Intelligible Hospitals (Understanding the parts = understanding the whole)

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INTELLIGIBLE HOSPITALS
UNDERSTANDING THE PARTS—UNDERSTANDING THE WHOLE
INTELLIGIBLE HOSPITALS
Understanding the parts = Understanding the whole

This Final Project is presented to
The Faculty of the School of Architecture
By

Giovonni Reese

In partial fulfillment of the requirements for the Degree of

Bachelor of Architecture

Kennesaw State University, Marietta, Georgia
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Student's Full Name: Giovonni Reese
Thesis Project Title: Intelligible Hospitals: Understanding the parts = Understanding the whole

Thesis Summary: This thesis investigates how the intelligibility of circulation systems is primarily addressed through architectural means of spatial connectivity, hierarchy, visual connections, topology, tectonics; rather than incorporating technology and signage to solve these concerns. These issues are common in all other hospitals in varying degrees. Therefore, these findings can be adapted and implemented to address other hospitals circulation contentions. The resultant of this thesis is to develop a layout for the existing hospital, which uses architectural methods to design for a better circulation that will inherently benefit the people and the occupants.

Student Signature

Approved by:
Internal Advisor 1
Internal Advisor 2
Thesis Coordinator 1
Thesis Coordinator 2
Dedication

This thesis is dedicated to my architecture family Brandon, Damari, Jonne, Katrina and Laura. Their support over the years have made all of this possible. Also, a special dedication to Dr. Shpuza and Dr. Zamani for all their knowledge and help throughout my research on the subject. It was a pleasure learning from both of them. A special thanks to my mentor Damon Greene and his wife Dr. Wendy Greene. Having a practicing architect and a practicing doctor look over my work helped bring out real life issues that needed to be addressed in this thesis.

Last but not least the biggest dedication goes to my father Steve Jefferson and my mother Natasia Jefferson. My father left our family to work overseas for 7 years to help support me and my sister through college. That is a debt I will never be able to repay. My mother is the reason I am the man I am today. She is my biggest fan and my biggest supporter. I am blessed to have all these great figures in my life and the support each of them has given me; I will never forget. Thank you to everyone who has had a helping hand in this thesis.
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Healthcare complexes exemplify many features of complex buildings since they expand over time to accommodate growth and the ever increasing specialization of branches of clinical medicine. We understand and use buildings by moving through them. Especially in hospital complexes, intelligibility of movement is critical for the functioning and the interfacing among patients, visitors and healthcare professionals. This thesis focuses on the redesign of the circulation system in Piedmont Hospital complex in Atlanta GA, which has expanded over the years into a sprawling complex labyrinth of pavilions. In 1957, Piedmont started on Peachtree street with just one central building. A series of eight different building extensions altered the flow of this site over time making the circulation non-intelligible.

The thesis explores what constitutes intelligible circulation within a space. This exploration will compare different architectural methods used to make effective circulation in hospitals. The precedent analysis of several cases investigates various types of circulation and their effects on the functioning of hospitals. The thesis proposes a design intervention that claims that an intelligible circulation system of corridors and public areas helps building way-finding and user satisfaction. Specifically, this thesis investigates how the intelligibility of circulation systems is primarily addressed through architectural means of spatial connectivity, hierarchy, visual connections, topology, tectonics; rather than incorporating technology and signage to solve these concerns. These issues are common in all other hospitals in varying degrees. Therefore, these findings can be adapted and implemented to redress other hospitals circulation contentions. The resultant of this thesis is to develop a layout for the existing hospital, which uses architectural methods to design for a better circulation that will inherently benefit the people and the occupants.
List of readings to understand the Problem/Questions on Hospitals

Characteristics of the hospital buildings: Changes, Processes and Quality. By: Giuseppe Pellitteri

Finding the Building in Wayfinding By: Craig Zimring, John Peponis & Yoon Kyung Choi

Realizing Improved Patient Care through Human Centered Design in the Operating Room by: Anjali Joseph

Buildings and Power: Freedom and Control in the Origin of Modern Building Types By: Thomas Markus

Building a Better Operating Room: Views from Surgery and Architecture By: Andrew M Ibrahim · Justin B Dimick · Anjali Joseph

The way forward: hospital wayfinding By: Young, Eleanor

Wayfinding: an orientation system for hospitals By: Malkin

Preliminary study on the design strategy for vertical circulation of the outpatient building in general hospitals By: Zhang, Malu

Spatial Configuration, spatial cognition and spatio behavior: the role of architectural intelligibility in shaping spatial experience By: Kim, Y.O

Space suntax and Spatial cognition By: Alan Penn

Human wayfinding and Cognitive maps By: Golledge R.G.

Just down the road a piece: Development of topological knowledge of building layouts. Environment and Behavior By: Haq S., Zimring C.

3 Ways Hospital Construction Has Evolved By: Bob Herman
Key Points from Readings:

Finding the Building in Wayfinding

- The building should express its own layout and exploration of paths should be clear
- Spatial Cognition is important
- Configurational properties rather than merely relying on landmarks or signage
- The shape of the space and the number of occupants moving through that area
- Landmarks hinder rather than help understanding
- Configuration is all about the overall pattern
- The ease of memorization
- Typology is key to the navigation within the space
- Complex architectural environment can not depend on direct visual perception
- Spatial pattern that can be systematically described
- Design in a way that the occupants may prefer certain paths over others (Memorization of system)
- Counterintuitively use routes
- Corridors junctions are slightly offset with respect to each other
- Hospitals are built in phases
- A change in designs almost always comes during the change of phases
- Function of the programs influence the space
- When a new built environment is being tested it gets integrated into the next phase making the whole circulation of the new phase different from the original.
- During the testing phase of the new program one unit is built and tested and the other units are on hold. This is to see if the new program works. If it doesn't, they will go back to the old program.
- Because of this testing phase you end up with different program phases mixed in with each other making the intelligibility of the space poor.
- Short time frame when building new parts of the existing hospital
Concern to the build space, it can be made through the distribution and composition of spaces, the shape of the exterior volume of the building, the presence of views to outside, green and worship spaces, furnishings, materials, finishes, colours, signage, light (both natural and artificial), elements of visual reference (for example, art installations).

For example, the Cognitive Psychology says that a corridor with more than two changes of direction doesn’t help to create a mental maps for the orientation. Therefore, such corridor isn’t good.

