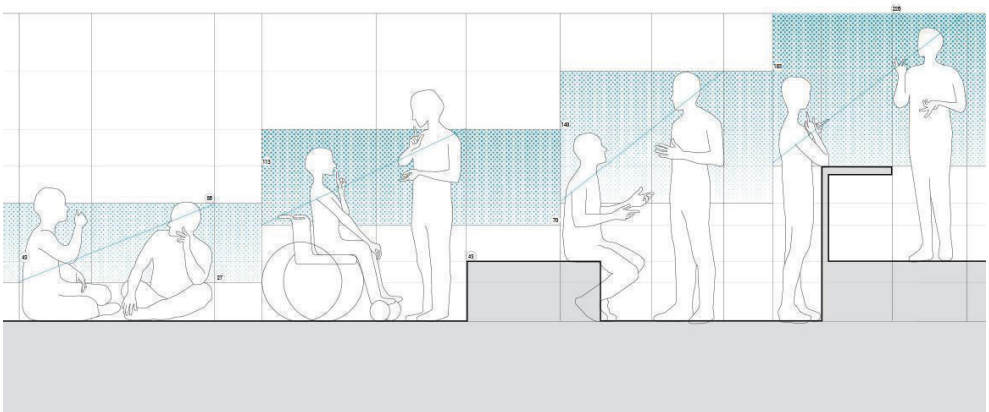

Fig. 03. DeafSpace Modular.
Source: Studio 27, 2015.[2]

Case Study: Community Center for the Horace Mann School for the Deaf and Hard of Hearing

The Horace Mann School is an accredited dual language program with instructional fluency in American Sign Language and English. The new community center anticipates welcoming the Deaf community as users of the building. Envisioned as an inclusive neighborhood hub, the proposed community center will offer a range of programs, including affordable K-6, middle school, and teen afterschool and evening programs, as well as summer programs, short-term classes for adults and seniors, and larger gathering opportunities for athletics, meetings, art shows, and other community needs. Recently, the Mayor of Boston Michelle Wu initiated an ongoing discussion and review of a future vision for a new facility to house the Horace Mann School. In 2019, the City of Boston commissioned a full-scale external engineering review of the existing 1975 facility and in early 2022, she outlined a future vision for the Horace Mann School. [3]

The sophomore studio inserts itself into this moment of transition to speculate on what a community center might look like when considered alongside and in support of the future Horace Mann School for the Deaf and Hard of Hearing. The academic project began with talks from principals at MASS Design Group, and Machado Silvetti Architects, who are collaborating on designing a temporary educational building environment in Charlestown to house the Horace Mann community while a permanent building begins planning. Students were introduced to contemporary ongoing research into the architecture of deafness and the historical context and legacy of the state institutions such as The Governor Baxter School for the Deaf

[2] StudioTwentySevenArchitecture. *Fragment 04: Gallaudet University.* [online] Available at: https://www.studio27arch.com/casestudy/fragment-04-gallaudet-university/ [Accessed 1 Jun. 2023].

[3] BLW Engineering (2019). *Jackson Mann Engineering Report*. [online] *Boston Public Schools*. Available at: https://www.bostonpublicschools.org/cms/lib/MA01906464/Centricity/Domain/1901/Jackson_Mann%20Engineering%20Report.pdf [Accessed 1 Jun. 2023].

in Falmouth, Maine, and the Wyoming School for the Deaf in Casper, Wyoming. The student cohort later heard from the Co-Directors of the Human Experience Lab at Perkins & Will, who shared their expertise in environmental psychology and the intersections between human behavior and design. These real-world discussions, research, and education facility design invites students to reimagine the architecture of a community center to amplify the lived experience and sensory experiences of all its expected users. The project brief embraces the community center's evolving identity and inclusive mission as a mixed-use hub, with public spaces and services that consider those who have been historically marginalized and unconsidered by building designers.

Methodology: Sensory Ecologies

Sensory ecologies refer to the interplay between environmental stimuli and human perception, encompassing modalities across scales. These ecologies interact to create unique experiences that shape our understanding of space, from the body-scale of intimate experiences to the macro-scale of spatial connections. Sensory ecologies are critical aspects of designing with the Deaf and Hard of Hearing communities and recognizes the importance of user-centered design in the design process, particularly for deaf individuals, in order to facilitate clear communication, community building, and promote a sense of belonging. These Deafspace principles can be applied across scales, from designing individual rooms to wayfinding throughout buildings. The five design principles include:

