

# **navigation**

in nichols hall



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Navigation in Nichols Hall  
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## Abstract

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Society more and more sees wayfinding systems as a critical aspect of a successful built environment. The advancement in experience design can be seen as shifts in design focus— from focusing only on one or a few aspects of a built environment to see the environment as a unified whole to studying various relationships between the environment and the users. Positive wayfinding experience comes from a comprehensive understanding of people, human cognition, behavior, and emotions. (Wang, Yanling, 2005) Essential aspects of a positive wayfinding experience include the consideration of the environment, information, service, behavior. But the role of the users, behavior, and emotion—especially positive ones in wayfinding is less explored than that of the negative ones. The goal of this thesis is twofold:

- simplifying the required cognitive effort that is required to navigate in a complex large environment, and to advocate the importance of effective wayfinding strategies, user behavior and their importance to navigation in a complex large environment.
- To decide on the best approach/solution, user-testing is conducted at the Nichols Hall on the campus of Kansas State University followed by semi-structured interviews. The participants' responses showed a considerable improvement in speed, accuracy, and ease-of-use when completing wayfinding or engagement tasks.

**Opposite**  
Nichols Hall atrium

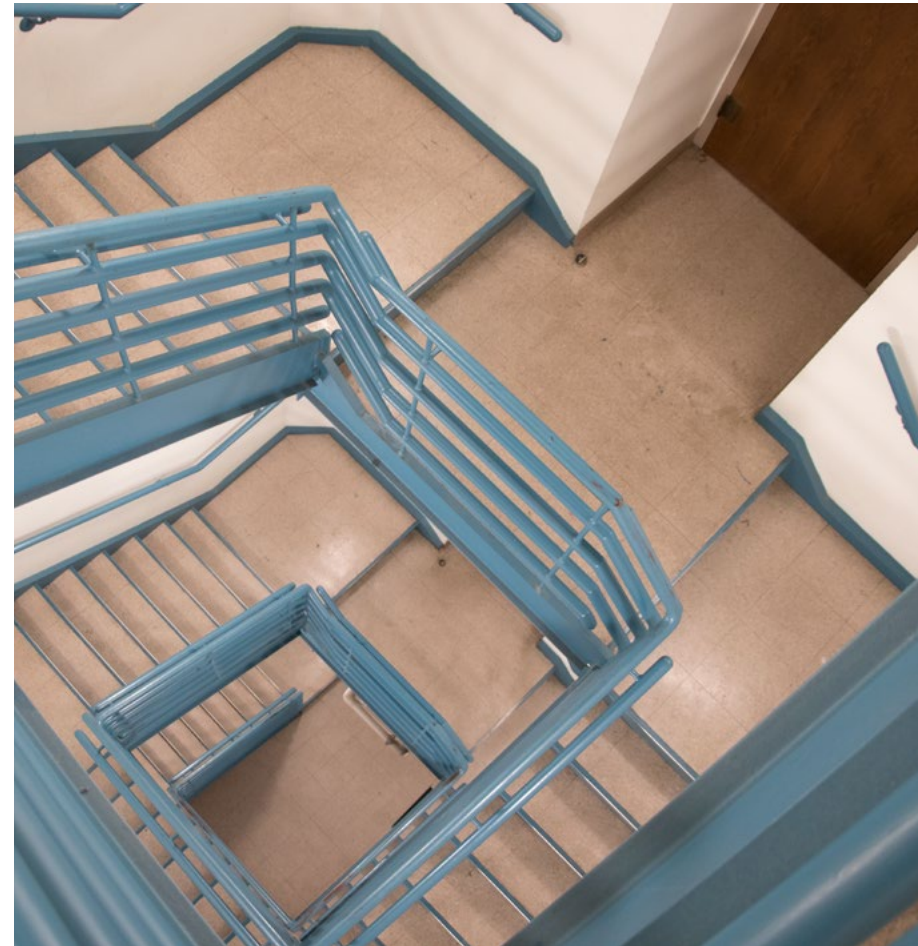


**Below, left**

Nichols Hall south stair case

**Below, right**

Nichols Hall Atrium



**Project Overview**

This thesis paper presents findings on wayfinding and user behavior in a complex large environment. Wayfinding systems are critical to successful navigation in a built environment. In general, successful wayfinding systems can help make the environment easier to understand, navigate, and create a positive experience for the users.

Beginning spring of 2019 I have been conducting different wayfinding exercises and tests using Nichols Hall as the site for the tests to develop effective strategies for wayfinding and behavior in a large complex environment like Nichols Hall

This goal would be accomplished by meeting the following objectives:

- Create a wayfinding system that helps orientate and navigate users in an effective and efficient way within the space
- Install a wayfinding system in Nichols Hall that is clear and easy to use in order to benefit residents, visitors, and the university community and in turn making it easier for them to navigate and locate their destination within Nichols hall.
- Install a well-thought-out, functional, and learnable wayfinding system that is engaging and works with the space.

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## Introduction

10 "Anyone experiencing even momentary disorientation and lack of recognition of their immediate surroundings experiences the uncertainty of being "lost." This state occurs when the wayfinding process being used to guide travel or movement through space fails in some way. Failure may be due to many different circumstances, to fully understand how to compensate for being lost, it is essential to know about wayfinding and the cognitive and environmental factors that influence it (Reginald Golledge 1999)." Wayfinding behaviors can be influenced by factors from both the environment and human individual differences. For example, people with both high and low spatial abilities can get lost in complex buildings that are aesthetically appealing yet difficult for wayfinding. The wayfinding process, usually considered a simple and effortless task, involves complex cognitive processes. In order to deliver an effective wayfinding system, it is crucial to understand how the user behaves in the given space.

### Motivation

One building on campus presents a wicked wayfinding problem for students and members of the Kansas State University community, those trying to find classrooms, studios, offices, and the university community that wants to visit the Chapman theatre in the building. In each of these groups, there are hundreds

of students each semester. Most of these students (freshmen) are unfamiliar with the building and by (Romedi Passini, 1984) principle the building has very high wayfinding problems. Dialogues with students and faculty indicated that many got lost in the building or have a hard time finding their destination within the space. One consequence is that students were late to class and office hours. Furthermore, many gave up altogether when they couldn't find their destination. Interviews with students show that many relied on asking for directions as their wayfinding strategy in the building. The effect of this strategy is a misuse of staff's manhours. Further consultation with secretaries and others who worked in the building also showed that people searching for classrooms, labs, elevator etcetera regularly asked for directions. One of such Secretary in the building mentioned that she stands outside the department office the first week of school so that she can answer questions relating to wayfinding in the building. Though many students and visitors were helped by this assistance, it is not the logical fix as the current practice is expensive, inadequate, and time-consuming.

### Research Goals

According to (Best 1970), there are two logical solutions to the wayfinding problem: Move destinations so that they are easier to find or provide wayfinding aids. In the case of Nichols hall, moving destinations was impractical. It was necessary to provide wayfinding aids. The first approach is to understand wayfinding in its entirety and the best practices needed to solve a wicked wayfinding problem—given the inherent mobility of humans, wayfinding can be viewed as one of the earliest human activities necessary for survival. Architects, urban planners, landscape architects, environmental graphic designers as well as behavioral and cognitive psychologists have been involved in the multidisciplinary study of wayfinding. Wayfinding discussed in this thesis primarily refers to human wayfinding in the built environment unless further specified—The goal of this thesis is in two parts:

simplifying the required cognitive effort that is required to navigate in a complex large environment. To advocate the importance of effective wayfinding strategies, user behavior and their importance to navigation in a complex large environment.

### Research Objectives

This goal would be accomplished by meeting the following main objectives:

- Create a wayfinding system that helps orientate and navigate users in an effective and efficient manner within the space
- Install a wayfinding system in Nichols Hall that is clear and easy to use in order to benefit residents, visitors, and the university community and in turn making it easier for them to navigate and locate their destination within Nichols hall.
- Install a well-thought-out, functional and learnable wayfinding system that is engaging and works in the space.

### Research Questions

1. What are the Wayfinding best practices/processes?
2. Who is moving through the space, how often, what are their goals? What are their behaviors?
3. What role does design have in the effectiveness of a wayfinding system?
4. What characteristics/attributes make the system effective?
5. How do you measure the effectiveness of a wayfinding system in a complex large environment?

## Key Terminology

**Cognitive Map** – A cognitive map is a mental mind map or we could say visual representation, which we use to store information on spatial connections and distances and geographical relationships between locations. As an example, when we visit a new holiday resort, the visual representation in our minds of the place gets clearer each day and more developed.

**Environmental legibility** – Environmental Legibility is the indication of the ease with which environments can be learned and understood by humans.

**Field of View** – Field of View refers to having a clear and visible view of the line or field of sight, i.e. you can see the path ahead to be traveled or navigated.

**Landmarks** – Landmarks may be defined in a number of ways, such as strategic foci toward or away from which one travels, intermediate foci on courses and routes that assist spatial decision making or significant physical, built or culturally defined objects that stand out from their surrounding.

**Locomotion** – refers to the real-time part of navigation in which we move successfully in the direction we intend without injuring ourselves or moving into obstructions. It requires coordination to the immediate surroundings directly accessible to our sensory and motor systems at a moment in time.

**Navigation** – Navigation refers to the specific means by which people find their way, including route navigation, landmark navigation, and map navigation.

**Place-making** – Place-making is a people-centered approach to the planning, design and management of public spaces. Put simply, it involves looking at, listening to, and asking questions of the people who live, work and play in a particular space, to discover needs and aspirations. This information is then used to create a common vision for that place.

**Spatial Awareness** – Spatial awareness is the ability to be aware of oneself in space. It is an organized knowledge of objects in relation to oneself in that given space. Spatial awareness also involves understanding the relationship between these objects when there is a change in position.

**Spatial Markers** – Markers reduce or eliminate conflict over space by creating an effective warning device system.

**Spatial Orientation** – is the natural ability to maintain the body's orientation and/or posture in relation to the surrounding environment (physical space) at rest and during motion.

**Space syntax** – The idea is that spaces can be broken down into components, analyzed as networks of choices, then represented as maps and graphs

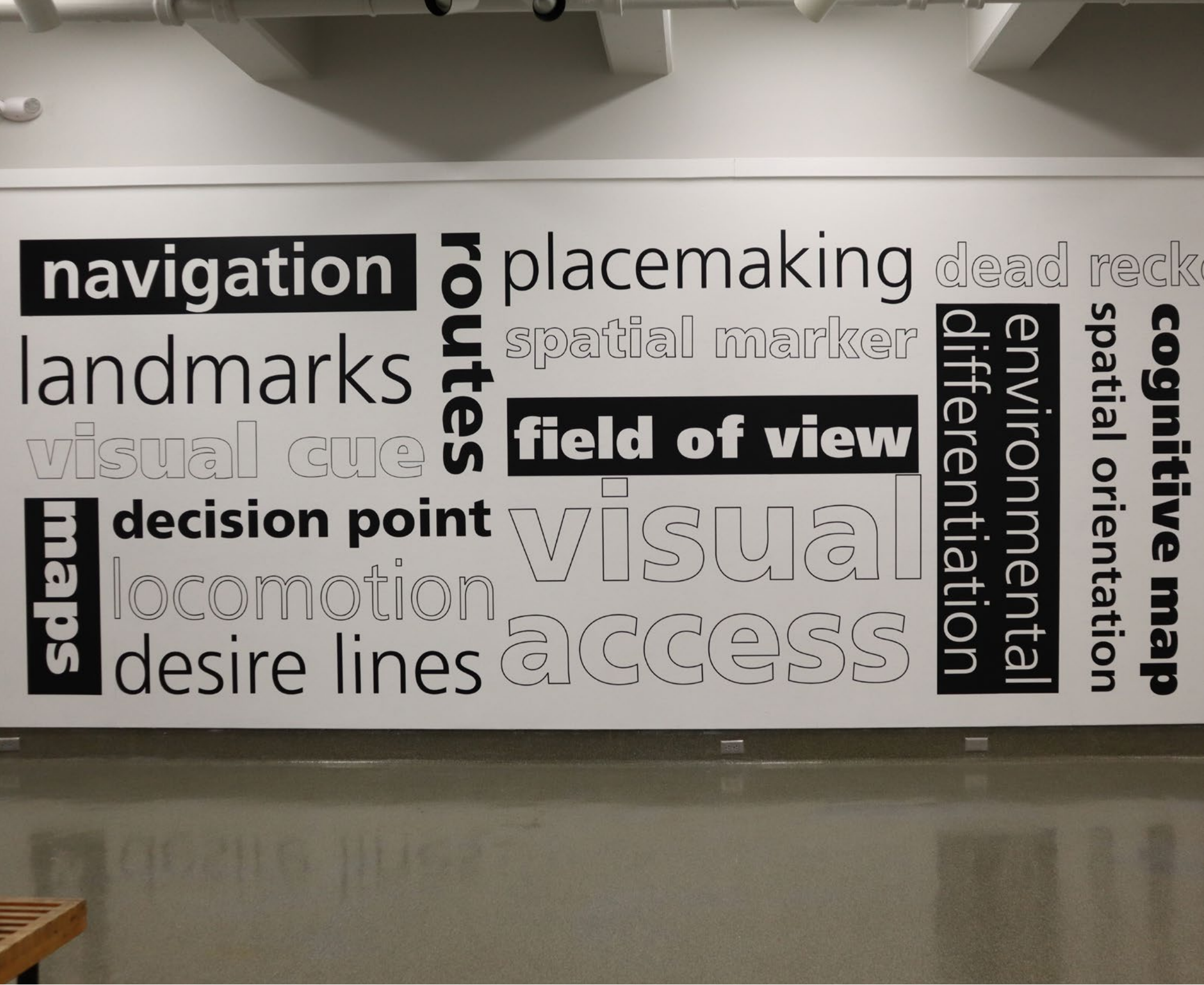
that describe the relative connectivity and integration of those spaces.

**User Experience** – is a person's emotions and attitudes about using a particular product, system or service. It includes the practical, experiential, affective, meaningful and valuable aspects of interaction and product ownership — in wayfinding is all about guiding users such that they have a positive experience.

**Visual Cues** – Visual cues are sensory cues received by the eye in the form of light and processed by the visual system during visual perception. Since the visual system is dominant in many species, especially humans, visual cues are a large source of information in how the world is perceived.

**Wayfinding** – Wayfinding refers to information systems that guide people through a physical environment and enhance their understanding and experience of the space.

**Opposite**  
wayfindingword cloud mfa show



## Defining Wayfinding

### What is Wayfinding?

Different researchers from different fields such as psychology, geography, and urban design have been trying to unpack the cognitive processes that go into wayfinding decisions. According to SEG, (the Society for Experiential Graphic Design) wayfinding system refers to the tools and methods used to facilitate this decision-making such as maps, direction signs, navigational assistance, and symbols to help guide people to their destinations. Maps, signage, photographs, videotape, verbal directions, and recently virtual environments are many approaches that have been used for spatial knowledge achievement (Shamsuddin, 2015). Using those wayfinding tools encompasses different complex tasks that involve different cognitive processes (Wiener, 2009).

“Wayfinding is the process of determining and following a path or route between an origin and a destination.” (Arthur Paul, and Romedi Passini. 1992). Wayfinding is knowing where you are in space, knowing where you are going, and knowing how to get there from your current location. It refers to people's experience of orientation and facilitates the selection of a particular route to traverse the urban environment, helping people successfully get to their destination. “Wayfinding is a cognitive process comprising three

distinct abilities: a cognitive-mapping or information-generating ability that allows us to plan actions and to structure them into an overall plan; and a decision-executing ability that transforms decisions into behavioral actions” (Romedi Passini, 1984) Both decision making and execution are based on information generated by cognitive mapping. These three abilities together constitute a spatial problem-solving process. Wayfinding not only directs people to destinations, but also educate them on boundaries, and the key features of the built environment as a teaching tool. By doing this, the environment becomes more legible. Wayfinding and associated identification elements help support the way we understand and experience the city.

### Types of Wayfinding

Wayfinding is a comprehensive approach that focuses on making the environment easier to read and understand. Wayfinding in the conventional sense includes elements such as physical signage, electronic signage, use of landmarks as navigational aids, and certain types of tactile features that employ the sense of touch. Different types of wayfinding signage can present different kinds of information. Certain types of signage are useful for some situations more than

others. Signage can be broken down into four classifications: Directional Informational Identification Regulatory Directional signs typically point the observer towards one or more destinations. If it has an arrow then it's probably a directional sign. Informational signs work directly with Directional signs to communicate the bulk of wayfinding messages. Maps, diagrams, and indices are the heroes of the informational signs. When paired with the directional signs, they can answer the two most vital wayfinding questions: “Where am I in relation to my destination?” and “Which way do I go to reach my destination?” Occasionally, directional and informational signs are combined into a single unit, but they are also effective as individual distinct elements.

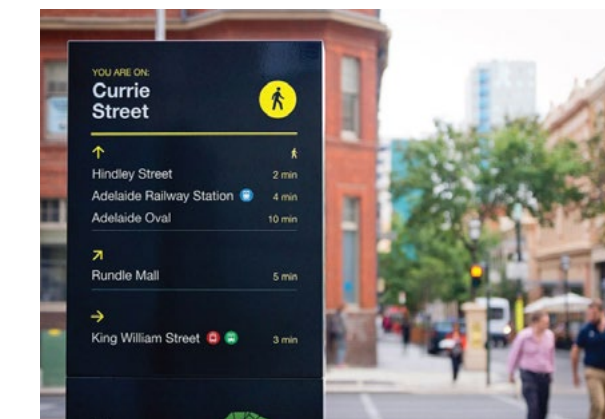
Identification signs label things: the range in scale and use of these is vast — a modest electrical closet sign is an identification sign but so is a set of twenty-foot tall channel letters bolted to the side of a building. Identification signs are generally inviting. Or helpful at least. They say “here's your destination – you've arrived!” Regulatory signs, however, are the lawmakers – “No Parking. No Exit. Don't do that.”

Regulatory signs do the least work in wayfinding. They add to the Certainty by establishing rules and order but do little else in showing the way.