By: Giuseppe Pellitteri
This is what Hospitals have become... UNINTELLIGIBLE
CIRCULATION FOCUS

STAFF CIRCULATION
VISITOR CIRCULATION

DUE TO RESTRICTIONS AND HEALTH CODE LAWS, MANY AREAS AND INFORMATION ARE NOT ACCESSIBLE TO THE GENERAL PUBLIC. THEREFORE, THIS THESIS FOCUSES ON THE VISITOR'S CIRCULATION.

WHAT IS SPATIAL INTELLIGIBILITY?

LOBBRY  CORE
CORRIDOR  HELP DESK

PARTS (LOCAL)
WHOLE (GLOBAL)

UNDERSTANDING THE PARTS = UNDERSTANDING THE WHOLE

REFERENCES
- Kim, Y.O - Spatial configuration, spatial cognition and spatial behaviour: the role of architectural intelligibility in shaping spatial experience
- Alan Penn - Space Syntax And Spatial Cognition
- Golledge R.G. - Human wayfinding and cognitive maps.
- Haq S., Zimring C. - Just down the road a piece: The development of topological knowledge of building layouts. Environment and Behavior

A break down of the key points from the research.
THEORY

WHAT MAKES A SPACE INTELLIGIBLE? HOW DO WE AS ARCHITECTS HELP VISITORS WITHIN AND OUTSIDE OUR DESIGN NAVIGATE?

THERE ARE STUDIES THAT DEFINE THESE TWO TYPES OF WAY OF THINKING AS LOCAL VS. GLOBAL. LOCAL IS FOCUSED ON THE ELEMENTS THAT AFFECT THE THINGS WITHIN THAT AREA AND GLOBAL FOCUSES ON THE CONNECTIONS TO THE NEXT AREA. THE HOME TOWN CONNECTION VERSUS THE HIGHWAY IN THE HOMETOWN CONNECTIONS TO THE NEXT CITY. MOVEMENT THROUGHOUT A SPACE WEATHER IT BE LOCAL OR GLOBAL CAN BE PLACED INTO TWO MAIN TYPES OF MOVEMENT. THESE TYPES HAVE PROS AND CONS BUT ARE KEY TO MOVEMENT.

THE TREE VS. THE BUSH ARE THE TERMS USED FOR SPATIAL ANALYSIS. THE TREE LIKE MOVEMENT IS BASED OFF THE IDEA OF GOING THROUGH ONE SPACE TO GET TO ANOTHER. THIS MAKES THIS MOVEMENT VERY CONTROLLING AND ORGANIZED IN THE WAY A PERSON NAVIGATES THE SPACE. THE BUSH IS THE OPPOSITE AND HAS MORE OF AN OPEN LAYOUT. THIS ALLOWS THE USER TO HAVE A HIGHER NUMBER OF CHOICES HE/SHE WANTS TO NAVIGATE THE SPACE.

= CONTROL & ORGANIZED LOW NUMBER OF CHOICES
EXAMPLES: CHURCH, FUNERALS, ETC.
(STEP BY STEP PROGRESS OF DOING THINGS)

= NON-CONTROL & RANDOM HIGH NUMBER OF CHOICES
EXAMPLES: CLUBS, BARS, ETC.
(ORDER OF THE PROGRAM IS UP TO THE USER)

VISUAL

NODE (KEYPOINT)

TOPOLOGY
Brief History of Hospitals

Some hospitals were multi-functional in the past, while others were founded for specific purposes such as leper hospitals, or as refuges for the poor, or for pilgrims: not all cared for the sick. Hotel Des Invlides was an example of this inner changed hospital. This was during the Barque Architecture. In 1671 the hospital was built. Also, during 1540, the church abruptly ceased to be the supporter of hospitals, and only by direct petition from the citizens of London, were the hospitals St Bartholomew’s, St Thomas’s and St Mary of Bethlehem’s (Bedlam) endowed directly by the crown; this was the first instance of secular support being provided for medical institutions. Through history this change of program throughout hospitals thus things over time have been added or morphed to fit the needs during that time. This idea that form follows function and function is affected by history of the area an links to place; affected the design. (Thomas Markus) Cortés, built the first hospital in North America. It is called the Hospital de Jesus Nazareno and it still stands in Mexico City (see map.) The first hospital in the United States was a center created in 1663 to treat injured soldiers in New York. The first incorporated hospital, Pennsylvania Hospital, was established in 1751. It is from these early church-and community-sponsored hospitals that today’s hospitals have evolved.

Throughout history the functional aspects of a hospital building often overshadows the architecture. The past history of the hospital has mainly forced on the emotional and functionality of the built work. Recently technological discoveries and new ways of treatment and care, influence the design choices in modern hospitals; which in turn focus became heavily on the functional aspects of the departments. Over the years the building typology has concern on the composition of spaces, the shape of the exterior volume of the building, the presence of views to outside, green and worship spaces, furnishings, materials, finishes, colours, signage, light (both natural and artificial), and elements of visual reference. Also, there is a concern the system of routes, internal and external, which is closely connected with the entrance hall and the expressive value of the wrapper.

In 2001, in Italy, a Ministerial Committee chaired by the architect Renzo Piano, developing a New Model of Hospital for acute care and high technology, put at the first point of its theoretical principles, the humanization of hospital space.
LINEAR  RING  GRID
LINEAR
Can Misses Hospital
Luis Vidal + Arquitectos
2014
Chris O’Brien Lifehouse
HDR Rice Daubney
2013
La Florida Metropolitan Hospital Clinic
BRATS Consulting & Projects SLP (Silvia Barbera, Jorge Bateteza, Crispóbal Tirado),
MURTINHO+RABY arquitectos (Pedro Murtinho, Santiago Raby)
2013
Rey Juan Carlos Hospital
Rafael De La-Hoz
GRID
Centre Hospitalier De Marne-La-Vallee
BRUNET SAUNIER
2012
EL Carmen Hospital Maipu

BBATS Consulting & Projects SL (Silvia Barbera, Jorge Bateteza, Cristóbal Tirado), Murtinho+Raby Arquitectos (Pedro Murtinho, Santiago Raby)

2013
Private Hospital Terra Quente
Pitagoras Group
2012
CASE STUDY ANALYSIS

CHRIS O'BRIEN LIFEHOUSE

THE CHRIST HOSPITAL

D'OLOTI COMARCAL HOSPITAL

PLANS

A STRONG PRIMARY PATH DEFINED BY THE VOID SPACES

A LARGE NUMBER OF PATHS EXTENDING OFF OF THE PRIMARY

PRIMARY

HE PRIMARY IS THE MAIN ELEMENT IN THIS DESIGN. IT IS LIKE THE SPINE.

