3.1 Wayfinding

2 Credits: Complete 5 of 9 | 1 Credit: Complete 3 of 9

- Circulation spaces adhere to conventional organizational concepts (e.g. linear, radial, grid, axial, central atrium, etc.).
- Most floors have similar floor plans with similar locations for toilet rooms, drinking water fountains, elevator lobbies, and emergency exits.
- Wayfinding system provides access to areas of primary function without passing through intervening spaces or unnecessary travel to remote areas.
- Wayfinding system differentiates primary routes, zones, or nodes using variations in flooring, lighting, color, ceiling height, and/or other architectural features.
- Wayfinding system assists in orientation and navigation by providing views to the outside along all primary routes.
- Wayfinding system uses a consistent graphic strategy to identify and differentiate routes, rooms, and spaces.
- Wayfinding system includes selected primary routes with tactile guide strips that have a different color and texture than the surrounding floor and detectable warnings.
- Wayfinding system includes visual and tactile and/or audible directional signs, maps, or models at all primary entrances, the primary access point to each floor and all corridor intersections.
- Wayfinding system includes systematic numbering of rooms.

1. Overview

Well-designed architectural wayfinding systems have a positive impact on occupant health as well as long-term building performance. Although all building occupants benefit from good wayfinding design, for some populations it is critical for independent use of a building and social integration. Therefore, understanding the basic principles of wayfinding design, particularly for these groups, is a critical aspect of universal design. This article focuses on the architectural aspects of wayfinding design. (Signage is another key issue that is addressed in a separate article.)

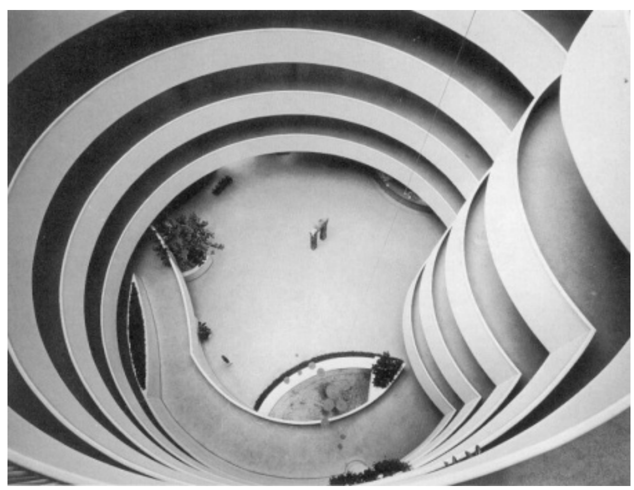

Figure 1: Guggenheim Museum, New York City, an example of a legible circulation system.

Good design for wayfinding is vital to universal design because it

- facilitates access and social integration,
- enables understanding and awareness of buildings and the activities within them, and
- reduces stigma and isolation.

Legible surroundings promote emotional satisfaction and effective communication (Lynch, 1960). A thoughtful architectural wayfinding system can save time and money in building operations by reducing wayfinding mistakes and making key resources easier to find. It can also help prevent accidents, reduce stress, and boost health and productivity (Evans & McCoy, 1998). According to Weisman, the “ability to find one’s way into, through, and out of a building is clearly a prerequisite for the satisfaction of higher goals.” Weisman argued that legibility of an environment has significant behavioral consequences (Weisman, 1981). These consequences are predictable and can greatly improve user experience. Understanding one’s surroundings, including escape routes and safe locations can sometimes mean the difference between life and death. Effective wayfinding is especially important in environments with an increased risk of violence or natural disasters caused by climate change.