### Psychology of Human Wayfinding

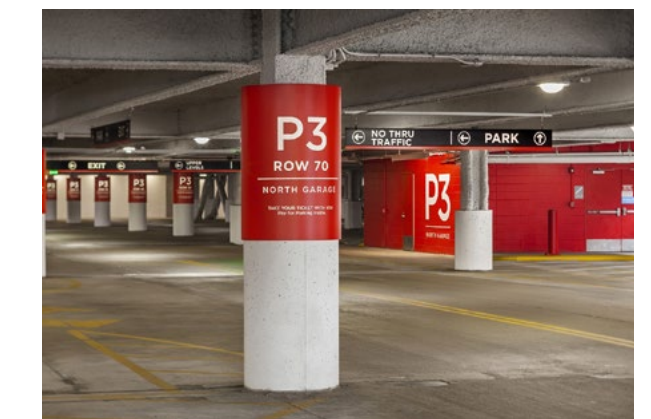
We travel through the environment to reach destinations that gratify our needs and wants. Successful travel requires that we know where to go and how to get there; it also requires that we can move along the intended route in the intended direction without having hazards or getting lost. Taken together, these are requirements of navigation: coordinated and goal-directed movement through the environment. Navigation occurs over a wide spectrum of Spatio-temporal scales. We navigate to the other side of the room, to the post office, to visit our relatives in another town, or go on vacation to another country. In order to navigate effectively, we apply our psychological skills of perception, cognition, and motor behavior, within the contexts of physical and social environments, and with the assistance of technology, information, and transportation. There are consequently a host of human factors issues relevant to navigation. Attention to these issues can result in improvements to wayfinding in the built environments — that increase the ease, accuracy, efficiency, comfort, and safety of navigation.

**Below, center**  
Directional Signage  
Identification Signage

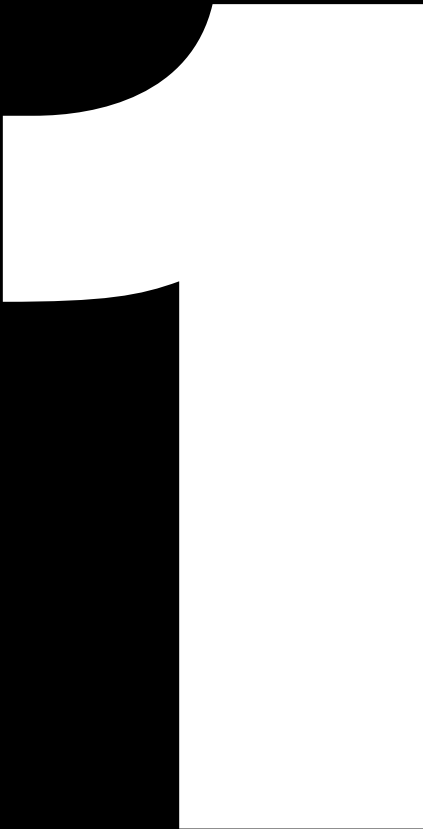


source: <https://fabrikbrands.com/the-wonders-of-wayfinding-design/>

**Below, right**  
Information Signage  
Regulatory Signage



Visual Investigation of  
Nichols Hall



**Opposite**  
Nichols Hall atrium



## History of Nichols Hall

Nichols Hall was built in 1911 as a gymnasium with a basketball court, swimming pools, and office space for the military science and physical education departments. A grand piano crashed through burning, crumbling floors and fell to the basement of Nichols Hall as a fire raged through the home of the music department Dec. 13, 1968.

Nichols became a shell after the fire. University administrators recommended razing the charred, burnt building. However, students protested the move in a campaign known as "The Castle Crusade." Students met with the governor to save Nichols, and the building was preserved.

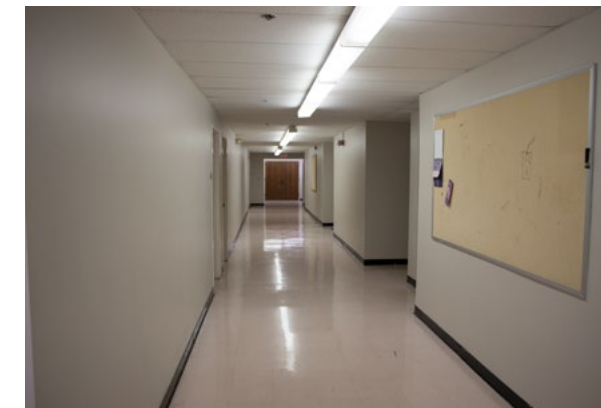
In the early 1980s, a new Nichols Hall was constructed inside the shell to house the departments of computer science and speech communications, theatre and dance, as well as a theater. The building was dedicated in 1985, and the School of Music, Theatre, and Dance was created in 2012. The building and "The Wabash Cannonball" live on.

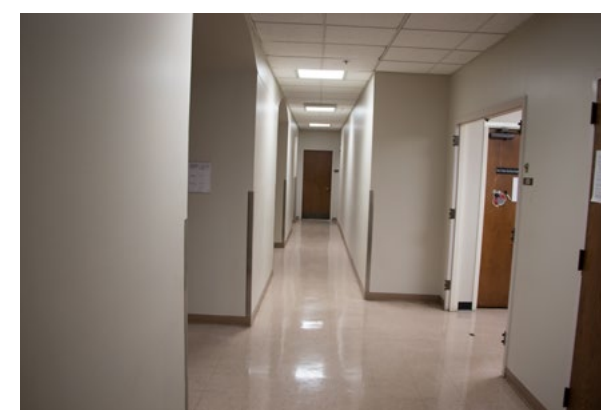
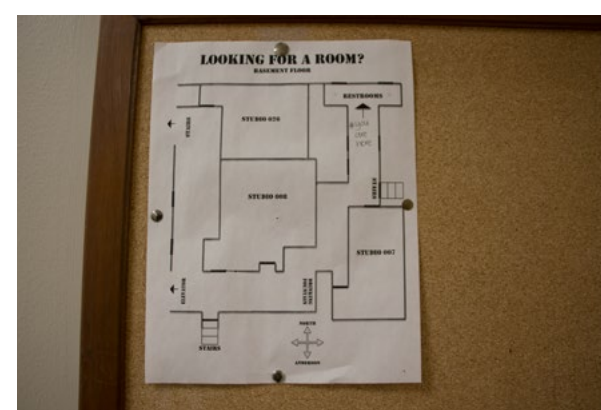
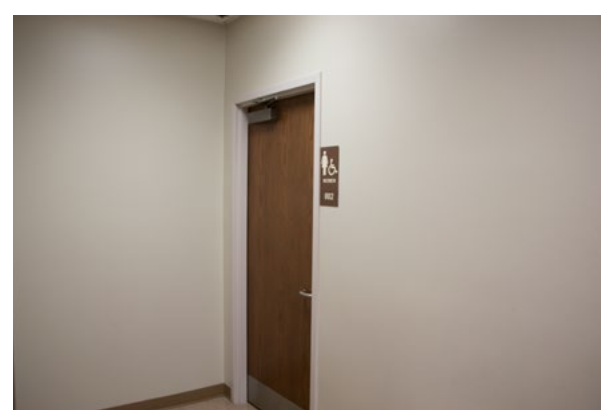
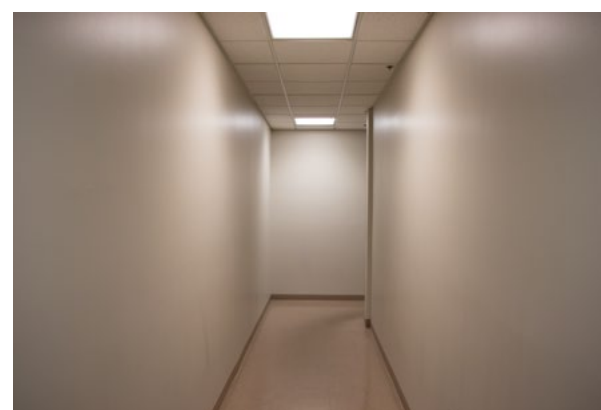
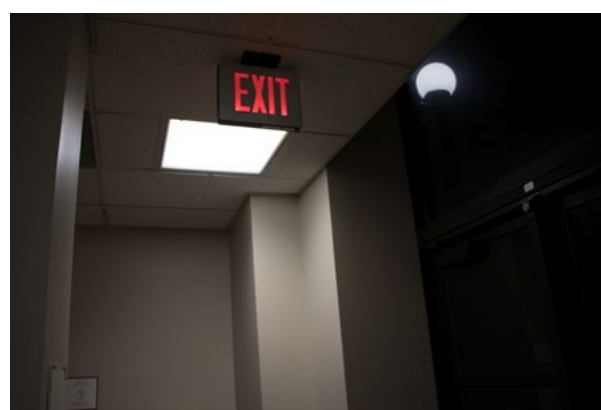
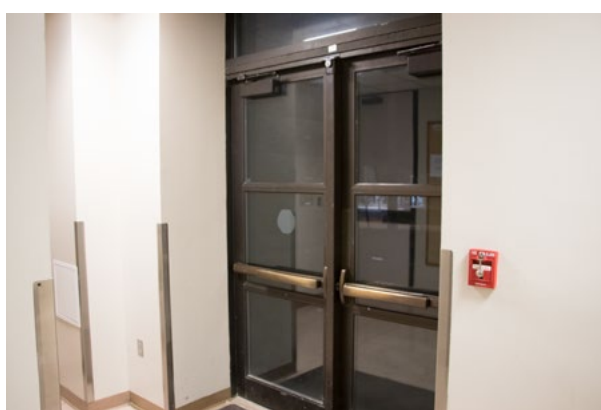
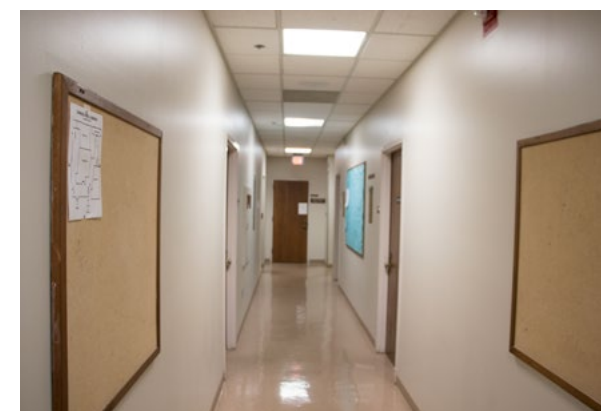
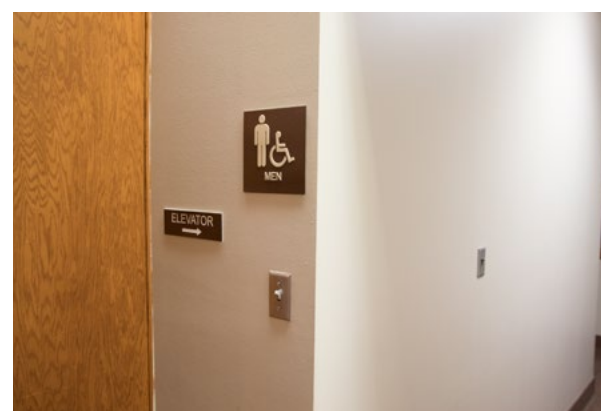
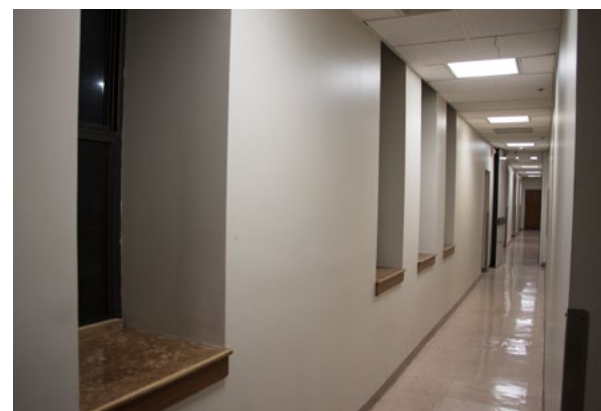
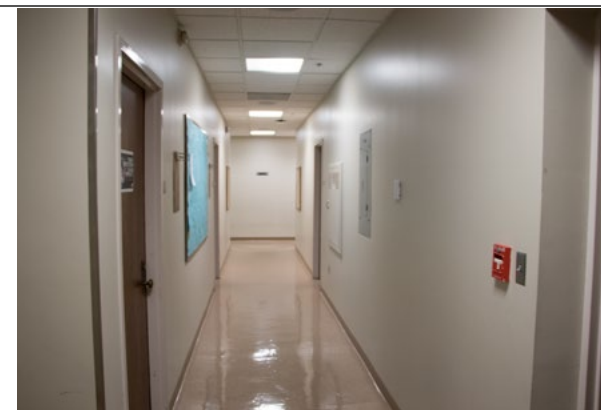
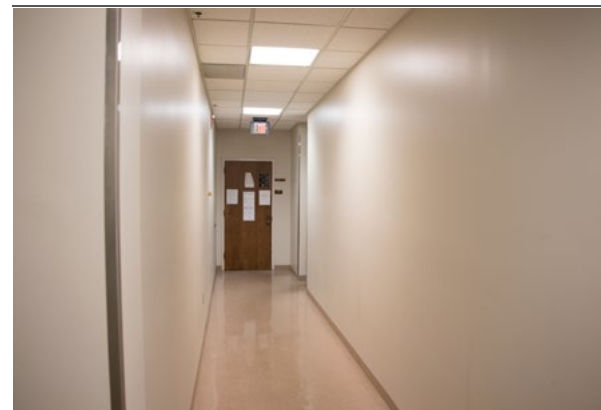
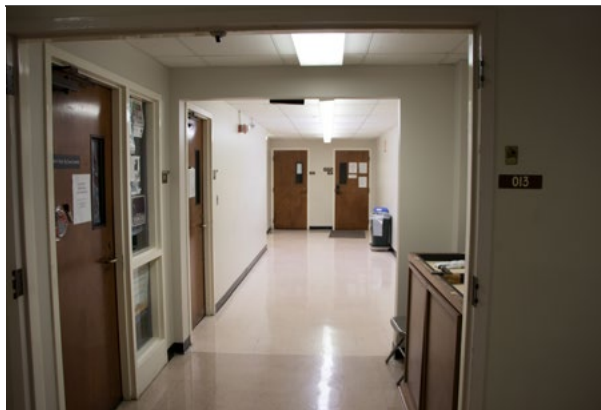
Nichols Hall has four floors, with exits on the north, south, west, and east side of the building. This investigation is identify the wayfinding system that currently exists in the space and also to determine what sort of future solutions is required.