THE PATH EXTENDS JUST FROM THE MAIN ENTRY MAKING IT FEEL LIKE THE SECONDARY IS THE LOBBY. (SECONDARY IS LOST)

SECONDARY

THE PRIMARY IS DEFINED BY THE OPENING OF THE SHELL THAT BRINGS IN LIGHT TO THE SPACE.

THE OTHER PATHS ARE DEFINE BY SMALLER MORE CUT OUT VERTICAL OPENING IN THE SHELL
**Nodes (Decision Points)**
- A large number of turns

**Hierarchy/Landmarks**
- Large voids that make the path clear and pushes the visitors through the space

**Light**
- With a deep floor plate, the use of skylight to get into the space is key
- The use of glass to bring more light in from the skylight

**Colors/Materials**

**Key Words**
- Voids
- High number of nodes
- Open core views
- Connectivity

**Spine**
- Connectivity
- Open floor plate
- Materiality
- Interior views

**Materiality**
- High number of nodes
- Cuts of lights
- Dense

**Turns are within the spine of the design making wayfinding intelligible. (already within the primary)**
- The hierarchy is the main entry which opens up to the spine
- The use of natural light within the core of the spine
- The use of structural columns and glass helps define the space

**High number of turns within the space**
- Defined by the carved-out view to the exterior
- Natural light is brought in all throughout the layout. Large scale and small
- Use of a concrete shell to carve out moments within the space
NODES (DECISION POINTS)
- The number of turns are very minimum because there isn't secondary corridors.
- Small amount of turns because of the primary being the many connection to all.
- That extend the main number of turns limited.

HIERARCHY/LANDMARKS
- Use of interior and exterior space makes the design.
- Hierarchy within the primary.

LIGHT
- Use of natural light coming from the open courtyard.
- Open interior courtyard that gives a visual connection to the whole.

COLORS/MATERIALS
- Use of perforations to bring nature light in from.
- The use of concrete.
- The use of glass.

KEY WORDS
- Simple
- Facade
- Few nodes
- Connectivity
- Exterior core
- Interior core
- Connectivity
- Few nodes
- Materiality
- Connectivity
- Few nodes
- Hierarchy within paths
- Views
- Materiality
CASE STUDY ANALYSIS

AKERSHUS UNIVERSITY HOSPITAL

CENTRE HOSPITAL DE-MARNE-LA-VALLE

THE SIEFF HOSPITAL

PLANS

PRIMARY

SECONDARY

OPEN PRIMARY
WITH CONNECTIONS
TO THE SKY

PATHS EXTENDED

SMAL PRIMARY

TO MANY EXTENDED
PATHS

THE PRIMARY IS NOT
SO CLEAR

THE PATHS ARE SOME
WHAT BLENDED WITH THE
PRIMARY
NODES (DECISION POINTS)

HIERARCHY/LANMARKS

LIGHT

COLORS/MATERIALS

KEY WORDS

HIGH NUMBER OF NODES
MATERIALITY
OPEN AIR

MATERIALITY
LONG CORRIDORS
LIGHT WELLS
HIGH NUMBER OF NODES

NUMBER OF TURNS ARE VERY LOW

USE OF OUTSIDE VIEWS AND OPEN SPACES

OPEN AIR AREA HELPS WAYFINDING

USE OF GLASS TO HELP VIEW THE LAYOUT

LARGE OPEN SPACE
VIEWS
FEW NUMBER OF NODES
CONNECTIVITY
Kraemer Radiation Oncology Center
BY: Yazdani Studio of Cannon Design
Location: Anaheim, CA

This elegant by simple design is focus on the heath care of cancer treatments. Most traditional radiation treatment centers are places below ground. It is place below ground because of the heavy equipment and to shield radiation. By designing this beautifully aesthetic above ground this is bringing in the natural light and the amenities that support the psychological and emotional needs for cancer patients. As you start to pick apart the functional purpose of the design we start to see the configurational properties which truly make this design an intelligible circulation. The first intuitive action that helps influence circulation is the use of interior colors to creative calming and nature oriented flow throughout the space.

This elegant by simple design is focus on the heath care of cancer treatments. Most traditional radiation treatment centers are places below ground. It is place below ground because of the heavy equipment and to shield radiation. By designing this beautifully aesthetic above ground this is bringing in the natural light and the amenities that support the psychological and emotional needs for cancer patients. As you start to pick apart the functional purpose of the design we start to see the configurational properties which truly make this design an intelligible circulation. The first intuitive action that helps influence circulation is the use of interior colors to creative calming and nature oriented flow throughout the space.
The topological structure plays a key role in the design of this space. With its circular plan design it makes finding the primary and secondary paths easy in the design (See Figure 1.0). The corridors are within a contentious loop which makes it an intelligible arrangement for new patients. If one was to get lost, one just would have to follow the path and it will lead them back to the start. By doing this there is a low need for signage within the space. Architecture should always be the signage. Now, within the layout a spatial cognition starts to form. The idea of knowing that one just has to walk around and it will always lead them back to the entrance. There is this idea of finding the main floor through the use of the interior lighting (Way-Finding) and color and also, the hierarchical coordination within the space (See figure 1.1). As you break down the floor plate more we can see a hierarchy on different parts of the circulation. This hierarchy is used as a way-finding tool or destination for lack of better words. Once a person gets to these key point within the space that are increased spatially, as a navigator of a new space there are key view points (Nodes) that let you see into the critical spaces (Example Main Entry) (See Figure 1.3). Another key element that plays a key role in the circulation of this building is materiality. At the core of this floor plan are the treatment rooms. The whole plan is wrapped around this core and is easily identified by the use of three-foot-thick concrete walls and Wood panels (See Figure 1.2). The spatial cognition starting to form in one's head is do to this simple but powerful use of concrete. By using such a heavy element as the core and expressing that within the space, everyone walking within the circulation knows spatially where the center of the building is located. Thus, the process of eliminating the use of way-finding handicaps (signage) even further within the space. The overall elements that can be taken from this that make it a successful circulation is the use of topological structures, hierarchy in spaces and the use of materials.
CRITICAL MOMENTS

