ISSN: 0975-833X

Available online at http://www.journalcra.com

International Journal of Current Research
Vol. 11, Issue, 06, pp.4307-4310, June, 2019

DOI: https://doi.org/10.24941/ijcr.35558.06.2019

INTERNATIONAL JOURNAL OF CURRENT RESEARCH

RESEARCH ARTICLE

WAYFINDERS IN BARRIER FREE ENVIRONMENTS

***Iman Salah- El-Din Hamza and Amr El-Gohary**

Architecture Department, College of Engineering, Ain Shams University, Egypt

ARTICLEINFO

Article History:
Received 14th March, 2019
Received in revised form
16th April, 2019
Accepted 20th May, 2019
Published online 30th June, 2019

Key Words:
Wayfinding, Perception, Cognition, Wayfinding process, Architectural informational cues, Barrier free environment.

**Corresponding author:*
Iman Salah- El-Din Hamza

ABSTRACT

Wayfinding is an essential spatial activity that way finders experience every day in their journeys from their origins to their required destinations. The wayfinder must perceive, explore, solve spatial problems and follow a certain route to reach his/her destination. Golledge has defined the term "wayfinding" as: "*The process of determining and following a path or route between an origin and a destination*." Wayfinding process is concentrated on the perception and cognition of the wayfinder within architecture and the built environment and it is based on three processes: processing environmental information, decision-making and decision execution. It is based on the interaction between the way finder and the architectural cues. The way finder is facing two great challenges in the wayfinding process, firstly wayfinding his/her route without any barriers through the journey and secondly perceiving and analyzing the given architectural information within the environment and to choose the route independently and without any barriers to reach the destination in limited time. The barrier free environment has a great impact and direct effect on the wayfinder in the wayfinding process by the given architectural informational cues with the environment. The paper highlights on the design of the architectural in formational cues within the barrier free environment as the main force behind enhancing and facilitating for the wayfinding.

***Citation: Iman Salah- El-Din Hamza and Amr El-Gohary,* 2019.** "Wayfinders in barrier free environments", *International Journal of Current Research*, 11, (06), 4307-4310.

INTRODUCTION

Barriers are part of our lives, users have to overcome barriers that they continue to face in different ways, and accordingly, they have a large range of adaption and adaptive behavior. There are different types of barriers that users deal with every day, barriers to movement, barriers to space and time, barriers to access to the built environment, barriers to perception, and barriers to communication. Barriers make the built environment unsafe and cause a high level of difficulty to all users to access the built environment, which becomes unreachable and it affects all opportunities in participating in all sectors of life. According to the principles of universal design, accessibility and mobility are important aspects that enhances the built environment and has a great impact on the behaviour, attitude and experience of the user in accessing a building and navigating through it to reach the required destination and that is called wayfinding.

Wayfinding: In 3000B.C: Polynesian islanders found ways to navigate across the oceans reading the stars, moons, and waves and using landmarks for navigational clues without the need to know where they were located geographically. Wayfinding is a process used when a user needs to find the way from a oneknown destination to another. It is the concept of spatial orientation, this term was introduced by Kevin Lynch in 1960 in his book "the image of the city" and explained as" "*The elements of the built environment that allow us to navigate successfully through complex spaces like cities and towns".*", wayfinding is aprocess to perceive, explore and solve spatial problems within the built environment. Wayfinding was defined as: "*The process of determining and following a path or route between an origin and a destination*." (Golladge, 1999), it depends mainly on the environmental perception and cognition of the way finders and the physical and mental abilities of the wayfinders within the built environment and the interaction between the wayfinder and the aspects of the built environment which can facilitate the process, "*the process of finding the way to a destination in a familiar or unfamiliar setting using any cues given by the environment*" (Passini *et al.,* 1992).

Perception is the process of interpreting information received from the senses (Goldstein, 2010), it is an information processing activity. Perception is amental and sensory process that interprets incoming sensory information and it is influenced by a variety of factors such as the user's past experience, the effect of stimulation, the level of attention to the details, the ability to respond, the motivation's level and the social and emotional perform.

The environmental perception as explained by Gifford, is a type of perception that is related to the reinterpretation of the gathered data by users in the way that store, transform,

organize, forget and recall knowledge within the built environment.