1. **Space and Proximity** shows understanding of spatial distances, enclosures, arrangements, and visual connections to support basic communication needs.
2. **Sensory Reach** aids deaf individuals in utilizing vibration, tactile, and social cues to perceive their environment. This guideline supports wayfinding, view corridors, and connections to extend sensory understanding.
3. **Mobility and Proximity** guidelines enable signed conversations while users are walking safely. Designing spaces for clear pathways and circulation, with carefully considered intersections and thresholds, is essential.
4. **Light and Color** facilitate visually centered communication. A thoughtful palette of colors and textures helps to contrast with human skin, well-controlled light helps to show facial expression, and the use of natural lights indicates the changes in the day to provide a sense of time.
5. **Acoustics** support minimal background noise with clever room adjacencies so Deaf users will not be distracted if they have hearing aids.

These principles consider user-centered and inclusive experience at multiple scales in the design process.

Student Project Examples

This paper describes four student projects from a sophomore studio that reference the *Deafspace Design Guidelines* mentioned above. These projects explore both the body-scale through interior studies emphasizing isolated moments through precedents and physical fragment models, and the macro-scale utilizing sectional drawings and annotations depicting circulation, way-finding, spatial awareness, and connections to the environment.

Circulation and Movement

In Alim Bayram's project, he delved into the relationship between movement and circulation using fragment design models. (Bayram, 2022) The primary objective was to create a space seamlessly integrated with its surroundings while promoting people's flow through the site. Alim broke up the site into smaller zones, examining how movement could be enhanced within each one. He explored open courtyards, narrow passages, spacious halls, all interconnected by a network of pathways, each with distinct ambiance and circulation patterns. The design models synthesized architectural elements at the scale of the body such as stairs and corridors. (Fig. 03) By utilizing fragment design models, Alim optimized the flow and movement of people through the space, resulting in a cohesive and practical design. [4]

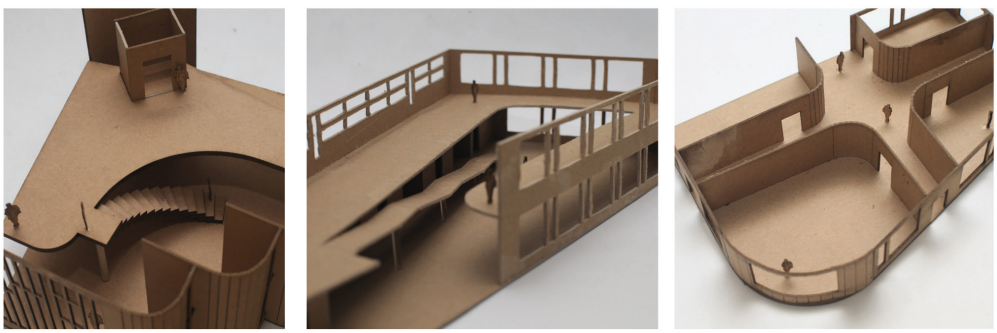

Fig. 04. Circulation and Movement, Fragment Study.
Source: Alim Bayram. Concept Development.

Thresholds and Moments of Arrival

Sarah Carpenter explored the relationship between threshold and aperture, investigating how the manipulation of these architectural elements could create unique spatial experiences within the built environment. (Carpenter, 2022) To begin, Sarah researched the theoretical and practical aspects of threshold and aperture in architecture, analyzing the Skaden School for the Deaf by Sverre Fehn in Sweden. (Fig. 05) Using this knowledge as a foundation, Sarah began experimenting with a series of fragment models that focused on the relationship between interior and exterior spaces or using light and shadow to create visual interest. (Fig. 04) By

[4] From *Deafspace Design Guidelines*, Chapter 3.1 Pathways & Flow, 3.2 Ramps & Stairs, [4.2] Solar Control - Daylight & Shade, written in 2010 by Gallaudet University and Hansel Bauman

manipulating these elements, she was able to create spaces that were both visually exciting, functionally effective, and experientially impactful.[5]

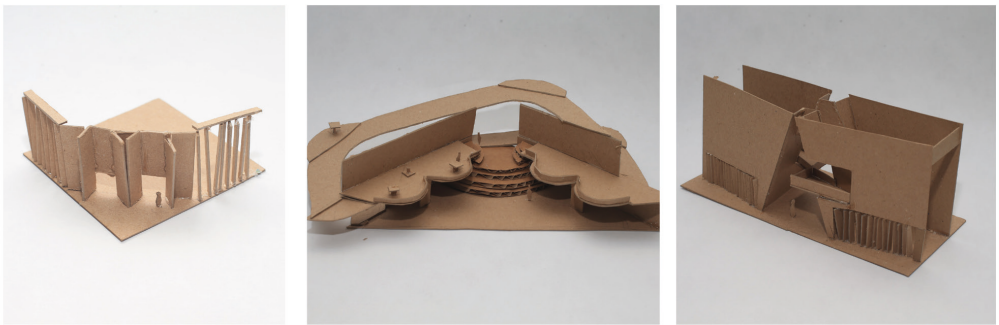

Fig. 05. Threshold Conditions, Fragment Study.
Source: Sarah Carpenter. Concept Development.

