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Impact of Circulation Configuration on Wayfinding: An Experiential Approach to Architectural Legibility

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Abstract - Wayfinding is a very important aspect of user experience in architectural spaces, especially in those with complex architectural arrangements. Although signage and graphic design are often used to help with wayfinding, the use of architectural circulation as a primary method of wayfinding has not been adequately explored. This research evaluates the effects of circulation arrangement on wayfinding, with a focus on the effects of spatial arrangements, path hierarchy, and connectivity on cognitive mapping and ease of navigation. By combining architectural theory, environmental psychology, and case studies, this research reconsiders architectural circulation as a cognitive framework rather than a functional one. By considering architectural circulation as a spatial component, this research provides design-related findings that facilitate intuitive wayfinding through the architectural space.

Key Words: Circulation, Wayfinding, Spatial Cognition, Architectural Legibility, Built Environment

1. INTRODUCTION

In modern architectural practice, the factors of scale expansion, multifunctionality, and vertical growth have greatly increased the complexity of internal circulation systems. As a result, users are often faced with difficulties in building navigation, particularly in unfamiliar environments. Circulation, as the discipline that regulates movement organization in built space, therefore assumes a vital role in determining spatial clarity.

Circulation refers to the systematically planned route of horizontal and vertical movement paths that connect different spaces in a building. It covers a wide range of categories, such as horizontal circulation, vertical circulation, and transitional circulation spaces that act as a bridge between the public and private domains. The layout and hierarchical structure of the different circulation types have a great impact on movement patterns and navigation through architectural spaces.

In addition to simple routes, circulation also involves a number of architectural features, including corridors, stairways, ramps, nodes, intersections, thresholds, and visual connectors, which impact visibility, orientation, and decision-making at critical points in a building. Effective definition of circulation routes and nodes improves users' understanding of spatial relationships, while ineffective definition can result in confusion and disorientation.

This study views circulation as a unitary spatial system that consists of different types and elements, which in turn influence user movement and perception. The study of the different types of circulation and their architectural elements and their influence on spatial legibility highlights the importance of well-designed circulation systems in improving intuitive navigation in complex architectural spaces.

2. Circulation and Wayfinding Concepts

Circulation in architecture refers to the systematic movement that connects spaces and functions in a building. Based on the definition provided by Francis D. K. Ching, circulation affects the order in which spaces are experienced, thus affecting both the functionality and the space experience. The paths of circulation define the hierarchy of spaces and guide people through spaces.

According to the theory of wayfinding, as described by Kevin Lynch and Romedi Passini, effective navigation is made possible through the concepts of spatial legibility, decision points, and environmental cues. Circulation systems are the most important elements in wayfinding, which help in organizing routes and decision points. Effective circulation routes make navigation easier and reduce the need for signs.

Spatial cognition also explains the process by which users perceive, interpret, and cognitively organize architectural space. By traversing circulation routes, users create cognitive maps based on visual associations, spatial continuity, and repetition. Nodes, intersections, landmarks, and visual axes in circulation routes aid in memory formation and spatial understanding.

When circulation systems are well defined, continuous, and logically structured, they contribute to the spatial legibility and wayfinding. On the other hand, fragmentation and ambiguity in circulation systems affect cognitive mapping. This conceptual framework places circulation at the intersection of movement, perception, and cognition, which provides the basis for intuitive navigation in complex architectural spaces.

Table -1: Relationship Between Key Circulation Elements and Wayfinding Outcomes

Circulation Element	Architectural Description	Wayfinding Outcome
Corridors and Passages	Primary horizontal circulation routes connecting functional spaces.	Provide directional clarity and continuity, supporting intuitive movement.
Staircases	Vertical circulation elements linking different floor levels.	Act as strong orientation anchors and vertical reference points.
Nodes (Lobbies / Junctions)	Points where multiple circulation routes intersect.	Support decision-making and improve spatial orientation.
Thresholds	Transitional spaces between different functional zones.	Indicate spatial change and reinforce mental segmentation.
Visual Axes	Clear sightlines along circulation paths.	Enhance predictability of movement and aid cognitive mapping.
Navigational Reference Points	Distinct architectural features located along movement routes.	Improve memory recall and reduce navigational confusion.

3. Circulation configuration as a wayfinding element

The current study points to circulation configuration as a basic factor influencing wayfinding ability in architectural space. Circulation configuration refers to the logic and organization of movement paths, including factors such as linearity, hierarchy, continuity, and transition.

Linear and axial circulation patterns create consistent movement paths, which decrease cognitive load and improve orientation. In contrast, disjunct or highly networked circulation patterns introduce decision-making points, which may increase cognitive load and lead to spatial disorientation. A hierarchical organization of circulation, whereby primary and secondary paths are distinguished from each other through width, natural lighting, materialization, or salience, improves intuitive understanding of spatial relationships and enables prioritized movement choices.

Transitional spaces like lobbies, ramps, and atria act as important nodes in wayfinding, which not only reinforce user orientation but also act as spatial anchors in the circulation system. In addition, visual continuity in the circulation route helps users to anticipate their destination and maintain directional confidence by having unobstructed sightlines throughout the environment.