Cognition is mentally processing information obtained through perception; it is the process of knowing, gaining, organizing the information received from the built environment. It focuses on some aspects as thinking, remembering and mental development, and it involves the understanding of values and effects on behaviour and attitude formation (Downs *et al.,* 2005). Cognition is the process that helps the users to navigate and wayfind within the built environment forming the cognitive map leading to cognitive mapping.

Cognitive map is a mental map to help the wayfinder to recognize the architectural information cues needed and where they are (Golledge, 2003) and the arrangement of the things and spaces within the built environment.

Cognitive mapping is a mental representation of the space (Passini *et al.,* 2000),it is the process whereby users acquire, code, store, recall and decode information about the relative spaces and attributes of the built physical environment.

The wayfinding process defined as "*finding one's way to a destination through spatial problem solving comprising three interdependent processes: decision making, decision executing and information processing"* (Arthur *et al.,* 1992). The wayfinders move through the built environment processing information to plan and have decisions to execute in their actions, behavior and attitude as shown in Figure (1).

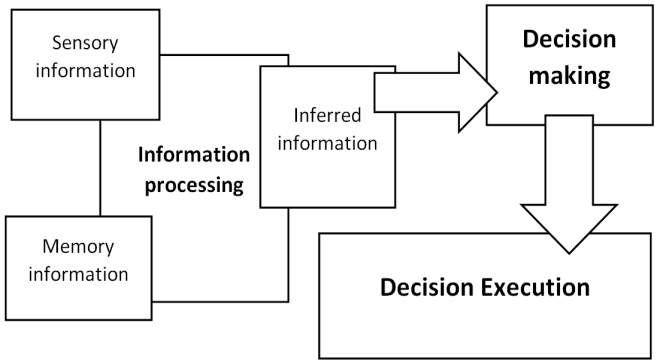

Figure 1. Wayfinding process (researcher)

- Information Processing**:** the built environment information cues is fundamental in making decisions and taking actions, it depends on direct sensory contact with the built environment (sensory information) and past experience (memory information),and the inferred information based on both sensory and memory information, it is aphase of spatial problem solving and essential in making decisions and plans and actions.
- Decision making**:** it is the development of the plan of action as the decision is based on the built environment information which is obtained from the destination and from the previous experience and it needs a series of decisions as wayfinder breaks down the complex problem into sub problems to solve them into semi solutions, then the solutions become the decision plan.
- Decision execution: requires turning decisions into behavioural actions and it is separated into action part (as the decision where to go) and object part (as the required destination) (Passini1981).

Barrier free environment is a space that allows for free and safe movement and access for all users including the disabled ones, without any barriers, with dignity and as much independence. The barrier free environment is named by UNESCAP as non- handicapped environment (Design manual for a barrier free built environment, 2004), that allows the accessibility and mobility to all the users within the built environment by providing this environment with all the facilities and architectural information cues that encourages and enhances the experience of the users within this built environment and removes all the barriers that can face the user and can be an obstacle within the built environment, and can participate in all activities of life.

The Americans with Disabilities Act (ADA) in 1990 has focused on the building codes in designing the built environment that assures the physical access to it, accordingly facilitates the universal access to all users. The barrier free environment has a great impact and direct effect on the wayfinder in the wayfinding process by the given architectural information cues with the environment.

Wayfinding Design relies on the presence of fundamental architectural information cues and aspects within the built environment to articulate and facilitate the wayfinding for all the wayfinders including the disabled. The following present design details of architectural information cues that can affect the wayfinders' abilities in obtaining information from the built environment and leading to a final decision that is shown in their behavior and attitude.

1-Spatial organization is the building layout and it is considered the major component in wayfinding design as it affects the level of convenience of wayfinders' experience in the wayfinding, and in using the cognitive mapping within the built environment (Arthur *et al.,* 1992).A complex layout has a negative impact on the wayfinders' experience through the building and the ability to understand the relation between spaces (Passini 1996). There are some guidelines for well-designed layouts to assist the wayfinding:

- Division of internal spaces: Dividing the internal layout into clear, small and well-defined spaces, including zones, paths, edges, nodes, and landmarks to facilitate exploring the building and improve the understanding of the spatial relationships and maintaining the connectivity between spaces (Lynch1960). Differentiating the zones and areas inside the built environment by changes in heights, size, shape, colours, lights, or architectural styles in order to improve the wayfinding process and improve the cognitive map (having a concrete cognitive mapping), as described "*Degree to which different parts of an environment look different*" (Montello, 2005)as shown in Figure (2).
- Visual access: is defined as "*the degree to which different parts can be seen from various viewpoints*", (Montello, 2005) as the greater visibility makes the wayfinding process easier, accordingly, it help the wayfinders to see through and out of the built environment and orient themselves. Windows within the corridors can enhance the visual access by allowing greater view for the space (Huelat 2007) as shown in Figure (3).
- Entrances and Exits: Clear entrance points with different architectural languages are often used to differentiate the entry door from others and to be

identifiable easier for the wayfinders and the exit points are legible from the main circulation or decision point and the emergency points need to be visually accessed

- Horizontal and Vertical circulation: Corridors help to define the users' way, and can be divided to either primary or secondary to assist in the wayfinding process. Paths can have different colours or textures to help memorizing the way (Castell, 2017). Identified circulation plan with vertical circulation as stairs and lifts to be visible from the entrance point and same location in every floor.

Figure 2. Differentation between spaces within the built environment

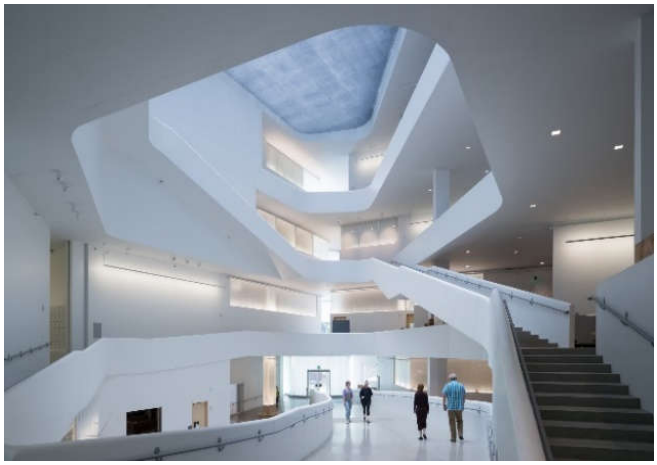

Figure 3. Visual access within the built environment

2-Landmark: Lynch described the landmark in his book the image of the city "*as an external point of reference that is not a part of the route like the nodes in a travel network".*

Landmarks are characterized by singularity as to be in a clear form, in contrast to the background and within a prominent location. There are many features in objects that can be justified as landmarks, such as sounds and smells that sometime reinforce a visual landmark, although they do not seem to constitute landmarks by themselves.

Landmarks must be located in significant places as entrances, changing in directions, and at decision points to enhance the wayfinding process and to be visible from a distance combined with talking directories or signs to help the wayfinder who cannot read. They have to be in contrast with the surrounding of the built environment, and have a multi- sensory if possible for disabled ones (Castell, 2017) as shown in Figure (4).

Figure 4. Landmark as a reference point

3-Colour is an architectural communication cue between the wayfinder and the built environment, and it has a significant role in the encoding and recognition process. It helps to improve the visual memory of images for the built environment, and it can help the cognitive mapping by marking different spaces in the building. The use of colour has a great impact on both usability and emotional response on the wayfinders in the built environment as signs and landmarks. Wayfinders with vision impairments as colour blindness will feel disoriented and frustrated when they dependent on colour-coding only.

- Colour- coding must be supplemented with another form of given information to serve all the wayfinders (Seinfeld, 2012). Colour has different aspects in the architectural information cues in the wayfinding process:
- The layout**:** Colour schemes can be applied to the layout design of the building, by differentiating between areas and zones, and defining areas with colour-coding, as it can be applied by colour-coding to the walls, floor, ceiling and doors of different areas. The user in the colour-coded built environment makes fewer errors in the wayfinding process (Hidayetoglu, 2010) as shown in Figure (5).
- Landmark and sign:colour can enhance landmarks and signs for easy wayfinding as it is provided with visibility, shape, attractive colour and texture, and the colour of the landmark and signs should be in contrast and differ from the background and surrounding.
- Choosing colour that are easy to be remembered by the user without confusion such as the selection of colours that are known by their descriptive words as (red and blue) not colours as (turquoise) which can be subject whether it is green or blue.