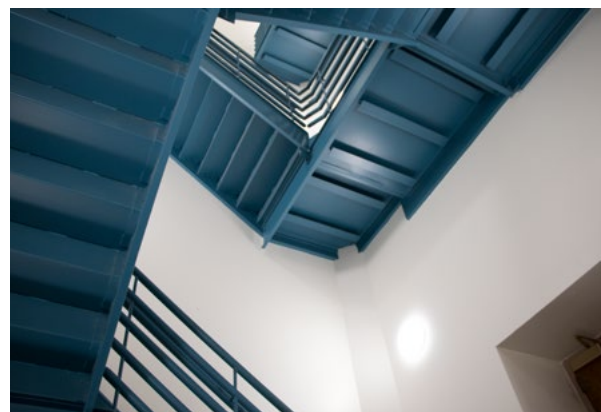
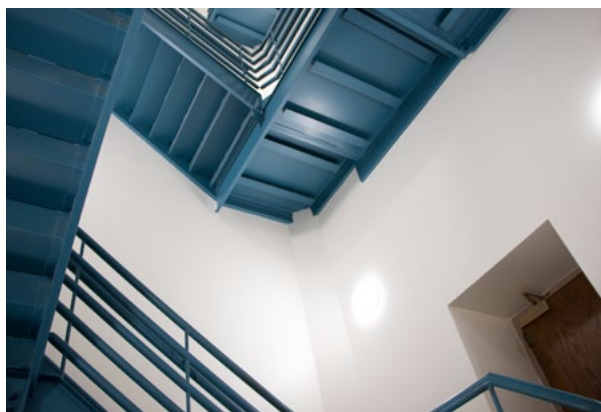
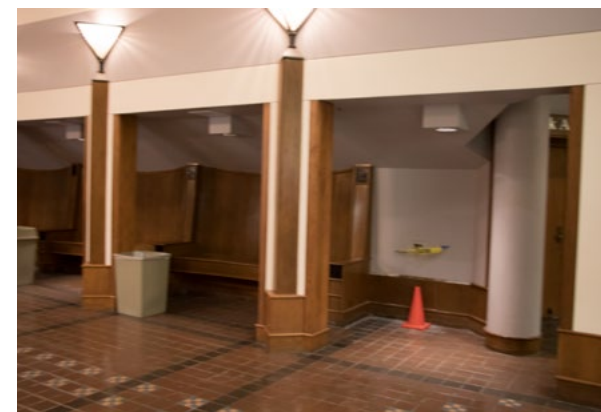
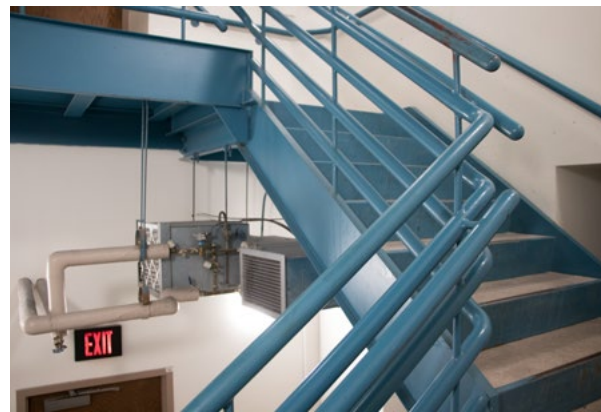
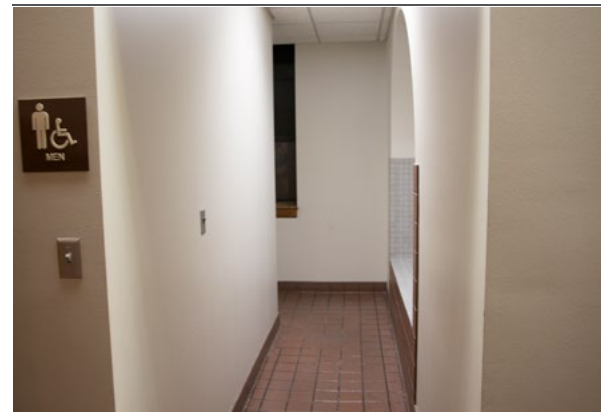
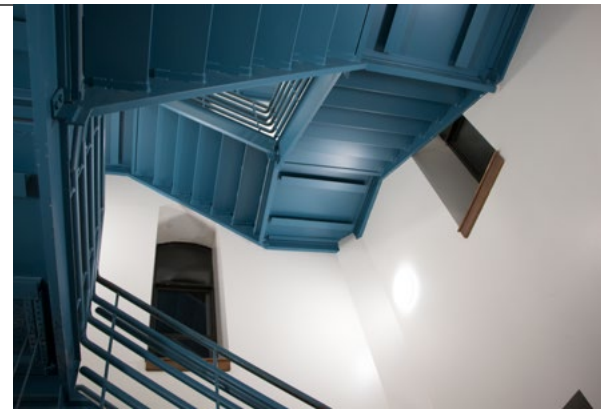
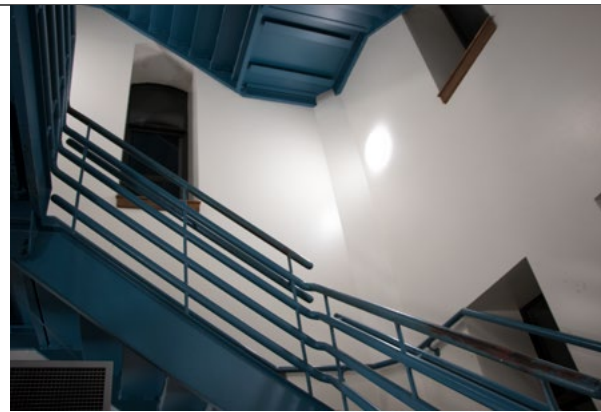
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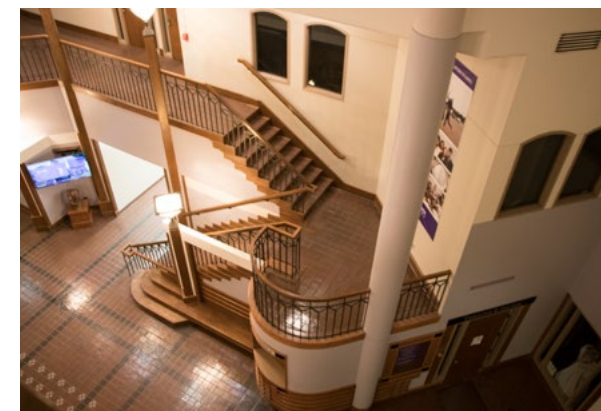
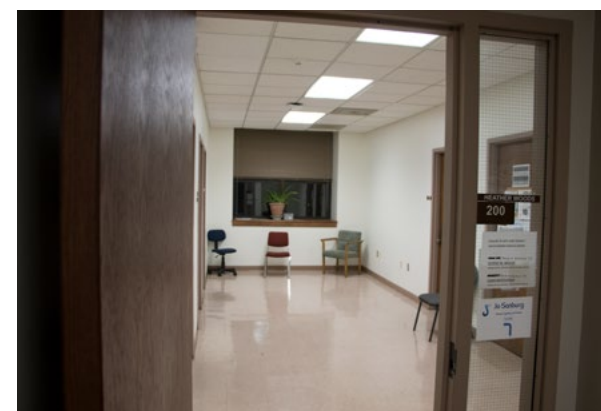
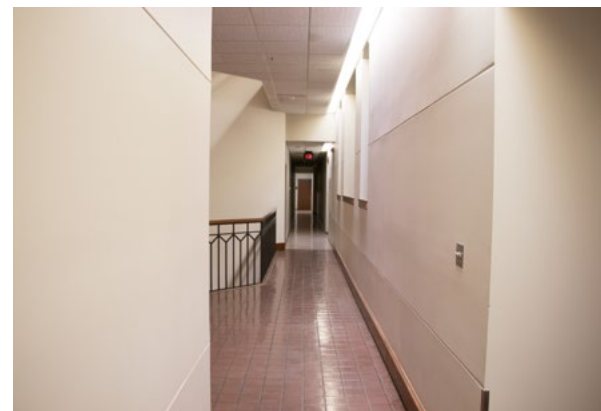
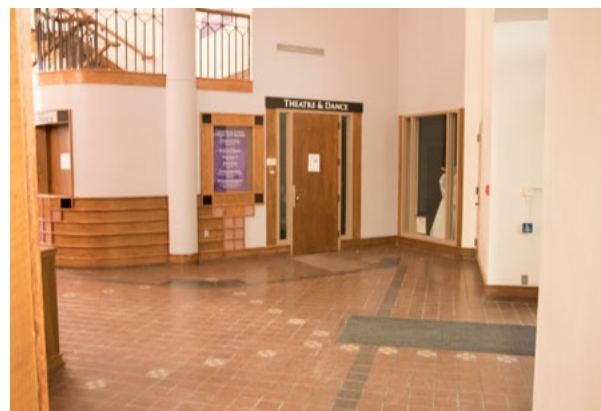
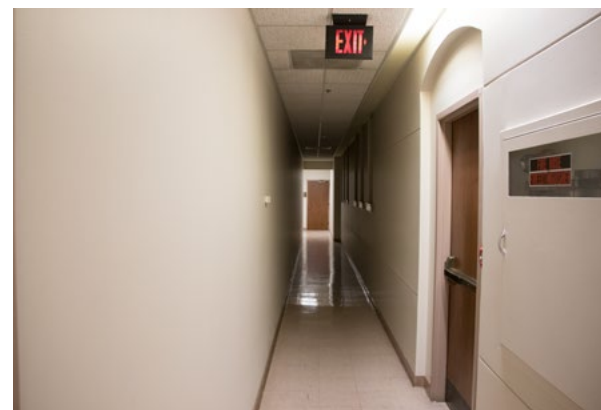
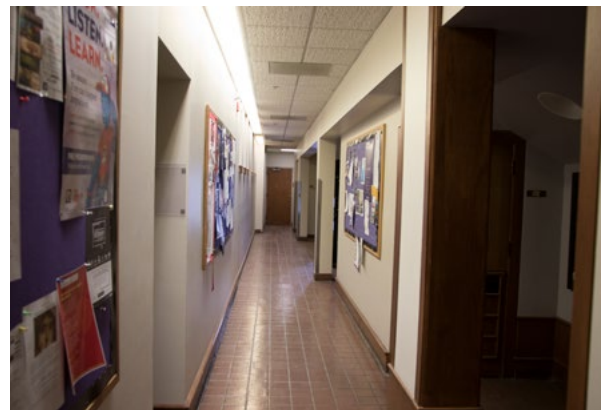
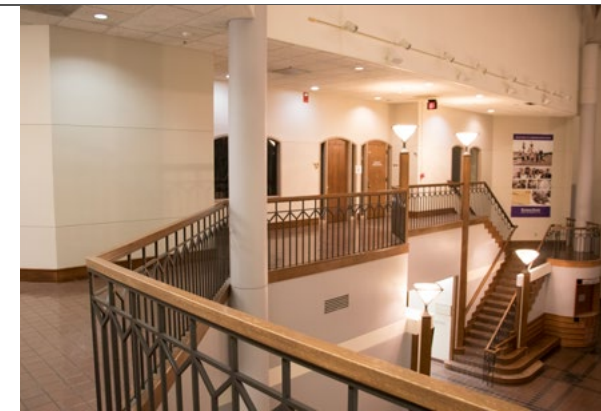
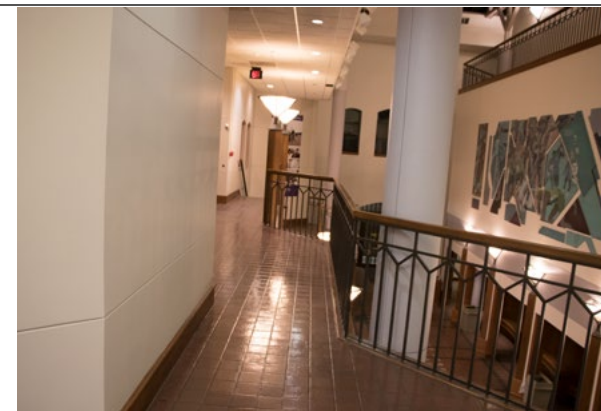
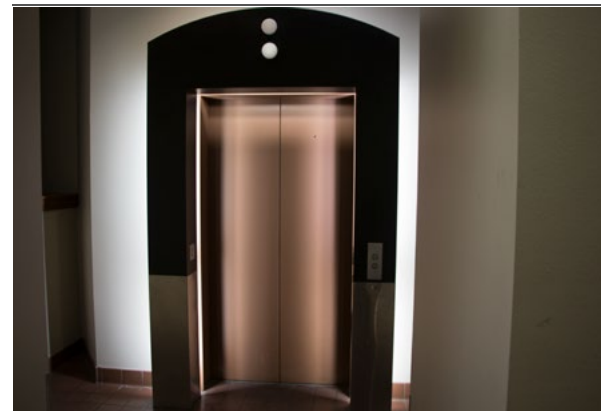
Nichols Hall visual investigation L-R

- #1 atrium
- #2 basement hallway
- #3 first floor west hallway
- #4 first floor west exit
- #5 basement central hallway
- #6 basement central exit
- #7 third floor central hallway
- #8 basement hallway
- #9 second floor west wing









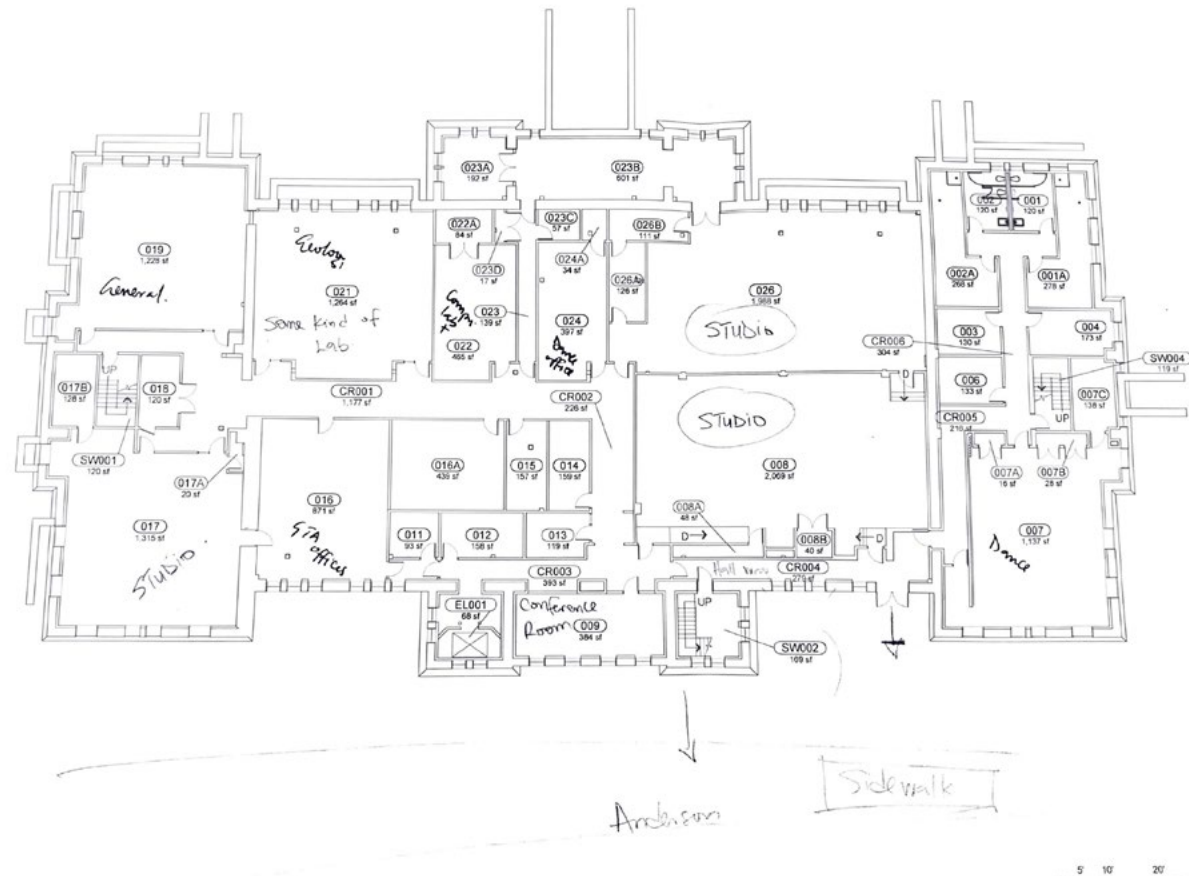
## Understanding the space

To have a better understanding of the space, I walked through the space using the posted sign and I also walked the space using the floor plan of the space. The flow of traffic within the space was observed to determine the frequently used entrance/exits in the building and identify the time of the day the building has the most traffic.

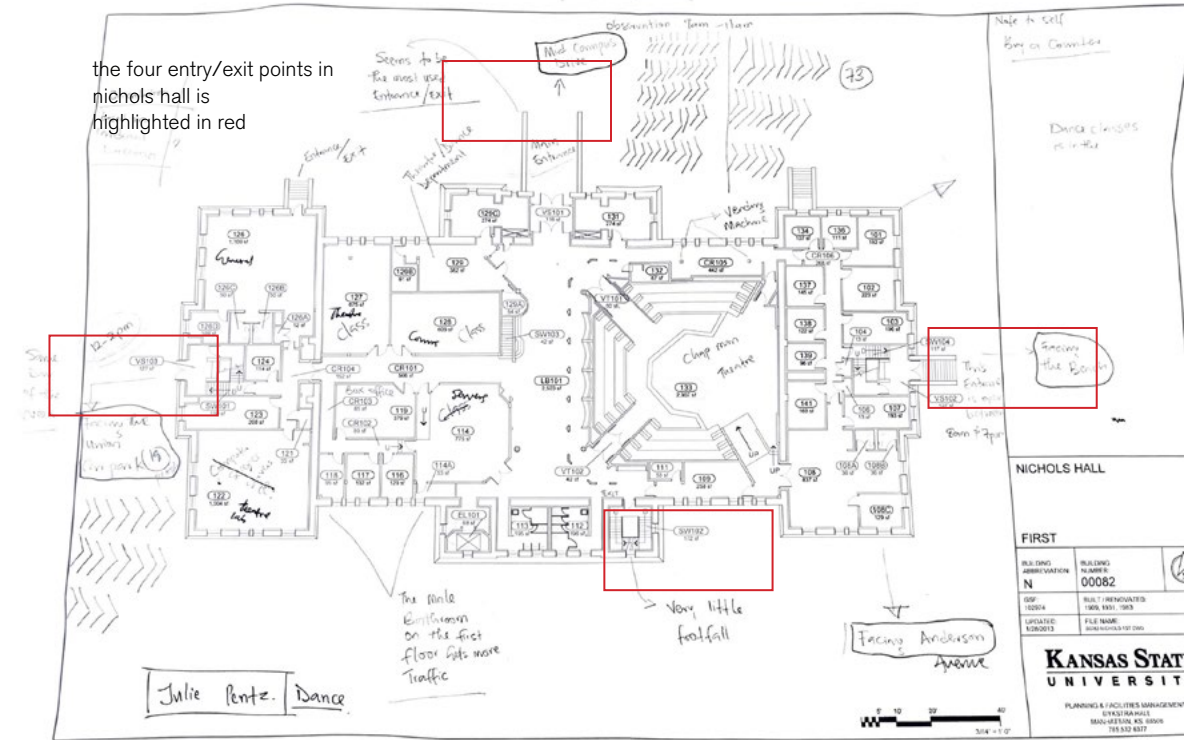
Nichols has four main entrances and exit. Their are no bathrooms on the third floor. The north, south and west entrance is wheel chair accessible. The Chapman Theatre is the major location within the space, every other rooms is anchored around the theatre. The hall ways in Nichols hall are narrow and the ceiling hangs low in the basement, first and second floor. The floors are not marked so it is quite challenging, which floor you are on.

### Who are the users?

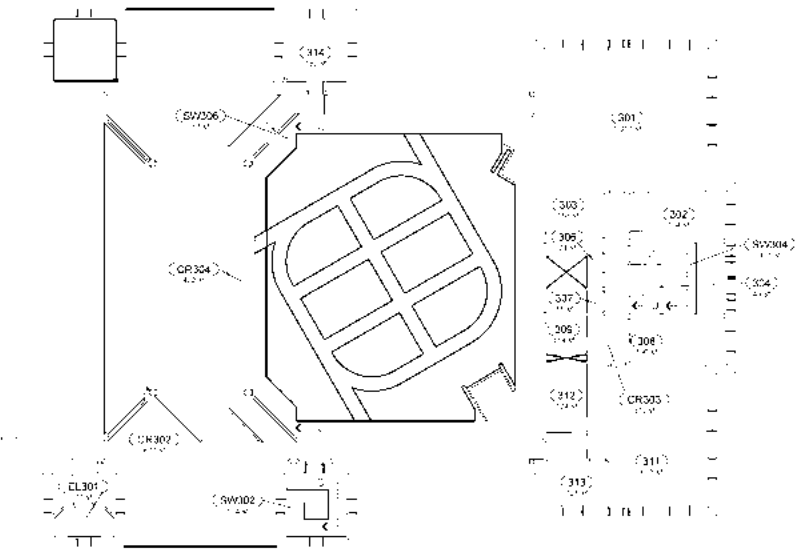
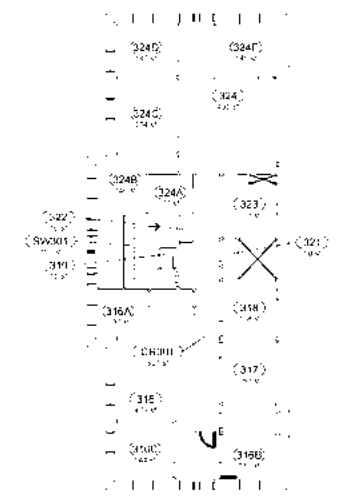
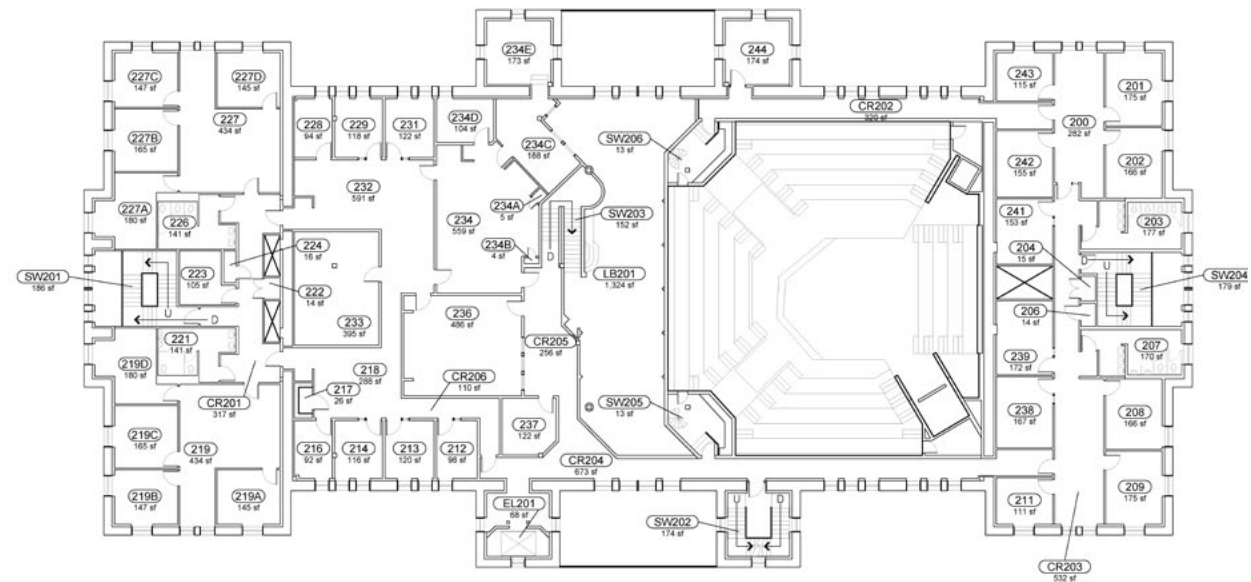
Basement — Dance and theatre, Geography  
 First Floor — Dance and theatre, Geography, Computer Science  
 Second Floor — Communication Studies, Speech therapy  
 Third Floor — Center for Student Engagement, Communication Studies  
 Other users — Manhattan Community, the Kansas State University student and Faculty



**Opposite**  
 #1 Nichols Hall Basement Floor Plan  
 #2 Nichols Hall First Floor Plan



**Center**  
#3 Nichols Hall Second Floor Plan  
**Right**  
#2 Nichols Hall Third Floor Plan



**Defining Nichols Hall  
Wayfinding Problem**

**Lack of signage/instructions at decision points**  
Decision points are where the navigator must make a wayfinding decision (for example, whether to continue along the current route or to change direction.) A sign embeds additional information into the space to direct the navigator's next navigational choice. This information should be relevant to both the choices offered to the navigator at that point, and the larger goal of the navigational task. Simply put, a sign should tell the navigator what's in the direction it points, and the destinations so indicated should help the navigator reach his eventual goal.

