Uncovering the hidden complexities in the wayfinding user experience: Development of explanatory models

Alan Parsons

Iowa State University
Uncovering the hidden complexities in the wayfinding user experience: Development of explanatory models

by

Alan Parsons

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Program of Study Committee:
Lisa Fontaine, Major Professor
Debra Satterfield
Fred Malven

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# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>LIST OF FIGURES &amp; IMAGES</td>
<td>iii</td>
</tr>
<tr>
<td>CHAPTER 1: INTRODUCTION</td>
<td>1</td>
</tr>
<tr>
<td>CHAPTER 2: UNDERSTANDING COMMUNICATION, OUR ENVIRONMENT &amp; WAYFINDING</td>
<td>9</td>
</tr>
<tr>
<td>2.1: How Our Minds See Our Environment</td>
<td>9</td>
</tr>
<tr>
<td>2.2: An Understanding of Semiotics</td>
<td>21</td>
</tr>
<tr>
<td>2.3: Why Semiotics is Important to Wayfinding</td>
<td>27</td>
</tr>
<tr>
<td>2.4: Frames: Understanding How People Read Environments</td>
<td>41</td>
</tr>
<tr>
<td>2.4.1: Manipulating of Museum Space and Identity</td>
<td>44</td>
</tr>
<tr>
<td>2.5: Cultural Conventions and Symbolism</td>
<td>46</td>
</tr>
<tr>
<td>2.5.1: The Building &amp; Power Discourse</td>
<td>48</td>
</tr>
<tr>
<td>2.6: Empowering Technologies</td>
<td>53</td>
</tr>
<tr>
<td>CHAPTER 3: A MORE USER EMPOWERED WAYFINDING</td>
<td>57</td>
</tr>
<tr>
<td>3.1: Increased Consumer Demands for Individualization/Personalization</td>
<td>58</td>
</tr>
<tr>
<td>3.1.1: Shadow Model</td>
<td>61</td>
</tr>
<tr>
<td>3.1.2: The Variable Concept Model</td>
<td>72</td>
</tr>
<tr>
<td>3.1.3: Revisiting and Adapting the Arthur/Passini Model</td>
<td>83</td>
</tr>
<tr>
<td>3.1.4: Cognitive Maps as the Ideal Personalization Method</td>
<td>89</td>
</tr>
<tr>
<td>CHAPTER 4: CONCLUSION</td>
<td>92</td>
</tr>
<tr>
<td>BIBLIOGRAPHY</td>
<td>98</td>
</tr>
</tbody>
</table>
LIST OF FIGURES & IMAGES

Figure 1: Lynch’s Definitions; p. 15
Figure 2: Arthur and Passini’s Diagram of Decision Making While Wayfinding; p. 20
Figure 3: Images of Spoken Word; p. 22
Figure 4: Comparison of Images From Pre-spoken and Post-spoken Word; p. 24
Figure 5: Berger’s Model; p. 32
Figure 6: Saussure’s Model; p. 34
Figure 7: Illustration of Landmarks; p. 36
Figure 8: Gary Allen’s Chart; p. 37
Figure 9: Wodiczko Hersorn Projection, 1988; p. 50
Figure 10: Wodiczko: Projection of the Grand Army Plaza, 1984-1985; p. 51
Figure 10a: Augmented Reality Examples, p. 55
Figure 11: Shadow Model; p. 64
Figure 12: Entrance to Memorial Union; p. 68
Figure 13: Example of Variable Matrix, p. 76
Figure 14a: Designer’s Variables, p. 77
Figure 14b: User’s Variables, p.78
Figure 14c: User’s Variables, p.78
Figure 15: Variables Factors Model; p. 81
Figure 16a: Close-up of Adaptation of Arthur and Passini’s Diagrams; p. 85
Figure 16b: Adaptation of Arthur and Passini’s Diagrams; p. 86
Figure 16c: Adaptation of Arthur and Passini’s Diagrams; p. 87
CHAPTER 1:
INTRODUCTION

“The door, the arrow, the corporate identity, the logotype, the traffic sign, is only the appearance, privileged and standardized, of knowledge through signs of the world of things, products, and actions. Our existence then becomes more and more symbolic because it is lived more and more inside an ideographic world where we prepare our actions not with objects themselves, but with signs that designate them.”

The sense of belonging to a place, being comfortable in that place, being able to adapt to or personalize a place allows us to feel safe, empowered, and in control of the environment we are in. Since the dawn of human existence, explorers, settlers, and navigators have been developing specific navigational aids to better understand and live in foreign environments.

Early navigation methods relied on the observation of spaces through areas that we now identify as districts, paths, landmarks, nodes and boundaries. Through these observations or the user’s experience, a person could develop a cognitive (or mental) map which was uniquely her own and which could adapt to new information over time. These observation skills still exist in humans, but in contemporary times designers have introduced formalized wayfinding assistance in the form of instructions that focus on

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1 Mole, Abraham; Design Issues: Vol. III, No. 1:44
paths at the expense of acknowledging most variables and cognitive mapping skills that help complete a user’s experience in interacting with the environment. These instructions, in the form of directional sign systems, are now relied upon almost exclusively as a method for assisting travelers to get from point A to point B. While these directional approaches are often efficient (for example, in highway signage), they limit the traveler’s awareness of the space they are moving through. Knowledge and focus on the path is certainly appropriate on the highway, but in many other situations, a more comprehensive awareness of one’s space and the variables that affect a traveler in a space could enhance the user’s understanding and experience of their environment within a space, making it possible more closely personalize their wayfinding experience or better understand and relate to the environment. Current wayfinding systems do not fully acknowledge a wide range of variables that affect travelers individually while wayfinding.

For example, a traveler who is relying on his cognitive map while moving through an airport might be more likely to anticipate the location of decision points (nodes) and be more likely to recognize when he moves from one district to another. These abilities would be greatly useful in the event that he overlooked the directional signage, which is in place to point him to his destination. By treating all travelers the same, with one universal approach, the current emphasis on pathway navigation and unacknowledged variables limits the individual’s ability to create a unique and elaborate cognitive map. User’s become forced instead to abandon their sense of exploration and conform to a singular didactic message in order to find their way. While most current wayfinding systems work for some people, even those that work will often do nothing to actually
make an individual feel a sense of belonging or allow an individual to navigate in his/her own intended way. These systems also do not adapt themselves to the nature of human emotions as a determining variable when entering a space.

One might wonder, then, why the didactic approach of directional signage/pathway navigation has become the gold standard in wayfinding systems, given its obvious limitations. And while new technologies such as GPS and augmented reality bring some improvements (such as mobile information delivery), they still seem to rely on the tunnel vision already used in standard directional signs. Why can’t wayfinding systems be more individualized and allow for more self-empowerment when traversing a new place or space, while at the same time keep some of the universal methods known to work in aiding the majority of people?

Chapter 2 will review some of the reasons why designers have long preferred universality when attempting to communicate messages. These include the modernist tendency toward presuming a universal comprehension of visual and typographic messages. Conversely, though, it will also review the basic communication and semiotic theories that bring into question the possibility of universal clarity of any message as it moves from sender to receiver (or speaker to listener). An existing model will also be examined that analyzes some of the decision processes that occur while wayfinding.

In chapter 3, some of these theories will be adapted to wayfinding communication, in order to develop new explanatory models that identify why and how a universal message might fail to assist travelers as they navigate a space.

This paper demonstrates the need for a new approach to wayfinding aids that could allow travelers to individualize their experiences and their memories of a space, in order
to build on their innate cognitive abilities. To validate this assertion, it presents the following original research:

A) Two newly developed explanatory models of the wayfinding process, to compare the perceptions and realities of the navigation process and to show the many ways that one person’s variables and needs might differ from another’s.

B) The decision hierarchy diagram developed by Arthur and Passini is adapted to acknowledge the variables (or noise) that likely occur during each traveler’s process.

C) After presenting these explanatory diagrams, the author examines whether the new technologies differ from current sign systems in terms of:

- Their ability to be individualized
- Their reliance on pathway navigation
- Their support of an individual’s cognitive map development.

Through the pioneering work of urban planner Kevin Lynch, and others in the fields of linguistics, sociology, psychology, architecture, interior design and most recently graphic design, we have come to understand the way that people move about in a space. By understanding Lynch’s definitions of landmarks, boundaries, and nodes, architects can better plan buildings around people’s needs, graphic designers can better develop signs to communicate seen and unseen space, and interior designers can make paths more prominent. All of these are intended to help people navigate a space. However, with the designers’ intentions to help people get around, travelers can still be lost, confused, and frightened in foreign environments.
If people were allowed the opportunity to personalize a space, and the wayfinding system within the space was adaptive to each person’s own understanding of navigating, then that experience, although not universally prescribed, would have universal appeal. More importantly however it will allow an individual to enter, explore, orient and exit a space while keeping intact her own understanding of how she navigates. A personalized wayfinding system would be adaptive to an individual’s changing emotions before he enters, as he moves through, and when he exits that space. Because of this, the navigator would feel more empowered and in control, resulting in a more comfortable and beneficial experience.

**User Empowerment**

The desire and ability for user empowerment has been increasing in recent years. Individuals have come to expect and demand opportunities to personalize their experiences. This shift was acknowledged in Time Magazine’s Person of the Year for 2006², which was identified as “You”. Instead of a famous person’s photo, the cover featured a mirror-like surface in which the reader could see himself or herself as the person of the year. This was in response to the growing popularity of user-developed content such as Wikipedia, YouTube, MySpace, Facebook and Second Life.

“The tool that makes this possible is the World Wide Web….It’s a tool for bringing together the small contributions of millions of people and making

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² Time’s Person of the Year: You; December 13, 2006; by: Lev Grossman; www.time.com
them matter. Silicon Valley consultants call it Web 2.0, as if it were a new version of some old software. But it’s really a revolution.\(^3\)

On these sites, individuals are given the power to showcase their own content about how they view the world for everyone to see. A single person can create a website and personalize it; individuals can recreate how they wish to be or how they want others to view them. All of this is done through a singular universal channel in which anyone can be a member of and have access to.

The internet and content on it, much like personalizing ring-tones, or landscaping your home to look different than the same tract home next to you, is becoming increasingly individualized while keeping the structure intact. In almost all forms of design and communication this can now be seen. Increasingly in marketing campaigns the phrases “for your personal needs” or “with you in mind” are being used even though they are meant to reach a wide audience. These marketers and advertisers know the importance of the individual and that while people want to fit in; they want to do it in their own way.

A current example of this can be seen with changing ones cell phone face. Thousands of other people may have the same physical phone as you, but a lesser amount will have it with the same face cover you chose to put on it that day, and even fewer still will have it with your personalized ring tone. With the multitude of apps now available for smart phones, it is unlikely that any two user’s have the exact combination of tones, skins, and apps. While these changes give the user a sense of empowerment, the device’s

\(^3\) Time’s Person of the Year: You; December 13, 2006; by: Lev Grossman; www.time.com
functionality remains pretty consistent from one user to the next. Likewise, many people have the same computer, but will set up how they navigate through the folders and files based on their own personal strategies of how to do so. Yet the operating system still retains many of the same universal menus and options; a user cannot override all of the system’s structure. How close can we get to this type of partly personalized, partly universal user experience when creating wayfinding aids?

The internet, once looked at as only something to view and get information from (much like a directory, map, or directional sign), is now completely interactive and increasingly personalized. Could the same happen with wayfinding systems? Could a system that has been developed primarily for people to obtain linear, directional information adapt to be more interactive and personal for each user?

In the very near future we can expect to see advancements in smart phone and augmented reality technology that will use a combination of GPS coordinates and user entered data, information relative to an individual’s desires and needs, in order to aid in wayfinding. These devices will relay information back to the user about where they are, where they might want to go and could adapt to user’s as they may frequent a place. The devices might even help to navigate a person depending on their mood, the time of day, traffic flow patterns.

