Wayfinding beyond signage: rethinking the role of spatial objects and object relations

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Abstract. Wayfinding is one of the significant aspects to be considered in enhancing the quality of service and sustainable use of a public facility by its user. This study examines the role of objects in space in providing information for building users in the wayfinding process. The study was conducted by assigning some wayfinding tasks to some participants that are unfamiliar with the setting of the study. The method was through the walking-with observation and verbal protocols that indicate how the participants navigate in the building to find a particular location. The findings from the verbal protocols show that wayfinding strategies involved object-searching for finding cues regarding knowledge of position, location, route and place identification. The environmental objects other than signage and maps were also used and read as wayfinding cues. The different decisions made at particular points show how every object of cues relate to each other affecting the decision to be made and action to take. These findings suggest the needs to rethink the role of objects and object relations as the core of wayfinding strategies. Wayfinding design needs to incorporate the mechanism of object-searching and object relations, which will define the configuration of objects as a part of architectural spaces.

Keywords: wayfinding, object-searching, object relations, strategies.

1. Introduction
Sustainable design includes the social aspect on how design meets user needs thus guarantee the longer use of a facility by its user. A user-oriented design then is crucial to be considered in enhancing the service quality of a public facility [1]. One among other aspects to be included in the user-oriented design is wayfinding or the ease by which user can effectively find his/her way into, through or out of a building [2]. Wayfinding aspect is one of space quality parameters in public facility that support the service quality in circulation functionality [3].

Wayfinding becomes an essential issue for users of public buildings with a complex spatial configuration such as hospitals, airports or other, especially for those who are not frequent visitors and unfamiliar with the building environment. Getting lost or having difficulty in finding a place of destination become a common problem due to the complexity of layout and unfamiliarity of the user. Being lost in a complex building gives an unpleasant experience like being trapped in a contemporary labyrinth [4]. It is time-consuming, can create a frustrating and stressful condition, or in a case of
emergency, it can even threaten a human's life [5]. A wayfinding design based on an understanding of wayfinding mechanism is needed to deal with this problem.

The problem of wayfinding arises when people find difficulty in gaining information to guide their journey since wayfinding movement can take place by "consistent use of cues from the external environment" [6]. Regarding the provision of this external information, people often associate wayfinding design with the design of the signage system. However, merely implementing signage as wayfinding aids is not always helpful especially for users who do not get used to reading textual information. Researches have shown that wayfinding design should consider not only the use of sign but also the other aspects of architectural design, such as spatial forms [7], architectural and interior elements [8] or color and lights [9]. These studies have reported various environmental elements that contribute to wayfinding but have not explained the relation among these elements. The relation of environmental elements as cues in wayfinding is important to enhance the understanding of wayfinding mechanism.

This paper discusses the role of spatial objects in the wayfinding process. The objective of the study is to identify the spatial objects which were employed by the users as wayfinding cues and to analyze the relation among these objects in guiding users' movement during the wayfinding process. This study attempts to understand the role of the configuration of objects in wayfinding mechanism. This understanding will be beneficial in enhancing building service quality of and creating a sustainable environment.

2. Recording wayfinding performance of simulated visitors

This paper was based on a study carried out in a hospital setting, as one of the public buildings where wayfinding often becomes problematic for firstcomers and unfamiliar visitors. The setting was an outpatient service of a General Hospital in Malang, Indonesia. The outpatient service consisted of 13 clinics and occupied the second floor of the main hospital building. The building had a rectangular layout with two wings located alongside the northern and southern part of the center area, where all the vertical circulation were located (figure 1).

![Figure 1. The study setting, showing (a) the first floor and (b) the second floor of the building](image)

There were ten volunteers participated in this study, three males and seven females. The participants were healthy adults, with ages ranging from 23 to 50 year, with no severe visual impairment. All of the participants had not visited the setting more than once in the 12 months before the study and could be considered as unfamiliar visitors.

Each participant had to execute a wayfinding task. They were required to find several sequential destinations in the outpatient service area. The task started at the main entrance on the first floor. From here participants had to find four sequential destinations, namely the outpatient service, the customer service, the registration counter and a particular clinic. To avoid redundancy among participants, the researcher set up three different clinics as the final destinations. The participants were not given any
clues of the position or the locations of the destinations and were not allowed to ask anybody for direction. They could only depend on the environmental cues they met.

The participants' wayfinding performance was then observed by walking-with observation method. This observation method involved 2-3 observer, accompanying the participants walks. The observers took notes on movement paths and record participants action along the journey using video camera. During the journey, all participants were also asked to perform a think-aloud protocol, saying aloud what they saw, what they searched and what action they took. The protocols were recorded by a voice recorder to give more insight on the actions performed by the participants.

