A Fine Arts Laboratory for the Blind and Visually Impaired

an architectural thesis exploring the communication of meaning through total sensory perception

submitted to the College of Architecture and Planning
by Mark W. Arnold
May 1986
cover: Joy and Happiness from the book, How Can I Make What I Cannot See
This book is dedicated to my parents, Bill and Eloise Arnold. To you, mom and dad, I am forever grateful for your continued and unselfish love, respect, and support in all my endeavors. Thanks for carrying me in times of failure and sharing in my times of success.
Abstract

The following project is the result of a nine month study dealing with the communication of architectural meaning through active involvement of all the senses. The argument dealt with concerns itself with confusion and alienation caused by architecture which conveys its meaning only through the sense of sight, thereby being two dimensional and non-experiential.

The project, a Fine Arts Laboratory for the Blind and Visually Impaired, Indianapolis, Indiana, uses the blind and visually impaired segment of society as the approach to investigating the communication of architectural meaning through the linking of sensory clues to elements used in the understanding of spatial sequence, such as path, node, and landmark.
Acknowledgements

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Ms. Rebecca J. Arnold, my sister and personal typist

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Statement

The optimum in the communication of architectural meaning can only be achieved by designing for the total interactive involvement of all the senses.

Argument

Today architecture students and practicing professionals have an over-indulgence with facadism. To briefly define facadism, it is the decoration or embellishment of the exterior of a building, purely to satisfy the visual aesthetic. The belief is that beautiful and meaningful architecture is achieved only through a visual response. The problem with this response is that once one has moved beyond the facade, the space beyond is usually banal and generic. This is exemplified in thousands of speculative malls and office buildings throughout the country. Architecture in this sense is rather two dimensional and the communication of meaning is expressed only at one level.
In our effort to create visually dynamic architecture, we have neglected our responsibility to respond to the other senses. The word aesthetics is derived from the Greek word aesthetikos meaning "of sense perception." Aesthetic thought has traditionally been concerned with all of the senses, and it is only recently that it has primarily been associated with sight.

Kent C. Bloomer, in an article titled, "Have You Heard of Haptic?", states:

The visual properties of a design are generally regarded as representing the aesthetic properties, while most other sensory considerations tend to be assigned to a more technical realm as physiological or design 'factors'.

The goal of designers today is to isolate sound and create interior spaces that are completely environmentally controlled. The result is a comfortable but sterile and "hermetically sealed" type of architecture.

The main factor which separates architecture apart from the other arts is the fact that you move through it and inhabit it over time. Perceptively, it is constantly changing with every movement you make. The communication of architectural meaning should unfold as the individual moves throughout the space, using all of his senses in order to comprehend.
To understand the meaning in a piece of architecture, it must be experienced. The communication of that meaning includes four variables:

The sender: The physical built form that generates the meaning.

The message being communicated: the underlying meaning in the built form.

The mode in which the message is being communicated: the different levels or ways of communicating the meaning.

The receiver: the individual experiencing the built form and interpreting what is being said.

However, when one or more of these variables of communication is deficient, the comprehension of meaning is often lost or misunderstood. This misinterpretation or loss of meaning can cause the individual to feel alienated and separate from the built environment. Deficiencies are as follows:

Problem of the sender: Too often the building is a decorated box—a sender dressed in the latest architectural fashion, but saying nothing and experientially stagnant.
Problem of the mode of communication: Too often the meaning being communicated can only be comprehended through the sense of sight, neglecting the opportunity to express meaning through other senses.

Problem of the receiver: Too often the individual being communicated to is not carefully studied. Architecture is often negligent in responding creatively to those who have a physical or mental disability.

**Approach**

As an approach to the thesis, the study focused on the visually impaired segment of society, to whom architectural meaning must be communicated through an interactive involvement of all the senses. Architecture which can only elicit response from the sense of sight or that is experientially shallow not only causes alienation and confusion in visually handicapped individuals, but inhibits them from participating in societal functions as well. Kevin Lynch states in his book, *Image of the City*, "A distinctive and legible environment not only offers security, but also gives the potential depth and intensity of human experience."
East Quad: an example

On the campus of Ball State University there exists a building known to all as East Quad. Originally known as the Science Building, East Quad has housed many departments in the university including most recently History and Computing Services. However, East Quad is now undergoing renovation. The creaky wooden floors have been replaced by concrete and resilient tile. The once 14 foot high ceilings have been lowered to 8 feet. The once loudly echoing hallways have been quieted by an acoustical drop-in ceiling. The tall wooden framed windows have been replaced with bronze anodized aluminum and tinted glass. Most people welcome the change, for it is seen as a vast improvement over the eyesore that East Quad had become. But an improvement for who? Dena Polston, a blind student at Ball State, remembers the building well. "I always felt that I was at Harvard or something. The creaking wooden floors and the echoes in the hallways always made me think that this was what Harvard would be like." Gary Lee, another blind student at Ball State, remembers the details in the building most. "Ever put your hand on one of those old steam radiators? Man, they are neat!"