Technology can play a huge role in aiding wayfinding systems, but not if it merely mimics the current didactic emphasis on pathways. Refocusing on the human’s innate navigational skills, and their ability to create cognitive maps of the world around them, will allow designers and developers to create better wayfinding devices. Instead of
a system that focuses on a linear path, these new visual aids can help to “widen” the path or “open it up” for allowing a user to project their own sense of navigating.
CHAPTER 2:
UNDERSTANDING COMMUNICATION, OUR ENVIRONMENT & WAYFINDING

2.1: How Our Minds See Our Environment

The actual process of wayfinding has been around since time itself. It can be said that every species of animal can wayfind. Wayfinding is “purposeful movement to a specific destination that is distant and cannot be perceived directly by the traveler… this includes and goes beyond the act of avoiding obstacles while moving through the environment.”

One, if so inclined to, could then make the argument that even plants wayfind as they reshape their root in search for water, as they wrap around or shift direction in growth to continue past an obstacle, or follow the movement of the sun for nutrients. Ants march out onto scented paths previously laid by explorer ant so they always know where to go. Bats and many marine life use echo location methods to track and locate objects around them. This is similar to methods used today for human navigation although we go about it visually, by touch or audibly rather then scent.

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4 Spatial Abilities, Cognitive Maps, and Wayfinding: Bases for Individual Differences in Spatial Cognition and Behavior; Gary L. Allen; p.46-80; 1999
The term wayfinding can be traced to have originated with Kevin Lynch in his groundbreaking research on systematically structuring cities and trying to understand how we move through spaces and places. Lynch, a city urban planner who studied human perception in navigation urban landscapes developed rules to which he believes everyone recognizes either consciously or subconsciously. Even today these terms and their meanings remain largely unchanged. The boundaries and definitions are as follows:

**Paths**: the channel in which the user or navigator will follow

**Edges**: elements that may lie within or near a path but not considered paths. Edges are more like actual boundaries.

**Districts**: sections or areas the navigator can walk into. These areas usually have identifying characteristics that will separate them out from other areas.

**Nodes**: nodes are strategic spots, junctures, decision points or entryways along a path or entering a district.

**Landmarks**: reference points. These can be everyday objects or a mental image the user recalls in the space. For example a light post might be distinct from other things in the area so one might remember this as a place where they turn left. Remembering the spot of a major event that happened to you might give you clue to where you are in relation to everything else as well.

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5 Lynch, Kevin; “The Image of the City”, The MIT Press, ©1960, 47
Lynch also expresses the view that “nothing is experienced by itself but always in relation to its surroundings, the sequence of events leading up to it, the memory of past experiences.”\(^6\) People’s images of a city come from their own personal memories.

Cities are also fragmented into parts that are created by different people with different intentions or more notably different interpretations. Lynch points out that these fragments also make up the whole of what a city is and how it can be experienced.\(^7\) However, there is an obvious dichotomy in that, while this might be true, the fact that various “fragments” exist also creates confusion in some cases which might limit one’s ability to fully comprehend and experience a place as it might otherwise be experienced.

Therefore, when experiencing a place, one might find full experience in something simple while another might find it in the complexity of fragments. Part of this idea of societies being made up of groups comes from what Lynch calls “legibility” or how all the parts are made whole within society. It is essentially the city as perceived and realized by the inhabitants not by an individual but from individuals coming together. “Structuring and identifying the environment is a vital ability among all mobile animals”.\(^8\)

Here, Lynch is suggesting that being able to identify or move about within a place and recognizing that environment comes not from an innate void but from our ability to organize what we see, and the byproduct is that we are then related to the environment. People make sense of the environment the way they know how and therefore will engage in a place they see or feel makes sense to them. There are specific cues in the

\(^6\) Lynch, Kevin; “The Image of the City”, The MIT Press, ©1960, 1  
\(^7\) Lynch, Kevin; “The Image of the City”, The MIT Press, ©1960, 2  
\(^8\) Lynch, Kevin; “The Image of the City”, The MIT Press, ©1960, 3
environment that we give meaning to and optimize in order to have a “free-moving life”. When everything is ordered and vivid in the environment “symbols and collective memories of group communication” are more widely shared.⁹

For example it is much easier to navigate a website with five main links and minimal sub-links then cluttering the main page with hundreds of links and multiple pop-up menus. Another example would be walking through a library. Imagine if the library stacks were organized the color of the binder, or not organized at all. People create groupings and then organization within that grouping in order to understand the environment. A Street becomes a block when multiple streets are added. A block becomes a neighborhood, a neighborhood becomes a district, a district becomes a city, and so on.

Lynch’s theories are shared by Howard Gardner in his book “Frames of Mind: The Theory of Multiple Intelligences”. Gardner is a psychologist at Harvard. By looking at and understanding his theories that multiple intelligences exist one can not only see that in all of them there is some sort of organization process taking place. The idea that he is coming up with these theories illustrates organization in order to understand the environment. It is important to note that while multiple intelligences exist it is not necessarily the case that they all exist in a single individual. Some individuals are more developed with many multiple intelligences while others might have less developed and not as much intelligence. This suggests that when developing an organized system of things it is important to look at every person and their intelligences.

⁹ Lynch, Kevin; “The Image of the City”, The MIT Press, ©1960, 3
An example of multiple intelligence is in the category Gardner calls ‘Logical-Mathematical Intelligence’, a person can easily group, categorize and organize objects in a logical manner.

“…The competence that I am terming ‘logical-mathematical intelligence’ does not have its origins in the auditory-oral sphere. Instead, this form of thought can be traced to a confrontation with the world of objects. For it is in confronting objects, in ordering and reordering them, and in assessing their quantity, that the young child gains his or her initial and most fundamental knowledge about the logical-mathematical real.”

Gardner suggests that knowledge stems from child development and how that child grows and reacts with the world. Much of what Gardner is discussing in his book is very similar to Lynch’s own theories. People gain knowledge from the world around by interacting with the environment and by doing so they form memories and relationships with people and objects. In doing so, these things are categorized to make sense to the individual.

This would certainly suggest that the more a person interacted with an environment the more comfortable they will become. This suggests that a good wayfinding system would then have to do more than simply provide words and images in aiding someone in navigation in order to give someone the sense they belong. The

wayfinding system designed would need to allow for people to confront the objects and manipulate them for their own benefit and understanding.

While there is an emotional connection to this line of thought, Gardner points out that “the basis for all logical-mathematical forms of intelligence [begins] initially in the handling of objects”\(^\text{12}\), that it is purely based in the physical world. This means that while emotions can arrive from the interaction with objects they are not what begin the process to organize objects.

Similarly Lynch begins his process, in the sense of wayfinding, by understanding how people move about a space. He finds that people’s ability to organize and group objects intelligently provides them with a “clear image” and a “vivid and integrated physical setting”.\(^\text{13}\) Only then will a person feel a sense of emotional security and “a relationship between himself and the outside world.” However he continues by suggesting that perhaps it is our emotions with the physical world that cause us to want to organize the environment; “This is the obverse of the fear that comes with disorientation; it means that the sweet sense of home is strongest when home is not only familiar but distinctive as well.”\(^\text{14}\) This might suggest that Lynch sees more of emotional tie to what people find organized and that an environment that is understood stems from a person’s emotions to it first.

The table below (Figure 1) helps explain Lynch’s definitions of what he see makes up an environment

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\(^{12}\) Gardner, Howard; “Frames of Mind: The Theory of Multiple Intelligences”, Basic Books, \(\text{©1983, 131}\)

\(^{13}\) Lynch, Kevin; “The Image of the City”, The MIT Press, \(\text{©1960, 3}\)

\(^{14}\) Lynch, Kevin; “The Image of the City”, The MIT Press, \(\text{©1960, 5}\)
Lynch further continues to discuss emotional behaviors in that there is an obvious value in the mystery of what a place has to offer. It would seem then that yet another dichotomy exists where on one hand people will organize a place in creating a clear image to comfortably reside in. On the other it is exactly that unknowing, of not being able to categorize a place that can give a person perhaps a sense of belonging.

Some people feel comfortable with mystery and after all one must first be unfamiliar with a place if they are going to organize it. Such a thing cannot exist where a place is to every individual’s own desired liking of comfort even before they set foot into the place. So the design process can only begin to help by making navigation and the exploration of a place as simple and comfortable as possible for a person to order and orient their thoughts.

He stresses however that this is only possible under the strict conditions where there is no danger in being lost and people should be rewarded in knowing they are still in the correct place.

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Therefore, while remaining mysterious the overall environment is that of being organized and complete. This forms the “legibility” needed for people to read a place and interact with the environment. In other words it is how people and the space around them come together to co-exist. Essentially people seek what Lynch calls “an open-ended order”.16 People, as well as the environment must be flexible and be allowed to change and create new stories; while at the same time do this within an ordered space or belief system.

YouTube might be an example of this. The structure of the website is well organized and might be considered easy to use. Also the concept of what it can be used for is understood on a massive level. However the content with in it, while being organized within the site, varies greatly. Individuals have made and been allowed to make the website virtually their own by personalizing it with their own content.

Lynch concludes this section of his book in defining the image of the city into three parts. The first of which is “Identity”: The distinction from other things. Knowledge of what things are is essential. Secondly, “Structure”: The relationship people and objects have with each other in an environment. Finally “Meaning”: The emotional or practical relation people have prior to engagement with or after experiencing a place.17

It can easily be understood and recognized that people do in fact engage a space in this manner. However, to what degree does a single person engage in personalizing a place? Certainly not all people will think of a place or encounter it in the same way.

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17 Lynch, Kevin; “The Image of the City”, The MIT Press, ©1960, 8
While we all might have the ability to identify, order and become emotional with a place it is probably to varying degrees and understanding.

In understanding further the individual intelligences people are brought up with in a society, Gardner describes a situation we all face when trying to find our way. His understanding of the human mind suggests that we all have the many intelligences yet people call upon specific intelligences better then the next simply by the way they were raised and how they were produced within a society. It is the definition of a “spatial intelligence” that becomes so familiar with wayfinding. As an exercise in visual memory Lynch suggest:

“First, imagine a horse. Which point is higher, the zenith of the horse’s tail, or the lowest part of the horse’s head? Imagine an elephant and a mouse. Now imagine the eyelashes of each creature. Which takes longer to bring into sharper focus? Imagine your kitchen sink. Which faucet controls the hot water? Or, to conclude this series, imagine a campus or square with which you are familiar. Time yourself as you scan from one building to the next, and now compare the time elapsed when you scan from one side of the campus (or square) clear across to the other.18

This exercise plays right into Lynch’s image of the city. We have the ability to call on our memories of things before and after we are in a place. Gardner helps to make

it clear however that we might not all be recognizing the space as easily as Lynch might want us to believe. A person with a more acute sense of their spatial intelligence might be able to recall the place more accurately or they might be able to imagine a more accurate image of what lies around a corner.

“Central to spatial intelligences are the capacities to perceive the visual world accurately, to perform transformations and modifications upon one’s initial perceptions, and to be able to re-create aspects of one’s visual experience, even in the absence of relevant physical stimuli.”

There are however many other forms of intelligence people use in order to navigate through a space. Therefore a major step in designing a wayfinding system that will accommodate the greatest number of user’s is to perhaps try and allow for the greatest number of intelligences to understand it.

In their book *Wayfinding: People, Signs, and Architecture* Romedi Passini and Paul Arthur, two of the most influential people in terms of continued theories and research for environmental graphic design and wayfinding recognizes that people are different and will most likely wayfind in different ways. They pose the question if people always take the same route and make the same decisions. They respond to these issues by stating:

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“If everybody were to develop fundamentally different decision plans, these plans would be of no use in the design of wayfinding information systems….Each type of circulation demands its own type of decision plan. Thus, if the appropriate information is provided, people on the whole will develop similar plans.”21

While they mention it is important for wayfinding systems to acknowledge the individual they also suggest that a wayfinding system could not exist if it were to take in all the possibilities and issues that would arise in helping people navigate. And so to the day the vast majority of wayfinding systems follow this mold, to reach that people on a whole instead of individually. The key research within this paper will attempt to change this by asking the same questions. Are there multiple experience people have? Do people navigate in different ways? Can a place have multiple navigational methods and still be a system? Can people take the same route and yet navigate differently?

Arthur and Passini best reveal their system through a hierarchical diagram of decisions a person might encounter from beginning to end. The diagram is something the designer of the system creates based on their knowledge of the space and what they think people entering that space will encounter as well as what those peoples decisions might be.