The following components serve to make the built environment more legible (Arthur and Passini, 1992):

Architectural Wayfinding Components

Objective	Components	Elements
Clear articulation and coherent grouping of exterior and interior spaces	Shaping site and setting	Landscaping, berming Roadways, entrances/exits Pedestrian routes sidewalks, pathways
	Building form and architectural features	Building form Building volumes Physical separation or clustering of components Roof design Placement of openings Cladding (skin) - textures, materials, colors Decoration, ornamentation
	Articulating interior spaces	Programmatic organization Defining spatial units Defining destination zones Interior design
Creating legible circulation systems design	External and internal circulation systems	Design concepts (paths, markers, nodes/ Intersections, edges/links) Approach from street Roadways Parking External paths and walkways Entrances and exits Connection to mass transportation
	Level change devices	Elevators Staircases Escalators
	Internal transportation	Mobility aids People movers Fixed rail systems
Integrating Communication Systems	Information wayfinding design	Environmental graphics Sign orientation devices ‘You are there’ maps Real-time information devices

Table 1: Components serving the legibility of the built environment as defined by Arthur and Passini's Wayfinding: people, signs, and architecture.

2. Issues to Consider

Plan configuration and visual access: General knowledge of familiar floor plans and building layouts help people orient themselves in unfamiliar settings (Baskaya et al., 2004). E.C. Tolman found that using familiar schemas helped participants navigate an unfamiliar space with few errors (Baskaya et al., 2004).

Typical schemas include:

- Geometrical symmetry (e.g. circular or linear)
- Continuity of floor plans from level to level
- Implementation of simple corridor and central atrium systems that provide spatial legibility and visual access between spaces (Canter, 1975; Lawton et al., 1970).

These simple plan configurations are cognitively memorable, improving users comfort and ability to orient themselves in unfamiliar spaces (Goltsman & Iacofano, 2007).

Geometrically simple floor plans also help to improve visual access, which can be difficult to achieve with plans that are more complex. Providing visual access is an important element when facilitating spatial orientation (Baskaya et al., 2004). Carpman, Grant, and Simmons found that visitors entering a hospital were influenced more by visual access to a destination than by signs, illustrating the strong influence the physical environment and architectural features have on wayfinding behavior (J.R. Carpman et al., 1986; Baskaya et al., 2004).

Figure 2: A tactile map of the Grand Canyon allows visitors to explore the site in relation to specific landmarks. Image courtesy of the U.S. National Park Services.

Interior design: Interior design features that optimize wayfinding (e.g. lighting, color, materiality, artwork, flooring, and furniture layout) should accompany recognizable plan configurations and visual access schemas. By creating "districts" or spatial differentiation (i.e. identifying a space used for a specific function with a consistent color or floor type), wayfinding becomes more intuitive without relying on graphics or signs. These features can be easy to implement and cost effective. They can facilitate an "awareness and understanding of path systems, establish interior landmarks, and link interior directions to a larger orientation system" (Steinfeld et al., 2012).

Users that have visual impairments or who do not speak the native language sometimes rely on interior features to prompt spatial awareness, making the placement of notable landmarks at nodes, or major intersections, an effective strategy for navigation (Golledge, 1999; Lynch, 1960).

Although texture and pattern can successfully be employed as a means of spatial differentiation, designers should be cautious of using patterns that cause overstimulation (Steinfeld et al., 2012). When too many patterns compete for attention, it can become difficult to distinguish the most important features from the rest. For individuals with certain visual impairments or those taking psychotropic medications, these conditions may also cause a false perception of depth or a misinterpretation of cues (Steinfeld et al., 2012). Further, "excessive use of pattern may cause agitation and overstimulation for those with dementia" and other neurological impairments (Steinfeld et al., 2012). When utilized properly, patterns that contrast with the surroundings can users identify key locations.

Signs and room numbers: Signs play an important role in wayfinding systems and should serve to reinforce interior design and architectural wayfinding elements. All wayfinding signs should follow a consistent graphic format that is legible to all users and should be placed at consistent locations throughout the facility (Goltsman & Iacofano, 2007; Steinfeld et al., 2012). The presence of effective sign systems can reduce discomfort, anger, and confusion (Wener & Kaminoff, 1983; Steinfeld et al., 2012). See also, *isUD Solutions: Signage 3.2*.