**Lack of visual cues in the system**  
The visual appearance of the built environment provides navigational cues for travelers that might benefit the way-finding process. Therefore, when designing built environments it is important to consider how users will respond to the characteristics of the environment during way-finding. The hall ways in Nichols are long, narrow, non-distinctive and not very well differentiated routes.

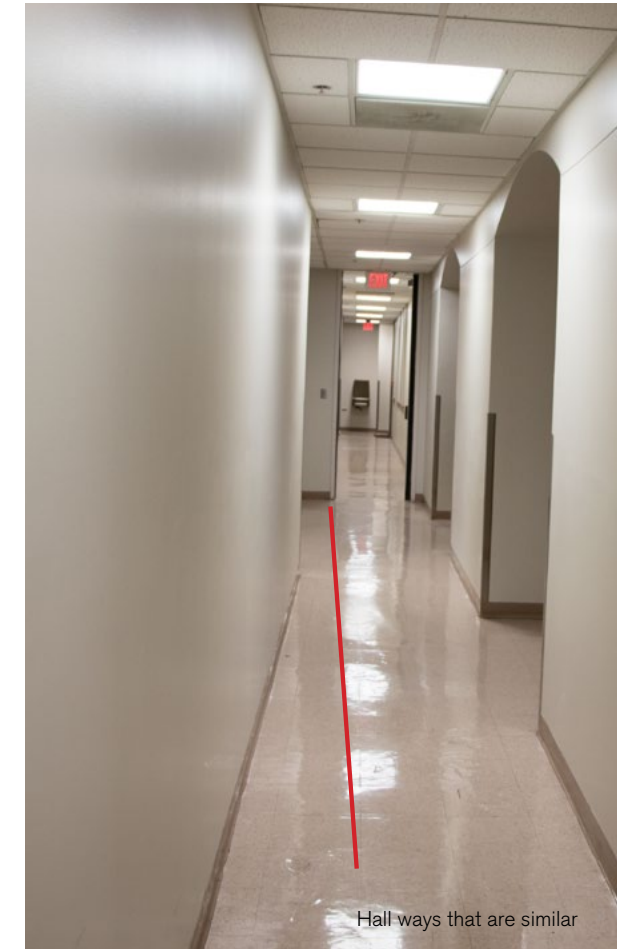
**No floor markers in Nichols**  
A marker is an object that marks a locality. Markers give strong identities to various parts of a site or building. They act as mental landmarks in the



No signs, no instruction, there is no navigational choice to make



Hall ways that are similar



Hall ways that are similar

wayfinding process and break a complex task into manageable parts. The floors are not marked, it is difficult to tell if you are at the entrance of the first floor or the basement. There are no markers at focal points and exits/entrance of the building.

**No Reassurance that user is on the right route**  
There is no signage system in place that gives periodic reminders that users are on track to arrive at their destination; there is also no signage that shows the user how to return to the course.

**Route choices are not well defined**  
Nichols has four entry points but there is no clear instruction on how users can determine the best course for reaching their destination.

**Confusing Numbering System**  
The numbering system for the rooms in Nichols hall is confusing, the rooms are numbered counter clockwise.



**Center**  
no floor markers  
**Right**  
instructions are not clear.



Design Principles for Wayfinding

2

**Opposite**  
Student Union Building  
Kansas State University



## Architectural Wayfinding Design Principles

This set of design principles is concerned with making information spaces effectively navigable. Navigability means that the navigator can successfully move in the information space from his present location to a destination, even if the location of the destination is imprecisely known. Three criteria determine the navigability of a space: first, whether the navigator can discover or infer his present location; second, whether a route to the destination can be found; and third, how well the navigator can accumulate wayfinding experience in the space.

The first criterion, successful recovery of location and orientation, asks the navigator if he can definitively answer the questions, "Where am I?" and "Which way am I facing?" A response to these questions could be verbal, such as "I am in Lobby 7, facing Lovers lane," or written, by drawing an arrow on a map of the environs. The second criterion for navigability is the ability to successfully perform wayfinding tasks. Successful wayfinding occurs when the navigator can make correct navigation decisions that take him from his present location to a destination that fulfills his larger purpose. Examples of such decisions are whether to continue along the present route or to backtrack, what turn to take at an intersection of paths, or whether to stop and acquire information from the environment to confirm the present route. Arthur and Passini call

wayfinding spatial problem solving [Arthur and Passini, 1992], in which the navigator finds a satisfactory solution to a larger task through navigation. The third criterion for navigability is how well the navigator can accumulate wayfinding experience in the space. The imageability of a large-scale space is the ability of a navigator to form a coherent mental image or map of it. Kevin Lynch, an urban planner, first investigated how the characteristics of an urban space affected how well people remembered features in it [Lynch, 1960]. Lynch interviewed residents of Boston, Los Angeles, and Jersey City, New Jersey, and asked them to draw sketch maps of their city from memory. From these sketch maps and verbal interviews, Lynch compared the imageability of the cities: how well the sketch maps and interviews reflected the actual layout of each city. Lynch found that the respondents organized their city images using a set of common features: paths, landmarks, regions, edges (barriers), and nodes (intersections). What makes Lynch's findings especially interesting is that the imageable or memorable features of a space are used by people to assist wayfinding. Landmarks are memorable locations that help to orient the navigator; regions are distinct areas that place him in one part of the environment, and nodes mark points where wayfinding decisions are made. Since a

navigator uses these features to record his past route-following experiences, a designed space that employs them should be more effectively navigable.

These last two criteria, wayfinding ability, and imageability have special relevance for information spaces. Wayfinding in an information space, we have argued, should correspond with information-seeking behavior in an information access environment. Successful wayfinding then implies that the user can use the information access environment to fulfill his information need. In a navigable information space, the problem of being "lost in hyperspace" [Edwards and Hardman, 1993] could then be solved.

In an imageable space, each episode of successful navigation can contribute to building a coherent mental picture of the information environment and of the content therein. Ideally, the user becomes more and more effective in fulfilling information needs every time he navigates through the environment. And in an information space organized on a principle relevant to the user's task, the mental map corresponds to a conceptual map of the content, reflecting important relationships in the information and the principles used to organize it. The principles here come from both the study of museum exhibits and the research of environmental psychologists, cognitive scientists, and others

who study how humans represent and navigate in the physical environment.

### Principles for effective wayfinding include:

- Create an identity at each location, different from all others.
- Use landmarks to provide orientation cues and memorable locations.
- Create well-structured paths.
- Create regions of differing visual character.
- Don't give the user too many choices in navigation.
- Use survey views (give navigators a vista or map).
- Provide signs at decision points to help wayfinding decisions.
- Use sightlines to show what's ahead.

### Below

Seaton Hall  
Architecture Department  
Kansas State University



**Below**

Weigel Library, Seaton Hall.  
Colored chairs was used to create an identity for the space that differentiates it from other rooms in the space.

**Create regions of differing visual character.**

The space should be divided into regions with a distinct set of visual attributes to assist in wayfinding. The character that sets a region apart can be some aspect of its visual appearance, a distinction in function or use, or some attribute of its content that is consistently maintained within the region but not without. Regions may not have sharply defined boundaries, or their extent may be in some part subjective, but a minimum requirement is that there is a generally agreed space said to be within the region, and a surrounding area said to be outside it. Regions assist wayfinding by providing another set of cues for recovering location. They associate a set of defining features with an area in space and give a way of identifying a place as being in a certain region. When the navigator moves from one region to another, the shift in the character of the space is another fact that informs him of his location along the boundary of the two regions.

**Use landmarks to provide orientation cues and memorable locations.**

Landmarks serve two useful purposes. The first is as an orientation cue. If the navigator knows where a landmark is in relation to his present position, he can say something about where he is, and which way he is facing, in the space he shares with the landmark. A



desirable property of a landmark for this use is visibility, the ability to be seen from a large surrounding area. Such global landmarks can help the navigator judge his orientation within a wide area, as opposed to local landmarks, which can be seen only in the immediate vicinity. A system of local landmarks that exhaustively cover the space can also provide the same cues as a single, towering landmark. The second use of a landmark is an especially memorable location. In his sketch-map interviews, Lynch noted that different respondents marked or mentioned many of the same places.

It is these memorable places that can provide instant recognition of one's location. A shared vocabulary of landmarks provides the basis for verbal or written descriptions of locations or routes. Landmarks associated with decision points, where the navigator must choose which path of many to follow, are especially useful as they make the location and the associated decision more memorable. Lynch [Lynch, 1960] discusses landmarks in an urban context at length, and describes their defining physical characteristic as "singularity, some aspect that is unique or memorable in context."

**Create well-structured paths.**

Paths should possess a set of characteristics to be

"well-structured." Well-structured paths are continuous and have a clear beginning, middle, and end when viewed in each direction. They should confirm progress and distance to their destination along their length. And a navigator should easily infer which direction he is moving along the path by its directionality or "sidedness." A well-structured path maintains a navigator's orientation with respect to both the next landmark along the path and the distance to the eventual destination.

This principle informs how the traversal of a pre-defined route will appear to the navigator. The features of a well-structured path should again correspond to concepts relevant to the content of the space. The beginning and end of the path form an introduction and conclusion, and progress are marked by moving from one concept or message to the next. A continuous path should have both shared attributes that define it as distinct from its context and evolving or changing features that mark its length and connect one part to a subsequent part.

**Create regions of differing visual character.**

The space should be divided into regions with a distinct set of visual attributes to assist in wayfinding. The character that sets a region apart can be some aspect of its visual appearance, a distinction in function or use,

**Below**

#1 Seaton Hall.  
Kansas State University  
Metallic type and brick are unique features in the space that serves as a landmark for orientation in the space.

#2 Student Union Building  
Kansas State University  
The path is well structured and has clear sight lines to see what is ahead.



**Below**

Seaton Hall.  
Kansas State University  
Colored walls is used to create areas of visual  
difference in the space.



or some attribute of its content that is consistently maintained within the region but not without. Regions may not have sharply defined boundaries, or their extent may be in some part subjective, but a minimum requirement is that there is a generally agreed space said to be within the region, and a surrounding area said to be outside it. Regions assist wayfinding by providing another set of cues for recovering location. They associate a set of defining features with an area in space and give a way of identifying a place as being in a certain region. When the navigator moves from one region to another, the shift in the character of the space is another fact that informs him of his location along the boundary of the two regions.

**Use survey views (give navigators a vista or map).**

When navigating in any type of space, a map is a valuable navigation aid. It places the entire space within the navigator's view, and several kinds of judgments can be made readily: the location of the navigator, and what is in the immediate vicinity; what destinations are available, and what routes will take the navigator there; and the size of the space, and how far the navigator is along his chosen path. In addition, the survey view provides a ready image of the space, which can provide the basis for the naviga-

tor's mental map. Several researchers have found that giving subjects access to only survey knowledge of an environment can give comparable or superior performance to knowledge gained from route-following experience on landmark estimation and sketch-mapping tasks [Thorndyke and Hayes-Roth, 1982] [Golledge et al., 1995]. The navigator's mental map, primed with the image of his environment, can be augmented readily with experience gained from actual navigation in the space.

**Provide signs at decision points to help wayfinding decisions.**

Place signs, when necessary, at decision points. Decision points are where the navigator must make a wayfinding decision (for example, whether to continue along the current route or to change direction.) A sign embeds additional information into the space to direct the navigator's next navigational choice. This information should be relevant to both the choices offered to the navigator at that point and the larger goal of the navigational task. Simply put, a sign should tell the navigator what's in the direction it points, and the destinations so indicated should help the navigator reach his eventual goal. Passini describes this principle as part of his theory for wayfinding as spatial decision-making [Arthur and Pas-

sini, 1992] [Passini, 1984]. According to this theory, a navigator begins with a high-level goal, and acquires information from his environment (or uses what he already knows about the space) to make his first move towards a top-level destination. At decision points along the route, the navigator combines observation of local features with previous knowledge of the space to make the proper navigational move. When the navigator does not have previous knowledge of the space, or a map to refer to, only the local features at the decision point can inform his navigational choice. A sign placed at a decision point in this framework needs to inform the navigator of the correct route.

**Use sightlines to show what's ahead.**

Give the navigator a more extensive view in a particular direction and a goal to draw him in that direction. In a complex large environment, in which the first-time visitor has uncertain expectations as to its extent and purpose, sightlines are valuable means of giving enough information about what's ahead to encourage the visitor to move farther. Sightlines give long but narrow samples of unfamiliar space. Based on that sample, the viewer can determine if that direction is of interest or not. To make a sight line interesting, the designer can provide a goal to navigate toward. It

**Below**  
Seaton Hall,  
Kansas State University  
Floor Plans used as a map to orientate the user in the space.

**Opposite**  
#1 Student Union Building  
Kansas State University  
Signage at decision points  
#2 Seaton Hall  
Kansas State University  
example of clear sight line

might be some feature or object that is striking or unusual, something to spark the navigator's interest. It is the reward for choosing the path that it lies at the end of.



Effective Wayfinding Strategies

3

**Opposite**  
Student Union Building  
Kansas State University



## Wayfinding Strategies

Effective wayfinding programs require an underlying strategy to provide clear direction and guidance for the design development process. The strategy should be based around agreed local objectives with outputs tailored to a range of local user needs with input across the local stakeholder community to ensure buy-in and support through to delivery on the ground. A strategy should also determine the expected benefits of the program – both economically and socially – helping to meet with local mode-shift, health, and economic objectives – and will determine the range of product and information types required to deliver a successful outcome.

While signage and map outputs offer a wide variety of physical solutions to respond to the context and purpose of a wayfinding scheme, the number of conceptual approaches to developing a wayfinding strategy remains relatively low.

Kevin Lynch is widely regarded as the pioneer of contemporary wayfinding strategies. His landmark book, *The Image of the City* (MIT Press 1960), established the core principles of legibility for an urban context. He argued that, as people navigate places they create their own 'mental maps' of the place. Contemporary wayfinding systems have built on those principles set out in Lynch's book to develop informa-

tion hierarchies that support the creation of mental maps and legible places. The core elements of such strategies are built on existing features, such as:

- **Paths:** streets, sidewalks, trails, and other routes used by people to get from A-B.
- **Edges:** perceived boundaries between places such as walls, buildings, and shorelines.
- **Districts:** relatively large city areas as distinguished by identity or character.
- **Nodes:** points where route decisions need to be made such as gateways, focal points, or intersections.
- **Landmarks:** readily identifiable places or features that serve as reference points.

These elements can be combined in different ways. The *Wayfinding Handbook* (Gibson, 2009) identifies 4 approaches predominantly based around:

- **Districts:** This approach presents advantages in terms of simplification and progressive disclosure of wayfinding information, but may require a steeper learning curve for visitors unfamiliar with the place and maybe limited for geographically complex or large areas.
- **Corridors:** where main corridors are identified and all pedestrian directed along these. Corridors can be built into a network that may support the

creation of effective mental maps. Disadvantages are that corridors can create congestion hotspots and channel footfall into constrained areas. Corridor based strategies do not encourage wider exploration and are unsuitable for grid-based urban forms.

- **Circuits:** principally used to create 'tourist trails' and to link places sequentially. Circuit based strategies have a very specific target audience which can limit the wider wayfinding benefits.
- **Landmarks/destinations:** the approach most commonly adopted in Europe. Landmark based strategies encourage unsupported exploration, improving footfall more widely, and reducing pedestrian congestion.