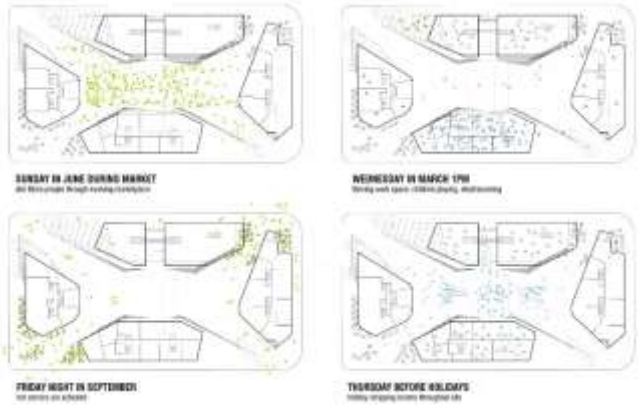

Fig -1: Circulation Diagram with Movement Flow

4. Experiential Impact on Wayfinding Behavior

Wayfinding is more than just a simple task of getting from point A to point B and can be seen as a process that is active, experiential, and perceptual. As people move through a space, they are constantly being subjected to sensory input, interpreting space, making decisions at decision points, and reassessing their location in real time. A good circulation system is one that facilitates this constant perceptual process by allowing clear sightlines, spatial consistency, and smooth transitions between spaces.

From an experiential perspective, circulation design also serves as a moderating factor for emotional comfort. Well-designed circulation patterns are associated with feelings of confidence, comfort, and ease. On the other hand, designs that are complex or ambiguous, often characterized by poor views, irregular paths, or too many intersections, have been found to increase stress, hesitation, and anxiety levels. The empirical evidence suggests that difficulties in wayfinding in unfamiliar or psychologically demanding environments can negatively impact emotional well-being.

This emotional aspect is especially important in institutional environments such as campuses, museums, and hospitals, where the users may already be experiencing cognitive or emotional stress due to unfamiliarity with the environment. In such environments, circulation that improves the legibility of space not only helps in navigating the space but also helps in creating a positive experience of the space.

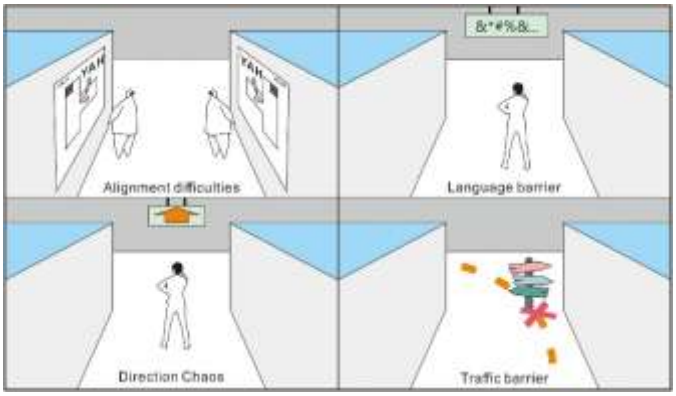

Fig -2: Diagram showing user interaction with circulation and visual cues in interior spaces.

5. Circulation as the Inherent Navigator in Architecture

The findings of this research indicate that circulation arrangement acts as an implicit cue in architectural space, guiding the movement of users without the need for explicit direction. By considering circulation as a non-residual and non-peripheral aspect of space, wayfinding is effectively integrated into the architectural space. This finding is supported by architectural literature that shows that the organization of space and the paths of movement have a significant impact on how users perceive space, thus simplifying navigation.

Alignment, repetition, proportion, and spatial rhythm are architectural elements that provide inherent navigational cues. Good alignment of routes and repetition of spatial information create recognizable patterns that reduce the mental effort required for navigation. Hierarchical circulation routes, in which the major routes are expressed through scale, material, and spatial emphasis, communicate functional priority and help the user distinguish between major and secondary routes. These design principles allow the user to predict spatial sequences and navigate without relying on too much signage or graphical wayfinding systems.

Intuitive wayfinding occurs when the circulation system is able to convey direction and spatial hierarchy through architectural form and organization. Visual continuity along movement paths and the use of spatial sequences that logically unfold help to facilitate the user in creating a mental map of the space. As such, architecture itself is a powerful tool for wayfinding.

6. CONCLUSION

This research concludes that circulation is a crucial factor in determining wayfinding efficiency in architectural spaces. In addition to its purpose of movement, circulation is an important factor that affects spatial perception and cognitive mapping. This research proves that well-organized circulation systems improve wayfinding efficiency by providing direction and order through architectural form.

The results show that when circulation is planned as a unitary spatial component rather than as residual space, it has the potential to support intuitive wayfinding by default. Factors such as path continuity, hierarchical differentiation, spatial sequencing, and clear nodes are responsible for creating spaces that are easy to navigate and have good legibility. These aspects of circulation design help to minimize user confusion and improve psychological comfort.

The study also further supports the argument that architecture itself is the most effective wayfinding device when the circulation system is coherently organized. Although future studies may explore this issue further through empirical studies, the current study makes a contribution to architectural discourse by identifying circulation as a key factor in determining the effectiveness of wayfinding.

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