INTERIOR LIGHTING

FIGURE 1.1

HIERARCHY
By: SOM  
Location: Cincinnati, OH

This design is focused more on the functionality of the space. Opening in September of 2015 is the new design model of the integrated patient centered orthopedic care. The building is filled with natural light throughout the space because of its façade which adds to the views within the space. But what makes this design a great circulation for the occupants within the space? Let's start by looking at this simple but affective floor plan for the Christ Hospital Joint and Spine Center.
As the name implies the joint and spine is the circulation of the building. There is the use of axial mapping within this design (See Figure 2.0). This is by far the easiest way to navigate a space. There is one primary circulation that makes up the bulk of the floor plate and the secondary is the other axis in the design. The core is within the primary path and goes with the flow of the circulation (See Figure 2.1). There is a structural circulation within the floor plate (See Figure 2.2). Within the circulation columns align with the path of travel giving a sense where the primary axis is within the design. By having this topological structure, this eliminates the need of most signage. There is also a small zone of hierarchy within the entry way of the building (See Figure 2.3). The simplicity of this design is what makes it so affective when it comes to circulation. The spatial cognition of the space is at its simplest in this hospital. As soon as you enter the space the layout is apparent. The use of opening through the floor plates helps the navigator to quickly relate the previous floor to the one they are currently on. By seeing the connective they get a faster understanding of location and layout of the building. Overall, the key element that makes this an affective circulation is the axial mapping, structure mapping and the use of views.
The Sieff Hospital
By: Weinstein Vaadia Architects
FIGURE 3.0

PATHS

PRIMARY

SECONDARY
Piedmont Hospital
The first facility for Piedmont Hospital, pictured circa 1915, was a fifteen-room home located at the corner of Capitol Avenue and Crumley Street in downtown Atlanta. The hospital, founded in 1905 as Piedmont Sanatorium, remained in this location until 1957.

Piedmont Hospital

Soon to be the main entry way was built around the 1963

The first building was built in 1957 on peachtree

Built around 1984 for new practices

Built around 2004

Built during 2005 but finished 2006

Building 77 & South Bed Tower Addition was Built Around April 2008

Built in late 2010 early 2011

Built in 2010
2

FLOOR TYPE IS UNIQUE TO THIS AREA OF THE BUILDING.

1

CORE IS SIMILAR TO OTHERS. NO CLEAR SIGNAGE OF LEVEL

5

STRONG VISUAL CONNECTION TO THE OTHER BUILDINGS. UNIQUE SKYLIGHT TO HELP IDENTIFY THIS AREA WITHIN THE BUILDING

5

VERY UNIQUE LANDMARK TO HELP IDENTIFY LOCATION WITHIN THE BUILDING. CLEAR VISUAL CONNECTION.

5

STRONG VISUAL CONNECTION TO KEY CORE OF THE BUILDING FOOTPRINT.

5

FLOOR TYPE FOR THE THIS SPACE

VALUE OF INTELLIGIBILITY

1 BAD

5 GOOD
VISUAL CONNECTION TO ROOF LINE. IF WE WORKED COULD BE A STRONG VISUAL LOCATION FOR VISITOR

NOT A STRONG CONNECTION WITH THE CORE LOCATION. VISITORS HAVE A HAD TIME FINDING THIS LOBBY AREA BECAUSE MOST FLOORS DON'T HAVE THIS LOBBY LOCATED ON IT'S LEVEL.

USE OF A DIFFERENT MATERIAL FOR THIS FLOOR IN THE CORE.

FLOOR TYPE IS USED IN DIFFERENT AREAS OF THE HOSPITAL. NOT UNIQUE TO AREA

MOST SEATING AREAS ARE LOCATED IN THIS AREA ON EACH FLOOR. VISUAL TO THE STREET GIVES THE VISITOR AN IDEA OF LOCATE.

VALUE OF INTELLIGIBILITY

1 BAD

5 GOOD
1. Typical corridor and floor type. Value of intelligibility: 1 (bad) to 5 (good).

2. Material used on other floor levels making this not unique to identifying the floor.

2. Strong visual connection with the roof line. Could be made into something that visual connects the visitor.

Typical seating location which is good for the visitor. Visual connection to the street gives an idea of location within the building.
STRONG VISUAL CONNECTION WITH THE ROOF LINE. COULD BE MADE INTO SOMETHING THAT VISUALLY CONNECTS THE VISITOR. AS YOU GO UP THE BUILDING THIS CONNECTION BECOMES MORE CLEAR MAKING THE WAYFINDING STRONGER THE HIGHER UP THE VISITOR GOES.

A DIFFERENT TYPE OF FLOOR USED IN THIS CORRIDOR MAKING IT IDENTIFIABLE TO VISITOR.

MATERIAL USED ON OTHER FLOOR LEVELS MAKING THIS NOT UNIQUE TO IDENTIFYING THE FLOOR.

TYPICAL CORRIDOR AND FLOOR TYPE.

VALUE OF INTELLIGIBILITY

BAD  GOOD
STRONG VISUAL CONNECTION WITH THE ROOF LINE. COULD BE MADE INTO SOMETHING THAT VISUALLY CONNECTS THE VISITOR. AS YOU GO UP THE BUILDING THIS CONNECTION BECOMES MORE CLEAR MAKING THE WAYFINDING STRONGER THE HIGHER UP THE VISITOR GOES.

NOT A STRONG CONNECTION WITH THE CORE LOCATION. VISITORS HAVE A HAD TIME FINDING THIS LOBBY AREA BECAUSE MOST FLOORS DON'T HAVE THIS LOBBY LOCATED ON IT'S LEVEL.

SIMILAR TO THE LAST FLOOR MAKING THIS FLOOR LESS UNIQUE. PROGRAM TYPES ARE DIFFERENT ON THIS CORRIDOR.

TYPICAL SEATING LOCATION WHICH IS GOOD FOR THE VISITOR. VISUAL CONNECTION TO THE STREET GIVES AN IDEA OF LOCATION WITHIN THE BUILDING.

TYPICAL CORRIDOR AND FLOOR TYPE.

MATERIAL USED ON OTHER FLOOR LEVELS MAKING THIS NOT UNIQUE TO IDENTIFYING THE FLOOR.