Multisensory wayfinding information and redundant cueing: Visitors to unfamiliar sites can easily overlook navigational cues. Such users, in addition to those with perceptual impairments, can benefit from redundant cueing as a means of providing functional wayfinding. (Steinfeld et al., 2012).

One example of redundant visual cueing is identifying floors with a large number, a consistent color, and an easily recognizable symbol (Goltsman & Iacofano, 2007). This provides people with varying cognitive and visual abilities multiple ways of identifying their location (Goltsman & Iacofano, 2007).

Although the most common form of navigational cueing is visual, other means of cueing such as acoustic, olfactory, and tactile (haptic) can help reinforce and enhance navigational information.

- Acoustic cues can provide information to all users, especially those with low vision (Steinfeld et al., 2012). Acoustic cues include recorded announcements, music, water features, and variations in reverberation levels (Steinfeld et al., 2012). Too many acoustic cues can overwhelm users with excessive noise, which can be distracting. Therefore, Steinfeld et. al. suggests limiting acoustic cues to communicate the most important information or providing selective channels such as headsets for individuals that may require specific knowledge (Steinfeld et al., 2012).
- Tactile signs are a common means of providing information to people with limited vision. In some cases, the space required to communicate information through tactile means (using raised letters) exceeds the space available. In these situations, audible signs are more efficient (Steinfeld et al., 2012). Raised characters are required by accessibility codes but only in limited locations, e.g. room numbers, restroom labels. Although Braille is also required, only a small percentage of the population with visual impairments can actually read Braille.
- Olfactory cues can be easily implemented using fragrant plants or gardens, building materials like cedar, or cooking (Steinfeld et al., 2012). These and other features with high olfactory content can reinforce awareness of surroundings, aid in route descriptions, and provide strong landmarks for orientation at low cost (Steinfeld et al., 2012).
- Tactile (haptic) cues provide an intimate relationship with the environment and can take the form of tactile signs (e.g. Braille, raised characters and/or graphics, interactive signage), textured surfaces, temperature, or airflow. Curbs, railings and guard rails, floor surface changes, and vegetation edges are all good examples of tactile cues. Code

requirements for tactile cues are minimal, but tactile strategies can be very effective in helping individuals with limited site understand their surroundings and avoid hazards. Typically, they also serve as visual cues and can contribute to olfactory or acoustic cueing as well.

The most functional wayfinding systems for the widest range of people use multi-sensory cues at major nodes, and decision points. For example, a player piano can act as a visual, acoustic, and tactile landmark. Paired with fragrant plantings, the designer can utilize the piano area as a means of communicating wayfinding using all of the senses (Steinfeld et al., 2012).

3. Related Standards

2010 ADA Standards for Accessible Design: Section 703 - Signs defines the *minimum* sign regulations that apply to covered buildings and facilities in the United States. It addresses character size, stroke thickness, spacing, contrast, finish, tactile characteristics, symbols, and location. The guidelines for signage characteristics included in this section are a good place to start when designing wayfinding signage, however designers should consider unique circumstances before finalizing designs. For example, larger character sizes than those specified in the document may be necessary to adequately accommodate people with low vision.

ISO 16069:2004 Graphical Symbols -- Safety signs -- Safety way guidance systems (SWGS) describes the general design and application principles relating to visual components used when creating safety way guidance systems (SWGS). These principles apply to electrically powered and phosphorescent components and address environment of use, material, layout, installation, and maintenance.

ISO 17398:2004 Safety colors and safety signs -- Classification, performance and durability of safety signs describes requirements for a classification system for safety signs based on expected service environment, materials, photometric properties, means of illumination, fixing methods, and surface.

ISO 23601:2009 Safety identification -- Escape and evacuation plan signs lists design principles for signs identifying emergency escape plans that contain information on fire safety, evacuation, and rescue.