Now all those experiences are just memories. Once past the renovated neo-gothic facade, the building could be any other building on campus. The floors, ceilings and walls are the same brand and color as those in North Quad, West Quad, and the Robert Bell Building. Time and progress have removed character and replaced it with institutionalism.
As previously mentioned, comprehension of the built environment to a blind or visually impaired individual depends on two main elements: sense perception and movement.

Sense perception can be classified into two main categories: forewarning or distant senses and immediate or contact senses. Forewarning or distant senses are sight and sound. Through the use of these senses one is sensorially "clued in" or can detect what is happening before actual arrival at an event or before an incident takes place. The immediate senses are the haptic senses, defined here as expanded senses of touch. This includes the detection of heat, cold, kinesthetics (body movement), pain and pleasure. The vestibular sense (the sense of balance) is also a contact sense.

It can be argued that the distant senses were developed only through their coordination with the contact senses. As an example, the only reason we pull our hand away when we see it is about to be struck by a hammer is due to the fact that we have experienced, through contact senses, a similar incident in which pain was induced due to an object striking our hand. Since a blind or visually impaired individual has little or no sight, he must therefore rely primarily on sound and contact senses.
Movement is also critical to the comprehension of space to the blind. Dependency on the contact senses requires the individual to actively move throughout the space in order to comprehend its shape and volume. Information about the space is given through the use of auditory or contact sense clues. Sensory clues may be natural or man-made. Natural sensory clues exist through natural processes or due to their natural state, such as water, wind, and rustling leaves. Man-made sensory clues are derived through man-made processes or technology, such as architectural components and electronic auditory devices. Spaces deficient in adequate sensory clues provide little information, causing insecurity and inhibition. Comprehension of the total environment is acquired through the sequential movement from space to space. Repetitious spaces that contain no sensory clue differentiation become confusing.
Landmark

Path, Node, and landmark
Conceptual Framework

Sensory Clues as Landmarks

Kevin Lynch’s book, *Image of the City*, devoted itself to identifying the way in which people select information from the urban environment to create cognitive maps. Briefly, cognitive maps are processes which enable an individual to mentally determine his position in respect to a given environment. The study concluded that there are five elements which are used in the comprehension of the environment: paths, edges, districts, nodes, and landmarks.

Charles Moore and Kent Bloomer, in their book, *Body, Memory, and Architecture*, carry the importance of landmark still further. The landmark not only offers direction and orientation, but also a sense of identity. The physical features become associated with events or occurrences that happen while at that landmark. An identity is created thereby linking the landmark with memory.
To many of us, landmarks are primarily visual in nature. Most people refer to unique forms or shapes that visually stand out in their mind when asked to name landmarks. However, landmarks do not have to be unique objects, but can be a wide variety of things from textures to sounds. Part of the investigation of the thesis dealt with the exploration of sensory clues, both natural and man-made, and how these clues could be manipulated into built form. Once these clues were translated into built form, they were then used along circulation paths to offer orientation as well as understanding about the space. The following sketches are parts of the investigation into sensory clues and translation into built form.

Blind and visually impaired individuals alike refer to sensory clues as landmarks to help them cognitively map out buildings and cities. These landmarks can be anything from the sound of a water fountain to a gradient change in the sidewalk. These landmarks along the path become etched into the individuals memory and thus offers orientation and measurement to him as he retraces the path.

The goal of the project was to use the elements of path, node, landmark, etc., and relate the meaning of the facility to the individual, either sighted or non-sighted, through the sequential movement through the building.

1 Kent Bloomer, "Have You Heard Of Haptic?" Interiors, Oct. 1979, p. 85

Tactile/Haptics

- Natural: variety of texture, warm, soft
- Man-Made: click, cold, hard, quick

Changes in acoustical reflection due to overhead variation of form

Volume

Hollow

Tactile Rhythm

Can be visible?