Arthur and Passini’s diagram depicts a person’s path from point A to point B and focuses on the points in between where people will need to make their next decision. Along each of those points is where it is noted the decision or action that will take place.

(Figure 2: Arthur and Passini’s Diagram of Decision Making While Wayfinding)

In order to perhaps understand the various types of people that designers must communicate with it is important to understand how we communicate with each other. Passini said it best himself:

“Environmental communications is a design issue. It is responsible for providing user’s with the information necessary to solve their wayfinding problems.”

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A study of semantics and linguistic communication models will allow one to see how individuals communicate both vocally and visually. This will give a perspective outside design but related to communication, the most important aspect of design and these models will be important in creating new models of communication within wayfinding systems.

2.2: An Understanding of Semiotics

Directional signage is a perfect example of a trichotomy. On a basic level, and following along with Charles S. Peirce’s model of communication as laid out in *Logic as Semiotic: the Theory of Signs*[^23], we can say first, the directional signage and map is the “signifier” in that they are vehicles that represent the contents of the building. They are the written word of what lies along the path. Secondly the signage also “indexes” the space around it and assumes the role of a person giving directions.

The directional signage and map also play the part of a person’s memory in that they aid in memory for the navigator or replace the need for memory. Thirdly, Peirce brings in the idea of an “interpretant”. The “interpreter” is the piece that completes the trichotomy. If any one of these three does not match up for any reason then the model becomes broken and genuine communication will not take place.

We must also consider how communication is seen universally, as well as how it is seen by the creator and also by the navigator. The intent of the designer will differ from the way the navigator will interact with the signage system, which shown in Saussure’s model of communication (Figure 3), the recipient is creating a “sound-image”.

This is basically the concept or thought that forms within person’s thoughts when another signifies something, or in other words it is what is given meaning by those needing to give meaning to something, those being communicated to.

(Figure 3: Images of Spoken Words)

The person speaking typically has no idea what exact image the listener is imagining and the listener has no idea what image the speaker has in mind other than how they might be describing it. Saussure explains a sound-image to mean a “psychological imprint of the sound, the impression it makes on our senses”.24 In the case of spoken language these psychological characters of signs are what one would conceive a word to look like. It is the image that appears in the imagination of the listener.

In almost every definition this is the same as a person imagining a location without being at or having been to that location or filling in what might lie past the

24 Innis 1985:36
corner. Both visualizing of a spoken word as an image in the mind and imagining an area or space past one’s own physical vision are using the cognitive mapping because one is relying on past memories, experience, or what they imagine something to be. This is something designers and wayfinders need to understand and should recognize if they are to create a system.

Abraham Mole, a sociologist who has researched on visual communication and graphic design explains why we attach symbolic meaning to objects as such:

“The door, the arrow, the corporate identity, the logotype, the traffic sign, is only the appearance, privileged and standardized, of knowledge through signs of the world of things, products, and actions. Our existence then becomes more and more symbolic because it is lived more and more inside an ideographic world where we prepare our actions not with objects themselves, but with signs that designate them.”25

The idea that people go about their lives, interacting with objects but attaching symbolic meaning to them, means that a visual sign system, meant to give meaning, not have arbitrary symbolic meaning defined to it, could easily fail in its attempts to communicate effectively the intentions of its designer. (Figure 4)

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25 Mole, Abraham; Design Issues: Vol. III, No. 1:44
Linguistics and Anthropological studies of society help us to perhaps understand why the world as we know it is categorized and generalized the way that it is. This is important because if indeed there is something wrong with this method for wayfinding, then it is necessary to look at what might be the source.

Postmodernism argues that what we call knowledge is a special kind of story, a text or discourse that puts together words and images in ways that seem pleasing or useful to a particular culture, or even just to some relatively powerful members of that culture. It denies that we can have objective knowledge, because what we call knowledge has to be made with the linguistic and other meaning-making resources of a particular
culture, and different cultures can see the world in very different ways, all of which "work" in their own terms. It argues that the belief that one particular culture's view of the world is also universally "true" was a politically convenient assumption for Europe's imperial ambitions of the past, but has no firm intellectual basis.26

Postmodern theorists obviously moved away from modern thought by believing,

“…from the postmodern point-of-view, modernism is defined by its belief in objective knowledge, or at least in the possibility of objective knowledge, and by its assumption that such knowledge refers directly to an objective reality which would appear in the same way to any observer. A further characteristic modernist assumption is that knowledge is a product of the activity of the individual mind, fashioning its ideas or mental schemas to correspond with this objective reality.”27

The step into post-modernistic society was a natural one, once post-modern thinkers began to ask question about the mathematical equations, structures, and

\footnote{26 Semiotics and the Deconstruction of conceptual Learning; J. L. LEMKE; Originally published in J. Soc. for Accelerative Learning and Teaching, 1994}

\footnote{27 Semiotics and the Deconstruction of conceptual Learning; J. L. LEMKE; Originally published in J. Soc. for Accelerative Learning and Teaching, 1994}
simplicity that were created by modernist thinkers. “How do marks on paper (or lighted pixels on a screen) convey to us a complex conceptual meaning?”

From postmodernism came the idea of “phenomenology”. Everything that is those things in society that are too narrow and too mechanical is made to interact with society but have turned out to do so without considering human emotions and desires.

“Among the types of participant constructed in our culture are ones we call human individuals, but what a human is (an organism, a social individual, an actor or agent) is not necessarily the same from one type of activity to another. We learn how to conflate them, to make them all seem the same, and indeed how to think of ourselves as being constructions of this kind (cf. Lemke 1988b, in press). Human individuals cannot be taken for granted as the starting point of either social or cognitive theories.”

So far postmodernism has been able to question and in large part prove the importance of meaning and individualism in a culture. It has been able to show that people learn and adapt to environments and that indeed there are emotional and outside influences people carry around with them that will affect the way they interact with objects, people and spaces.

28 Semiotics and the Deconstruction of conceptual Learning; J. L. LEMKE; Originally published in J. Soc. for Accelerative Learning and Teaching, 1994
29 Semiotics and the Deconstruction of conceptual Learning; J. L. LEMKE; Originally published in J. Soc. for Accelerative Learning and Teaching, 1994
However in the fourteen years since Semiotics and the Deconstruction of Conceptual Learning was written, we still question these aspects of our life and still generalize, and group our existence with perhaps a small understanding of individual desires. Within wayfinding these ideas of personalization, such as found in customizing webpage’s or cell phones for example, are not being considered. Since other forms of visual communication are beginning to realize the importance of the individual it does not seem unlikely that the same concept should apply to wayfinding as well.

2.3: Why Semiotics Is Important to Wayfinding

It is obvious that there will be multiple interpretations for the same thing. In essence, and this is an idea Saussure realized, it is not the speaker or in this case the designer that creates a language for the recipient to navigate but the language or path is “assimilated by the individual”. Ferdinand de Saussure was a very influential figure in the area of linguistics at the dawn of the 20th century. His focus was on structuralism and semiotics and is often seen as the primary scholar in these theories of communication. Much of the theories of linguists and scholars, even to this day stem from understanding Saussure’s ideas of semiotics.

If we were to understand what Saussure might be saying in terms of a Wayfinding system we might think of that system as created by the designer to communicate the contents of the building, which will have to be translated by the navigator for that space.

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to be traveled. Today we follow Lynch’s methods in developing a wayfinding system by agreeing that “the city [or building] makes the commonalities of people a reality by creating a community and society”.31 People interpret correctly and wrongly all the time yet we all live in seemingly organized societies and communities. Can a place then take what we might be misunderstanding and correct it for us? Or better yet can a place or wayfinding system allow for what might be a misunderstanding, but is actually just an individual’s own interpretation, to occur while still getting that person to navigate through the space efficiently?

There must be one unifying commonality that allows for a community to come together. How it is that people from an opposite end of life will meet up with another from the other end of life and live in a community, both feeling they belong to that place? Is it a shared desire, hope, belief, or interest in that environment? Ironically however it is becoming clearer today that a unifying method such as this cannot be depended on as being that answer.

In his book, “Seeing Is Believing”, Arthur Asa Berger tries to illustrate when we move through a space not only do we perceive the objects we see and interact with, but our perception can also be a preconceived expectation of what we are seeing or about to see. Essentially these changes and us always having to adapt to objects as to what they are and what they mean.32 Also what the object is perceived to be depends on many variables on the side of the viewer and also the physical object being viewed.

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31 Lynch, Kevin; “The Image of the City”, The MIT Press, ©1960, 47
“Much of what we see is determined by someone else”. So now we have one object that perhaps a single person created. When people enter a space they bring emotions and preconceived notions with them when viewing objects in a space. This will determine how they intend to see an object, affecting the meaning of it. As the creator of that object also has an intended meaning for the object, it might differ from those using the object. Most likely the definition the creator intends it to be is what it should be understood as but this doesn’t mean it is understood as such by others.

This paper is trying to determine whether or not an object utilized in visual communication, (which essentially all objects do) can be met with some compromise so that a person is allowed individual empowerment over that objects without affecting the original message of that object. We must then understand that an individual gives personal meaning to objects for their own benefits in a navigational situation? Furthermore, how can the designer or developer of the wayfinding system create a situation where this personalized method of navigation can happen?

Since the meaning of what we see is largely pre-determined for us we can conclude that we are obviously segregated into groups in society and therefore have to give up certain notions. We are forced to look upon objects so that we can be pulled through space.

Berger quotes Rudolf Arnheim from his book “Visual Thinking” in which Arnheim states that:

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“Visual perception is not a passive recording of stimulus material but an active concern of the mind. The sense of sight operates selectively. The perception of shape consists in the application of form categories, which can be called visual concepts because of their simplicity and generality. Perception involves problem solving.”\(^{34}\)

The idea that when we perceive something we must problem solve what we are seeing can lead to the understanding that one’s perception of a space or object may differ the next time she/he encounters it, and if the problem was never solved in the last encounter then this will repeatedly lead to confusion about the object.

For example one might be able to get from A to B but will never actually learn the most efficient route to get there or perhaps the safest route. It is the way the space and environment is designed and is visually communicated that is causing the confusion in perception as well as what people bring into it.

Semiotics tells us that we are always sending messages to others about ourselves based on matters such as our appearances and we look at others as doing the same thing.\(^{35}\)

It should not be expected that we all think alike. Different people utilize different parts of their brain than others do; and not only that but we all will use one part more one day and the next day, even when in the same situation will find that we cannot use that


part as efficiently anymore. This will determine how people interact with objects on a normal basis.\textsuperscript{36}

With that understood then it must also be understood that while focusing on visual communication for the purpose of this paper not all the problems within can be solved with this discipline alone since not all people can use that area of their brain as efficiently as others. Perhaps future research on this matter will bring wayfinding into areas beyond sight and into sounds that might relate to objects in a wayfinding system or textures that will tell people where they are that are more efficient and more visually pleasingly than Braille.

Berger developed models (Fig. 5) to help illustrates his ideas that when we perceive something there is a communication happening between multiple levels, each one interacting with the other and influencing the other. \textsuperscript{37} Medium is the central thing that communicates to everything interacting with or creating it. All forms of communication or those things that communicate pass through the medium. Outside of the medium the Artist communicates to the Audience with the Artwork and receives information back from the Audience, which will be communicated back into the Artwork. The same occurs with a Society, being made up of an Audience and Artwork. All of these factors pass through a medium. (Figure 5)

With Berger’s’ model we can easily work this into visual navigational aids in a current wayfinding system and see the impact it is having on the navigator. Words that Berger used can be substituted for words related to wayfinding, for example:

<table>
<thead>
<tr>
<th>Berger</th>
<th>Wayfinding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Artist</td>
<td>System developer</td>
</tr>
<tr>
<td>Artwork</td>
<td>Environmental Graphics, Interior Design, Architecture</td>
</tr>
<tr>
<td>Medium</td>
<td>Perception, understanding</td>
</tr>
<tr>
<td>Audience or receiver</td>
<td>Navigator</td>
</tr>
<tr>
<td>Society</td>
<td>That which is made up of an Audience, Artist, Artwork</td>
</tr>
</tbody>
</table>

The model is lacking however in that it generalizes and group’s individuals without explaining or showing two key factors that determine how we might perceive an
object. The first being how do variables such as emotions, time of day, or outside influence play a role in this model? The second variable being what happens when the audience just does not understand the object they are viewing? Where can the communication model then be diverted so that this person is accepted into it and is no longer lost?