VALUE OF INTELLIGIBILITY

BAD GOOD
A focus on which entry gets used more by the visitors through out the day.
A focus on the surrounding buildings that make up the hospital. To have a better understanding of the program layout as a whole.
CIRCULATION ANALYSIS
VISITOR'S CIRCULATION PATH

1957

THERE IS A HIGH NUMBER OF INTELLIGIBILITY BECAUSE OF THIS SIMPLE LAYOUT (R=1). THE NUMBER CHOICES VS. CONNECTION IS ALSO LOW (R=.010) WHICH WILL PLAY A STRONG ROLE.

CIRCULATION OF BUILDING
THERE IS A LOWER NUMBER FOR INTERGATION VS. CONNECTIVITY ($R=\cdot 417$). THIS IS BECAUSE THE NUMBER OF CHOICES HAS INCREASED DUE TO THE ADDITIONS ($R=\cdot 137$).

A CLEAR UNDERSTANDING THAT AS THE NUMBER OF CHOICES INCREASE THE LEVEL OF INTELLIGIBILITY DECREASES. THE LAYOUT BECOMES MORE IMPORTANT TO MINIMIZE THIS FROM HAPPENING.

CIRCULATION OF BUILDING
1984

VERY SIMILAR TO 1963. NOT TO MANY ADDITIONS ADDED DURING THIS TIME PERIOD.

VISITOR’S CIRCULATION PATH
DURING THIS TIME PERIOD THE NUMBER OF CHOICES INCREASED (R=.284) BUT THE INTELLIGIBILITY ALSO INCREASED (INTERGATION VS. CONNECTIVITY, R=.51).

IT SEEMS THAT THE PATH THAT IMPROVES IS ONE THAT IS MORE TREE LIKE AND CONTROLLING OF THE PROGRAM. (WE MUST GO THROUGH ONE ROOM TO GET TO THE NEXT PART; A SET PATH) VS. BUSH LIKE (WHICH WE HAVE MORE CHOICES TO GET TO THE OTHER SPACE THEN JUST ONE SET PATH).

VISITOR'S CIRCULATION PATH
THERE IS A SMALL INCREASE IN CHOICES VS. CONNECTIVITY (R=.27) BUT THE INTELLIGIBILITY HAS INCREASED MORE (R=.643).

FROM THIS LAYOUT THE UNDERSTANDING IS THE BUILDING TO KEEP A SPACE GROWTH BUT INTELLIGIBLE, WE MUST CREATE A LOOP USING THE LEAST AMOUNT OF CHOICES AS POSSIBLE. THIS WILL KEEP THE INTELLIGIBILITY OF THE SPACE HIGH AND ALSO MAKING A KEEP LOOP FROM ONE END OF THE BUILDING TO THE OTHER.

VISITOR’S CIRCULATION PATH
NOT MUCH HAS CHANGED FROM 2006 TO 2008 IN THE OVERALL CIRCULATION OF THE SPACE.

VISITOR'S CIRCULATION PATH
There is a second loop that gets created but the number of choices vs. connectivity decreased ($R = .176$). It seems to be the number of loops within a space can affect not only the choices vs. connectivity but also the intelligibility because that has decreased at a high scale ($R = .261$).

There seems to be a limit to loops within a space. This could be determined by the size of the overall space, the number of connections that make up that loop or something else. Having this restricted area makes the space very unintelligible. By taking this restriction out the $R = .62$.

(CURRENT): Visitor’s circulation path
- RECLAIM RESTRICTED PATH

BY REMOVING THE RESTRICTED AREA THIS CREATES A THIRD MUCH SMALLER LOOP THAT CONNECTS THE OTHER LOOPS. BY DOING THIS THE NUMBER OF CHOICES Vs. CONNECTIVITY INCREASES (R=.35) AND THE INTELLIGIBILITY INCREASES (R=.637).

PROPOSED: VISITOR'S CIRCULATION PATH
Looking at how the rooms shape other programs. Every patient room was on cube space. It takes two patient rooms to make a help desk area.

This idea of being confused in a space and how do I fix this?

Looking at just the path of circulation.

Looking that most corridor conditions
Large section model to help understand the whole hospital. The Blue elements are the elevator connections and the green are the stairs. Visitors circulation paths throughout the space are marked with blue thin elements.
DESIGN TOOLS

EXISTING BUILDING

DESIGN ITERATION B

TO EXTEND OUT HELP DESK SO VISUAL WITHIN CORRIDOR
- USE OF MATERIAL - COLOR

DESIGN ITERATION

EXISTING HELP DESK AREA

EXTENDING BUILDING

DESIGN ITERATION C

INTERGATION OF THE HELP DESK IN THE LOBBY AREA

DESIGN ITERATION

EXISTING HELP DESK AREA

NEW BUILDING

DESIGN ITERATION A

EXISTING HELP DESK AREA

DESIGN ITERATION A & B

DESIGN ITERATION C
A. Placement of Equipment Room  
B. Getting off on the wrong floor then retaking the elevator  
C. High number of stops at different locations of Help Desks  
D. Being stopped by visitors asking for directions  
E. Location of Labs and Examine Rooms

Doctor's issues with circulation:

There is a high number of doctors within Piedmont Hospital that have to deal with circulation problems on a day to day schedule. The most common issue is being stopped frequently by visitors asking for directions. This happens more around the parking deck entry on the hospital.

Another top issue is the use of the elevators and the stops. Most doctors keep making the mistake of getting off on the wrong floor and this is because each floor is almost identical. There is no clear floor identification when you get off on each floor.

A few other issues are the placement of help desk. Every day the doctors have paperwork that must be filled out and sent to the right department/help desk to be filled into the system. This causes the doctor to do multiple drops throughout the day. On top of this is the placement of equipment room areas and labs.
A. Signage
B. Location of help desk
C. Which elevator to use
D. Getting wrong directions from staff
E. Can't finding waiting area
F. Finding parking when ready to leave building
G. Getting off wrong floor

Patient's Issues with Circulation

The main focus should be on the patient and their visitors. There seems to be a big issue with the signage and a focus on key areas to help the visitors along the way.

Signage is very hard to read and looks the same for all floors. Simply putting numbers and letters to an area is not enough to help with wayfinding. From my reads it is critical that the user relate the space with icons, materials or something that defines the space uniquely.