- Colour of paths on floors are used to highlight the route and delineate the boundaries of the areas. It should not exceed four different spaces in the building withdifferent colours, and any object must have a contrast colour with the surrounding to be easily recognized (Castell, 2017) as shown in Figure (6).

Figure 5 Colour within the built environment

Figure 6. Colouron the floor within the built environment

4-Light plays a great role in the wayfinding process by giving the wayfinders the confidence and the feeling of safety needed within the built environment, weather it is natural or artificial light. It has a great effect on the cognitive ability in processing the information that encourages them to find their required destination. Lighting can be used to highlight paths, stairs, landmarks, signs, or any directional information, without glaring or reflecting from any surfaces and without using any patterns that can conflict and confuse the wayfinders. It is important to choose the right lighting and light characteristics as these have a great impact on the behaviour and the attitude of the wayfinders within the built environment.

5-Texture: Different types and textures of materials can affect the wayfinding process and assist the wayfinders to find their way easily. Using contrast in texture of the finishing materials in the built environment can give a good experience to understand and memorize the route for the wayfinders (Passini *et al.,* 2000) and can be used as a landmark for certain spaces.

Conclusion

The barrier free environment has a great effect and direct impact on the behaviour and the attitude of the wayfindersin the wayfinding process. According to the principles of universal design accessibility and movabilityare important aspect that enhances the experience of the wayfinders in the built environment. There are many architectural information cues within the built environment that can affect the accessibility within the built environment on the wayfinding process. Accordingly, they improve and make it easier for all wayfinders including the disabledones, and removing any barriers, to access with dignity and independently, and provide enabling built environment in great extent. The design has an effective role in looking beyond the barriers and addresses different design of the architectural information cues in the wayfinding process that can be the main force behind enhancing and facilitating the wayfinders' experience and their lives, and to take the concept of accessibility to higher level by making all the built environment inclusive to all

REFERENCES

Arthur, P. and Passini, R. 1992. Wayfinding: people, signs, & Architecture. McGraw- Hill, New York.

Castell, Lindsay, 2017. The influence of building features on wayfinding by adults with intellectual disability: Toward achieving more inclusive building design. Curtin University.

Design manual for a barrier free built environment. 2004. Vastu Shilpa Foundation, Environmental planning collaborative, HCP Design & Project Management Pvt. Ltd.

Downs, R. and Stea, D. 2005. Image and Environment: Cognitive Mapping and Spatial Behaviour, Chicago, U.S.A.

Gifford, Robert, 2002. Environmental psychology: principles and practice, optimal books publishers.

Goldstein, E.B. 2010. Sensation and perception, Belmont, CA: Wadsworth, Cengage learning.

Golledge, Reginald. 1999a. Wayfinding Behavior: Cognitive Mapping and Other Spatial Processes, Baltimore, MD: The John Hopkins University Press.

Golledge, Reginald. 2003. Human Wayfinding and Cognitive Maps. In Colonization of Unfamiliar Landscapes: The Archaeology of Adaptation, eds M. Rockman and J. Steele, London: Routledge.

Hidayetoglu M. Lutfi, Olgunturk, Nilgun, 2010. Color and wayfinding,colour and light in Architecture_First International Conference.

Huelat Barbara. 2007. Wayfinding: Design for Understanding: A Position Paper for the Environmental Standards Council. The Center for Health Design. http://www.healthdesign. org/chd/research/wayfinding-design-understanding.

Lynch, K. 1960. The image of the city, Cambridge, MIT-Press.

Montello Daniel, 2005. Navigation: In the Cambridge handbook of visuospatial thinking. New York, NY, Cambridge University Press.

Passini Romedi, 1996. Wayfinding Design: Logic, Application and Some Thoughts on Universality. Design Studies.

Passini Romedi, Constant Rainville, M Habib, 2000. Spato-Cognitive Deficits in Right Parietal Lesion and Its Impact on Wayfinding: A Case Study. Neurocase: The Neural Basis of Cognition.

Passini Romedi.1981.Wayfinding: A Conceptual Framework. Urban Ecology.

Steinfeld Edward, Maisel, Jordana, 2012.,Universal Design, Creating Inclusive Environments,,Canada.

****