Sensory Architecture
Redefining How One Interprets Space

Heather C. Holz
Problem Statement

How do combinations of our senses influence the way we interact with our surrounding built environment?
The built environment can trigger and or stimulate the senses, creating a more holistic experience of one’s surroundings.
Humans are visually dominant creatures but it is important that designers address not only this visual sense, but all of our senses, for people experience a space or environment with different sensory strengths, and this differentiates their experience and or understanding of that space.
“places are specific, but their elements are general; we comprehend places through sensory data; our understanding of place is filtered through memory; and our delight in place is enhanced by a degree of mystery.”

- Henry James
"The complexity of the individual part is only understood against the coherence of the larger paradigm...it is the clarity of this relationship that grants legibility. And while mystery indeed gives delight, it is likely not critical to our understanding of spatial construct..."

- Joy Monice Malnar and Frank Vodvarka

Authors of Sensory Design
## Legibility Schematic

<table>
<thead>
<tr>
<th>Sense</th>
<th>Complexity</th>
<th>Coherence</th>
<th>Contextual</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visual</td>
<td>Figure (detail)</td>
<td>Ground (context)</td>
<td>Icon</td>
</tr>
<tr>
<td>Sound</td>
<td>Signal (note)</td>
<td>Keynote (ground)</td>
<td>Soundmark</td>
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<tr>
<td>Odor</td>
<td>Immediate (context)</td>
<td>Ambient</td>
<td>Episodic (memory)</td>
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<tr>
<td>Haptic 1 - Touch</td>
<td>Gradient (surface)</td>
<td>Context (type)</td>
<td>Attribute</td>
</tr>
<tr>
<td>Haptic 2 - Kinesthesia</td>
<td>Tension (muscular)</td>
<td>Resistance (mass)</td>
<td>Task</td>
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<tr>
<td>Haptic 3 - Plasticity</td>
<td>Compression</td>
<td>Expansion</td>
<td>Expected</td>
</tr>
<tr>
<td>Haptic 4 - Temp/Hum.</td>
<td>Degree</td>
<td>Range</td>
<td>Comfort</td>
</tr>
<tr>
<td>Orientation</td>
<td>Self (body)</td>
<td>Space (surround)</td>
<td>Activity</td>
</tr>
</tbody>
</table>

**Complexity**: the intricacy of detail present in a specific location

**Coherence**: our sense of order, our knowledge of the larger environment

**Figure/Ground Relationship**

**Contextual**: sensory data that is neither figure nor ground but fundamental components to the identification of a particular place.
The Sensory Slider is a design tool based on the Legibility Schematic, which has a bar, that for each sense, measures the intensity of the figure/ground clarity from overload to deprivation.

Joy Monice Mainar and Frank Vodvarka are the creators of the Character of Place Schematic, Legibility Schematic and Sensory Slider Diagrams/Graphics.
### Sensory Matrix

#### New Design

<table>
<thead>
<tr>
<th></th>
<th>Approach</th>
<th>Entry</th>
<th>Ticket Area</th>
<th>Coat Check</th>
<th>Gift Shop</th>
<th>Restrooms</th>
<th>Exhibits</th>
<th>Education Space</th>
<th>Restaurant</th>
<th>Kitchen</th>
<th>Offices</th>
<th>Employee</th>
<th>Employee</th>
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#### Standard Design

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### Spacial Diagrams

Sunlight and Public vs. Private

#### Diagram 1

```
- Office
- Social area
- Gift shop
- Exhibit
- Ticket area
- Education space

SUNLIGHT
```

#### Diagram 2

```
- Visitor lockers
- Coat check
- Restrooms
- Gift shop
- Ticket area
- Education space
- Exhibit
- Storage
- Restaurant
- Kitchen
- Reception area
- Membership area
- Offices
```

#### Table

<table>
<thead>
<tr>
<th>Sunlight</th>
<th>Approach</th>
<th>Entry</th>
<th>Ticket Area</th>
<th>Cashier</th>
<th>Gift Shop</th>
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<td>Indirect</td>
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<td>50</td>
<td>60</td>
<td>33.3</td>
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#### Public

<table>
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<tr>
<th>Occupable by visitors</th>
<th>50</th>
<th>70</th>
<th>90</th>
<th>90</th>
<th>80</th>
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**Note:** The table above represents the distribution of sunlight in different areas, with values indicating the percentage of sunlight in each area under different sunlight conditions.
Site

Chicago, Illinois - Museum Campus

Typology

Addition to the John G. Shedd Aquarium
Original Building and Oceanarium
Floor plans from Arch Record
Presentation Drawings from EHDD
Sections Looking North
Presentation Drawings from EHDD
Section Looking East through center of Aquarium

Sub-Basement Plan of Existing Shedd Aquarium
Nodes and Paths
Exploration of the iceberg in various sketches, led me to discover the relation and importance of the octagon to the site. It is used throughout the original aquarium.
Development of Octagon

- North Elevation
- Underground access
- Entry
- Exit
- Amphitheatre
- Interactive Exhibit
- Educational Spaces
- Restaurant
- Mechanical Rooms
- Restrooms
- Gift Shop
- Employee Break Room
- Food