People learn what objects are and can relate these objects to visually imprint in the mind when they see the word of that object. People can also relate a tree for example to being a tree even though it looks nothing like that tree next to it. People are very good at filling in blanks to objects so that if they only see part of one and if they have seen something similar before then they can guess to what it is.\(^{38}\)

Berger again utilizes Saussure’s models (Figure 6) to show that “meaning, then, is determined not by content but by relationships.”\(^{39}\) It is the relationship (shown by the arrows) we know to exist between the word and the object that gives it its meaning and also the relationship the object has with other objects in giving it the contrast of being different.

The silhouette of a tree is still recognizable as a tree, however when ask to think of a tree we will not all share the same image of the tree. It is our experiences from the past that determine how to define what we are being told to look at. When asked to think of a tree some may not even think of a tree but be reminded of a car crash involved with a tree or an event that took place under many trees. The Signifier is the description of what

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it is. What is being imagined or understood is what is signified. Someone is the signifier and what is being understood in the communication is a signified object.

(Figure 6: Saussure’s’ Model)

Most of this is very closely related to the idea of cognitive mapping. “Cognitive mapping concerns how we think about space and how those thoughts are used and reflected in human behaviors”.40 We have the ability to create a mental image of the space we enter even if we have never been there before. If our mental map or the signifier and the signified does not match up with our actual surroundings then we can get lost. There are three main theories to how we use our cognitive mapping skills that are pointed out in “Spatial Representation and the Use of Spatial Codes in Animals” by William A. Roberts

1) Use of multiple landmarks to locate important places

2) To infer new routes or shortcuts that would be to their advantage

3) By exploring a spatial environment, an animal can form a topographical map of that environment.\(^{41}\)

Figure 6 shows that it might be shown that anything can be deemed a landmark. Most everything Lynch describes including edges and boundaries can be used to mark a location and be used as a memory. An object being used as a landmark might let one know to turn right at the sign or at the oak tree. A person might use a significant event such as they place where they had their first kiss, of the corner where the riot happened last year, “the part of the lake where I caught the fish”, in order to give a reference point for a meeting spot. A stretch of tape or fence line is often used as a border to direct people in another direction. Borders might not be seen unless looking at a map such as geographic borders or air space. In terms of feeling comfortable in a place a person might have personal boundaries.

A number or combination of these can play off of each other or be the cause of another (Fig. 7). This is why they are all grouped under landmark. For example an event might cause a border, which is often land marked by an object. An object might cause an event that will often create boundaries. All of these are memorable and can be used to help people navigate. Currently most wayfinding systems employed focus only on paths and simple landmarks. This makes them very limited to exploration and therefore any sense of individual prowess. It’s as though one is walking in a tunnel, not really sure

\(^{41}\) Spatial Schemas and Abstract Thought; Merideth Gattis; A Bradfor Book, The MIT Press; Cambridge, Massachusetts; 2001
where you are only where you are going. Stray from the path and you’re lost. Wayfinding needs to be more encompassing with in an environment.

(Figure 7: Illustration of Landmarks)

42 illustrations by Alan Parsons
Of course using a cognitive map is not the only means to navigate nor is it the only thing that affects navigation. Gary Allen explains this, illustrated in (figure 8) where he has determined some primary goals to which someone might have entering a space.

1) Want to reach a familiar goal
2) Want to explore with the goal of returning to an origin
3) Want to travel with the goal of reaching a new destination

<table>
<thead>
<tr>
<th>WAYFING MEANS</th>
<th>Travel to familiar destination</th>
<th>Exploratory Travel</th>
<th>Travel to novel destination</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oriented search</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Follow a marked trail</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Piloting between landmarks</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Path integration</td>
<td>X</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Habitual locomotion</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Referring to a cognitive map</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

(Figure 8: Gary Allen Chart)

Traveling to a familiar destination lends itself to being able to accommodate all of the wayfinding means outlined by Allen. Allen’s chart (Figure 8) does not yet show the

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43 Spatial Abilities, Cognitive Maps, and Wayfinding: Bases for Individual Differences in Spatial Cognition and Behavior; Gary L. Allen; p.46-80; 1999
elements and variables that can affect people in wayfinding when perhaps one is familiar with a place but is still lost. This chart is yet another generalization of what typically happens. What is does show however are events such as exploring a place for the first time does not lend itself well to “habitual locomotion”. The reason is because a habit is a set adaptation to somewhere or something else. But what also typically happens is being in a familiar place and still getting lost, either because it is night instead of day or you are walking through the space with a headache or are stressed about something. It is possible also that one will know a space but have a different destination.

He does however acknowledge that “at some level of consideration no two wayfinding attempts are exactly alike, even those involving repeated travel between familiar destinations, an element of uncertainty is a factor in every effort.”

Other elements that can affect wayfinding and that might differ in the way we use our cognitive mapping skills are discussed about in “Sex, Gender, and Cognitive Mapping” by Carole M. Self and Reginald G. Golledge.

“Men have been found to be more accurate than women in geometric placement of buildings on a map, in locating the direction of landmarks, in estimating travel distances and in using cardinal reference points to give directions. Women have been said to be more likely than men to refer to

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44 Spatial Abilities, Cognitive Maps, and Wayfinding: Bases for Individual Differences in Spatial Cognition and Behavior; Gary L. Allen; p.46-80; 1999
landmarks when giving directions, they are also more accurate in the recall of landmarks, and association of objects with a particular location.”

In trying to understand the importance of semiotic relationships in terms of visual communication Catalina Bogdan has possibly been the first to combine theories from both sides. There is an attempt made by Bogdan in “The Semiotics of Visual Language” in what a system would be like if it could eliminate as many problems concerned with navigation and visual communication as possible:

“By devising a proper, essentially non verbal meta-language with an adequate system of identification and indexing of the plastic concepts under scrutiny.”

In Bogdan’s terminology “plastic concepts” refer to the physical designs and systems created to communicate visually to an audience. We have developed a “meta-language” however, or in other words, a language that speaks to a main language or is used like a sub-language of a main language by creating signage and universal symbols throughout our wayfinding systems. In a sense visual communication such as the use of semaphores or signage or universal symbols or arrows are all things that we use to translate our everyday language but in a much more simplified form. For example we use English and speech as a primary form to communicate but we also use symbols to

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46 The Semiotic of Visual Language; Catalina Bogdan; East European Monographs, Boulder Distributed by Columbia University Press; 2002
communicate. A symbol can speak to almost any language and therefore is a language of itself but also of the language it speaks to.

Visual communication is a complex form of communication, much more complex than verbal communication. It is more abstract as typically it is a one on one conversation between a person and an object, the object of course cannot tell the person if they are right or wrong in what they interpret as its meaning.

For this reason systems are developed for people to follow and they must learn to use but as outlined multiple times above, these systems lack in personal investment to the user and by doing so will continue to create confusion and frustration in people.

While Bogdan believes in a more universal approach to visual communication, there should also be room for personal manipulation to some degree in order to incorporate multiple views and understandings. This will help to balance the amount of adaptation a person will need to perform by creating a system that can adapt to a person, making it less prone to failing and getting a person lost or confused.

It would seem to be logical that the way we are meant to view objects and space as determined by others would mean that the determining factor was brought forth by an individual or smaller group representing the cumulative, shared perceptions of a culture. The result of this, however is that the individual within a culture can never truly utilize, manipulate, or adapt to an object or space in their way because it would upset the generalization and perception a collective group shares. With this in mind designed objects do exist on a universal scale but still allow for personalization of the device.

In many ways universalism or standards, as currently seen in many wayfinding systems only helps to create a certain type of tunnel vision, as one cannot truly stray from
the path or explore what lies outside the path will become interrupting someone else’s use of the path or fearing that they are lost or confused. We as a culture are trained to be generalized individuals, realizing that certain “universal symbols” or navigational aids would be better if they met our personal perception of space, yet nonetheless collectively agreeing upon these universal meanings and representations in the belief that they are universally beneficial to everyone, at least to the maximum extent a generalized object will allow.

Therefore while we think of ourselves as individuals, we accept that a universal icon or image will be able to communicate to everyone as a whole when in fact it might not. All aspects of design share this idea. But more recently in today’s culture one can easily see a push away from this, and an understanding that perhaps people desire more freedom within a designed environment, to personalize one’s individual space for a better understanding and comfort level.

Signage directing a mass of people through an airport written in English is less beneficial then a bilingual sign. But if that same sign allowed for an individual to type in his or her own language then it would be even more beneficial. However this approach is still limiting as it only concerns those that utilize this bilingual method of wayfinding.

2.4: Frames: Understanding How People Read Environments

In understanding how people inhabit and interact with space it is perhaps necessary to first discuss how it is that we frame ourselves and objects so that we may
give more or less relevance to other frames over our own. A prime example of this might be how artists communicate to an audience through a visual aid that is then left up to the audience to interpret no matter what environment that communicative piece is displayed. Meyer Shapiro is often being described as having an individualist style, Meyer Shapiro’s account of frames questions:

“What is the significance of the rectangular field within which images are found, a field which now is well-nigh taken for granted and even considered ‘natural’ […] When did it appear and what variations on the limitation of ground, with respect to the placing of images on it, have obtained? What, more generally, is the significance of the prepared ground as such in the history of image production?”

This question can easily be asked of the art gallery and art museum as well. Not only is art framed within a format but it is also framed within the environment and space it is presented in. How might this affect the way in which art is then viewed? If we did a series of paintings of a forest and then hung them in the same forest what would the reaction be? Would the images only have one frame, that is their format, or is the forest also framing them? Would people appreciate the art more or would they be overloaded with a replica of nature superimposed over it?

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Schapiro suggests the image frame “belongs to the space of the observer rather than of the illusory, three-dimensional world disclosed within and behind.” He sees the image as a window into another world in which a person can enter but what lies within and without is always left up to the interpretation of the individual viewing it. Again, it becomes evident that frames are being taken for granted. For this reason alone the gallery/museum is able to operate in somewhat of an efficient level. Somehow, the art, being taken out of its original frame or context is able to exist in this alien, sterile space. However, can we truly understand the meaning behind the image or fully appreciate the image when the image itself is taken out of context and put into a new frame?

“[..] If in the West, the object is exhibited as the main hero and the surrounding space doesn’t exist at all, ‘we’, on the contrary, should perhaps primarily exhibit ‘space’ and only then arrange objects in it. This theoretically leads to the necessity of creating a special kind of installation—the ‘total’ installation.”

Art that is placed in a manner to be juxtaposed with the space in the gallery becomes something in which we can interact with and immediately understand and feel as though we are in relation to the experience. We are able to move about freely always changing the objects within the space. This might obviously have an effect on others

around you. However if done properly and understood then the objects will always remain that of art or in the case of wayfinding, be functional as a navigational aid.

2.4.1: Manipulation of Museum Space and Identity

The vast majority of art museum space is organized in a manner in which the viewer is forced to navigate the space in a linear fashion. One comes to a room; this room is designated to a time period, style of art or artist. The simple decision is made to go in or move on. Once a desired room is chosen one continues in a linear progression through the space in a stop and go fashion in front of the work of art.

When viewing the art the individual begins contemplation of that piece, deciding whether they enjoy aspects of it, dislike aspects of it, or are otherwise indifferent to it. After this art piece they move to the next, seemingly forgetting about the last in order to try and experience the next one. The process begins again. The art is locked in place and by viewing it the viewer is locked in as well, approximately five feet away.

This is control and manipulation of space and movement. In an extreme example this is similar to the postmodern philosopher Michel Foucault’s Panopticism\textsuperscript{50} in which he describes the enforcement of discipline and power onto others within a theoretical prison first realized by Jeremy Bentham’s Panopticon. Bentham was a mid-nineteenth century utilitarian philosopher.