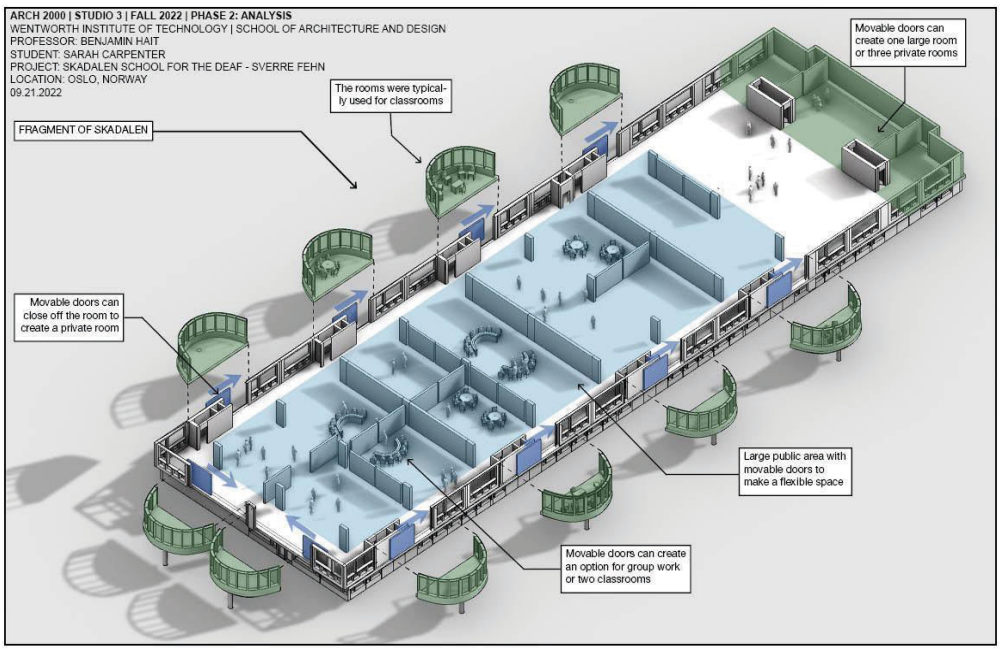

Fig. 06. Analysis of interior and exterior threshold conditions in the Skaden School for the Deaf.
Source: Sarah Carpenter. Precedent Research.

Conversation Eddies

Student Nathaniel Clement created intimate moments along a path that promoted connection and ease of communication between inhabitants. (Clement, 2022) He first developed fragment models looking at how users could quickly move aside and have a deeper conversation in a widened space. He identified movement and nodes as separate elements and integrated these ideas into subsequent models. (Fig. 06)

[5] From *Deafspace Design Guidelines*, 1.1 Degrees of Enclosure, 2.3 Spatial Awareness and 3.3 Thresholds, written in 2010 by Gallaudet University and Hansel Bauman

Fig. 07. Conversation Eddies, Fragment Study.
Source: Nathaniel Clement. Concept Development Guideline Study.

He advanced the merging of these spaces in his precedent investigation of Hellerup School by Arkitema Architects in Denmark, where he studied how stairs, seating, and gathering could be seamlessly combined while distinctly coded into one space. (Fig. 07) His analytical methods of diagramming in plan and axonometric drawings sharpened his strategies in designing the Community Center. He identified these zones throughout his scheme through tones and color that contrasted with human skin so that signing and facial expression could be clearly seen. These resulted in "conversation eddies" or spaces along a path that could expand to become spaces of gathering, communication, and connection for varied-sized groups. [6] (Fig. 08)