There seems to be a lack of lobby signage for users but yet the hospital has more lobbies not being used then rooms. A void of space that could be used for other programs to help with the aid of the facility.

The main issue is that visitors enter from the parking which is located in the back. This causes confusion because the service area are placed in a way that focuses on the user coming in through the front entrance.
PERSONAL OBSERVATION OF ISSUES WITH CIRCULATION

Observations of the space were looked at through an architectural lens. When first entry into the hospital it became very clear that the signage was hard to understand. The use of materials were mostly the same on each floor.

Next, were are the locations of key elements for wayfinding. The signage was placed in a way that the user had to look up to read it (example: airport signage), everything was marked with either numbers or letters. The text size for signage was hard to read. The use of the wall was completely overlooked.

Finally, elements like the help desk service was not clear to the user. It was placed in away were the user has to come all the way into a space to check if that was an area for help services. No clear elements that suggested the user to come to this area for help.

**A. Signage**
**B. Location of Help Desk**
**C. Entry Point into Hospital**
**D. Finding parking once leaving the facility**
**E. Which elevator to use**
**F. No visual connections to other parts of the hospital**
**G. Floors look similar, confused on which floor to get off on**
- Relocation of help desk to help better circulation flow
- Typical help desk location
- Helping identify each floor with unique architectural elements
- Creating a more intelligible circulation to help reduce signage and confusion
- Analyzing current circulation to see where circulation can be improved
- Circulation issues from personal observation
- Circulation issues for the doctor
- Circulation issues for the patients/visitors
- Elevator shaft
EXISTING BUILDING HELP DESK INTERVENTION

TO EXTEND OUT HELP DESK SO VISUAL WITHIN CORRIDOR
  - USE OF MATERIAL
  - COLOR

- THIS IS A FOCUS ON THE CENTRAL HELP DESK WHICH IS LOCATED IN THE SAME PLACE ON EACH FLOOR

- THIS INTERVENTION IS FOCUSING ON THE SURFACE AREA AROUND THE HELP DESK OPENING

- BY PULLING THE VOLUME OF THE AREA OUT THIS ALLOWS FOR VISUAL CONNECTION FROM BOTH ENDS OF THE CORRIDOR

- BY REINTRODUCING THE VOID AT A SMALLER HEIGHT, THIS CREATES A FRAME THAT DEFINES EACH LOCATION OF THE HELP DESK
THE CHRIST HOSPITAL

TURNS ARE WITHIN THE SPINE OF THE DESIGN MAKING WAYFINDING INTELLIGIBLE. (ALREADY WITHIN THE PRIMARY)

BASED OFF OF THE CASE STUDY, TURNS WITHIN A SPINE LIKE PATH SHOULD BE MORE EXPRESSED

EXISTING HELP DESK AREA
EXISTING BUILDING
VERTICAL PLANE INTERVENTION

AGE INFLUENCES

TYPES OF CONDITIONS

- LONG CORRIDOR CONDITION

- CORNER CORRIDOR CONDITION

DESIGN ITERATION B

- USE TEXTURE THAT RELATES TO THAT FLOOR

- USE OF LARGE NUMBERS COMES CLEAR TO ALL AGE GROUPS

- FOCUS ON THE CORE WALLS TO HELP DEFINE FLOOR LEVEL

- FOCUS ON THE CORRIDOR WALLS TO HELP CIRCULATION

- FOCUS ON THE CORRIDOR CORNERS/TURNS
CORRIDORS NEAR OR HAVE WINDOWS SHOULD USE MATERIALS TO HELP BRING IN MORE NATURAL DAYLIGHTING INTO THE SPACE.
FOCUS ON CIRCULATION PATHS

ADD TE: BY USING THE TOOLS IN DEPTH MAP, THE MORE INTEGRATED SPACES AND KEY INTEREST POINTS WITHIN THE SPACE ARE EASILY DEFINED.

THIS ALLOWS ME TO PICK OUT THE CRITICAL NODES FOR CHANGES OR INTERVENTIONS.

CRITICAL NODES:
- PARKING ENTRY
- MAIN ENTRY
- CORE AREAS (2 MAIN CORE LOCATIONS)

AREAS PICKED BASED OFF OF NARRATIVES BEING OVERLAYED TO FIND KEY POINTS AND DEPTH MAP BACKING UP THE IMPORTANCE OF CONNECTIVITY/INTERGRATION OF

KEEP THE ORIGINAL LAYOUT THE SAME
RECLAIM RESTRICTED AREA FOR VISITORS USE
RECLAIM RESTRICTED AREA & SHIFT/CREATE NEW RESTRICTED AREA

DESIGN ITERATION A
DESIGN ITERATION B
DESIGN ITERATION C
FOCUS ON FLOOR PLATE

A FOCUS ON THE FLOOR/WALL ELEMENTS AS A WAY FOR WAY-FINDING. PLACES THIS UNIQUE ELEMENTS IN KEY PARTS OF THE BUILDING.

USE OF MATERIALS ON FLOOR PLATES

USE OF AESTHETICS ON VERTICAL ELEMENTS UNIQUE TO EACH FLOOR

DESIGN ITERATION A

DESIGN ITERATION B

POINTS OF INTEREST
FOCUS ON HELP DESK

ORIGINAL

DESIGN ITERATION A

INTERGRATING HELP DESK INTO CORE
- USE OF MATERIAL
- COLOR

DESIGN ITERATION B

TO EXTEND OUT HELP DESK SO VISUAL WITHIN CORRIDOR

INTERGATION OF THE HELP DESK IN THE LOBBY AREA

DESIGN ITERATION C

EXISTING HELP DESK AREA

MOVING HELP DESK NEAR CORE AND ALLOWING FOR VISUAL CONNECTION

ADD TEXT

DIFFERENT ITERATIONS ON THE IDEA TO MAKE THE HELP DESK LOCATION CLEAR TO THE USER. PLACEMENT ON THIS ELEMENT IS CRITICAL FOR WAYFINDING AND OTHER USAGE.

