# DESIGN RESOURCES

DR-14 Spatial Orientation, Environmental Perception and Wayfinding

# Spatial Orientation, Environmental Perception and Wayfinding

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## Issue and Its Importance to Universal Design

Wayfinding is how people get from one location to another, including their information-gathering and decision-making processes for orientation and movement through space. Wayfinding design builds on research in cognition and environmental psychology to design built spaces and products that facilitate the movement of people through urban settings and individual buildings.

Architectural wayfinding design addresses built components, including spatial planning, articulation of form-giving features, circulation systems and environmental communication. Information design encompasses all sensory-based information systems, and, more recently, GIS-based systems. These are mutually reinforcing and complementary design strategies requiring collaboration of architects, graphic designers, and management to coordinate internal building and external site design features.

Wayfinding design is integral to universal design because it fosters easy comprehension and use of built entities at all scales. Successful wayfinding design allows people to (1) determine their location within a setting; (2) determine their destination; (3) develop a plan to take them from their location to their destination; and (4) execute the plan and negotiate any required changes (Mayor's Office for People with Disabilities, 2001). It includes overall spatial organization of the setting, articulation of form-giving features, individual architectural and environmental features and information provision. Building features can assist users to find their way and maintain their sense of orientation, factors that contribute substantially to their satisfaction and frequency of use of a built setting. Wayfinders are concerned principally with how the route is structured rather than with the environment through which the path passes, so that environmental features may only be learned to prompt turns or mark distances along segments (Golledge, 1999). Well-timed delivery of information is critical, but new approaches concentrate on built forms, architectural messages and wayfinding devices to reduce signage, which can be confusing when layered on poorly designed sites or architectural features, or added as building use changes (Peponis, Zimring, and Choi, 1990).

Despite its demonstrated importance to building use, costs, and safety, wayfinding receives less than its due in planning, research and building evaluation. Often the investment in wayfinding systems is less than that devoted to amenities like art and furnishings. Planning for wayfinding systems is best when it is integrated with every step of the design process, and incorporates participation of user groups. Similarly, post-construction evaluation can identify further problems of wayfinding rather than waiting until a serious problem occurs.

## Key Terms

Wayfinding: The information-gathering and decision-making processes people use to orient themselves and move through space; how people get from one place to another.
Wayfinding Design: Design of built spaces and products that facilitate the movement of people through urban settings and individual buildings.

<u>Architectural Wayfinding Design</u>:  Design of the built components of wayfinding, including spatial planning, articulation of form-giving features, circulation systems, and environmental communication.

<u>Information Wayfinding Design</u>:  The design of environmental information systems, including graphics, signage, and audible and tactile signals.


**Existing Research/Evidence**

Wayfinding strategies should communicate effectively to people with a wide range of sensory, physical, language and intellectual abilities; social and cultural backgrounds; gender; and stature differences (Arthur and Passini, 1992; Levine, 2003; Orleans, 1973; Stea and Blaut, 1973; Weber and Charlton, 2001; Allen, 1999). Women tend to have less spatial confidence than men (Lawton et al., 1996 and 2001; Lawton and Kallai, 2002; Frank, 2002) and rely on localized landmarks for wayfinding, while men use globalized configuration strategies (Bever, 1992; Couclelis, 1996). Age-related and cultural differences in spatial construction and description, representation, and wayfinding are also wide (Downs and Liben, 1985; Suzuki and Wakabayashi, 2005).

While humans learn routes unidirectionally in a laboratory, in practice they learn routes in both directions, coming and going.  Unidirectional learning is the primary way people with mental deficits learn routes (Golledge, Parnicky, and Rayner, 1980), and is more common in blind or visually impaired persons because their orientation and mobility training teaches only route-following rather than layout-learning (Welsh and Blasch, 1980, cited in Golledge 1999).

The documented cost of confusing wayfinding systems is real.  They are:  1) lost staff time and concentration due to direction-giving and other interventions; 2) lost business due to frustration and ill-will of users; 3) costly missed appointments or delayed meetings; 4) additional security staff and traffic management; 5) compensatory environmental communications systems; 6) danger to users wandering into limited access areas of buildings; 7) injury and death during emergency situations; and 8) potential law suits surrounding lack of safety and accessibility (Arthur and Passini, 1992; Carpman and Grant, 1993 and 2002; Zimring, 1990).

In his influential 1960 book, *The Image of the City*, architect Kevin Lynch first used the term "way-finding" to describe how individuals navigate the city using its paths, edges, landmarks, nodes, and districts.  Cognitive research in the 1970s expanded Lynch's static concept of spatial orientation into a dynamic, process-oriented understanding of wayfinding that is better aligned with the realities of human information gathering and decision-making.  While Lynch's pioneering research on the spatial image of the city has been contested in its specifics by later researchers (see Downs and Stea, 1973), most of the elements he identified as essential to the formation of individual mental images of cities (or cognitive maps, to use the term coined by Tolman in 1948) are still acknowledged as important design considerations for architects and urban planners alike.

Over the next two decades, researchers studied how the layout of built structures influenced human emotions and movement. Christopher Alexander and his collaborators published two books in the late 1970s (*A Pattern Language*, 1977, and *The Timeless Way of Building*, 1979) that still have credence.  Francis D.K. Ching's *Architecture:  Form, Space and Order* (1979; reissued without much change in 1996) describes the influence of built form and architectural design on

human behavior and identifies patterns of movement in built structures motivated by qualities of architectural space.  In a parallel trend, other researchers were developing principles of human-oriented product design (Norman, 1988), many of which are important to wayfinding design.