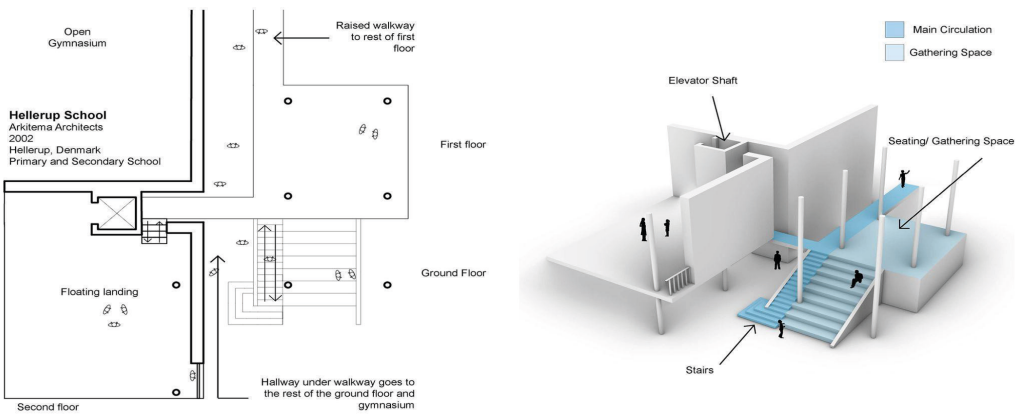

Fig. 08. Analysis of Circulation and Gathering Spaces in Hellerup School in Denmark.
Source: Nathaniel Clement. Precedent and Guidelines Research.

[6] From *Deafspace Design Guidelines,* Chapters 1.3 Collective Space-Promoting Connection, 3.1 Pathways & Flow, and Chapter 4.1.2 Color Eddies, written in 2010 by Gallaudet University and Hansel Bauman.

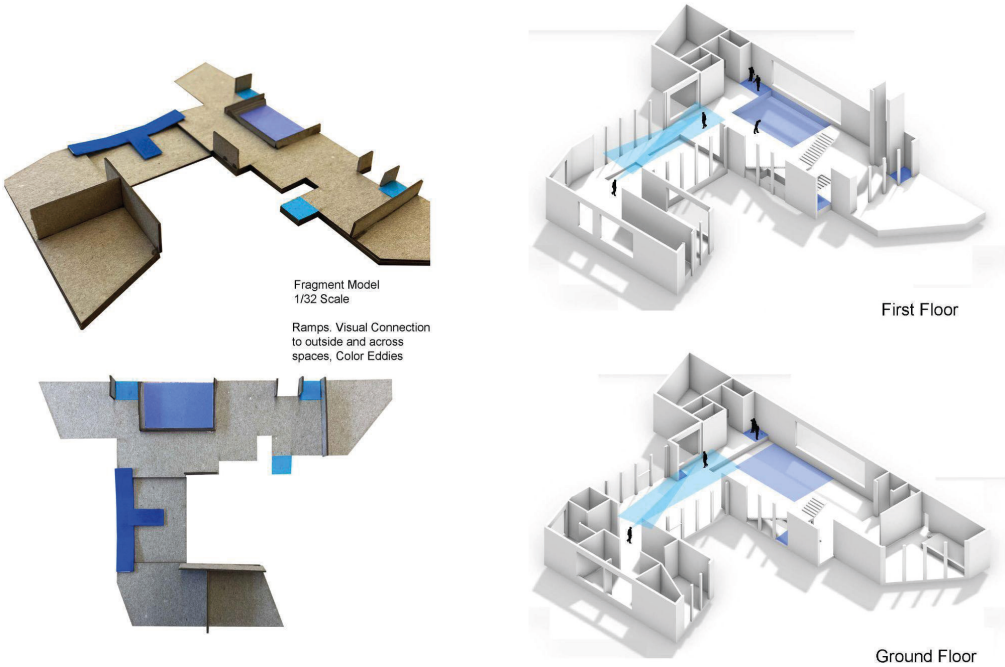

Fig. 09. Conversation eddies explored in model and axonometric drawings.
Source: Nathaniel Clement. Community Center.

Visual and Spatial Connections

In Colin Sainato's project, spatial orientation and connections were critical concepts. (Sainato, 2022) He intended for individuals inhabiting the space to have visual cues to see and connect with others in an expansive vertical area. In his study of Gallaudet University by Studio 27, he observed that the center atrium allowed for a clear view between floors. The glass allowed for visibility yet permitted minimal acoustic distraction while helping one feel a part of a shared public space. (Fig. 09) He translated lessons from Gallaudet's spatial and visual connections into his final design of the Community Center, where he brought natural light into the central space and to each floor. He created visibility and spatial connections in the interior of the building both vertically across floors and horizontally across the ample main space. (Fig. 10) He also used the full floor-to-ceiling windows to create engagement with the exterior of the building, with balconies that extend the inside-out and the outside-in, providing a sense of time. Finally, he developed an inviting space at the ground level and entry that considers how users use vision as a primary means of way-finding. He opened the space, with interior spatial arrangement so users could see what may lie ahead, pause, communicate with friends, and see potential barriers, before they move further into the building.