VISUAL CONNECTION IS KEY TO UNDERSTANDING ONES PLACEMENT IN THE BUILDING AND PLACEMENT OF PROGRAMS WITHIN.
VISITOR CIRCULATION TYPES

CCU AREA

ICU/SURGICAL WAITING AREA

LOBBY

CRITICAL CARE UNIT (CCU)
VISITOR CIRCULATION TYPES

HEART CENTER

WEST ICU

SURGICAL SERVICES

CENTER ICU

HELP DESK LOBBY

ICU/SURGICAL WAITING AREA

HEART CARE
VISITOR CIRCULATION TYPES

INTENSIVE CARE UNIT

WEST ICU

CENTER ICU

ICU/SURGICAL WAITING AREA

HELP DESK LOBBY
VISITOR CIRCULATION TYPES

MINOR INJURIES
VISITOR CIRCULATION TYPES

SURGICAL SERVICES

ICU/SURGICAL WAITING AREA

HELP DESK LOBBY

SURGICAL SERVICES
MOST AREAS A VISITOR HAS ACCESS TO IS THE PATIENT ROOMS, LOBBIES AND CORRIDORS WITH OUT RESTRICTIONS

GROUP VISITORS + SINGLE VISITOR
VISITOR CIRCULATION TYPES

LABOR AND DELIVERY

HELP DESK

LABOR & DELIVERY

LOBBY
TYPES OF VISITORS

RUSHED MOVEMENT
- Labor and Delivery
- Critical Care Unit
- Intensive Care Unit

PACED MOVEMENT
- Minor Injuries
- Surgical Services
- Heart Care

SLOW MOVEMENT
- Health Examination
- Group Visitors
- Single Visitor
LOCAL INTERVENTION

EXISTING BUILDING

THE SPACE WITH HIGH INTEGRATION (INTELLIGIBLE= REDS AND ORANGES) WILL REMAIN AND THE DESIGN INTERVENTIONS WILL LINK TO THESE SPACES WHICH IN THEORY/DATA WILL HELP IMPROVE CIRCULATION FOR THE VISITORS.

HIGH INTEGRATION

LOW INTEGRATION
Idea on bringing the help desk to the core.

Idea on making a visual connection through the stacked lobbies.

Looking at the condition of most corridors. A long narrow layout.
DESIGN TOOLS

EXISTING BUILDING
(ECONOMICAL COST)

EXTENDING BUILDING
(MODERATE COST)

NEW BUILDING
(HIGH COST)
This iteration focuses on the tree-like movement when it comes to circulation. From various different types of hospitals and the simple idea of control lead to this way of thinking for the circulation. By doing these iterations the user has to go from space to space to reach their destination. By having this understanding the programs can be placed in a way that helps the visitor at each new location until he/she reaches their point of interest.
This iteration focuses on the bush like movement where the user has most choices to get around the space. By using this method the user to cut down on travel time. The placement of way-finding tools will need to be placed within or around the key nodes (choices for turns). By doing this it will help insure the user is being effective with their choices to reach their destination.
This iteration has a focus on both elements of the tree and the bush movement. The placement on where these elements will happen are key. More studies did to be made to insure the right placement happens. The reason why the hospital is intelligible now is because it is made up of bottom these two movements.
2025: VISITOR'S CIRCULATION PATH
2031: VISITOR'S CIRCULATION PATH
EXISTING BUILDING
VERTICAL PLANE INTERVENTION

- A PERFORATED ELEMENT THAT EXTENDS OFF THE WALL NO MORE THEN THE DISTANCE OF A HAND RAIL (3 INCHES)

- INTERGATION OF THE BEAD MAZE WITHIN THE THE PERFORATED ELEMENTS

- ALL CHILDREN WAYFINDING LEADS THEM TO A NEAR BY HELP STATION

- HELPING TO PROVED ACTIVITY FOR THE CHILD
- INTENT TO KEEP CHILD STATIONARY IF LOST

- USE OF NATURAL WOOD FOR THIS FEELING OF WARMTH TO GUIDE WITH CHANGES IN DIRECTIONS FOR KEY TURNS FOR USERS PATH

STRAIGHT LEFT RIGHT

- AVOID THE USE OF NUMBERS AND LETTERS. SYMBOLS/ICONS ARE MORE RELATABLE

- USE OF LARGE ICONS AND TEXT IF OTHER WAYFINDING ELEMENTS NOT CLEAR

DESIGN ITERATION A
THE USE OF STRUCTURAL COLUMNS AND GLASS HELPS DEFINE THE SPACE.

USE OF MATERIAL ELEMENTS LIKE WOOD WILL HELP DEFINE THE SPACE. THIS WILL ALSO GIVE A FEELING OF WARMTH.

MATERIALS TO USE:

“Wood” creates modern bright environments. These warm natural elements are inviting and make the corridors appear less stark.

The use of this material on the horizontal planes used for wayfinding will not only help increase intelligibility but also add feelings to these dead lifeless corridors.
NEW BUILDING

DESIGN TOOLS

EXISTING BUILDING

[ECONOMICAL COST]

DESIGN ITERATION B

TO EXTEND OUT HELP DESK SO VISUAL WITHIN CORRIDOR
- USE OF MATERIAL
- COLOR

EXISTING HELP DESK AREA

EXTENDING BUILDING

[MODERATE COST]

DESIGN ITERATION C

INTERGRATION OF THE HELP DESK IN THE LOBBY AREA

EXISTING HELP DESK AREA

NEW BUILDING

[HIGH COST]

DESIGN ITERATION A

DESIGN ITERATION A & B

DESIGN ITERATION C
GLOBAL INTERVENTION

SITE ANALYSIS

GLOBAL CONNECTIONS
GLOBAL PLACEMENT OF HOSPITAL VERSUS OTHER HOSPITALS IN THE ATLANTA AREA

PIEDMONT IS THE IDEAL GLOBAL PLACEMENT FOR THE ATLANTA AREA. IT IS PLACED RIGHT IN THE MIDDLE OF TWO MAIN GLOBAL CONNECTIONS WHICH ARE I-75 AND I-85. WHICH ALSO TIES INTO HIGHWAY GA-400. THIS IS GIVING PIEDMONT THREE STRONG CONNECTIONS ON THE GLOBAL SCALE, VERSUS MOST OF THE OTHER HOSPITALS ONLY HAVE ONE OR TWO CONNECTIONS.
THIS IS THE BEST AREA FOR GROWTH BECAUSE OF THE AMOUNT OF LAND STILL WITHIN THE PROPERTY CONSTRAINTS.
THE OTHER TWO LOCATIONS ARE KEY SPOTS BECAUSE THE CONNECTION TO THE MAIN CORRIDER WHICH LINKS TO GLOBAL (ALONG PEACHTREE STREET).