Society for Experiential Graphic Design (SEGD) is an association of design professionals that works to connect people to place through graphic and informational design.

4. Measurement and Verification

Post-occupancy Evaluations (POE) can help ensure wayfinding systems are efficient. POEs must target information from a diverse group of people, including people with varying visual, cognitive, and physical abilities. Every facility that has undergone substantial renovations or additions should have a policy that mandates POEs at least every five years (Center for Inclusive Design and Environmental Access, 2010).

5. Design Considerations

For 3.1, Wayfinding (2 Credits: Complete 5 of 9 | 1 Credit: Complete 3 of 9)

1. *Facility has circulation spaces that adhere to recognizable organizational concepts (e.g. linear, radial, grid, axial, central atrium, etc.).* The use of common floor plans provide recognizable and easy-to-understand structure for visitors (see Figure 3) (Steinfeld et al.,

2012). Revisions to floor plans at later stages of design can often be difficult and costly, making it important to implement this solution as early as possible in the design process.

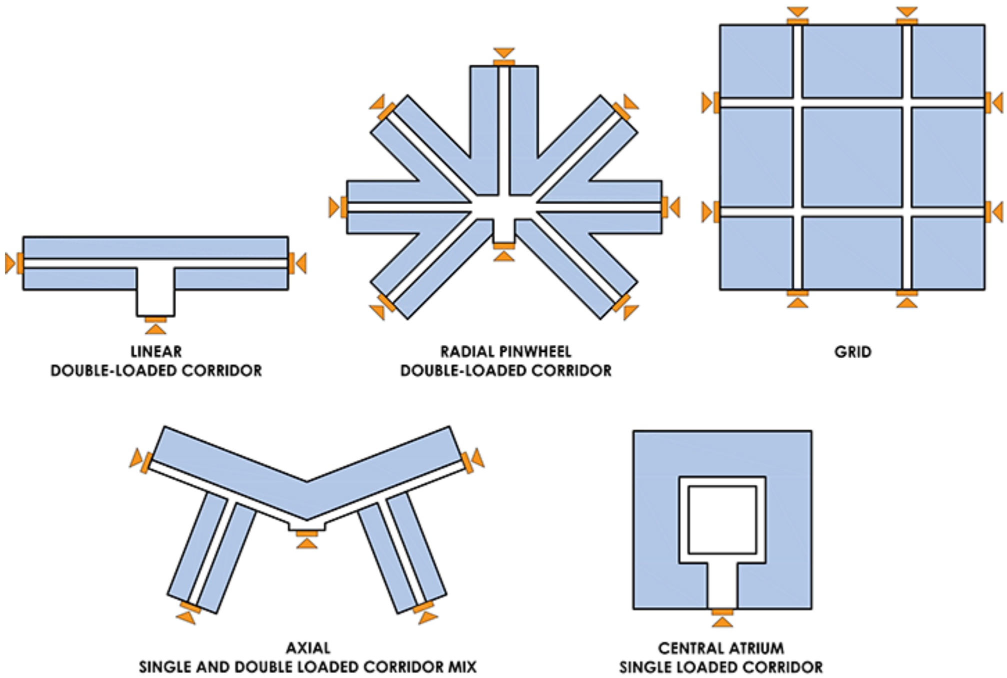

Figure 3: Conventional organizational concepts

2. *Facility has similar plans for most floors and/or similar locations for toilet rooms, drinking fountains, elevator lobbies, and emergency exits on each floor.* Historically, architects have sought to hide service elements and amenities, believing that they distract from a strong aesthetic statement; however; visibility of these elements in a consistent location on each floor can serve as an effective wayfinding tool (Steinfeld et al., 2012). This allows visitors to better orient themselves on each floor as well as well decrease stress when searching for a restroom, drinking fountain, or exit. Good design can make these elements an important part of the aesthetic statement as well as a strong wayfinding element through the use of material, color and graphics.