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\textsuperscript{50} Michel Foucault, \textit{Discipline & Punishment: The Birth of the Prison}, 195-228 (Vintage Books, 1977)
The Panopticon is a cylindrical prison with enclosed cells around the circumference. At the center of the Panopticon is an observation room where guards can take turns watching the criminals? Every cell faces one another, but because of the circular environment the only view from the cell is the center tower. Prisoners cannot however see the guards and are therefore always uncertain if they are actually being watched. Nor can the prisoner see other inmates. Most individuals navigating a building or street via signage are very unlikely to be considered prisoners, yet there are striking similarities to how most current wayfinding systems control and regulate what that individual will do and see.

“Each individual, in his place, is securely confined to a cell from which he is seen from the front by the supervisor; but the side walls prevent him from coming into contact with his companions. He is seen, but he does not see; he is the object of information, never a subject in communication.”

In the environment of this prison we find the control over individuals in what they look at and what they do. Although the Panopticon example is more extreme than what one will ever find in most wayfinding systems it is always clear who owns the power, whether it is power over the prisoner or power over the navigator. The prison as well as the art museum each plays a role in asserting this power by directing and laying out rules about how one should interact with that environment.

It is not a far stretch of the imagination that a prison such as the Panopticon can be analogous to an art gallery or art museum. Foucault proposes the idea that structured institutions such as businesses and schools can all fall under this theory called *Panopticism*. As Foucault puts it:

“Power has its principle not so much in a person as in a certain concerted distribution of bodies, surfaces, lights, gazes; in an arrangement whose internal mechanisms produce the relation in which individuals are caught up. [...] Whenever one is dealing with a multiplicity of individuals on whom a task or a particular form of behavior must be imposed, the panoptic schema may be used.”

2.5: Cultural Conventions & Symbolism

Pierre Bourdieu, a late twentieth century sociologist whose work branched deep into Anthropology, did a study in 1970 entitled *The Berber House*. In this study he basically role-played the way anthropologist/philosopher Levi Strauss might do an analysis, where he studied a culture in the way they lived in their home. He discovered that the home was made up of opposites that work with one another in order to create the environment these people shared. Specific objects within and outside the home were either associated with male or female, life or death, day or night, healthy or sick, etc. He

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found that these everyday objects such as the main support beam for the home or a weaving-loom were assigned symbolic definition that was also superimposed onto the people or other areas of the home. Most of the objects were meant to define boundaries.\(^53\)

What Bourdieu found with the Berber House is people defining spaces to fit how they need to live in the world, or at least how those in power want to live in the world and have others conform to that way of life. However, even though it might be the case that a house such as the Berber House might be constructed by social rules and beliefs that dictate how an individual will use that space one can assume that while there were structure and rules, there would need to be some individual thought or personalized space as well in order to. Decoration might differ from one house to the next, the opening of a doorway or the path leading up to the house. This is an example of how personalizing a space might coexist with structuring a space where strict rules might exist.

In the example of the Berber House each party’s role is played out according to what objects symbolize. Men sit in different places than women and each inhabit different spaces that are divided by materials such as the tools or devises they use or by walls or columns that support the house. Typically the inside of the house is viewed as female. However, there are cases when a man obviously must come inside, the place associated with female. The questions that are not answered here is, does the man then take on some aspects of being a woman, or does that man then show respect to the woman as they might toward the house, or does the space then become male? Is cross-gendered space allowed to then occur so both can inhabit it at one time?

2.5.1: The Building and Power Discourse

It is important to consider how people can manipulate an environment to mean something to themselves or to others, and how others viewing it will either understand the intended meaning and come to terms with it, or give the environment their own meaning instead. Whatever the intended universal meaning, many individuals and personalities will coexist within that same place.

*Public Projection*, a work of public art created by Krzysztof Wodiczko was an exploration of buildings and art in society. His work consisted of large scale projections of images that shown on the side of public buildings.54 His definition of how buildings play a part in our society is very thought provoking. Like Foucault, he also sees the building as representing power and an environment meant to control the public. For his public displays of art he actively seeks out buildings he feels conveys a sense of power over the public that approaches it and moves through it.

One could argue that wayfinding system take on the “language” of the building as they are meant to interpret for the public using the space what that building consists of and how to move through it. If a building is seen by others as controlling or powerful then perhaps it should be up to the systems that might otherwise translate that power to convey something else, something more personal to the user, that the user navigating the space might feel more comfortable with or understand better. For example if one feels over powered or constrained by the building and the space then why design a wayfinding

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system in the same manner if this is an attribute that does not relieve a person of that stress?

“This [the building before an image is projected] embodies and physically represents the concept of the organization of a utopian society in the form of a disciplined-disciplining body, allowing for both the multidirectional flow of power and the controlled circulation of the individual bodies.”

By defining building structures as such he must be well aware that since his art will be displayed on the buildings, the images will become a part of the structure, thus taking on some quality of the building he is trying to cover up or manipulate. Just as a wayfinding system might as it is meant to represent the flow of the building in a controlled manner.

Wodiczko is using the power of the building to make his point shown through the images he projects on them. He is also changing the way one might view these structures by projecting what he might see as more power images then the building itself. The building no longer becomes important in itself and neither does the image. Rather it is the combination of both the power of the building and the power of the image that creates the overall symbolic meaning. The two powers work together to create symbolism and to get the message across. He continues by saying:

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“The building is not only an institutional ‘site of the discourse of power’, but, more importantly, it is a meta-institutional, spatial medium for the continuous and simultaneous symbolic reproduction of both the general myth of power and of the individual desire for power. For these purposes, the building is ‘sculpted’ to operate as an aesthetic structure, thus assisting in the process of inspiring and symbolically concretizing (reflecting) our mental projections of power.”56 (Figures 9 & 10)

It seems that he is asserting that by projecting these images onto the building that they will hold the same power. In this case, since the building is a sign of control, he displays images, which are meant to have this same meaning. Most wayfinding system is not any different from this other than the fact that they are not meant to be seen in a negative context. While Wodiczko is personalizing the environment without actually physically disrupting the use of it for everyone else, the audience is still not yet able to personalize an for themselves and are forced to interact with the building as prescribed by those in power.
When considering a wayfinding system the designer of that system needs to be aware that what is being created is a projection onto that space of what they believe the user of that space should react to. By studying the user groups the designer can come close to projecting a system that might reflect the ideas of the user’s but the designer is still the one projecting the information. Wayfinding systems today are still institutionalized.

These systems are as prescribed to the user’s as the buildings are themselves. They do not allow for re-interpretation of meaning while still allowing for the important message to get across and most importantly they do not allow for the user’s of the space to project their own thoughts, feelings or meanings onto the space so that they can navigate the way they intended to when entering the space.

One common theme seen thus far through all these readings is the use of power or the need to control our environment. It would appear from the research that people are either the ones who create the power and the environments we move through or they are those that abide by the rules that were created and accept what is being presented to them as the truth.

If anything else is learned it is that while people might follow prescribed methods, they still have individual thoughts and each person will always look at and move through space as an individual, with individual needs, desires and emotions. People will project their own meaning onto objects and interpret words as they are not intended and of those people some will let go their natural ability to define how they see the space in order to conform to it the best they know how, or they won’t and they will simply be lost.
2.6: Empowering Technologies

Global Positioning Systems (GPS) is arguably the most advanced form of orientation we have. This technology is increasingly advancing especially since it is readily available to the general consumer. Today, GPS is found in everything from vehicles, watches and cell phones to the obvious navigational devices. Garmin Ltd, one of the leaders in GPS enabled devices explains that:

“The Global Positioning System (GPS) is a satellite-based navigation system made up of a network of 24 satellites placed into orbit by the U.S. Department of Defense. GPS was originally intended for military applications, but in the 1980s, the government made the system available for civilian use.... GPS satellites circle the earth twice a day in a very precise orbit and transmit signal information to earth. GPS receivers take this information and use triangulation to calculate the user's exact location. Essentially, the GPS receiver compares the time a signal was transmitted by a satellite with the time it was received. The time difference tells the GPS receiver how far away the satellite is. Now, with distance measurements from a few more satellites, the receiver can determine the user's position and display it on the unit's electronic map.”

With the ability to locate one’s location via satellite a large amount of information can be accessible through GPS enable devices that help a person navigate. Information such as exact location (within a few feet or more accurate with high end equipment), speed, distance, time, altitude, elevation, bearing, depth, and much more is easily displayed. Most GPS units will include a basic map or even overhead satellite imagery of one’s location with a virtual route along a chosen path. A GPS system can also record and track one’s path, leaving a trail of breadcrumbs behind. If a person were to find himself or herself lost, all they would need to do to return back to their original location is to follow that virtual path back which their GPS unit tracked and saved.

In more recent times the popularity of consumer grade GPS units and Smart Phones have increased the usability and technologies utilizing GPS. Most of these devices now can search objects, places or destinations while suggesting other similar ones within an online database or learn your personality and suggest places or routes for a person. GPS can be used for collecting places and things around a person’s current position and present that list to the person. In essence it is acting as a person’s cognitive memory. Which, as we will see later can pose an issue in the future.
Current trends in devices are utilizing GPS devise screens as a window into virtual worlds. “Augmented Realities,” allows the virtual images on the screen to overlap with the image of reality coming through the devices camera. For example if one were to hold their GPS enabled devise up and engage their augmented reality software, if so equip, such as the application Layar Reality Browser by Layar B.V. then an image would appear on the screen of what is directly in front of the device, similar to a viewfinder on a camera, only the software would then overlay the image of reality with an augmented one. The augmented reality might possibly show call out texts of places, streets or buildings or show a person
what’s around the next turn. This particular software can overlay games into a reality or overlay historical information about a place or building directly over that place or building. The device could show before and after images of a place or a person could plug in their own data and overlay their own images over a reality.

This growing and possibly exciting tread in technology has great advantages, however, there are always disadvantages as well. GPS and augmented realities will continue to play a role and be discussed further in the next chapter, as it is important to continue to show their importance in personalized wayfinding but also where their disadvantages may be since this is a very new form of technology.
CHAPTER 3:  
A MORE USER-EMPOWERED WAYFINDING

This paper demonstrates the need for a new approach to wayfinding aids that could allow travelers to individualize their experiences and their memories of a space, in order to build on their innate cognitive abilities and increase a user’s experience. To validate this assertion, it presents the following original research:

D) Two newly developed explanatory models of the wayfinding process, to compare the perceptions and realities of the navigation process and to show the many ways that one person’s variables and needs might differ from another’s.

E) The decision hierarchy diagram developed by Arthur and Passini is adapted to acknowledge the variables (or noise) that likely occurs during each traveler’s process.

F) After presenting these explanatory diagrams, the author examines whether the new technologies differ from current sign systems in terms of:
   -their ability to be individualized
   -their reliance on pathway navigation
   -their support of an individual’s cognitive map development.

The evidence presented in this chapter are in large part extensions of the research done by the social scientists, linguists such as Charles S. Peirce and Ferdinand de
Saussure, and artists that have composed their own writings, theories and diagrams to explain how communication between people occurs. The methods about to be discussed give several examples of how it is believed wayfinding systems are created and utilized in the past and present, but most importantly these findings will show why wayfinding systems need to be redesigned for future use and why current systems – even those with new technologies -- are becoming outdated.

In this chapter, new explanatory communication models created by the author will be presented. These are intended to help the future of wayfinding by creating better communication between the designers of a wayfinding system and the navigators. These expanded communication models take a new approach that integrates linguistic studies with environmental and cognitive studies done by thinkers such as Howard Gardner, Paul Arthur and Romedi Passini and Kevin Lynch, as well as hypothetical situations that can occur in any wayfinding situation.

### 3.1: Increased Consumer Demands for Individualization /Personalization

In recent history it has become evident that people are looking for a way to personalize their space and feel more as an individual when occupying shared environments. It is very difficult for current wayfinding systems to satisfy this need. There are many variables and reasons for this, as will be pointed out throughout this chapter. The models within this chapter will help bring forth ideas and knowledge that
will better allow for wayfinding systems to become more user-based and individually personalized.