### Below

#1 Student Union Building  
Kansas State University  
example of a path

#2 Student Union Building  
Kansas State University  
example of edges

#3 Student Union Building  
Kansas State University  
example of a districts or zones

#4 Student Union Building  
Kansas State University  
example of a node

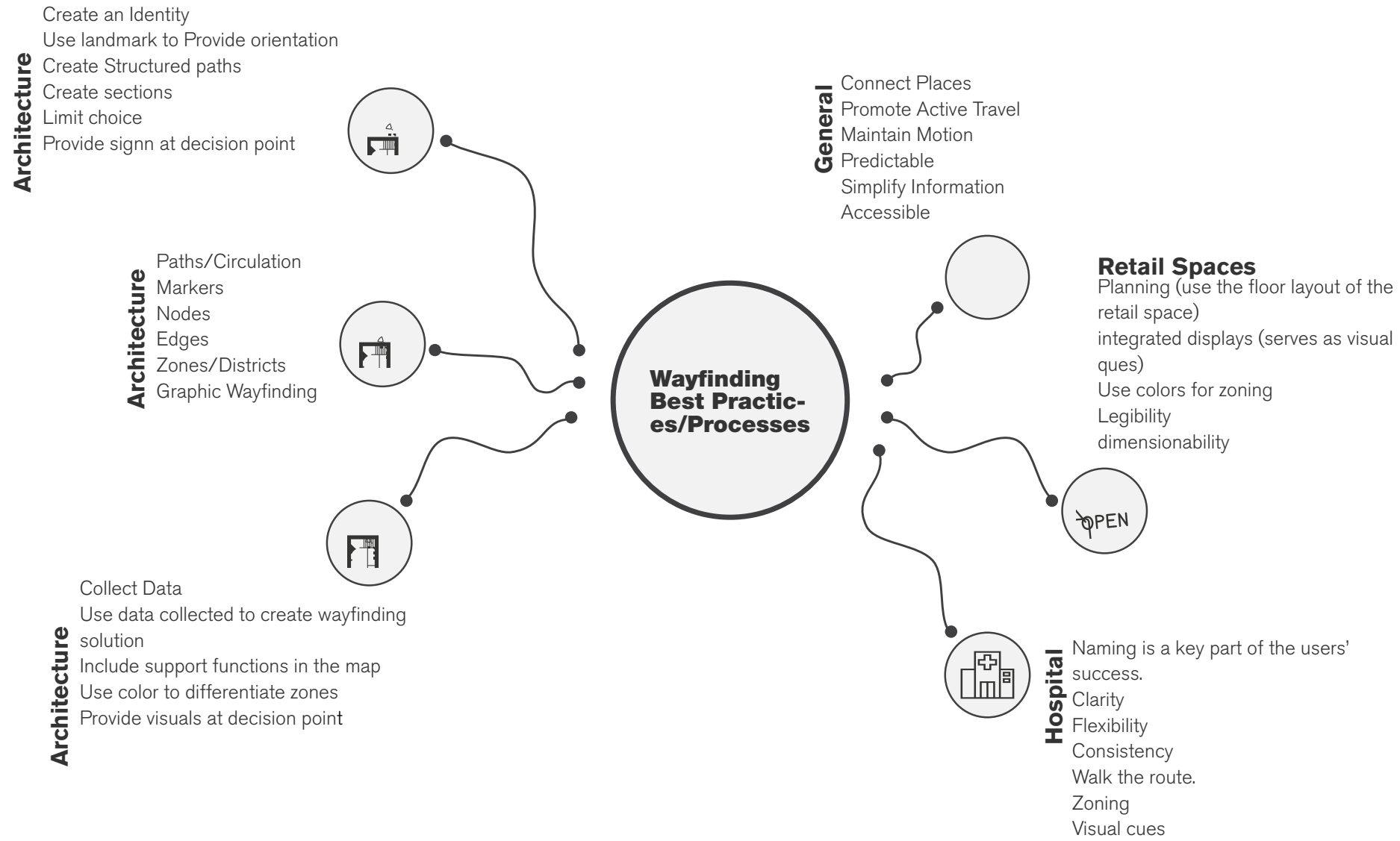
#5 Student Union Building  
Kansas State University  
the unique shape of the sitting the lounge creates a landmark for orientation in the space.



# 4

**Opposite**  
Seaton Hall  
Kansas State University





Framework for Categorizing Best Practices

5

Opposite  
Seaton Hall  
Kansas State University



## Universal Principles of Design

### Accessibility

The principle of accessibility asserts that designs should be usable by people of diverse abilities, without special adaptation or modification. Historically, accessibility in design focused on accommodating people with disabilities. As knowledge and experience of accessible design increased, it became increasingly clear that many required “accommodations” could be designed to benefit everyone. There are four characteristics of accessible designs: perceptibility, operability, simplicity, and forgiveness.

*Perceptibility* is achieved when everyone can perceive the design, regardless of sensory abilities. Basic guidelines for improving perceptibility are: present information using redundant coding methods (e.g., textual, iconic, and tactile); provide compatibility with assistive sensory technologies (e.g., ALT tags for images on the Internet); and position controls and information so that seated and standing users can perceive them.

*Operability* is achieved when everyone can use the design, regardless of physical abilities. Basic guidelines for improving operability are: minimize repetitive actions and the need for sustained physical effort; facilitate use of controls through good affordances and constraints; provide compatibility with assistive physical technologies (e.g., wheelchair access); and position controls and information so that seated and

standing users can access them.

*Simplicity* is achieved when everyone can easily understand and use the design, regardless of experience, literacy, or concentration level. Basic guidelines for improving simplicity are: remove unnecessary complexity; clearly and consistently code and label controls and modes of operation; use progressive disclosure to present only relevant information and controls; provide clear prompting and feedback for all actions; and ensure that reading levels accommodate a wide range of literacy.

*Forgiveness* is achieved when designs minimize the occurrence and consequences of errors. Basic guidelines for improving forgiveness are: use good affordances and constraints (e.g., controls that can only be used the correct way) to prevent errors from occurring; use confirmations and warnings to reduce the occurrence of errors; and include reversible actions and safety nets to minimize the consequence of errors (e.g., the ability to undo an action).

### Consistency

The principle of consistency asserts that systems are more usable and learnable when similar parts are expressed in similar ways. Consistency enables people to efficiently transfer knowledge to new contexts, learn new things quickly, and focus attention on the relevant

aspects of a task. There are four kinds of consistency: aesthetic, functional, internal, and external.

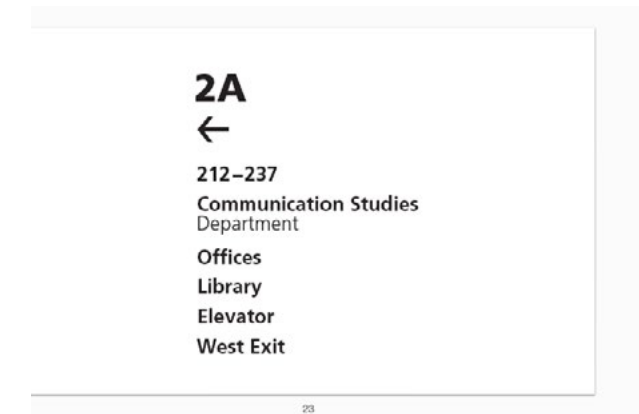
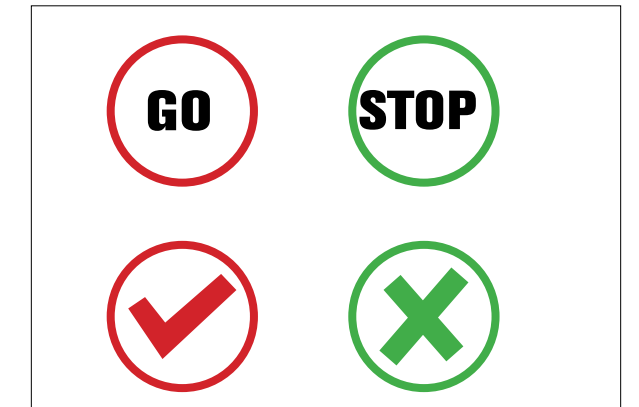
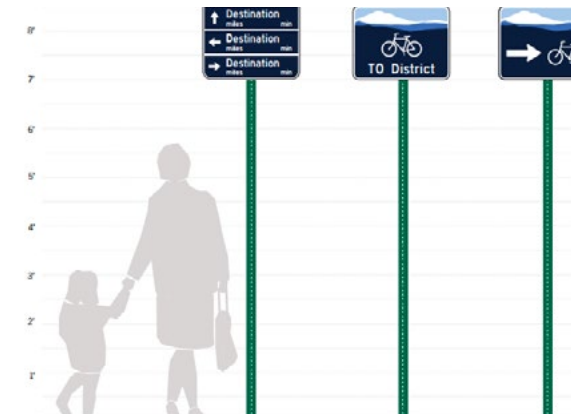
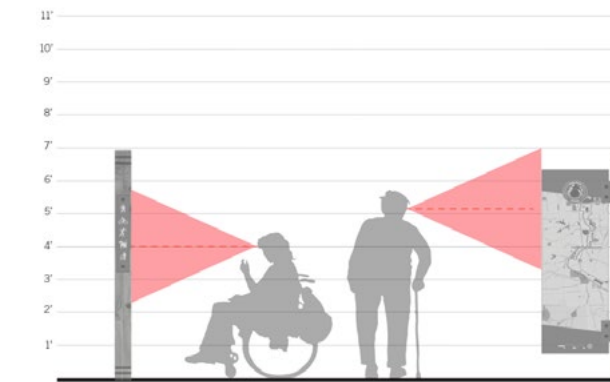
*Aesthetic consistency* refers to consistency of style and appearance (e.g., a company logo that uses a consistent font, color, and graphic). Aesthetic consistency enhances recognition, communicates membership, and sets emotional expectations. For example, Mercedes-Benz vehicles are instantly recognizable because the company consistently features its logo prominently on the hood or grill of its vehicles. The logo has become associated with quality and prestige, and informs people how they should feel about the vehicle—i.e., respected and admired.

*Functional consistency* refers to consistency of meaning and action (e.g., a traffic light that shows a yellow light before going to red). Functional consistency improves usability and learnability by enabling people to leverage existing knowledge about how the design functions. For example, videocassette recorder control symbols, such as for rewind, play, forward, are now used on devices ranging from slide projectors to MP3 music players. The consistent use of these symbols on new devices enables people to leverage existing knowledge about how the controls function, which makes the new devices easier to use and learn.

*Internal consistency* refers to consistency with other

### Below

- #1 example of accessibility
- #2 example of inference effect
- #3 example of performance load and hicke's law
- #4 example of Ockham's Razor
- #5 example of constrain



elements in the system (e.g., signs within a park are consistent with one another). Internal consistency cultivates trust with people; it is an indicator that a system has been designed, and not cobbled together. Within any logical grouping elements should be aesthetically and functionally consistent with one another.

*External consistency* refers to consistency with other elements in the environment (e.g., emergency alarms are consistent across different systems in a control room). External consistency extends the benefits of internal consistency across multiple, independent systems. It is more difficult to achieve because different systems rarely observe common design standards.

Consider aesthetic and functional consistency in all aspects of design. Use aesthetic consistency to establish unique identities that can be easily recognized. Use functional consistency to simplify usability and ease of learning. Ensure that systems are always internally consistent, and externally consistent to the greatest degree possible. When common design standards exist, observe them.

#### Constrains

Constraints limit the possible actions that can be performed on a system. For example, dimming or hiding unavailable software controls constrains the options that can be selected. Proper application of constraints

in this fashion makes designs easier to use and dramatically reduces the probability of error during interaction.

#### Entry Point

People do judge books by their covers, Internet sites by their first pages, and buildings by their lobbies. This initial impression of a system or environment greatly influences subsequent perceptions and attitudes, which then affects the quality of subsequent interactions. This impression is largely formed at the entry point to a system or environment. For example, entering many Internet sites entails going through a slow-loading splash screen, followed by a slow-loading main page, followed by several pop-up windows with advertisements—all this to enter a site that may or may not have the information the person was looking for. Such errors in entry point design annoy visitors who make it through, or deter visitors altogether. Either way, it does not promote additional interaction. The key elements of good entry point design are minimal barriers, points of prospect, and progressive lures

#### Hick's Law

Hick's Law states that the time required to make a decision is a function of the number of available options. It is used to estimate how long it will take for people to

make a decision when presented with multiple choices. Hick's Law should be considered when designing systems that involve decisions based on a set of options. When designing for time-critical tasks, minimize the number of options involved in a decision to reduce response times and minimize errors.

#### Interference Effects

when two or more perceptual or cognitive processes are in conflict. Human perception and cognition involve many different mental systems that parse and process information independently of one another. The outputs of these systems are communicated to working memory, where they are interpreted. When the outputs are congruent, the process of interpretation occurs quickly and performance is optimal. When outputs are incongruent, interference occurs and additional processing is needed to resolve the conflict

#### Ockham's Razor

Ockham's razor asserts that simplicity is preferred to complexity in design. Many variations of the principle exist, each adapted to address the particulars of a field or domain of knowledge. Implicit in Ockham's razor is the idea that unnecessary elements decrease a design's efficiency, and increase the probability of unanticipated consequences.

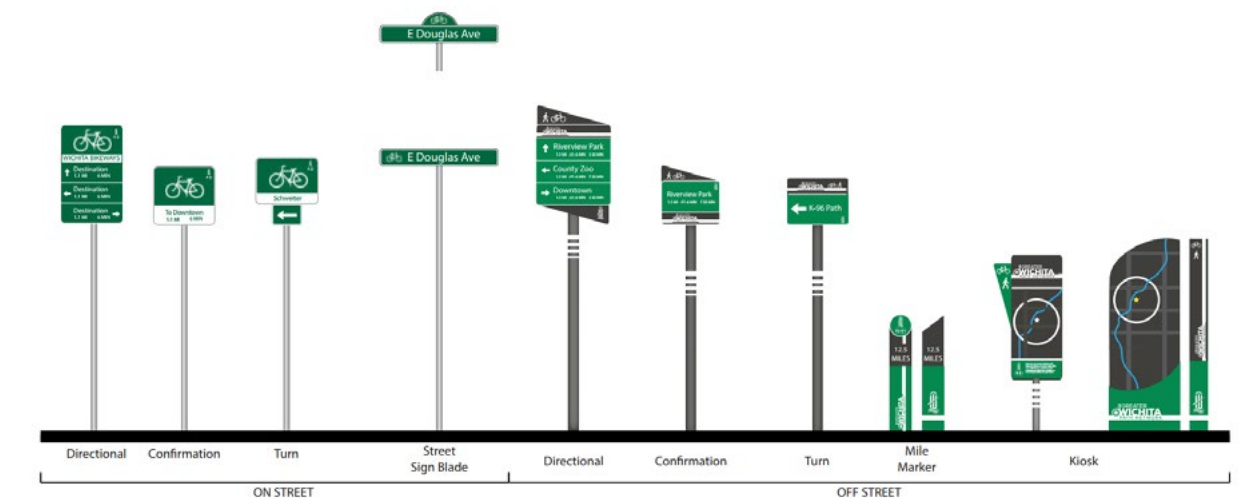
#### Below

#6 example of consistency

Unnecessary weight, whether physical, visual, or cognitive, degrades performance.

#### Performance Load

Performance load is the degree of mental and physical activity required to achieve a goal. If the performance load is high, performance time and errors increase, and the probability of successfully accomplishing the goal decreases. If the performance load is low, performance time and errors decrease, and the probability of successfully accomplishing the goal increases.





**Research Design**

**Below**  
#1-2 Phase One Test signage  
**Right**  
Lesson Learnt

Instead of designing a solution based on the problems that were discovered during the visual documentation, interviews and wayfinding task,—the decision was made to simple A-B testing to determine if the solution proposed satisfied some of the principles in the framework for categorizing best practices for creating wayfinding system.

**Goals for the Test**

**Connecting Places**  
Facilitate travel between destinations and provide guidance to new destinations. Wayfinding should provide seamless connections to and from destinations.

**Maintain Motion**  
Be legible and visible for people moving so that they can interpret wayfinding elements without stopping.

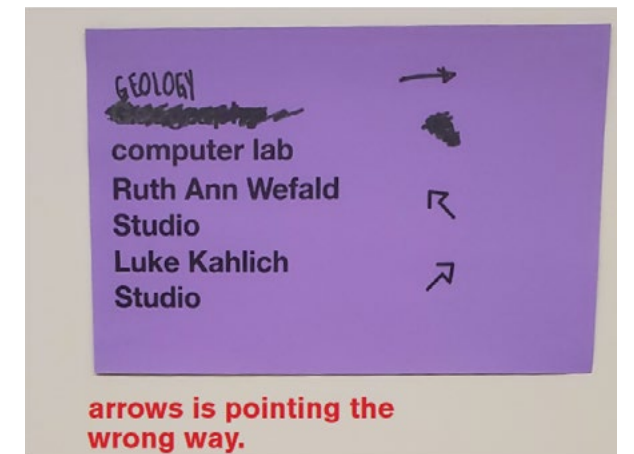
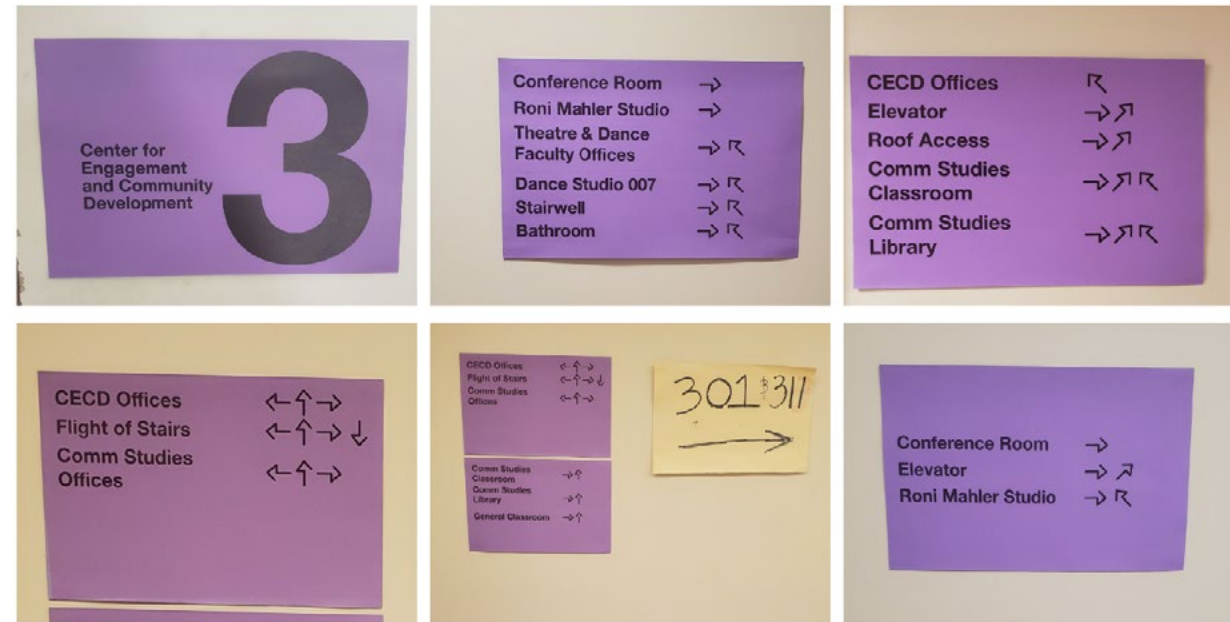
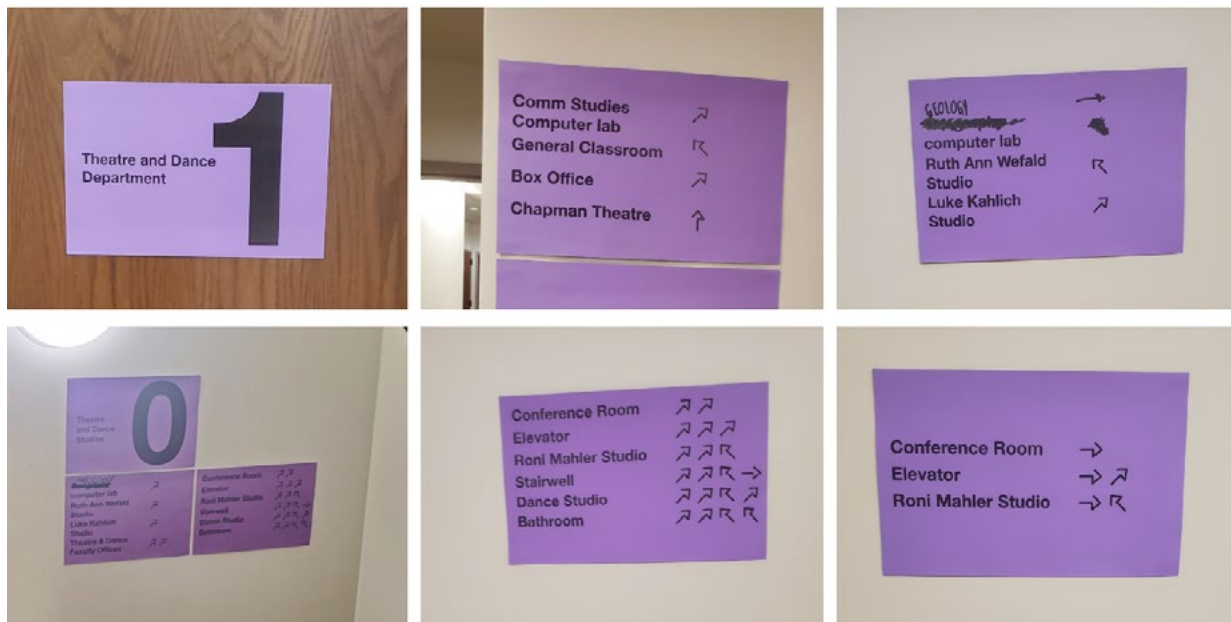
**Keep It Simple**  
Present information simply, using clear fonts and simple designs, so that it can be understood quickly.