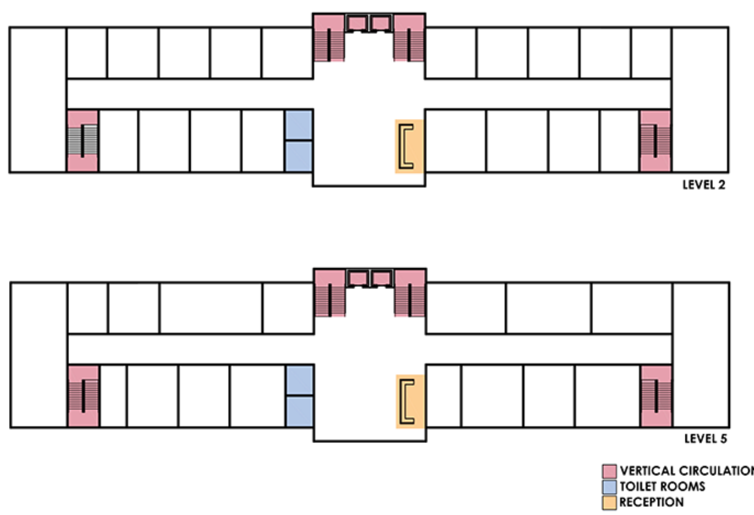

Figure 4: Floor Plan Layouts

3. *Wayfinding system provides access to areas of primary function without passing through other spaces and without unnecessary travel to remote areas.* Floor plans with clearly identified corridors and entry and exit at the same point help to avoid unnecessary traffic in non-circulation areas (Goltsman & Iacofano, 2007). Spaces that are likely to see a higher volume of users should be near a primary entrance and highly visible to avoid unnecessary travel through the space.

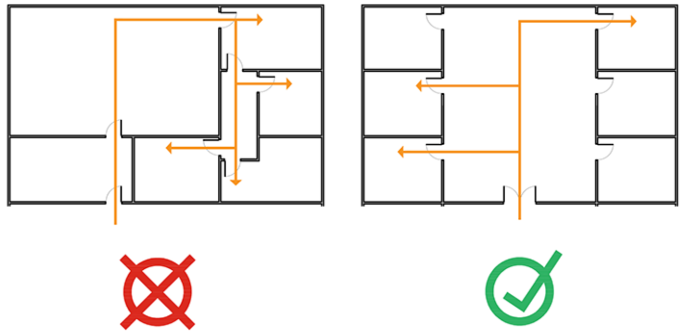

Figure 5: Circulation routes

4. *Wayfinding system differentiates primary routes, zones, or nodes using variations in flooring, lighting, color, ceiling height, and/or other architectural features.* Multimodal cues used to identify specific spaces and pathways can help make them identifiable for individuals with varying levels of perceptual abilities. This makes wayfinding more inclusive and intuitive. For example, if primary circulation routes have a consistent and unique floor material, wall color, lighting system, and ceiling height, users will likely intuitively register those areas as circulation.

5. *Wayfinding system assists in orientation and navigation by providing periodic views to the outside along primary routes.* Particularly effective when paired with an intuitive floor plan, views of the outside along primary routes allow visitors to orient themselves relative to outdoor landmarks.

6. *Wayfinding system uses a consistent graphic strategy to identify and differentiate routes, rooms, and spaces.* A consistent graphic strategy for identifying routes, rooms, and spaces enables the user to learn the applied strategy, helping them to easily locate and identify wayfinding signage and graphics throughout the facility. For example, if all wayfinding signs hang from the ceiling at intersections, users will learn to look up for wayfinding indicators if they become lost or lose their orientation.

7. *Wayfinding system includes tactile guide strips on primary routes that have a different color and texture than the surrounding floor and detectable warnings.* Tactile guide strips are required by codes in some countries. In such locations, tactile guide strips are familiar and easy to use for many people, particularly those that are significantly visually impaired (Steinfeld et al., 2012). The use of varied colors and textures can reinforce the tactile cues and make

Figure 6: Tactile guide strips

them helpful for all facility users. They should be used sparingly to mark only important routes, otherwise they lose meaning.