The 2006 issue of Time Magazine’s “Person of the Year: You” describes how this personalization phenomenon has developed. It clearly points out the desire for people to express their individuality. Time’s cover story was in response to Facebook, MySpace, YouTube and other websites that are in large part controlled by individuals while at the same time geared to a mass public. The fact that Time Magazine chose “You” to be person of the year shows that in our society we are more interested in personal expression than ever before, and want things to work for us as individuals. It recognizes that a society is helped made whole by its individuals acting as individuals but for the whole. What we can observe from this, which is relevant to wayfinding, is that these websites allow for individuality while working through a single operating structure.

Global Positioning Systems (GPS) and Smart Phones are the closest things that the average consumer can purchase in helping to create an individualized state of empowerment over a navigational situation. One can customize routes, have access to past, current and future routes, look up information on locations, and know their current speed, distance, time, etc. Information can be looked up online or by using applications on cell phones such as Yelp, Where, Google Maps, MapQuest, Urbanspoon, among others. There are cell phone applications such as Layar that, by looking at the phones screen an augmented, virtual image of call-out balloons overlay true images of the environment seen on the screen via the phone’s camera lens. One simply needs to input what it is they are searching for, and call-outs appear as well as an onscreen virtual route to follow toward your destination.
The entire wayfinding experience can be customized to individuals’ needs simply by what they want to find out. These websites and applications go a step farther by learning your habits, likes and dislikes, and suggesting places you might like or people with similar attributes you might hit it off with. While technology is beneficial, it can sometimes be limiting. This technology does not work in every situation and is largely dependant on having good cell phone reception. Not everyone has this technology or is willing to use it. Also this technology, while a step in the correct direction in terms of the ability to personalize a wayfinding experience, still can lead to tunnel vision like experience. This is the most adaptive form of wayfinding in today’s society, however, allowing for people to navigate the same place as another but in a somewhat more personalized way.

The greatest limitation of technology in the wayfinding experience is the fact that depending on technology can inherently remove one farther from any instinctual form of navigation or the exercising of one’s own cognitive mapping skills. For technology to best serve an individual’s wayfinding needs, it must support those inherent cognitive mapping abilities, not ignore them. A person should not depend completely on the technology, just as in the case of utilizing signage. Admittedly this is a learning curve of the individual, but there is something to be said in the way the devices are marketed and designed that can lead people to believe all they need is to depend on these things. The user or traveler is only experiencing the devices that wayfind for them. The user experience, (that might otherwise be realized from outside the dependence of these things) is almost totally absent or at least not marketed or projected to the traveler with
the same vigilance as having one depend on virtual pathways such as signage, GPS or augmented realities.

Two new explanatory models will be presented here, which build on Saussure’s and Berger’s models of communication (p. 32), combining theories of both, and then relating them to contemporary theories of wayfinding. Through these models it becomes easier to understand not simply the relationship between a speaker and listener, but between a person and objects, such as would be the case in a wayfinding scenario. A third model revisits Arthur and Passini’s decision hierarchy for wayfinding, introducing new concerns about how a wayfinding system might adapt to a person rather than vice-versa; this intends to help bring wayfinding to a more personalized experience.

A wayfinding system serves as a visual communication aid between a person and objects, but also acts as a mediator between the designer and the navigator. Whereas in earlier communication models presented by Saussure the speaker and listener are interacting directly, in the case of visual communication the interaction is not direct, but rather is mediated through signs. This can have an effect on how accurately something is interpreted, since the speaker is not available to offer clarification or elaboration of the message.

3.1.1: Shadow Model

In an effort to probe more deeply into the relationship of “speaker” and “listener”, the author has devised two new explanatory models. The first of these new proposed
models is the Shadow Model. It is represented by light, shadow and objects, adapting Saussure and Berger’s concepts of speaker and listener to visual communication and wayfinding. From this point on, concepts and ideas formulated by Saussure or Berger will be italicized in order to distinguish them from the author’s ideas. New terms being proposed by the author will be in bold.

Saussure’s model of communication identifies the *sender* (the person speaking a word) and the *receiver* (the person listening to the word); this paper will refer to his *sound-image*, the word that is spoken and the image of that word as it is interpreted, as a *shadow*. So where Saussure’s *Sound Image* is *an image in the mind of each participant that cannot be seen by the other*, the *Shadow* -- for the purpose of the proposed new model in this paper -- represents a thought as a visible image such as an arrow, symbol or logo. The difference being that the spoken word is imagined in the listener’s mind as an object similar to or very different from that of the image the speaker is thinking. The image of the written word, symbol or logo is physically obvious to those seeing it but the image it might cast or its shadow is not necessarily clear or obvious. A traveler in a space might see an arrow pointing up and understand that it is an arrow pointing up just as the designer intended and therefore that aspect of it is very clear in its meaning. However, that arrow might be interpreted be the traveling as either telling them to go up to the next level or straight ahead. It is the shadow being cast from the obvious image or object that can be misinterpreted. Saussure’s model specifically deals with a speaker having direct verbal contact with a listener. The *Shadow Model* will show how a distant party, at times completely removed from the recipient of information must communicate
via a visual system that acts as the communication device and how the recipient interprets the information.

For more clarification, with Saussure’s *Sound Image*, if the *speaker says “tree” the receiver will imagine his or her own understanding of a tree*. In the new Shadow Model *light* refers to that which was intended to be meaning and *shadow* as that which was actually taken as meaning. A *shadow* is something more abstract than the actual image and something that can be interpreted the same or different from the intended image, the meaning of what is being spoken or visually or typographically depicted. The designer presenting the image of a tree might intend the tree to mean “garden” but the viewer might interpret it as meaning “greenhouse” based on the *shadow* cast from the image. It is easy to see why it would be important for a designer to understand linguistic models such as Saussure’s.

If the image of a tree is now placed in a green house, this might confuse navigators, since they may have just passed through a park with trees. A person might feel they are at the wrong green house if they are inside and might go back outside where they first remember seeing trees. Even the specific nature of the image can cause a shadow, since it is clearly a tree and not a flower or a shrub; this may conflict with the user’s expectation of what they might find in a garden or a greenhouse.

Images (especially symbols) can be problematic, in that they are often too abstract, but sometimes words are also difficult for the navigator to interpret. If a person has never encountered a word or symbol in the past they will most likely not understand them in a decisive moment. These difficulties are just a few of the many unacknowledged variables that interfere with clear wayfinding.
Figure 11: The Shadow Model, showing the difference between the perceived communication process and the reality of such a process; developed by the author.
The Shadow Model (figure 11) illustrates the way these shadows work. The shadow in this case can be understood as an arbitrary image attached to a real thing such as signage, map, or set of directions. The shadow is given meaning by viewers, even if that meaning was not intended by the viewer.

The model shows perception vs. reality. While the general perception of designers is that a wayfinding system that is linear will create a linear communication as a result (i.e. the designer’s intent is shown via the signage and is assumed to be correctly translated by the viewer), the reality is that there are other variables that are overlooked or not understood. These variables cause confusion in most wayfinding situations, since intent can be lost or misconstrued.

Viewers observing the sign object cast a light of intent. That person either interacts with the object the way it is intended to be used, or interprets what they think the object should be used for, and interacts with it their own way. In actuality, interpretation occurs no matter what, and is always taking place. Objects allow themselves to be interpreted at different levels and some people will have easier times interpreting the original intent than others might.

In many ways this is similar to Saussure’s example of speaking the word “tree” -- while that speaker has a certain image in mind the listener will interpret the idea to look differently. Where wayfinding communication differs is that the interaction between speaker and listener no longer exists. The Shadow Model is relevant to any form of visual communication, whether brochure, book cover, logo, or sign; there is always a possibility of misinterpretation, since the listener cannot ask the speaker for clarification.
The right side of The Shadow Model shows how both the designer and the viewer can bring their own intentions to the same object, and how those intentions might reveal separate meanings apart from what the designer has intended. Where the shadows overlap there is mutual understanding of that object. Where the light overlaps there is shared intent toward or for that object. One can notice that the shared areas of intent and meaning are much smaller than the rest of the light or shadow being cast. The light and shadow can inevitably extend forever, allowing for an infinite number of meanings and intents. Only in the overlapping areas is there any true communication. In current wayfinding systems, as this model helps show, the overlapping area is very small in comparison to the expanding shadow outside the overlap, and can never fully encompass or be greater than the area outside the overlap. This is why current systems fail at times.

The shared understanding that does exist between speaker and listener can explain the partial success in the current approach by utilizing universal symbols, verbiage, and design. These are what people simply become accustomed to seeing in their everyday lives in the society they live in. Therefore the designer relies on the reasonable assumption that people will understand the meaning of something they have been exposed to over and over again. In wayfinding, these might include elements such as arrows, male and female symbols and terms such as ‘left’ and ‘right’, etc.

The amount of light and shadow escaping what could be shared meaning and intent, however, shows that there is significant loss in understanding; thus the communication is either incomplete or incorrect. Many variables are not being considered. The Shadow Model demonstrates that each participant brings their own intent to how they expect the signage to work. The meaning of the signage (light) for the
designer is how he/she believes or intends the signage to operate. The meaning (light) for the audience is how they believe the signage should work for them and how they view it. As discussed previously meaning can be affected by emotion, personality, memory, location, time of day, and other variables that can affect an individual within any environment. It becomes likely, therefore, that what the designer intends as communication is actually less understood than they might assume.

An example of this gap between intended and perceived meaning can be seen in a wayfinding scenario within the Iowa State University Memorial Union. Through this example, one might understand disconnect between how a communicator designs a physical sign system for a space, and how the navigator of that particular space then interprets it. Also important in the following example is the observation that individuals give personal symbolic meaning to objects that are unique to their own needs.

Let us imagine a scenario where people are attending an event in the Memorial Union’s Work Space; newcomers do not know how to get to this destination because there is no clear signage to point to the Work Space from all entrances of the building.
Figure 12: Entrance to the Memorial Union, showing directory on far wall

When entering from an opposite end of the building a scenario might play out as such:

A couple stands in the entryway of the building. They know they need to get to the East basement where the Work Space would be. However the signage does not direct them to where the Work Space is. Both overlook the directory that is mounted on the wall at the top of the steps that would show them how to get there if they looked at it.

Man: “well this is the basement”

(Both pause in brief silence – they are obviously confused.)

Man: “okay…let’s see…well it says the basement is this way…huh?”
Woman: (Walks to the basement door): “But how do we know it is the East basement?” (She opens the doors to the basement. This door is just to the right of the view in the photo above. A sign is posted on the door that reads “basement”)

At this point a few glances were being tossed in the direction of a bystander.

Woman: (Begins to enter the basement) “…let’s just go (here) and see…”

(More glances at the bystander for some sign of correctness:) “Do you know where the East basement is… there is an art show…there?”

Bystander: “Oh, are you looking for the Workspace?”

Man & Woman: “Yeah”

Bystander: “You can’t get there from this section of the building….” (They snuff with a confused grin as an expression.) “…The easiest way would be to go back through the ground floor…and …uh…go past the food court area all the way to the other end of the main hall…. go to the other entrance”

Woman: “Oh forget it, let’s just do the other thing!” (She is semi-frustrated that they were in the wrong place)

Man: “So we go to the ground floor?”

Bystander: “Just go up the stairs here, one level and go straight through to the other entrance and you’ll see a sign just inside the entry way. It’ll say Work Space. You can take the elevator to the left or the stairs to the right.”

Man: “Either left or right? And that’s the East basement?” (As they turn to go up the stairs)

Bystander: “correct, all the way down to the other entrance.”

Man: “thank you”
(Again, as they go up the stairs, this time with the directory in plain view, they bypass it with hardly a glance.)

Let us consider this situation along with the Shadows Model. This situation shows that a designer can create confusion by not understanding the building and also by not understanding those entering, and the preconceptions and other variables they bring with them. User experience is hampered due to the confusing layout of the building and the variables, incompatible with the variables of the building space, which they are bringing into the environment. In this case, the designer included a directory, or the object that the designer and travelers will cast light onto; thinking that this would be the type of information people would look for. The intent of the designer is that this object will cast a shadow through the space that will communicate the contents of the space and building beyond the space. The thought and practice is that the signage will become an aid for or take the place of a user’s cognitive map. The traveler in the space enters, casting their light and entering with a set of variables. The travelers will either find the navigational aid or bypass it. In this case the travelers bypass the intended navigational aid.