Layout:
- Main Building Entry
- Immersive Exhibit 1 Entry
- Immersive Exhibit 2 Entry
- Main Building Exit
- Immersive Exhibit 1 Exit
- Educational Spaces
- Restrooms
- Due to Sound
- Mechanical

Floor Plan:
- Visitors Entry
- Gift Shop
- Food
- Restrooms
- Employee Break Room
- Tickets
- Membership
- Ampitheatre Entry
- Kitchen & Restaurant
Further Development
Process Sections

Section Looking North

- Showing straight elevator within octagon lightwell
- 8-ft 10-in floor
- 12-ft floor
- Plaza 1st
- Vestibule 2nd
- Exhibit 1 entry
- Exhibit 1 exit
- Architectural plan and elevation drawings
Plaza Development
Skylight and Ramp Design
Midterm Programmatic Elements

Plaza and Entry

Aquarium Level One
- Tickets
- Cafe
- Rentals
- Coat Check
- Membership Desk
- Employee Break Room

Aquarium Level Two
- Aquarium Entry
- Aquarium Exit with Giftstore
- Entry to Existing Shedd
- Education Spaces
- Exit from Amphitheater
- Exit from Immersive Exhibit

Aquarium Level Three
- Exit from Existing Shedd
- Entry to Immersive Exhibit
- Entry to Amphitheater
- Restaurant
- Jellyfish and Sting Ray Exhibit
Midterm Floor Plans

Plaza and Entry

Sub Level One
Transverse Section
Transition to Original Shedd
Three Sections Looking East
Immersive Exhibit Section

Looking East
Programmatic Elements

**Plaza and Entry**
- Ticket Sales
- Cafe
- Membership Desk
- Offices
- Employee Break Room

**Sub Level One**
- Rentals
- Coat Check
- Aquarium Entry
- Aquarium Exit
- Giftstore
- Restrooms
- Chicago Skyline Exhibit
- Storage

**Sub Level Two**
- Aquarium Entry
- Aquarium Exit with Giftstore
- Immersive Exhibit Entry
- Education Spaces
- Restrooms
- Jellyfish Exhibit
- Storage

**Sub Level Three**
- Link to and from Existing Shedd
- Kitchen and “Buffet” Line
- Seating
- Touch Pond/Sting Ray Exhibit
- Short Film Viewing Area
- Family Area
- Restrooms
- Storage
Sub Level Two

: Public Circulation
Sub Level Three

: Public Circulation
Approach
Immersive Exhibit
Transverse Section
Plaza Roof Detail

- White Georgian Marble Railing
- Drain
- Bitumen
- 8" Concrete Slab
- White Georgian Marble Cladding
- Precast Concrete Sandwich Panel System
- Curtain Wall

- Concrete Pavers
- Sand
- Gravel
- Waterproof Membrane
- 6" Rigid Insulation
- Precast Concrete Single Tee
- Precast Concrete Inverted T Beam
- Precast Concrete Column

- 0'
- 1'
- 2'
- 4'
- 8'
Sensory Slider: Atrium

Figure
Ground

Visual

Icon

Signal

Keynote

Sound

Soundmark

Immediate

Ambient

Odor

Episodic

Gradient

Context

Haptic 1

Attribute

Tension

Resistance

Haptic 2

Task

Compression

Expansion

Haptic 3

Expected

Degree

Range

Haptic 4

Comfort

Self

Space

Basic Orienting

Activity

Overload
High

INTENSITY

Low

Deprivation
Sensory Slider: Immersive Exhibit

Figure | Ground
---|---
Visual | Icon
Signal | Keynote
Sound | Ambient
Immediate | Episodic
Odor | Context
Gradient | Attribute
Haptic 1 | Resistance
Tension | Task
Haptic 2 | Compression
Expansion | Expected
Haptic 3 | Range
Degree | Comfort
Haptic 4 | Space
Self | Activity
Basic Orienting | Overload
High | INTENSITY
Low | Deprivation
Sensory Slider: Connection

- **Visual**: Figure (High) - Ground (Low)
- **Signal**: Keynote
- **Sound**: Immediate (High) - Ambient (Low)
- **Odor**: Gradient (High) - Context (Low)
- **Haptic 1**: Tension (High) - Resistance (Low)
- **Haptic 2**: Compression (High) - Expansion (Low)
- **Haptic 3**: Degree (High) - Range (Low)
- **Haptic 4**: Self (High) - Space (Low)
- **Basic Orienting**: Activity (High) - Deprivation (Low)

**Overload**: High - **Intensity**: Low - **Deprivation**: Low
Active and Passive Systems

Active Systems
- Central Air and Water System (CAV) - Multizone System
- Geothermal with use of Lake
- Photovoltaic Glass in Roofs

Passive Systems
- Daylighting
- Permeable Plaza Surface
HVAC and Mechanical Diagram

Plaza

- Cooling Tower
- Mechanical
- Air Supply
- Air Return
HVAC and Mechanical Diagram

Sub Level One

- Cooling Tower
- Mechanical
- Air Supply
- Air Return
HVAC and Mechanical Diagram

- Cooling Tower
- Mechanical
- Air Supply
- Air Return