ArmstrongFlooring™

Walk On. Walk Strong.™

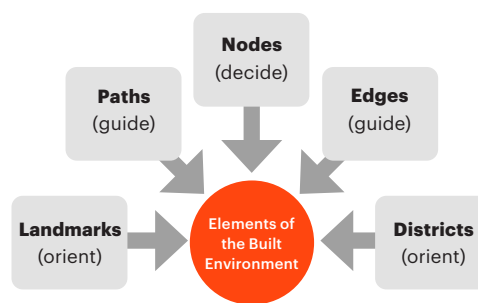# The Science of Wayfinding and the Role of Flooring Design

Contents

For centuries, humans have used stars to navigate across the land as well as the sea, but navigation isn't exclusive to ships or backcountry hikers. It is an essential activity of everyday life, related to work, necessity, and leisure. This white paper explores the science behind how people navigate in the built environment and how the theories and elements of wayfinding apply to flooring design.

Wayfinding

Wayfinding is the process of navigating your way to a destination in a familiar or unfamiliar setting by using cues in the environment. These cues may include a combination of signs, landmarks, maps, symbols, colors and other communications. As shown in Figure 1, Kevin Lynch, who studied with Frank Lloyd Wright, classified the elements of the built environment into paths, edges (barriers), districts (regions), nodes (intersections) and landmarks (Lynch, 1960). These elements do not exist independently but overlap and intertwine with one another. Ultimately, these elements orient, guide and help building occupants navigate their environments.

Flooring design can effectively be used to create these wayfinding elements. It can be used to create paths to lead occupants through a space, and to make navigation at intersections or nodes more manageable. Flooring can also denote and subdivide the space into districts or regions with a distinct set of visual attributes that can assist in wayfinding by providing additional cues for orientation. Regions which are often defined by visual appearance and set apart distinct building functions, such as a waiting area or nurses' station, can be created by using flooring design.

Wayfinding design theory considers not only a building occupant's ability to understand the spatial characteristics and their decisions as they move through a space toward their destination, but an occupant's behavior and their ability to perceive, select and understand information in their environment. A well-designed environment encourages comprehension of the environment, aids in navigation and provides a sense of direction and orientation (Connell, 1997).

According to Downs and Stea (Downs, 1973), wayfinding involves four principles:

- Orientation to determine a person's position with respect to nearby landmarks and the required destination
- Route selection that will lead to the desired destination
- Route control which confirms that the individual is following the selected route
- Recognition of destination when reached.

> Figure 1. Wayfinding elements of the built environment (Lynch, 1960)

Cognition

The above wayfinding principles are based on cognition or the knowledge and information that our brains acquire, store, retrieve and manipulate which helps us navigate. This knowledge is fed to our brains by our senses. As children, we are taught that there are five senses: sight, hearing, touch, taste and smell, but we can sense other information such as temperature, knowledge of body parts, pain, balance and vibration. Research has shown that our senses interact and work together with other cognitive systems responsible for thinking, imagery, memory, learning, language, reasoning and problem solving. Cognition, and especially spatial cognition, is an essential part of wayfinding as it helps us orient, navigate and perceive information.

Our brains store spatial knowledge through a process known as "cognitive mapping." A cognitive map is the result of psychological processes through which we code, store, remember and decode acquired knowledge about elements, locations, distances and directions, or the general pattern of our surrounding environment (Gooledge, 1999). Cognitive maps are based on imagery (e.g. landmarks) but also on user factors (e.g. culture) which may vary based on individual and group experiences and perceptions (Lynch, 1960).

Gestalt Theory

The understanding of our visual perceptions and senses have been influenced by psychology and in particular the works of Max Wertheimer, the founder of Gestalt psychology. In Gestalt psychology, the laws of organization explain how the human brain attempts to simplify and organize complex designs. According to these laws, our brains subconsciously organize individual design elements into whole systems or patterns to help us better understand our environment. Wertheimer first explained this concept using music where we hear the melody, the whole, instead of the individual tones (Wertheimer, 1924). Wayfinding uses this psychology in a positive manner, by designing in a way that supports identifying and processing a larger, more complex system instead of a deluge of small components.

To make sense of our world, Gestalt psychology suggests that we do not simply focus on every small element, but rather we consider how our minds will perceive the overall design. By perceiving the whole system, wayfinding can provide valuable and necessary information that we need to navigate and differentiate our environments.

Wertheimer formulated the basic laws of visual perception including the laws of organization for closure and continuation, however over the years new organizational laws have been introduced (Guberman, 2017) including similarity, symmetry and

order, proximity, and figure-ground. These laws of organization can be easy to incorporate into a design project and you may have unconsciously incorporated them to create cohesive designs.

> Figure 2. The Gestalt Principle of similarity can tie design elements (e.g. color, shape) together.

Let's explore some examples as it applies to wayfinding. When elements look similar, building occupants naturally group them together as part of a pattern or group. For this reason, designers can use similarity to create a single design element, illustration, or message out of multiple separate elements. For example, Figure 2 shows how color and shape can tie design elements are visually together. Continuation refers to the eye's natural tendency to follow continuous figures like lines, paths, or curves. As shown in Figure 3, continuation is a great way to draw your viewer's eye toward a focal point or aid in navigation. Conversely, when the Gestalt principle of continuation is not followed, our eyes are not drawn to a destination. This concept as illustrated in Figure 4 can visually shorten or break up a space such as a long hallway.

> Figure 3. The Gestalt law of continuity can lead us in a specific direction.

> Figure 4. The Gestalt law of continuity can visually reduce the length of a space such as what happens when squares are added to this hallway.

Benefits

The benefits of wayfinding are many, but probably the most important is the positive impact that wayfinding has on the human experience. Customers and visitors patronize spaces that are enjoyable, easy to navigate, and convenient. They do not gravitate to places that cause confusion, frustration, or negative experiences. Wayfinding can improve accessibility which is especially important to people with limited physical mobility or sensory impairments.

The idea that people will wander around and potentially shop more in complex shopping centers has been rejected by planners as the result of customer complaints and negative commercial productivity (Passini, 1996). Most importantly for a business owner — be it a hospital or shopping center — these experiences can impact the bottom line. A positive experience may mean a referral, additional business, or a repeat customer, while a wayfinding challenge may reflect negatively on how people view a business (Arthur, 1992).

Wayfinding Improves

> Human experience
> Accessibility and safety
> Building efficiency
> Bottom line

Positive experiences can also result in more efficient business operations which are demonstrated by less missed appointments and late arrivals, and doctors or other service providers are better able to maintain a daily schedule. Wayfinding can also improve circulation within a building, resulting in visitor and staff time savings, as well as concentration improvements. Airport surveys have shown that wayfinding is regarded by passengers as the third-most important variable in terms of level of service (Correia, 2008).

Additionally, wayfinding can positively impact safety. Emergency situations can trigger stress and confusion, which can lead to quick and impaired wayfinding decisions.

Conclusion

Flooring is an effective surface for the creation of wayfinding elements, although other orientation cues such as maps may be required to create effective wayfinding. Based on the theories and concepts reviewed in this paper, effective wayfinding can be achieved by flooring designs that:

- Subdivide the space into districts or regions with a distinct set of visual attributes
- Provide orientation cues.
- Establish distinct building functions such as a waiting area or nurses' station
- Provide well-structured paths to aid navigation
- Create cues at nodes (intersection) or decision points to help wayfinding decisions

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