Perhaps because of the preconception by the traveler that directional signage will be available (which it is not), they do not notice the directory. They also expect that different sections of the Basement will be differentiated from other parts (which they are not). They bring with them a preconception that the basement will be below where they entered, so climbing five stairs to look at a directory may not seem relevant to them. It also reveals how people are left to adapt to situations when entering new space; hence requiring them to use an internal dialog in analyzing the space and situation they are in.
It is interesting to wonder how the user experience would differ if such a physical space was navigated while utilizing a device that might allow for an overlay of an augmented reality. Recently this technology is becoming very popular and has potential for being very promising, at least in terms of personalizing one’s navigational experience. Currently, most likely due to the technologies infancy, it does not allow for a large amount of exploration along the path between point A and point B. Meaning once your goal is plugged in, it takes you there. This is of course the job of the technology. However, the idea behind allowing one to explore is to allow that person to also become familiar with a place and have fewer dependants on such a technological device.

A person is more likely going to enter in what they are already familiar with so if the environment has more to offer, be it a more efficient route, more interesting scenery, places more unique to that environment, then a person could completely miss these things and therefore they are not becoming familiar with the real environment but the virtual one or the one that is familiar to them. That said, it is reasonable to think that a person might wish for the environment to be familiar to them even if in reality it is not and therefore it is understandable why augmented realities are becoming an increasingly popular technology.

Becoming dependent on the technology does nothing to resolve the “tunnel vision” scenario of current signage systems or increase a user’s experience within the true physical environment, so again a person risks not learning the true space they are traveling through. This means that the traveler using augmented reality does not have the ability to utilize her cognitive map when navigating the physical space, as the personal device is doing it for them. In revisiting Howard Gardener’s thought on Logical-
Mathematical Intelligence we are reminded that perhaps we learn our environment best and understand the world around us when we interact with it physically:

“For it is in confronting objects, in ordering and reordering them, and in assessing their quantity, that the young child gains his or her initial and most fundamental knowledge about the logical-mathematical real.”58

There are very positive things to be seen with the new technology, which is still in its infancy; perhaps one day the prospect of being able to personalize your environment without affecting the physical space for others sharing the same space will be fully explored. It must be fully understood, however, by environmental designers, graphic designers and other visual communicators interested in incorporating such technologies that the physical space must not be taken for granted and that future wayfinding systems, both augmented and physical, must not hinder the ability for a person to explore and learn the real space and real objects they encounter. They must allow a person the ability to fully utilize their cognitive mapping skills even more so than is allowed with current wayfinding systems.

3.1.2: The Variable Factors Model

In order to see the multitude of variables that exist when a user interacts with their environment, a new model must be devised. This Variable Factors model takes into

consideration what is learned from the Shadow Model. For example we learned in the **Shadow Model** that there are preconceptions by the designer of the system as to how users of that system will utilize the navigational aids. Likewise it is understood that people traveling through a space will also have preconceived ideas.

These preconceptions are due to a lack of understanding variables and lead to what each party might intend to happen possibly leading to confusion. The Shadow Model shows that variables can differ between the visual communicator and those meant to receive the communicative message. What still needs to be expanded on is what can cause the multitude of misconceptions in terms of understanding what the variables are. The **Variable Factors Model** demonstrates how people enter a space with many internal and external variables, affecting the decision-making process.

Like the **Shadows Model**, the **Variable Factors Model** shows that the user of the wayfinding system is not a passive participant to be pushed along a path; it goes further however, to point out all the variables involved in a user’s interaction with wayfinding communication such as signage. It points out the variables that can affect the navigator prior to entering a space, and when engaging with a wayfinding system and moving from point A to point B and back again to point A. Variables within each user include such factors as how one is raised, what the person’s career is, education level, fluency in the local language, emotional state, and if the person is physically or mentally handicapped. These all affect an individual’s interaction with the world around them.

All users have different reasons for entering a space and these reasons will affect how they utilize and understand the navigational aids or the environment they are in.
The needs of a visitor coming to see a patient are different than that of a nurse or a medic rushing a patient to the emergency room. Coinciding with the differences in why a traveler is there is how they will use the space, how long they will be in the space, the speed at which they will travel through the space and how well they may be adapted to the space. Different emotions and thought process will in no doubt be variables in a medic trying to save a life compared to a visitor seeing a friend or even a visitor who may have lost a loved one.

But yet in most navigational aids to date all of these differences in people, emotions and reasons for why they are in that environment are met with the same navigational aids and expected to follow them the same way whether it works or does not.

Outside the realm of all the variables that might exist within a single environment, even more exist outside that environment. All of the same listed above hold true whether considering an airport, restaurant, college campus, city, etc. Each of these environments will have differences in the types of people traveling through them and each environment will contrast with another and differ in its intended use. All of these different environments utilize the same basic idea of wayfinding, which is to create an efficient flow of traffic that inevitably will result in utilizing a directional sign system of the same universal symbols and codes. The user experience, in the realm of wayfinding then, is most typically expected to work the same between these environments. Is it enough for the user experience of a place to simply say, as a designer of a system, Signs should be larger and have more contrast in an airport experience compared to a college campus experience?
There is of course a place for this. It would not be reasonable to toss out completely what has worked in most situations. This is especially true since for the duration of the existence of signage systems and symbols directing, people have become accustom to certain expectations and have they adapted to utilizing these systems. However people still et lost and frustrated and these current system can be lacking in a total user experience that is centered around truly understanding the environment and allowing one to feel a sense of belong rather than a sense of simply traveling through. Perhaps the focus needs to be more on navigating the environment rather than the sign system.

While there are a vast number of variables a person can experience during their wayfinding process (figure 13), they do have some choice in how they handle these variables. In order to perhaps help understand the multitude of variables in existence we can consider Joseph LeDoux’s idea of how the conscious and unconscious self is organized in his book *Synaptic Self: How Our Brains Become Who We Are*. He creates categories of what makes up a person; breaking them up into “physically, biologically, psychologically, socially, and culturally”.59

We can utilize these categories from his “mental trilogy” of cognition, emotion and motivation as a method for organizing an infinite number of variables. These variables can then be organized on a matrix showing the relative importance of some variable as they might relate to one another (fig. 13). The matrix cross-references both the individual’s variables as well as the different environments people will travel through.

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59 LeDoux, Joseph; “Synaptic Self: How Our Brains Become Who We Are”, Viking Adult, ©2002
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<td>with a group</td>
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Figure 13: Example of Variable Matrix: Shows Importance in Certain Environments
The **Variable Factors Model** represents a person navigating a space as a rotating cog along this path. The cog outside of the path (but still interacting with it) is the designer (Figure 14a).

![Figure 14a: Designer’s Variables](image)

Each cog or user (designer, user A, user B) has their own individual variables (figure 14b), represented by the many cog teeth that are shown; these include both long term and short term factors that occur while navigating through a wayfinding system. The variables work in relation to the Variables Matrix previously discussed. Since there can be multiple people going down the same path and utilizing the same wayfinding system, two user’s (user A and user B) are shown in this model to get an idea of how the variable factors of one individual’s might actually interact and affect another individual.
Figure 14b: User A Variables

Figure 14c: User B Variables
What can be seen between User A and User B is that perhaps at times variables may coincide for better or for worse, also changing the way people might interact with a place. The designer sits outside the path but sets the wayfinding into motion. The designer also introduces a set of processes in the form of signage, maps, interior design elements, etc. Other variables include landmarks, weather, traffic, population, and time of day, all of which are beyond the designer’s control.

As each person moves along the path each tooth interacts, further changing a person’s personality and this can affect navigational skills and understanding of how they would navigate. Not only is a person dealing with adapting to their own variables but they must now adapt to the wayfinding system along the path as well as others. As the diagram shows, each user cog rotates in a way that ensures infinite variability in the experience of one user vs. another. As a result, different users must surely be navigating by means of distinct process that are unique to them as individuals.

This means that as a person’s internal factor is influenced by an external factor, a specific wayfinding technique will also influence the situation. At times the static wayfinding system cannot adapt and rotate along with the cogs in order to match up with an individual.

The obvious difference between this model and current wayfinding practice is that current systems are static; they do not adapt to the user but require the user to adapt to them. Current sign systems do not acknowledge this multitude of variable factors, or provide the opportunity to explore one’s own inherent cognitive maps, or adapt it to one’s own personal factors without the likelihood of getting lost or feeling uncomfortable.
Consider a scenario where groups of people walk into a space. Each person will bring into that space different emotions, different goals and agendas; some may have wandered into that space by being lost from another space or some may have wanted to simply visit a new place. As they enter they are each presented the exact same static wayfinding system or signage and maps. The designer of today’s common systems believes the wayfinding system is meant to be simple and intuitive enough for most people to be able to use it. The reality is that the designer cannot fully know who will use it and under what circumstances it will be used. Therefore to try to force people to adapt to a design without acknowledging and accommodating all their unique variables can inevitably cause confusion.

Static wayfinding systems are the result of designers believing that they must be universal and prescriptive to move people efficiently and effectively through the space. Because of this there will certainly be people getting lost, as not everyone uses signage or maps. A person might be stressed and not think to use a map or understand the signs. Another might be in a hurry and bypass signs. Someone who is determined to use the signage might have preconceived thoughts of what the verbiage might say on the sign and get confused when it is different. Perhaps it is a wayfinding system that someone has never had experience with, making it confusing for that individual to use.
Figure 15: Variable Factors Model, (devised by the author. It recognizes many variables to better understand how they affect a user’s navigational traits.)
Let us consider Arthur and Passini’s wayfinding diagram again (p. 20). What happens between each decision is full of variables. We can understand these variables exist by looking at the Variable Factors Model. All of the variables will effect the decision a person will make and these scenarios change each time a person revisits the space and are not consistent between each person entering the space. How can a designer prepare for this? One solution might be to allow the variables to occur instead of avoiding them or generalizing them. This would mean the system would need to be more flexible. The system would need to be more adaptable to the navigator rather than the other way around. Precedents for this approach can be found in all areas of interaction and human-computer interface design, where usability is not expected to be an adaptive, rather than prescriptive, phenomenon.

Devices that overlay an augmented reality over a physical space certainly seem to be able to add to the personalization of a space. A navigator seemingly has complete control over where they want to go. A traveler can set up the virtual path to display information they want, how they want and at times the system will adapt and learn a person’s behavior and suggest routes, places, events, etcetera. It must be stressed again, however, that the physical space is important, as it is, after all, what we interact with. Designers need to be careful not to separate the virtual and physical realms as to lead a person to become too dependent on the virtual and in turn further stripping knowledge away from the physical, true environment. This is a lesson that can even be subject to debate with current physical signage systems. The emphasis on directional information in current wayfinding systems leads to people depending on these signs rather than allowing one the chance to learn the true physical space. It will be important that the
new technologies are designed with an appreciation for user-empowerment, and an understanding of the many variable factors that may or may not be identified by the users.

3.1.3 Revisiting and adapting the Arthur/Passini Model

Arthur and Passini’s diagram (figure 2) makes it seem that the decisions people typically make when wayfinding are universal and clear. At best though, Arthur and Passini -- as well as most wayfinding designers -- are making an educated guess about the experience that user’s have. Because of this it is inevitable that people using the system have to conform to a system built on assumptions of universality. Arthur and Passini did seem to realize the need for people to experience the space more as a way to improve their wayfinding skills:

“The hierarchical structure of decision plans helps us to remember not only decisions but also the spatial entities associated with them. This assumption explains the common experience that it is easier for people to remember a route if they make the wayfinding decisions by themselves than if they are following a guide. Although when guided, they are exposed to the same environmental information, because they are not making the
decisions, but merely executing them, they are not effectively recording the
decision plan.” 60

There is a “tunnel vision” occurring when navigating in systems that depend
heavily on external aids such as signage, a guide, a GPS unit, or augmented reality.
People who are given the chance to navigate a space for them without much aid will
typically learn that space better. Arthur and Passini understand this and seem to support a
system that generalizes the navigational experience, tackling one decision at a time.
However, once we acknowledge the complexities and variables that truly occur in the
process, the Arthur/Passini diagram seems too idealistic. By adding all the variables into
their decision process we can see how the current generalized approach to wayfinding is
also causing confusion and not allowing for people to learn or truly understand a space.