Fig. 10. Analysis of Connections and spatial awareness of STM Gallaudet University by Studio 27.
Source: Colin Sainato. Precedent Study.

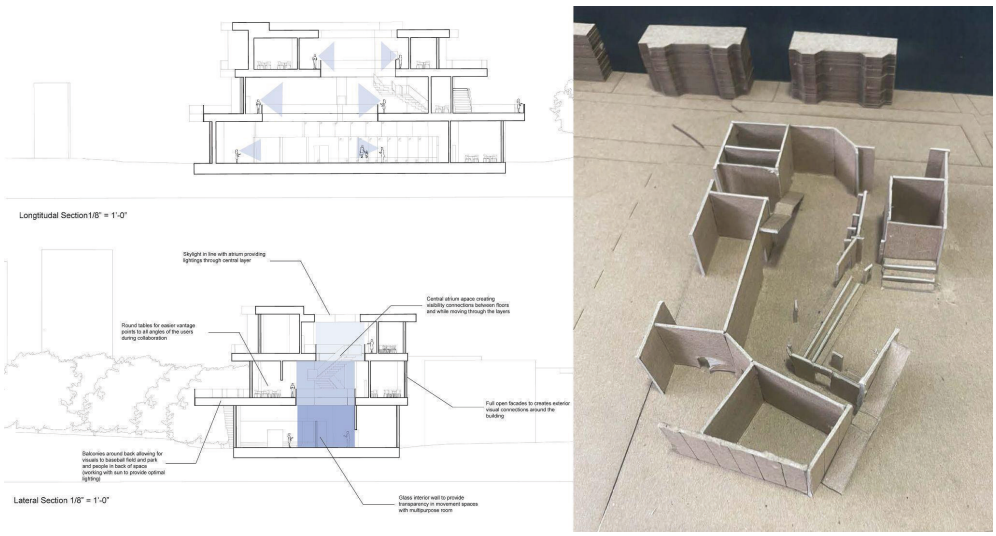

Fig. 11. Final Section and Ground Floor of Community Center.
Source: Colin Sainato. Central Gatherings and Layers.

Conclusions: Inclusivity and Intersectionality

The methodology in this studio project encourages students to thoughtfully consider the human body to produce an architecture of inclusiveness. The topic area provides opportunities to listen empathetically and learn from the Deaf and hard-of-hearing community. With these criteria in mind, students worked at multiple scales: the body, the space it occupies, the design of circulation, and wayfinding through a sequence of spaces. By starting at the scale of the body, the studio could produce learning outcomes that considered different types- of abled- and disabled bodies and produce through iteratively designing spatial conditions and movement sequences that actively engage with the parameters of accessibility. ADA was not relegated to a perfunctory checklist of dimensional criteria but rather a social and cultural driver of access and catalyst of architectural thought toward inclusive space-making. Oscillating between these varied scales, students worked both from the inside-out, advancing their understanding of sensory ecologies of Deaf spaces, and the outside-in, synthesizing the context and community around the designated site.

It is clear that incorporating Deafspace principles such as space and proximity, sensory reach, mobility, light and color, and acoustic, can have significant benefits for all users, not just those who are deaf or hard of hearing. By prioritizing sensory

experience and multi-scalar design methods, architects can create spaces that are more inclusive, functional, and accessible, while promoting a sense of community and belonging.

Deafspace principles also have the potential to create connections between various design disciplines, particularly interior design and landscape architecture. In interior design, visual cues such as contrasting colors and patterns, solar and electric lighting design, and interior sequences and furniture design can aid in wayfinding and promoting spatial awareness and inclusivity for Deaf individuals. In landscape architecture, utilizing Deafspace principles can enhance the sensory experience of outdoor spaces. By prioritizing tactile and olfactory elements such as plants and textures, designers can create spaces that engage multiple sensory modalities and promote connection with the natural world.

In summary, this paper seeks to contribute to design studio pedagogy and discourse at the intersection of inclusionary design, disability justice, and the centering of the lived experiences of historically marginalized perspectives and voices. The topic of disability has a fundamental architectural dimension that has been under-examined by the discipline. It affords and requires engaging with and learning from the rich experiences of disabled people historically marginalized from the status quo. Within this context, the same fundamental ambition remains to design an improved built environment for those who use it, with broader underlying aspirations for diverse collective life and a more inclusive and multi-scalar approach to developing sensory ecologies for the Deaf.

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