**Be Predictable**  
Standardize the placement and design of signs so that patterns are established and wayfinding elements become predictable.

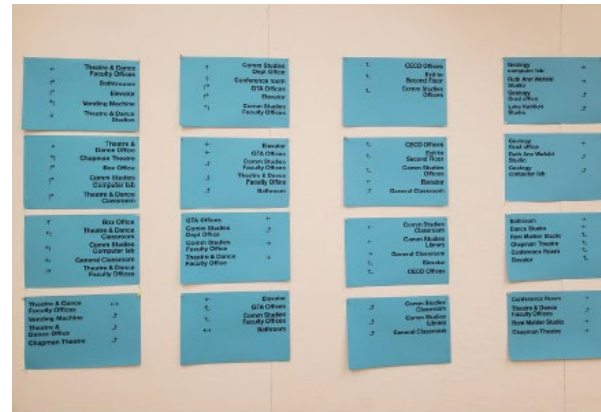
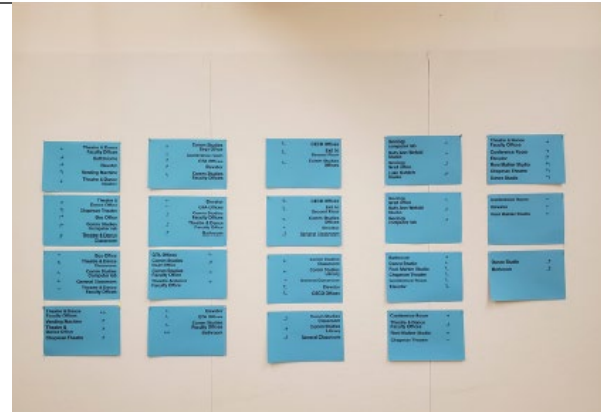
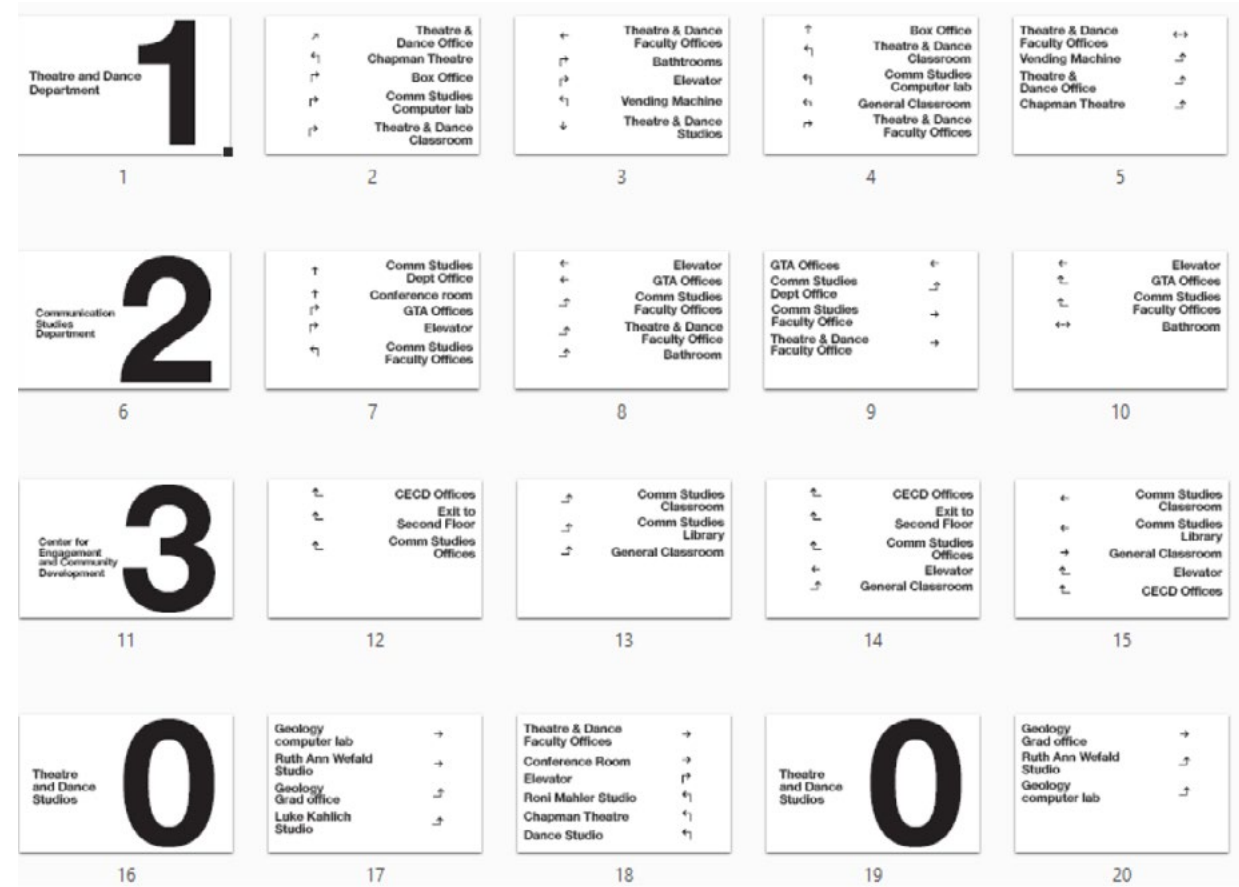
**Lesson Learnt in Phase one**

- route Instruction needed to be simplified on each signage.

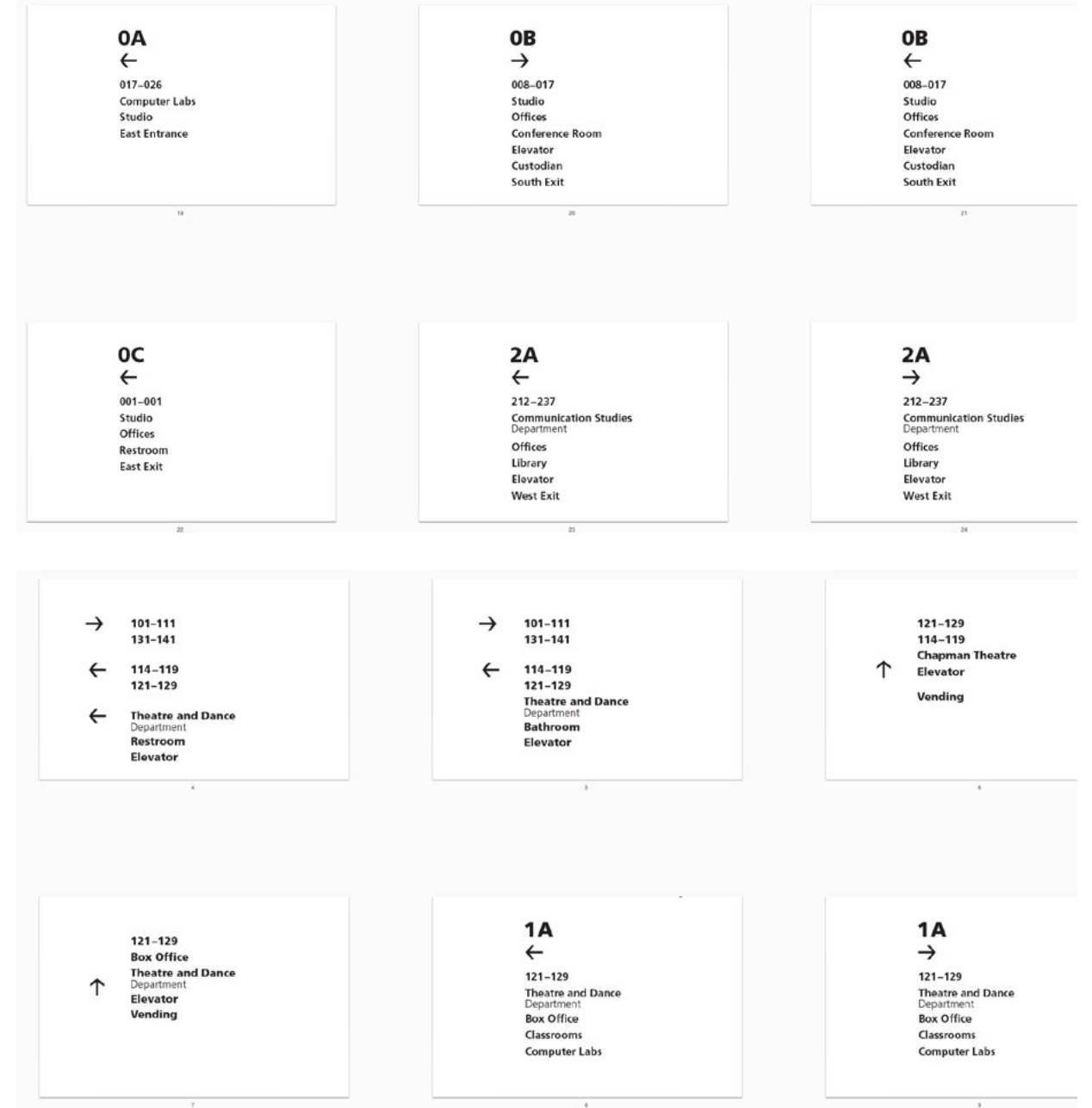
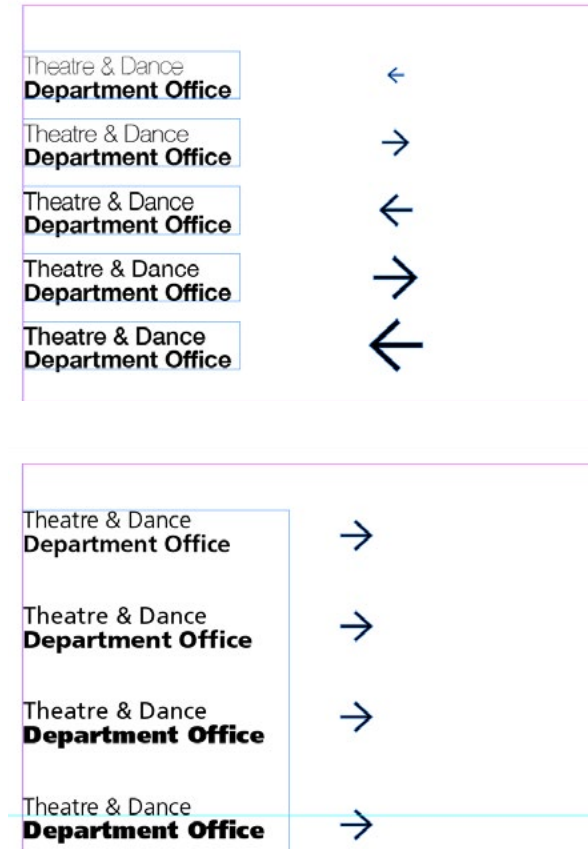
- the directional arrow needed to be clearer
  - the route needed to be walked again.
  - position of some of the signages needed to be reviewed for optimal performannce
- Lesson Learnt in Phase Two Testing**
- route instructions needs more clarification
  - forgiveness needs to be built into the sign system
  - the directional arrow needs to be more assured



Below  
#1-4 Phase Two Test signage



Below  
#1-3 Phase Three Test signage



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## Designing Nichols Hall Wayfinding System

### Designing Nichols Wayfinding System

An effective and unified wayfinding system needs to provide a balanced response to a variety of users' needs. Users differ in their abilities with their level of knowledge or information about an area potentially limiting their options. This is particularly critical in a complex large environment where users require greater reassurance. Further developing a detailed understanding of local user types and their wayfinding needs should form part of any wayfinding strategy that may be developed subsequent to this study.

### Signage Content

Establishing a naming and content hierarchy is core to the building of a wayfinding system, and will be an essential first step in developing a wayfinding strategy for the region.

Consistent naming of notable places across systems (trails / routes / destinations) will support navigation by identifying common places and allowing users to locate themselves. The naming hierarchy will have multiple levels, ranging from sections, landmarks and destinations/attraction to routes and. It is essential that the naming conventions and hierarchy be developed with the involvement and support of local custodians.

Coordination across jurisdictions to ensure names do not change along the same route/section, regardless of which jurisdiction boundaries the section may cross is fundamental. Multiple names for the same section can confuse and disorientate new users, visitors, and residents and will not build confidence in a comprehensive, branded, complex large environment

### Mapping

Clear, simple and easy to use mapping is central to the delivery of wayfinding information and to the promotion of walking and cycling. A single map has the ability to represent detailed destination content about routes and immediate area, to reduce the need for additional signing measures and may provide the opportunity to rationalize existing signing.

### .Signage elements

The physical components of a wayfinding system consist of a family of coordinated elements covering a variety of types and functions.

The system can be structured around a mix of different measures—from electronic media to lobby furniture to printed signage—all combining to provide consistent travel information to users where and when they need it. A wayfinding system not only

supports directional information needs, but should also reinforce the local character.

### Environmental wayfinding

Environmental wayfinding includes permanent or semi-permanent interventions. It ranges from simple measures such as place names or directional markers painted or embedded onto the paths, to more extensive works such as the removal of physical clutter to ensure clear sightlines to destinations thereby reducing the need for additional signs. Environmental wayfinding is useful where there is need to provide reassurance or confirmation of direction/route and where there are constraints—where the visual impact of the sign needs to be kept to a minimum.

Environmental wayfinding extends to including wayfinding interventions that are more subliminal such as the definition of routes through lighting and or material selection.

### Creating landmarks

Landmarks (along with nodal points and primary routes) help us find our way around as they constitute individually recognizable elements that identify places and act as journey attractors. Where complex large environment or open spaces suffer from lack distinctive features, creating landmarks can help to make places distinct and recognizable and supports the creation of mental maps. Interventions may include public art initiatives and place making improvements such as feature lighting, water features, environmental graphics.