For example, by considering their diagram, but this time change the variables in
order to see how a person, within their scenario might get lost. It is easy to see that
Arthur and Passini’s diagram is not dynamic or flexible enough to handle the variables
just as most wayfinding systems utilized today are not flexible enough to allow for each
variable.

Consider, for example, a person going into a wayfinding system with decision
points as described by Arthur and Passini; ie. a system very much like those in place
today. The person is going into a building to interview for a new job. Added to the
existing diagram are the gears with variables that might affect a person going in for an

60 Arthur, Paul and Passini, Romedi: “Wayfinding: People, Signs, and Architecture”; McGraw-
Hill Book Company; ©1992, 31
interview, as shown in figure 16a. The variables are identified within each gear and the gear can spin along the path or at key destination points intersecting each path leading up to a decision point. Any ambiguity at these points makes it difficult for the person to make the right decisions.

In figure 16a we can imagine the person is running late for a meeting as they head toward their first decision point, which is to simply “go to building”. As the person moves along the path they pass through multiple variables that will have or may not have an affect on the interviewees own variables. If the person is not led astray by those variables, there is still more to come. Being mentally distracted could lead the person from the true destination of following a corridor in the business square to going through a passage way to A within the lobby of complex A.

Figure 16a: Close-up of Adaptation of Arthur and Passini’s diagrams
Figure 16b: Adaptation of Arthur and Passini’s diagrams, acknowledging 3 variables that a user might encounter.

Now consider the same wayfinding system and scenario but with a new person (figure 16b). The same navigation system is set in place but different variables occur. They have to ask directions to where they need to go. For this example, we will think the person was pointed in the correct direction. The person moves into the building and enters but after entering they get to the decision point and the verbiage given to them
differs from anything on the sign. The person guesses, and that guess unfortunately lead
them away from their end goal along a new path. In the end they become more frustrated
which just adds to the person’s confusion.

(Figure 16c: Adaptation of Arthur and Passini’s diagrams, acknowledging 3 different
variables that another user might encounter)
These two diagrams (16a and 16b) show how varied the wayfinding process can be for just two different users trying to accomplish the same goal. A designer of a wayfinding system simply cannot assume that if people are stuck or lost at the first decision point that the reason for this is the same. Each and every person walking into this same building, using this same system will undoubtedly have different variables affecting whether they succeed or not. Yet today’s systems do not allow this to occur. Instead people are forced to rely on others or to rely on a linear system they may never understand or feel comfortable in.

How might Arthur and Passini’s diagram look if more variables were added? Variables seemingly unrelated to wayfinding but nevertheless affect it such as discovered within this research? Variables to consider would be the ones Arthur and Passini purposefully noted they left out because of the logical conclusion that if one might be able to design a simple and intuitive system then perhaps it will become universal. Since we have already discussed why this is not the case, and have shown that there are still many important things to consider that are leading people to become lost and frustrated, we must then reconsider which of the variables are important or, to go against Arthur and Passini’s claims, consider all the variables, leaving none out.
3.1.4 Cognitive Maps as the Ideal Personalization Method

By becoming accustomed to following signage in a universal and prescribed way, people are forced into a “tunnel vision” scenario, where they cannot fully utilize their cognitive map and eventual lose the ability to even realize they have one. The navigation process remains too narrow to serve all users. As research pointed out earlier, the cognitive map is important in drawing an image of what might be around the next corner or an overall image of the space even if one cannot see the entire space all at once. Unfortunately, the less people rely on their cognitive map, the more dependent they become on signage do all the work for them. As we have seen with the Shadow Model and the Variable Factors model, however, signage can have major limitations caused by many variables.

If the current static systems can be seen to have communication shortcomings, what is the solution? Current wayfinding systems do not allow these variables to naturally take place and therefore try to control them or disregard them. It would be better suited if the wayfinding path people were navigating along could adapt to the navigator, and allow them to make better use of their cognitive maps. The wayfinding system should visually communicate to navigators that they have the availability to wayfind in a way that is natural to them. Ideally the wayfinding system should be utilized for structure and support to safely and efficiently allow for each navigator to deal with variables that affect each individual coming into the space.

Current systems typically force people to adapt to a space around every corner. They force people to focus on a path to the exclusion of all other components of a space,
which could be incorporated into their cognitive maps. This does not allow the navigators to understand the space in their own way in efficiently moving from point A to point B and back again. A cognitive map allows a person to explore a place with more confidence and can help them feel safer and more at ease with the environment because they don’t feel as though they are being pushed through a narrowly prescribed path. In creating newer wayfinding systems in the future it must be recognized that if an individual is allowed to build their own map to a place, that place does not have to ever change and therefore anyone at anytime can be in that place and feel free to navigate how they intended to.

While there may be some predictability and while the intent is there to try and create predictability in today’s wayfinding systems the designed systems today seem to be missing two key factors that may help in allowing for better wayfinding. First, allowing for people to explore and go off the path without getting lost, to get them outside of the “tunnel” and allow them to feel they belong there in order to better understand the path they are suppose to take. Second, the first is the designer of future systems should create a system of navigation that adapts to each user rather than the user always being forced or expected to adapt to it. The system should adapt to the user and allow the user to personalize their wayfinding experience within the system. This can be done through some allowance of the navigator’s cognitive map.

In current systems the user is not really in control; they are expected to follow instructions that are assumed to be correct. Only by offering a more flexible approach can a greater number of people navigate a space with changing infinite number of variables and each succeeds in the end.
It is important to integrate much of the structure of past research and thought developed by wayfinding thinkers such as Arthur and Passini, and to understand and utilize many theories by linguists who pioneered thoughts on human communication. The hope is to not toss away what obviously works in wayfinding systems today, but to expand and make better a wayfinding system in a society that now expects and demands that the world around them can be personalized for them instead of always having to accept and adapt to someone else’s prescribed navigation methods.
CHAPTER 4:
CONCLUSION

This study calls into question current applications of “designer directed” wayfinding, and instead encourages a new, more “user-empowered” approach. It does not, however, define in any specific method of installation for such an approach.

With a sign, GPS or Augmented Reality devices already agreed upon as a directing agent in current society, its job therefore is to point in a direction or identify what the navigator cannot see or does not know. Unlike a conversation with a person, there is no further clarification from the sign than what is already presented. This leaves it now up to the navigator to fully interpret the intended message.

People’s needs, logic, emotions, and interpretations must be considered when determining how they will interact with space and objects and the navigational aids designed for their use. Assuming the communicator has the power and total control is false. Yet it is also apparently false that the control over meaning is within the navigator of the space; otherwise they would not become confused or lost in finding their way. Therefore, where is it that mutual understanding and meaning exist within communication, especially when there is a gap between the navigator and the communicator?

If landmarks are not intentionally placed for people to see, then people essentially leave a symbolic trail of breadcrumbs made up of everyday objects such as trees,
doorways, drinking fountains, light fixtures, clocks, and an entire array of objects they feel they can attach meaning to. The significance and symbolic meaning attached to an object is dependent on each individual, and how they interact with their environment. What is happening can be understood as the creation of shadows and defining of those shadows. These various interpretations of landmarks and all the variables can cause unexpected interpretations that are currently overlooked by a designer of a wayfinding system.

The increase in technologies such as Augmented Realities can mean that people get information they need to navigate faster. This can lead to travelers bypassing essential information or exploring and getting to understand their environment apart from the virtual one on their screens. Care must be taken to design systems that allow for people to not lose their cognitive mapping skills and to allow people to understand their environment.

When, and how, is a person able to fully understand exactly what the wayfinding system is telling them to do? In what situation might the navigator be able to navigate a space using a method completely distinct from another person, yet both are aided by the same wayfinding system? Can the navigator manipulate such a system, without disrupting it for someone else? Can a navigator manipulate or personalize a wayfinding system put in place by another? The next phase of research in navigation could move in this direction, by questioning the assumptions currently in place regarding instructional/directional signage.

It is also useful to ask these questions because if one can answer them, miscommunication in existing sign systems can hopefully be minimized. It now becomes
important for the communicator to recognize when intent is misleading because of his/her own perceptions, and the way in which he or she expects people to interact with the space. It is also important, as the communicator, to remember that others will have their own intentions for what they expect the message to include. The wording, placement and narrative tone of signage might then be improved to overcome some of the variables brought into a space by individual users.

By looking at communication models and the advance of ideas and theories through the past century, from Saussure and Pierce to Foucault and more contemporized thought, it becomes clear that the study of communication, whether spoken or visual, is an ongoing process that is constantly re-examined. Therefore it is very important for designers of wayfinding systems to always re-examine their assumptions.

Internalized memories of a space can be imprinted on the user’s cognitive map through the elements of signage, lighting, interior décor, architecture and branding; each of these speaks to the user moving through it. With concerns about miscommunication that have been presented in chapter 3, it seems clear that elements other than signage should play a more significant role than they currently do in wayfinding systems. This could mean that while there is a system in place to act as a structure or stabilizer, a person can move about a space with whatever intuitions or skills they have in navigation. This will help a person to develop a richer, more extensive cognitive map, therefore feeling that they do belong in that space. If done correctly a person should remember a positive and comprehensive experience of their surroundings and happenings and not merely the pathways and the signs.
This could also allow a person to enter the same space later with completely different variables and still be able to navigate, due to the flexibility of the wayfinding system to those individual’s needs.

The models and the scenarios pointed out show evidence that there are individual human factors that exist in the wayfinding process that cannot be ignored. They show that people do indeed get lost even with advanced wayfinding technologies, and the models presented show that it is because A) there is no direct communication between designer and user, B) that there are many variables that can cause confusion and C) even with advanced technologies and personalized wayfinding applications such as Augmented Reality travelers are still dependant and becoming increasingly dependant on other people or devices navigating for them.

It is possible that existing visual and graphic communication approaches and interior and architectural elements could be integrated to create a personalized wayfinding experience. But it is first important to understand and realize all the variables and how to put in place a system that will recognize these variables. Only then can a flexible wayfinding system exist enough for people to personalize it.

In the very near future we can expect to see more advancements in Smart Phone and Augmented Reality technology that will use a combination of GPS coordinates and user entered data, information relative to an individuals desires and needs, in order to aid in wayfinding. These devises will relay information back to the user about where they are, where they might want to go, and could adapt to user’s as they may frequent a place. The devices might even help to navigate a person depending on their mood, the time of
day, traffic flow patterns, or any number of variables that complicate one’s relationship with their environment.

Technology can play a huge role in aiding wayfinding systems, but not if it merely mimics the current didactic emphasis on pathways. Refocusing on the human’s innate navigational skills, and their ability to create cognitive maps of the world around them, will allow designers and developers to create better wayfinding devices. Instead of a system that focuses on a linear path, these new visual aids should help to “widen” the path or “open it up” for allowing a user to project their own sense of navigating.

Wayfinding should be the act of navigating a space through methods of exploration and interaction. It is also about where one stands in a place, where one belongs. The designer of a wayfinding system must first understand how people will see themselves in a space before they can begin to wayfind for them. This is where an understanding of culture, society, the mind, and belief systems needs to blend with the application of wayfinding design.

While it is the wayfinding designer’s job to communicate information, they need to remember they are not the ones translating/interpreting that information, and that the user of the system might translate differently than what was intended or assumed by the designers. Therefore, there needs to be room for improvisation to occur, allowing for a specific user’s personal method or style of navigation.

It is likely that most of us need cues from systems and other communicative devices in order to navigate, so there is certainly still a need for some form of visual communication through navigational aids. Understanding how to give individuals
confidence and self-empowerment in navigating will be a significant part in creating better wayfinding for people.

By examining various methods of customization, user empowerment and communication models that have emerged in the fields of production design, graphic design, architecture, linguistics, and other forms of spoken and visual communication, designers could create wayfinding systems that are more flexible, that recognize variables to allow more individuals to “control” their own experiences within the environment they are in, by acknowledging variables so that individuals can build on a more meaningful cognitive map in order to navigate a place.


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