Large size uncomfortable

They mash uncomfortable

Gradient as landmark progression
1) **Rapid Movement:**

2) **Slow Movement**

3) **Movement Variation**

The translation of acoustical sensory clues into built form: types of implied movement.
The translation of natural sensory clues into landmarks or to communicate the meaning of a space.
Study Continuation

An examination of the design solution that follows will reveal to the observer the fact that the main emphasis of the design is placed on the sequential movement of the visually handicapped user as well as the sighted user and the ability of those users to comprehend the facility as they are moving through it. What remains to be studied is perhaps the hardest area in communication of space to the blind—the communication of space while a visually handicapped person is not in motion. When a blind person remains static and the surrounding space offers nothing but visual clues in the communication of meaning, the user and the space are mixed into an ambiguous unity in which no boundaries or diffinitive edges are known. Although this problem was addressed in two areas of the facility, namely the theatre and the environmental exploration laboratory, neither were developed beyond a schematic level. Further research and investigation into this area would provide for a more complete response for the building as a whole.

Another area in which the investigation can be furthered is in the area of tactile perception. Tactile sensory clues, although studied and used in the project, were not exploited to the level in which they are capable of being used in the communication of meaning.
The Project

a Fine Arts Laboratory
for the
Blind and Visually Impaired
Intent

As the designer, the position I have taken in regard to the thesis not only holds true in respect to architecture, but in other art forms as well. Since a visually handicapped individual receives little or no enjoyment from art forms developed to entertain a sighted society, the desire was to create a facility that would allow the visually handicapped student to create and develop his or her own style of creative expression using a wide variety of mediums—clay, paper, music, or drama. The fact that the blind do perceive form differently than the sighted society is brought to light in Shiro Fukurai's book, How Can I Make What I Cannot See?, which depicts the creativity of blind Japanese children.

The present Indiana School for the Blind offers little in regard to art and music programs for the students, and offers nothing in regard to the interaction between the students and the general public.

Therefore, the creation of a Fine Arts Laboratory for the Blind and Visually Impaired was not to create a code formula design, but to fulfill the goal of creating an enjoyable, interactive environment for the creation, development, and exhibition of art, in all of its forms, while using all the senses in order to comprehend and understand the space in which the activities occur.
The Site: background

The Indiana School for the Blind, operated under the authority of the Indiana Department of Health, is a sixty acre campus located at North College Avenue and 75th Street in Indianapolis, Indiana. The campus, situated in a hilly wooded area on Williams Creek, was built in 1922, when the school was relocated from downtown Indianapolis. The present campus consists of 23 interconnected buildings located on a ridge above Williams Creek. The original buildings, consisting of administrative, educational, and dormitory facilities are of a neo-collegiate gothic style. An 85 foot tall carillon entry tower attached to the administration building is the focal point of the design. Several additional buildings have been added, including educational buildings and dormitories, a swimming pool, and a gymnasium, each designed in its own architectural "style", creating a smorgasboard of architecture. However, the original facility remains the dominant image due to its size, quality, and location. Additional facilities on the campus include a track and field area, a baseball diamond, and a playground, all located in the Williams Creek Flood plain.
Educationally, the school has an accredited K-12 program presently serving 180 students, 80% of whom live in dormitories at the school. The curriculum provides additional emphasis and training in the areas of orientation and mobility for those needing or desiring such training. The school also provides the facilities for the education and housing of emotionally disturbed children with multiple handicaps.

The "Jelly Roll": limestone embellishment on entry steps.
Original 1922 Administration and Assembly Building
The Site: looking east towards existing facility.

The Site: looking west towards main gate.
Steps to Nowhere:
steps at main gate.

Looking down the axis:
the original building
from the site.
Building Program Summary

The facility is comprised of a series of laboratories devoted to the development of Fine Arts: 2 and 3 dimensional Art Laboratories; Vocal and Instrumental Music Laboratories; Speech, Drama, and Telecommunications Laboratories. Other areas of the facility are devoted to the exhibition of the students' creativity; a multi-stage theatre and exhibit gallery. Attached to the facility is the Environmental Exploration Laboratory or more commonly known throughout the project as the orangery or birdnest. During interviews with blind and visually impaired students, when asked to name their favorite space, many referred to natural spaces, where they could hear the birds and the leaves rustling in the trees, feel the sunshine on their faces and the breezes on their skin. The intent of the orangery was to provide a space which the student would most enjoy, in order to evoke his creativity.