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## Following

Sample Test Signage  
phase one #1–4  
phase two #5–6  
phase three #7–16

# Theatre and Dance Department



**Box Office**

**Studio**

**General Classroom**



**Comm Studies**

**Department**

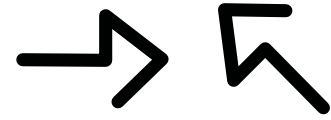
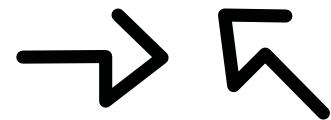
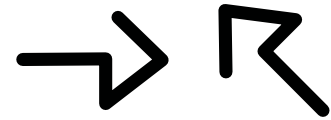
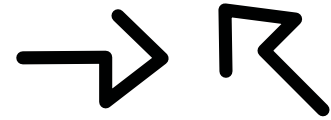
**Conference room**

**Comm Studies**

**Faculty Offices**

**GTA Offices**

**Bathrooms**



**Conference Room**

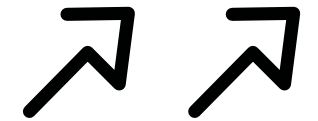
**Elevator**

**Roni Mahler Studio**

**Stairwell**

**Dance Studio**

**Bathroom**





**Theatre &  
Dance Office**



**Chapman Theatre**



**Box Office**



**Comm Studies  
Computer lab**



**Theatre & Dance  
Classroom**



**Elevator**



**GTA Offices**



**Comm Studies  
Faculty Offices**



**Theatre & Dance  
Faculty Office**



**Bathroom**

**Theatre & Dance**  
Department

**Theatre & Dance**  
Classroom

**Theatre & Dance**  
Faculty

**Comm Studies**  
Computer Lab



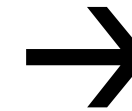
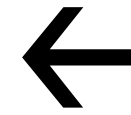
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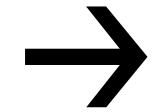
**Vending**

**Elevator**

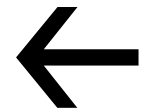
**Bathroom**

**Box Office**

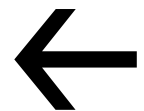




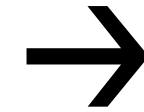
**101-111**  
**131-141**



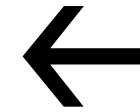
**114-119**  
**121-129**



**Theatre and Dance**  
Department  
**Restroom**  
**Elevator**



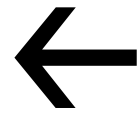
**101-111**  
**131-141**



**114-119**  
**121-129**

**Theatre and Dance**  
Department  
**Bathroom**  
**Elevator**

**1A**



**121–129**

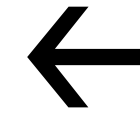
**Theatre and Dance**  
Department

**Box Office**

**Classrooms**

**Computer Labs**

**0B**



**008–017**

**Studio**

**Offices**

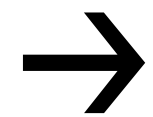
**Conference Room**

**Elevator**

**Custodian**

**South Exit**

# 2B

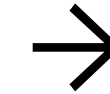


**200–211**  
**238–244**  
**Offices**  
**Sound Room**  
**Light Room**  
**Restroom**  
**East Exit**

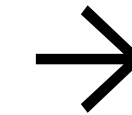
Theatre & Dance  
**Department Office**



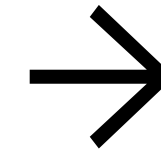
Theatre & Dance  
**Department Office**



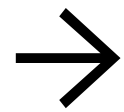
Theatre & Dance  
**Department Office**



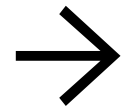
Theatre & Dance  
**Department Office**



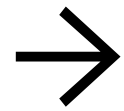
Theatre & Dance le  
**Department Office**



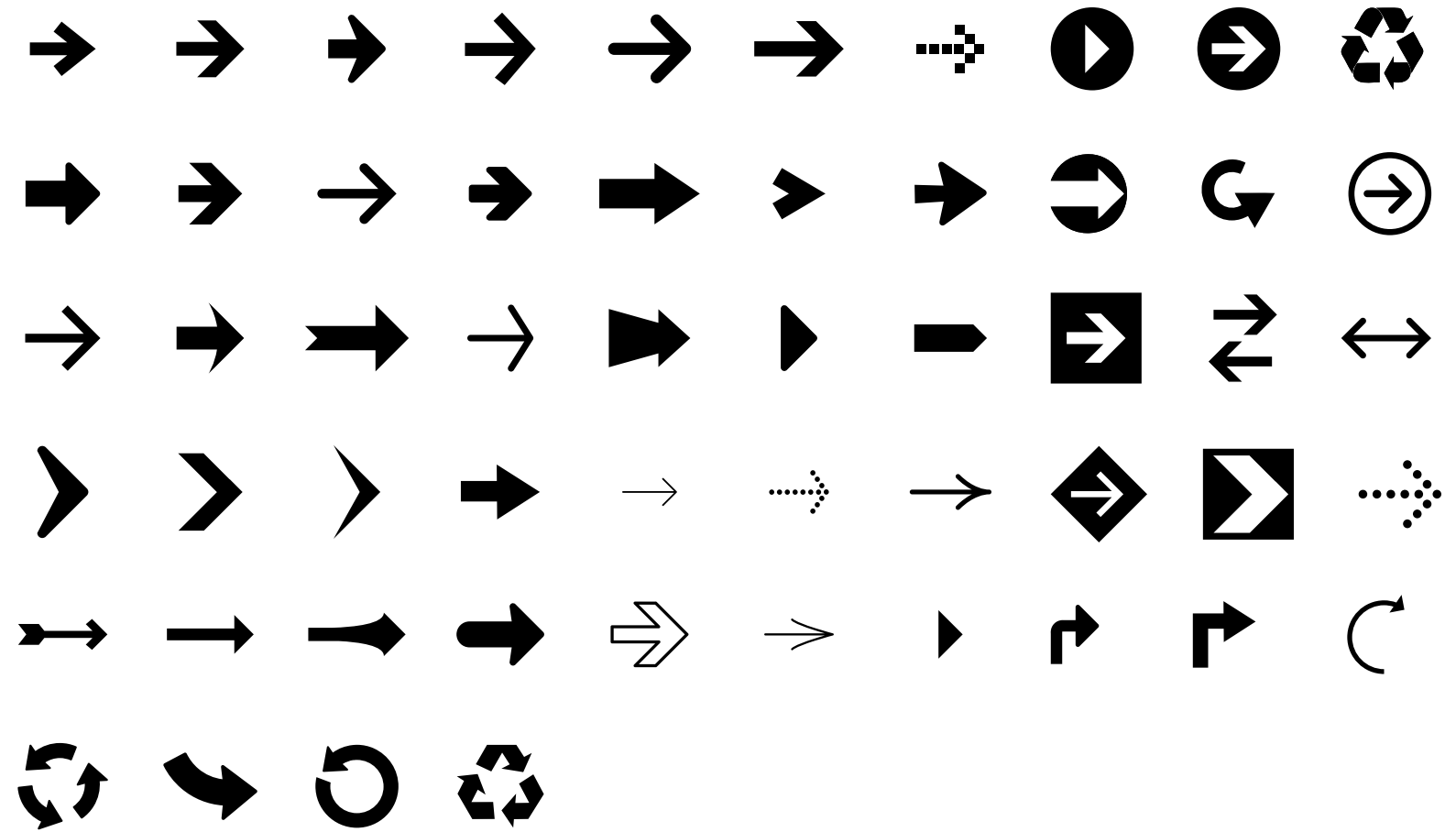
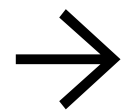
Theatre & Dance  
**Department Office**



Theatre & Dance  
**Department Office**



Theatre & Dance  
**Department Office**





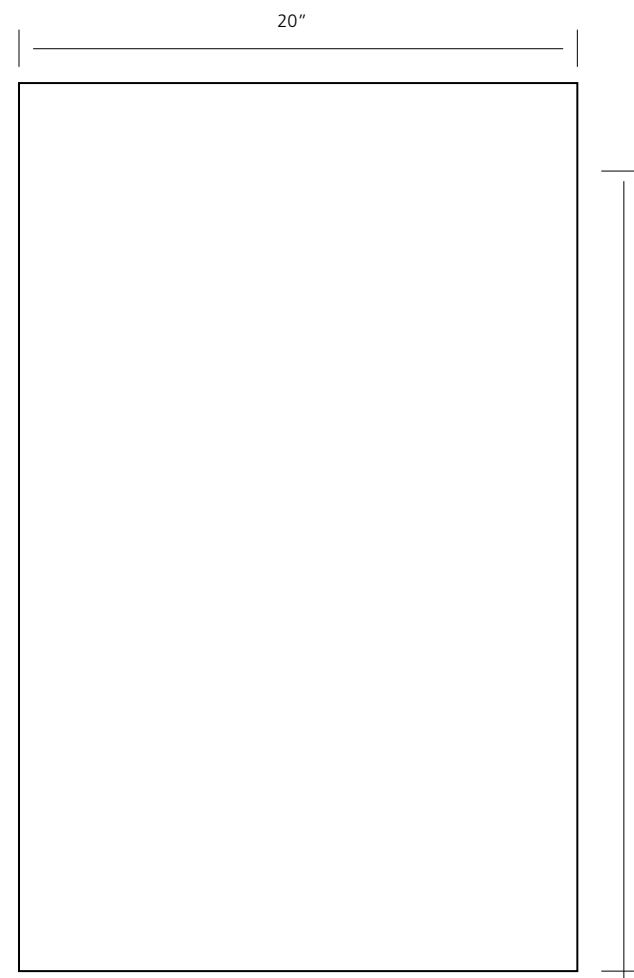
## directional signage

The decision about the location and position of a signage in a built environment is very important, the signage needs to be accessible visually in the space—such that the line of sight to the signage is not impacted, and the position of the signs are consistent through out the system. A clear visual access improves wayfinding, and reduces the mental and physical activity required to achieve the wayfinding goal.

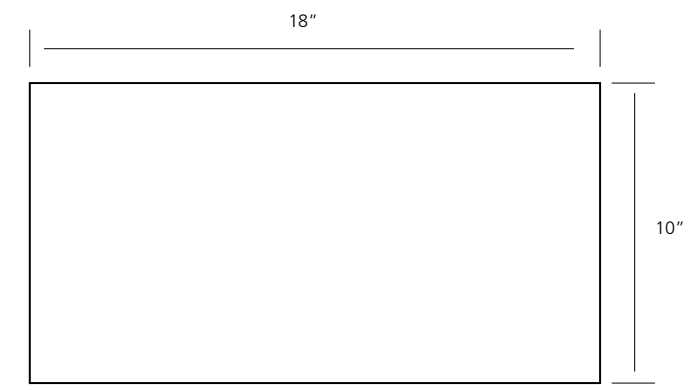
When putting up signage in a space, some of the factors to consider is the line of sight. This influence the height/distance of the signages in the system. For instance for the Nichols Hall signage system, the distance of the signages from the floor is 72”.



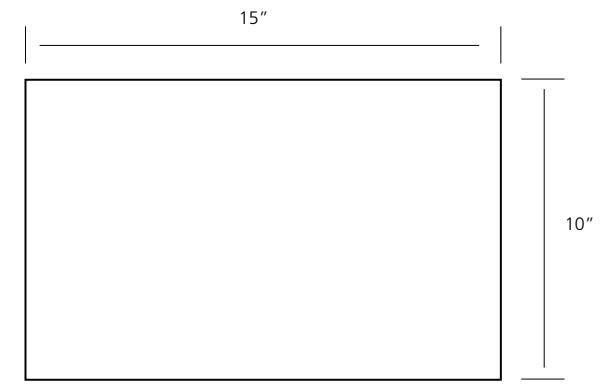
Building Directory Signage



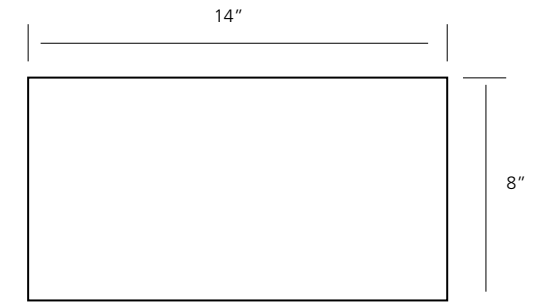
Directional Signage



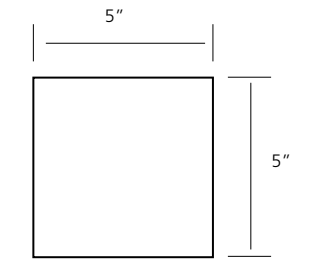
Information Signage



End Point Signage



Icon Signage

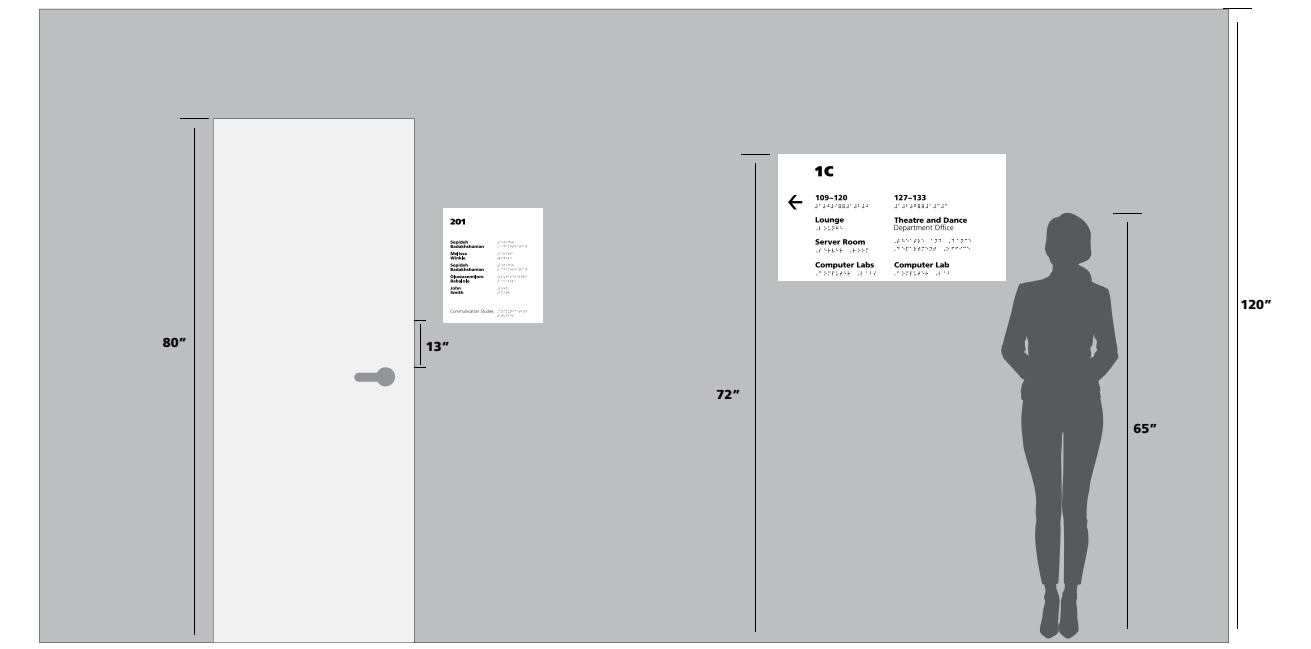
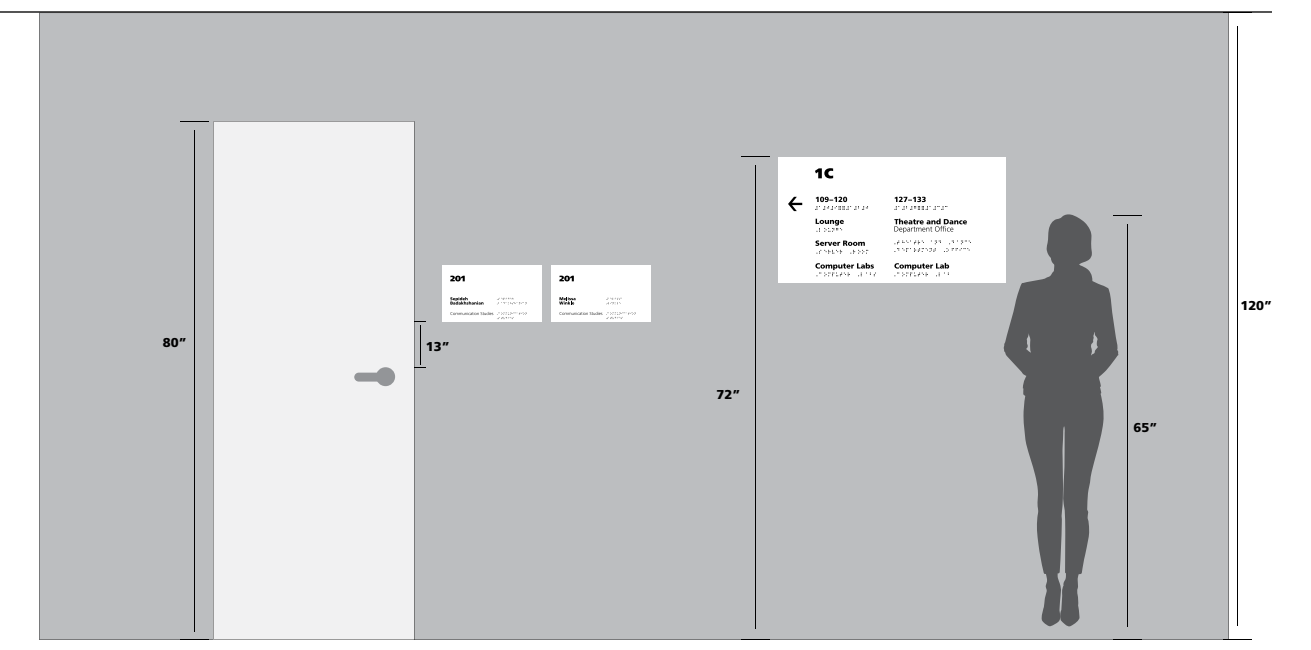