In 1992, University of Montreal architect and environmental psychologist Romedi Passini collaborated with the late Toronto designer Paul Arthur on *Wayfinding: People, Signs, and Architecture* (reissued in 2002), a seminal work that codified architectural and cognitive research. At the same time, cognitive mapping research demonstrated that people form 'cognitive maps' of their surroundings, acquiring, storing, and refining information in a schematized and structured form (Kitchin and Freundschuh, 2000 for psychological and geographical literature; Burgess, Jeffery, and O'Keefe, 1999 for neuroscience; also Golledge, 1999; Golledge and Stimson, 1997; Hart and Moore, 1973, Gould, 1973; Tversky, 2003).

Arthur and Passini argued that wayfinding is more dynamic than Lynch realized because humans evaluate a space as they move through it depending on information and cues they receive. Environments are complex entities perceived through purposive activities (Arthur and Passini, 1992: 33).  A wayfinding decision is behavior (turn right, go up, look for information) in response to an environmental stimuli such as an intersection, stairs, or billboard (Arthur and Passini, 1992: 31).  Information received "at the wrong place is as good as no information at all" (Arthur and Passini, 1992: 34).

Research on the relationship between humans and their built environments focused on how people acquire knowledge rather than on actual variations in their environment.  As a result, there was "a scarcity of theories and analytic techniques to deal with the architectural environment as a knowable morphology" (Peponis, Zimring and Choi, 1990: 556).  Space syntax researchers tried "to describe and quantify structural properties of building layout" (Peponis, Zimring and Choi, 1990: 556).  As early as 1990, they determined that "after a relatively brief exposure to a building, people tend to consistently direct themselves toward spaces from which the rest of the building is more easily accessible. Thus, they seem to acquire an understanding of the configurational properties rather than merely relying on landmarks, signs, or other cues" (Peponis, Zimring and Choi, pa. 556).  Additional experimental and observational studies show that cognitive space is primarily topological, dependent on relative location of places rather than their precise direction or distance (Penn, 2003; Haq and Zimring, 2003).

Most humans are unaware of their wayfinding strategies, and find it difficult to report them (Golledge, 1999).  Current research focuses on consolidating information on general principles of wayfinding and space cognition; specific building types; specific impairments or population groups; and wayfinding products.  Research is needed to explain how people use simultaneous wayfinding cues; how humans give and take directions; the differences in interior and exterior wayfinding;  behavioral response to architectural features; how organizations make wayfinding design decisions; real-world observation of common wayfinding strategies including GIS systems (Carpman and Grant, 2002).  Design students need more exposure to environmental psychology, space cognition, and space syntax research.  On the professional level, detailed wayfinding-related reviews of site, building, and landscape designs would improve practice, as would post occupancy evaluations of existing buildings (Carpman and Grant, 2002).

**Best Practices/Practical Applications**



**Information and map kiosk**
New York City



**Architectural cues for the wayfinder**
Prada Soho Store
New York City



**Integrated signage**
Student project
University College of GjÃ¸vik
Norway



**Visual landmark**
Student project
University College of GjÃ¸vik  Norway

**Design Guidelines**

Architects and designers are relative latecomers to wayfinding, and can benefit from acquainting themselves with the more-specialized, in-depth knowledge that has accumulated in other fields.  These guidelines are no substitute for more comprehensive research:

- Facilitate wayfinding for all individuals, regardless of abilities, to expand potential user groups.  Research and be aware of differences in wayfinding competencies in potential user groups;

- Wayfinding should be designed for the first-time visitor because repeat visitors can use their past experiences for navigation (Lynch, 1960).  Keep the mental state of the visitor in mind as well (e.g., distracted, tired, jangled nerves; worried patients at a medical facility) (VanderKlipp, 2006). Enumerate the capability demands placed on the user by wayfinding features or products to help identify groups unable to use a system or its features no matter what the reason (Coleman, Lebbon, Clarkson, and Keates, 2003);

- While comprehensive and collaborative planning should be initiated between architects and graphic designers early in the design process, designers need to acquire the specialized tools of good wayfinding design, including participant research, user involvement in design, evaluative research and design assessment tools (Arthur and Passini, 1992);

- The best-designed wayfinding plans change over time as users change, buildings are expanded, or restored, exterior modifications are made, or with larger cultural changes. Provide information in ways that are easily updated (VanderKlipp, 2006); research prior to building renovation, redesign, or with user complaints (Garling, Book and Lindberg, 1988; Brown, Wright and Brown, 1997);

- Provide users with an ordered environment that has "a clear possibility of choice and a starting-point for the acquisition of further information." (Lynch, 1960: 4);

- Provide users with a clear visual sweep of the site or building on entering to afford them an overview of their surroundings, so they can see a large number of elements and their relationships, at the same time giving them a sense of their relation to the whole (Lynch, 1960). The panoramic experience not only "delights", but helps the user obtain a view of the larger spatial configuration that reinforces memorability;

- Distinctive views of plantings, water features, unexpected changes in scale or color, and strong contrasts of spatial configuration, materials, and landscaping assist users to construct wider mental maps (Lynch, 1960);

- Give visual dominance to pathways, with their own characteristics of space, view and motion, because they are the main influence in forming mental maps of a space (Lynch, 1960);

- Use design to reinforce already existing social meaning, not to negate it (Lynch, 1960);

- Carefully control circulation to limit confusing options and reduce congestion. Limiting vehicular or pedestrian traffic can have the additional benefit of increasing privacy for staff and clients and enhancing security (VanderKlipp, 2006);

- Organize information consistently and hierarchically, and provide cues at key decision points (VanderKlipp, 2006).

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