KEY REASONS WHY EXPANDING IN THE BACK IS KEY. THE TWO LOCATIONS IN THE FRONT NEAR THE MAIN GLOBAL CORRIDOR ARE NEAR AREA UNINTELLIGIBLE. IF A CONNECTIONS WAS MADE FROM THESE TWO AREAS TO THE CURRENT CIRCULATION THERE, IT WOULD MAKE THE SPACE EVEN MORE COMPLEX TO THE USER.

BY USING THE BACK AREA, THE MORE INTERGRATED PATH CAN BE EXTENDED THUS CREATING A NEW ADDITION TO PIEDMONT BUT HELPING MAINTAIN OR INCREASE INTELLIGIBILITY WITHIN THE SPACE.
DEPTH MAP ANALYSIS

BY EXTENDING OUT THE MOST INTERGATED CORRIDOR THIS WILL BE THE KEY CONNECTOR TO MY NEW BUILDING. IDEA 1 WAS A SIMPLE CROSS BUILDING SHAPE TO KEEP THE NUMBER OF TURNS (CHOICES DOWN). THIS WILL HELP KEEP INTELLIGIBILITY UP. AFTER ANALYZING IN DEPTH MAP THE INTELLIGIBILITY DECREASED BY 1/10TH. THE BASES OF THE THESIS IS TO INCREASE INTELLIBILITY. IDEA 2 IS SIMILAR TO IDEA 1 BUT THE CORRIDOR WAS CHANGED TO HAVE A MORE CONTIOUS RUN TO THE NEW BUILDING. THIS MADE THE INTELLIBILITY THE SAME AS THE ORIGINAL. IDEA 3 FOCUSED ON THAT KEY CORRIDOR BUT CONNECTED WITH THE PARKING CONNECTION THAT WAS ORIGINALLY THERE. THIS MADE A LOP THAT BRANCHED OFF OF THE MOST INTERGATED CORRIDOR. BY DOING THIS THE INTELLIGIBILITY INCREASED BY 3/10THS.

HIGH INTERGRATION

LOW INTERGRATION
THE FACADE FOCUS ON THIS SEGMENT OF THE BUILDING WILL BE TOWARDS VIEWS AND CONNECTIVITY.

THE FACADE FOCUS ON THIS SEGMENT OF THE BUILDING WILL BE TOWARDS PEACHTREE STREET.

PROPOSED 2022

PROPOSED 2027

PROPOSED 2032
1ST FLOOR CONCEPTUAL PROGRAM

2ND FLOOR CONCEPTUAL PROGRAM/ TYPICAL LAYOUT FOR UPPER FLOORS
IMPLEMENTATION OF DESGN TOOLS

DESIGN ITERATION A
COMBINING HELP DESK, CORE AND LOBBY

DESIGN ITERATION B
FOCUS ON THE CORE WITH CLEAR SIGNAGE

TYPICAL FLOOR LAYOUT IN NEW BUILDING

- USE TEXTURE THAT RELATES TO THAT FLOOR
- USE OF LARGE NUMBERS COMES CLEAR TO ALL AGE GROUPS
- FOCUS ON THE CORE WALLS TO HELP DEFINE FLOOR LEVEL
- Focus on the floor plates to help make each floor identifiable

Only floor 7 through 8 have visual connection to Peachtree Corridor

Vertical connections to each floor

Idea for structural grid

Staff use

Patient/visitor use
THE PART OF THE HOSPITAL WITH KEY LABS/CLINICAL ROOMS HAS A LOW NUMBER OF WINDOWS. VISUAL CONNECTIONS IN THESE ROOMS ARE NOT NEEDED AS MUCH.

LARGE NUMBER OF WINDOWS ARE ON THE PATIENT SEGMENT OF THE BUILDING. THIS IS FOR VISUAL CONNECTION BUT MOSTLY HEALTH. AN INCREASE SHOULD BE MADE ON THE FACADE.

SIGNAGE IS NOT REALLY VISIBLE ON THIS BUILDING WHICH STATES WHAT THIS BUILDING IS FOR VISITORS.

SIGNAGE IS NOT BEING SHOWN CLEAR ENOUGH TO THE MAIN GLOBAL CORRIDOR. THE SIGNAGE IS TO DEEP AND LOW TO THE GROUND WITHIN THIS BUILDING.

USING THE EXISTING VERNACULAR OF CONCRETE ON THE NEW BUILDING FOR SOME OF THE AREAS WITH LABS/CLINICAL.

USING THE EXISTING VERNACULAR OF INCREASED WINDOWS ON PATIENT SEGMENTS OF THE BUILDING, INCREASING THOSE CONNECTIONS.

PRIMARY CONNECTION TO EXISTING BUILDING. INTERROGATION IS HIGH ON THIS CORRIDOR. KEY PATH.

SECONDARY CONNECTIONS TO THE EXISTING BUILDING.
EXISTING DESIGN ELEMENT BEING CARED OVER TO THE NEW BUILDING TO KEEP WITH THE VERNACULAR

- WORKS AS A VISUAL CONNECTION FOR WAYFINDING
4.3
NEW BUILDING DESIGN IDEA INTERVENTIONS USED

INTEGRATION OF HELP DESK INTO LOBBY AREA

INTEGRATION OF HELP DESK TO CORE (OR NEAR CORE)

EXISTING HELP DESK AREA
TYPICAL PROPOSED HELP DESK/LOBBY/CORE AREA
PROPOSED CORRIDOR FOR PRIMARY CONNECTION TO EXISTING BUILDING
EXISTING DESIGN IDEA INTERVENTIONS USED

EXISTING HELP DESK AREA

- AVOID THE USE OF NUMBERS AND LETTERS. SYMBOLS/ICONS ARE MORE RELATABLE
- USE OF LARGE ICONS AND TEXT IF OTHER WAYFINDING ELEMENTS NOT CLEAR
PROPOSED HELP DESK AREA
EXISTING CORE AREA

- Focus on the core walls to help define floor level

Use texture that relates to that floor

Use of large numbers comes clear to all age groups

Avoid the use of numbers and letters. Symbols/icons are more relatable

Use of large icons and text if other wayfinding elements not clear
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Photos:
All pictures of the space were taken by the author.