**Previous**

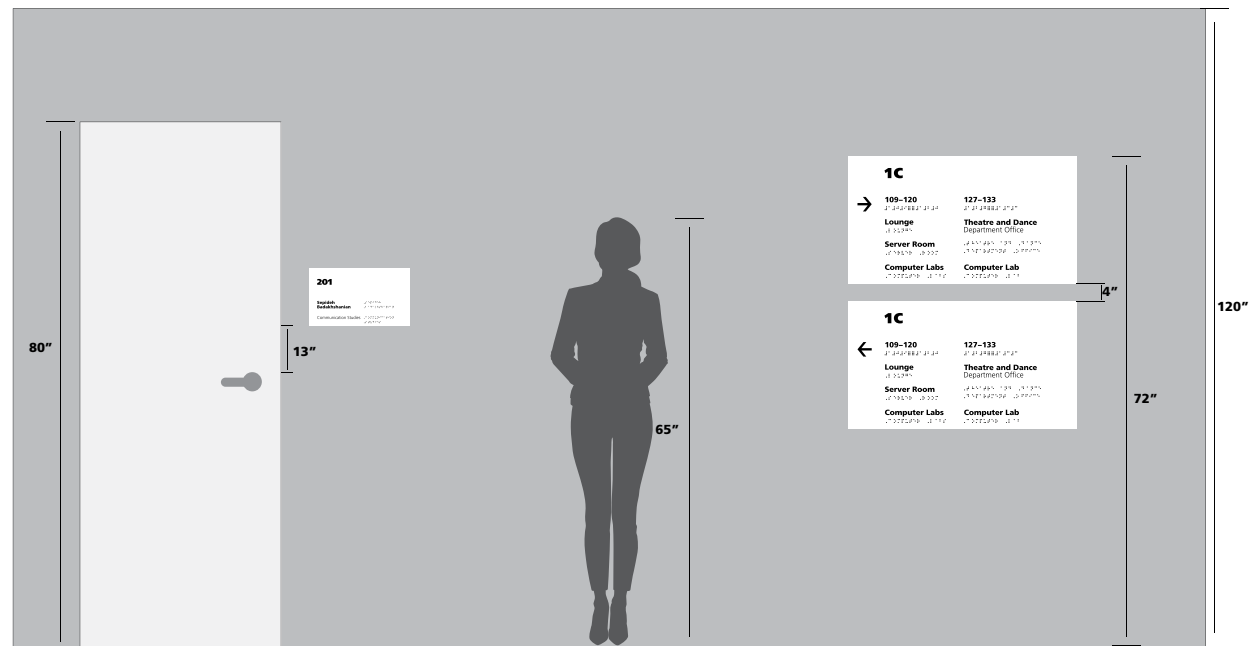
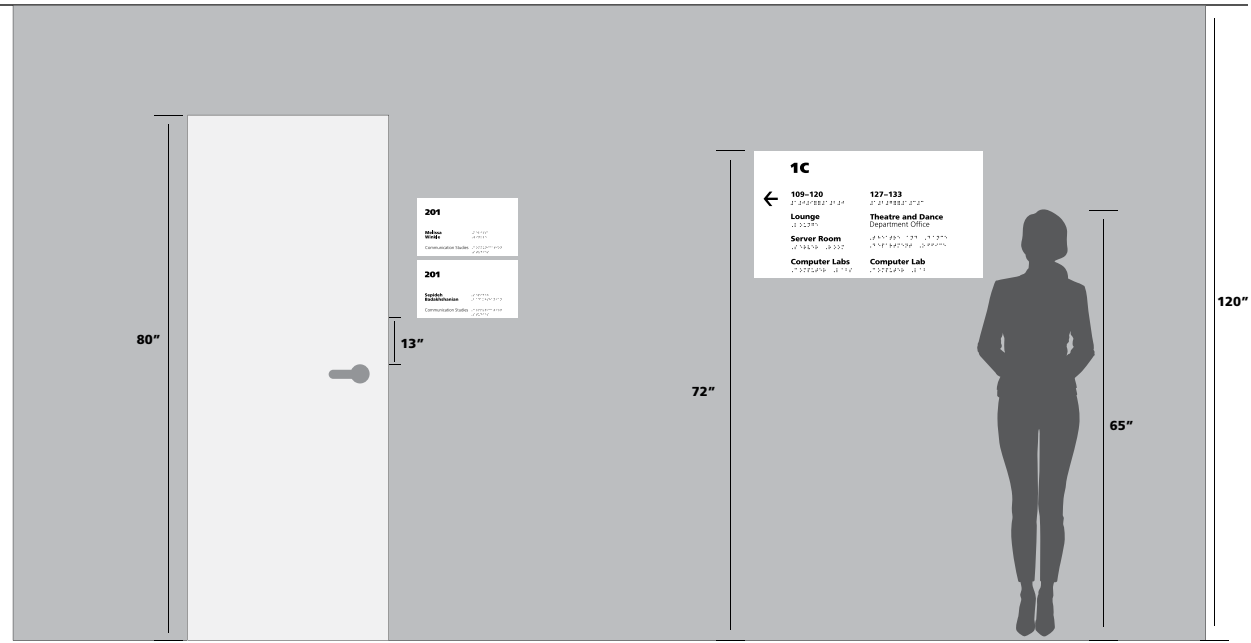
Size specification for Nichols hall signage

**Right**

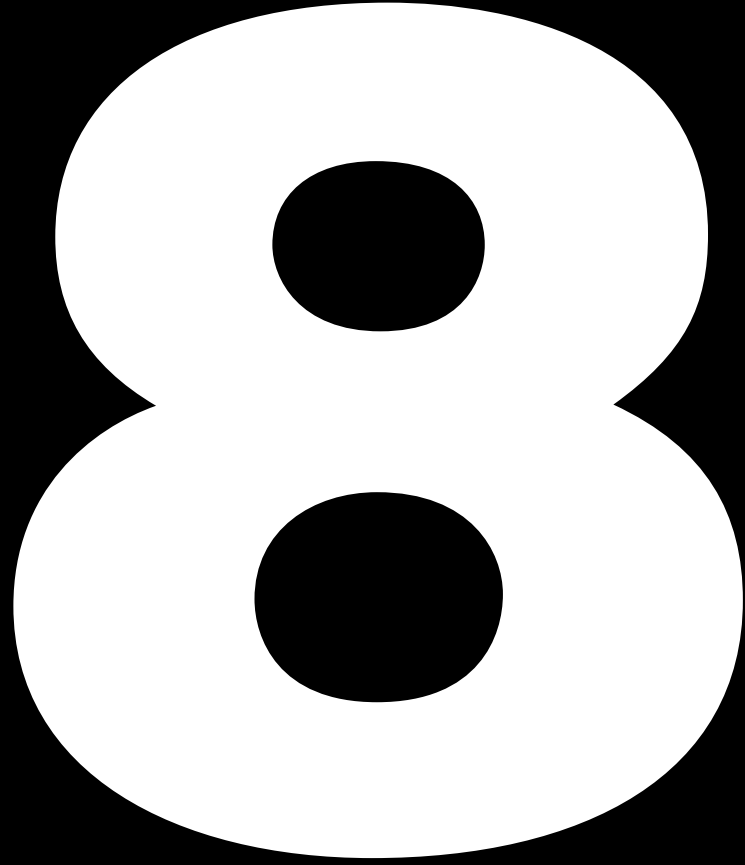
#1-2  
Specification for installing directional and identification signage



**Right**  
**#3-4**  
 Specification for installing  
 directional and identification signage



Designing the Exhibit



visual access

environmental legibility

visual cues

navigation

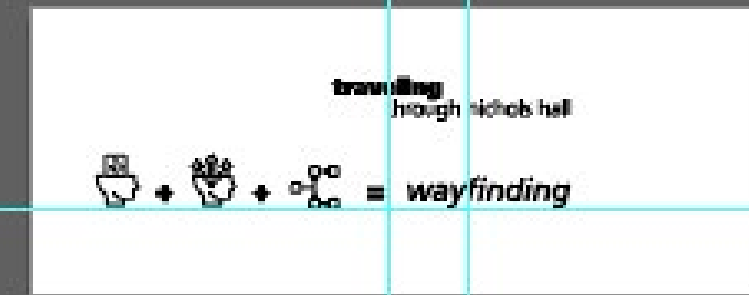
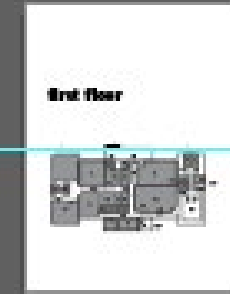
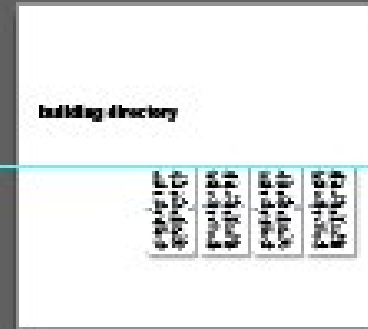
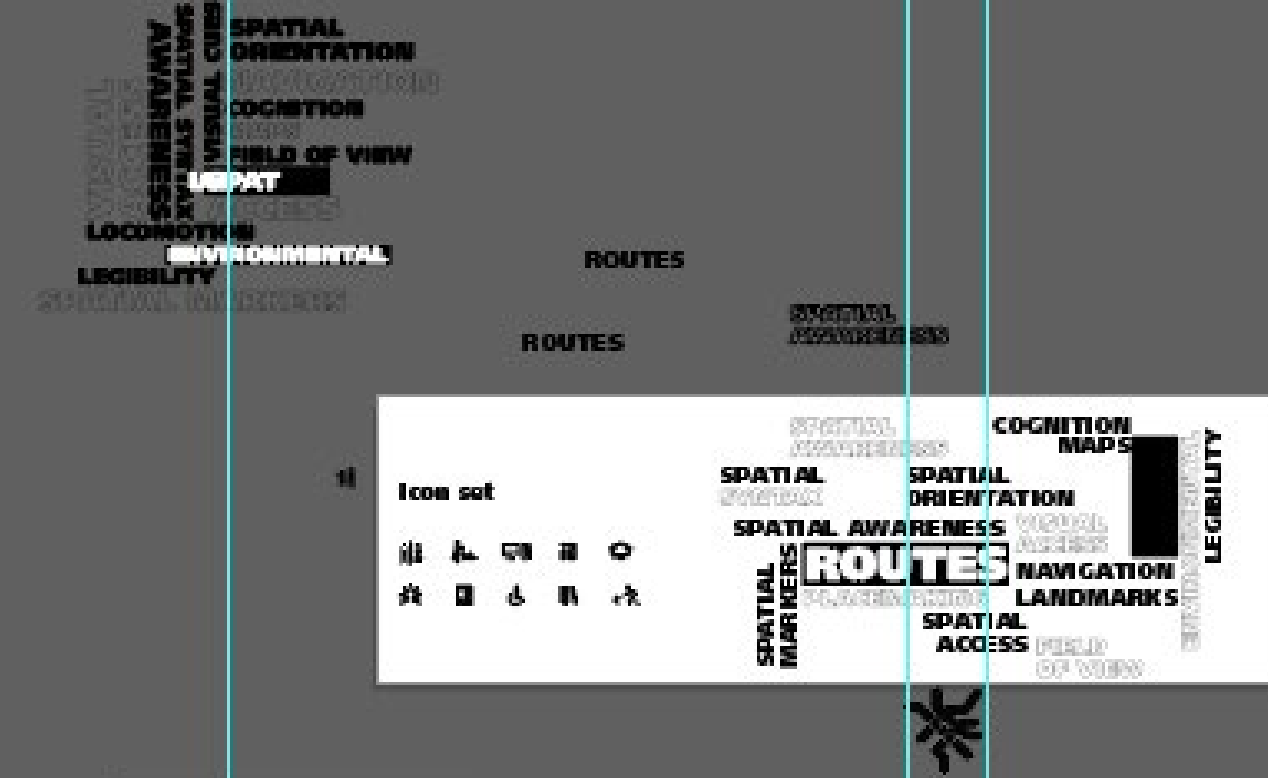
field of view

spatial orientation

spatial syntax

maps:

- spatial awareness
- placemaking
- landmarks
- cognition map



trav




**Opposite**

#1-5 Style frames/layouts  
for exhibition design

The designed wayfinding system for Nichols Hall had to be exhibited in the Chapman Gallery of the Department of Art. With this in mind, the solution was designed to educate the audience on what wayfinding is, and also show what a wayfinding problem looks like.

## navigation in nichols hall

*A wayfinding exhibition*

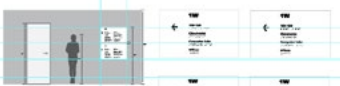
++

"Anyone experiencing even momentary disorientation and lack of recognition of their immediate surroundings experiences the uncertainty of being "lost" (Reginald Golledge 1999)." Wayfinding behaviors can be influenced by factors from both the environment and human individual differences. For example, people with both high and low spatial abilities can get lost in complex buildings. Wayfinding can be defined as a series of cognitive exercises—cognitive mapping that allows us to understand the space we are in; a decision making ability that allows to plan and structure them into overall plan; and a decision-executing ability that transforms decisions into behavioral actions.


### directional signage

The decision about the location and position of a signage in a built environment is very important, the signage needs to be accessible visually in the space—such that the line of sight to the signage is not impeded, and the position of the signs are consistent through out the system. A clear visual access increases wayfinding, and reduces the mental and physical activity required to achieve the wayfinding goal.

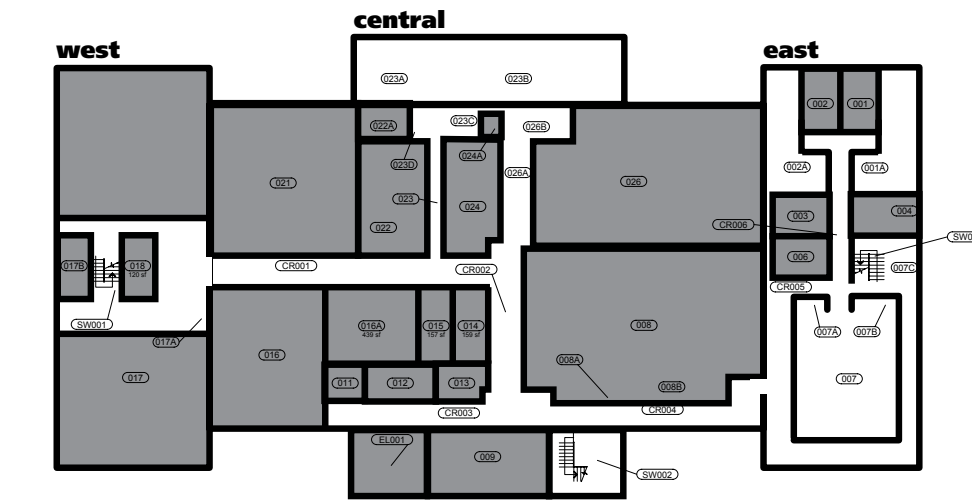
When putting up signage in a space, some of the factors to consider is the line of sight. This influence the height/location of the signages in the system. For instance for the Nichols Hall signage system, the distance of the signages from the floor is 72



### building directory



# first floor

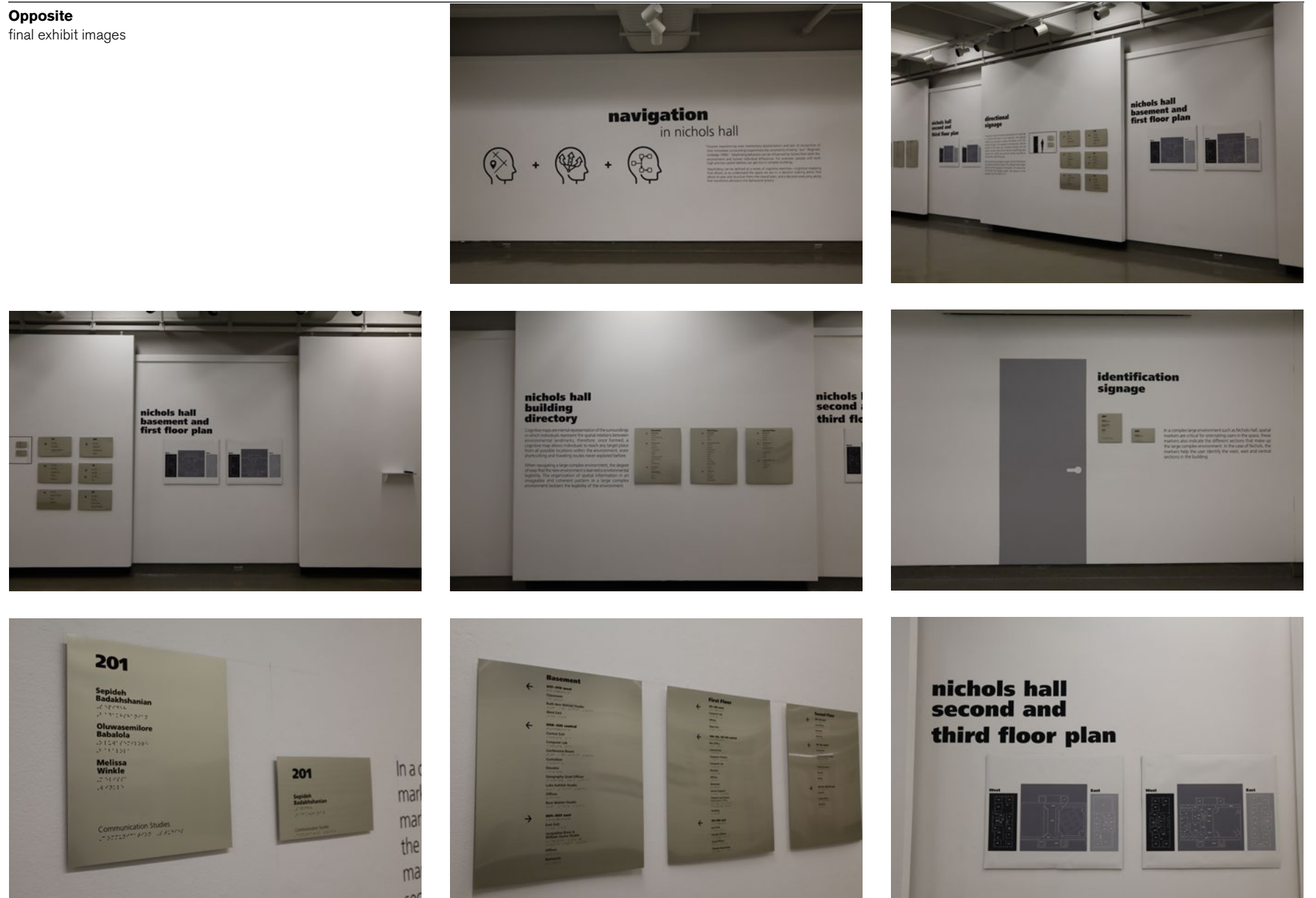


## video

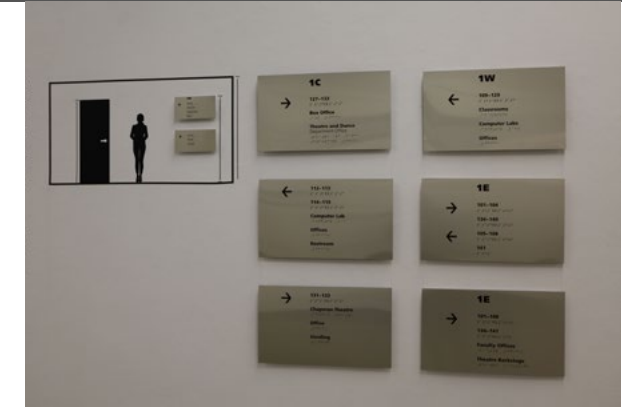
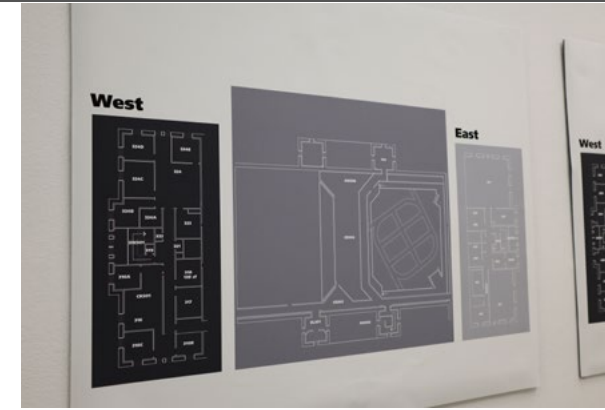




Opposite  
final exhibit images



**Opposite**  
final exhibit images  
example of directional signage  
in Nichols Hall



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