8. *Wayfinding system includes visual and tactile and/or audible directional signs, maps, or models at all primary entrances, the primary access point to each floor, and/or corridor intersections.* "You-are-here" maps and directories are valuable tools for helping visitors understand their surroundings. They are especially valuable in complex buildings or campuses. These wayfinding tools help visitors and long-term occupants to establish strong "mental maps" of the environment that can be used to recall locations and remember how to get from one point to another. To be useful for all visitors, maps should provide information in visual, audible and tactile form. New technologies are emerging that provide inexpensive multisensory displays. Multi-sensory maps and models are also engaging and invite interaction, promoting a better understanding of a place (Landau, 2014).

Figure 7: Top Left: Backlit multisensory interactive map that provides tactile map, audible, and visual information. Bottom Left: Multisensory interactive map that provides tactile map, audible, and visual information projected from above. Right: Multisensory interactive map that provides tactile map, audible, and visual information projected from above.

9. *Wayfinding system includes systematic numbering of rooms.* Room numbers are typically used for identifying room locations. Room numbers should be assigned intuitively and consistently throughout a building. Typically, the first number indicates the level that the room is located. Room numbers should be in order based on door locations along a path of travel. Service and maintenance rooms can be clearly identified as such by adding a letter at the start of the room number to show that they are not open for public use.

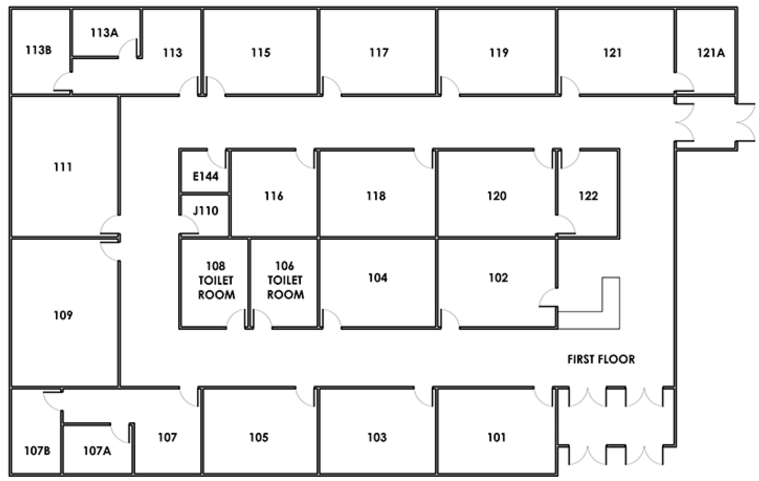

Figure 8: Systematic numbering of rooms. Notice the rooms are numbered such that odd numbers are on one side of the hallway and even numbers are on the other. Room numbers increase in order based on the doorway locations.

6. Definitions

The following definitions are adapted from Merriam-Webster Dictionary and the sources listed.

Boundary	The separation between one space and another
Clear articulation	Easily identified spaces demarcated by shape, color, arrangement, or signage (Arthur and Passini, 1992)
Coherent grouping	Spaces organized according to function or destination zones (Arthur and Passini, 1992)
Cognitive map	A person’s understanding of how a space is arranged, including how to navigate from one space to another.
Cueing	Term used to describe the set of prompts that help users navigate space (Steinfeld et al., 2012)
Integrated communication systems	Environmental graphics and signage that are well placed and underscore wayfinding messages in the built environment (Arthur and Passini, 1992)
Legible circulation systems	User paths that are intuitively perceptible and lead the user to well defined decision points
Legibility of space	The ease with which one can comprehend the spatial configuration of an interior space (Evans & McCoy, 1998)
Wayfinding	Act of spatial problem solving (Delos Living LLC., 2016)

7. References

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