Performance Area

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<tr>
<th>Description</th>
<th>Capacity</th>
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<tbody>
<tr>
<td>seating (300)</td>
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<tr>
<td>stage</td>
<td>1200</td>
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<tr>
<td>ticket booth</td>
<td>20</td>
</tr>
<tr>
<td>projection booth</td>
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<tr>
<td>cloakroom</td>
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<tr>
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<tr>
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<tr>
<td>Vocal/Instrumental Lab</td>
<td>Speech and Drama Lab</td>
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<tr>
<td>-----------------------------------------------</td>
<td>-----------------------------------------------</td>
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<tr>
<td>practice areas</td>
<td>classroom</td>
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<tr>
<td>band (20 @ 20)</td>
<td>stage</td>
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<tr>
<td>choir (30 @ 20)</td>
<td>sound/practice rooms (1 @ 100)</td>
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<td>uniform storage</td>
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<td>Total</td>
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<tr>
<td>clay area</td>
<td>exhibit space</td>
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<td>dry storage (bag)</td>
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<tr>
<td>project clean-up</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
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| Environmental Exploration Lab                 |                                               |
| enclosed area                                  |                                               |
| storage/maintenance                            |                                               |
| Total                                          |                                               |

| Gallery                                        |                                               |
| exhibit space                                  |                                               |
| storage                                        |                                               |
| Total                                          |                                               |

| Total Net Area                                 |                                               |
|                                               |                                               |
| Unassignable Space (based 60/40 assigned/unassigned) |                                               |
| Total Gross Area                               |                                               |

|                                               |                                               |

|                                               |                                               |

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|                                               |                                               |

|                                               |                                               |
Design Solution

The placement of the facility on the site was based on two key factors: orientation to landmarks and orientation to existing buildings. The public circulation space of the facility is placed on a visual axis with the carillon tower and parallel to the existing administration and auditorium building. Areas that are intended for public use are then set perpendicular to this axis. By placing the main circulation path on axis with the tower, the user can orient himself to it and to the remainder of the campus as he progresses along the sequence. The terminus of this axis is the public entry rotunda, which duals as a visual terminus and ceremonial entry to another landmark on the site, a grand set of steps located at the main entry to the campus and presently leading to nowhere. The laboratory areas of the facility are parallel to existing educational areas, causing them to be turned 45° from the main axis of the facility.
The circulation sequence of the building is set up as a series of paths, nodes, and landmarks for comprehension by the blind user as well as the sighted user through the use of multiple sensory clues.

Such elements along the circulation sequence as the entry arcade, undulating glass block wall, the arcade in which the circulation ramp is placed, and connecting bridges, relate to the sense of sound by creating acoustical rhythms or variations as well as visual ones. The undulating wall and bridges dual as tactile elements relating either their form to the function of the space beyond it, or by allowing the movement of air to cross the path.

Nodes in the building exist at points where paths meet or change direction. The concept behind the use of the nodes was for the form to act as a concentrated volume, both acoustically and visually, in which the person can be clearly oriented as to the direction to take or the options available.

Changes in the texture and size of the floor grid are to provide a tactile clue while moving as to the entering and exiting of spaces. Wall textures, such as brick veneer on the inside of the exterior wall relate the building envelope to those inside.

The auditorium, due to its ability to provide a variety of stage configurations, allows for the spectator to place himself into the situation being performed.

The ramp relates to the vestibular and tactile senses. As it slowly descends to the first level of the building, the excitement increases with the anticipation of arriving at the lobby.

Such items as a waterfall and an orangery add additional pleasure to the experience of the space by relating to tactile, auditory, and olfactory senses.
A concern of many, including myself is the complexity of the circulation sequence. The complexity however, is due to our sense of sight, which grasps the entire form of the building. Experimentally, however, the building is quite simple. As a test of this, a model of the circulation sequence was prepared and given to Gary Lee, a congenitally blind student. He was delighted with the variation in spatial sequence. As he told me, "I understand things not as a complete whole, but rather as assemblage of pieces. Your circulation sequence from my stand point is understandable because areas for decision are clearly marked."

The exterior is designed to relate not only to context but to what goes on behind the facade as well. Elements used to articulate the form were extracted and abstracted from the original building. Nodes of the building are expressed on the exterior by use of brightly colored metal panels. Trusswork and tracery work are also brightly colored so as to stand out to visually impaired students. The remainder of the building is faced in brick with glazed concrete masonry articulation to relate to the existing facility.
Legend

1. Entry Rotunda
2. Box Office
3. Goats
4. Storage
5. Gallery
6. Lobby
7. Auditorium
8. Receiving
9. Instrumental Music Lab
10. Vocal Music Lab
Legend

1. Upper Gallery
2. Upper Lobby
3. Lighting Booth
4. Clay/Ceramics Lab
5. 2 and 3 Dimensional Art Lab
6. Speech and Telecommunications Lab
Entry Bridge and Orangery: plans and elevations
Facility Connection Bridge: plan and elevation
Schematic Design

- Create an "ocean" of environment on possible, adjust.
- Would environment be your "race?"
- Possibility of space age.
- "ocean" to Path or "Path runs along side."
Organization of the site and the identification of landmarks.