3. Result
3.1 Environmental objects used as wayfinding cues
Wayfinding cues in this study refer to any objects that participants looked for, mentioned and used as an information source or reference points to guide their movement in searching for the destination. Some environmental objects used as wayfinding cues were identified by analyzing the verbatim record of the verbal protocols. The wayfinding cues identified in this study were signage, maps, specific function/area, building elements and condition of objects.

| Wayfinding cues             | Definition                                                                                   |
|-----------------------------|---------------------------------------------------------------------------------------------|
| **Signage**                 | Board containing textual and graphic information of location, direction or room name/number  |
| **Maps**                    | Two-dimensional representation of the building environment, showing the layout of rooms, functions, and other building elements. |
| **Specific Function/Area**  | A room or groups of rooms within an area of the building that serve a specific function.    |
| **Building elements**       | Physical elements that are part of the building                                             |
| **The condition of object** | An object with a particular condition that could imply information                          |

**Signage.** In this study, signage refers to the board containing textual and graphic information telling location, direction or place naming/numbering. Signage becomes the most frequently sought information by the participants. The following verbal protocols show the use of signage as wayfinding cues:

*I see a directory...ya a directory. We’ll see.... the outpatient department is on the second floor. (P06)*

*There is a direction to go to the eye clinic, go straight and turn left (P01)*

*This is pharmacy of the outpatient department, so ... oh Look! there is a sign of eye clinic (P03)*

The three examples show the use of different kinds of signage to obtain different kinds of information. A directory board is used to get information of location; a directional sign for route information, whereas an identification sign, is used to confirm the identity of a place.

**Maps.** Maps are defined as a two-dimensional representation of the building environment, showing the layout of rooms, functions, and other building elements. Some participants looked for maps in their journey, but some of them were not successful in finding the map. Here are some examples of verbal protocols showing the use of maps:
I am searching for a plan or layout of the first floor and find out the position of it (P03)
Yes, outpatient department…. Where is the plan? (P08)
There is no floorplan! (P09)
There is a floorplan over there, but it is not quite visible (P10)

By reading the maps, the participants were expected to find out the location and route of destination. However, they were not always successful in obtaining this information from the map. The following protocol illustrates a participant who could not find the desired information on the available map:

We are here... then to the outpatient department is ...... no... there is no information about the outpatient department. (P04)

Specific function/area. Specific function/area refers to a room or groups of rooms within an area of the building serve for a specific function or have the specific characteristic. Here are some examples of protocols showing the use of a specific function/area as wayfinding cues:

I walk to the north …Mmm. To the internal clinic, then I will search for the pulmonary clinic, okay (P04)
We turn left, there is Central Laboratory on the front right...okay...(P06)
I am currently in the area for maternity patient or obstetric (P10)
We go back to the counters .... counters (P05)
This is obstetrics … this is wrong … (should be) oncology clinic (P02)

Those protocols show that the function/area were used to refer to the place being searched, mark a place, identify one’s position even make someone aware that he has taken the wrong way.

Building elements. Building elements that were used as wayfinding cues refer to physical elements that are part of the building. In this study, participants used stairs, elevator, or door as wayfinding cues. Vertical circulation like stairs or elevator was used as a reference when a participant found out that they have to go to the different floor. Stairs could also be used as a place marking. The example of participants using stairs or elevators are shown by the following protocols:

To the second floor. O ya, there are stairs, ya to the stairs …okay, the stairs to the second floor (P08)
May I take the elevator? This is the first floor, right? (P09)
I saw the location of the layout is near the stairs (P03)

Another building elements used as wayfinding cues are shown in the following example of protocols:

We just get in…get in … the main entrance (P09)
There is a door in front, but it is not possible to enter (P10)

The condition of an object. This type of cues refers to an object with a particular condition that could imply information. The following protocols show examples of participants use the condition of an object as cues:

The room is empty, yeah, this is not the pharmacy (P01)
The customer service is usually easily found. It should be the place in front of where we just get to the second floor (P07).

The example shows that the condition of an object could be detected by direct contact with the environment (seeing an empty room) or by using prior knowledge (easily found customer service).

3.2 The relation of objects in guiding wayfinding movement

The map of participants’ movement paths showed that the different decisions could be taken at particular points. The different decision could be made since different participants use different spatial objects as wayfinding cues. For the purpose of this paper, we will show an example of different actions and decisions made in the first-floor lobby to go to the outpatient department on the second floor based on different cues.

Table 2. Examples of the use of objects and their relation in the first floor

| Narration | Object Used as Cues | Object Relation |
|-----------|--------------------|-----------------|
| P01 entered the lobby through the north door of the main entrance, stopped near the door, turn her body to the left. P01 then saw a sign of BPJS patient with an arrow pointing to the north staircase next to the sign. She assumed that BPJS patient should go to the outpatient department and decide to follow the go to the second floor through the staircase. | 1. the door (a way to enter the building) 2. the lobby (the position of the participant) 3. the sign of BPJS patient (inform the direction to take) 4. the north staircase (a way to follow the direction) | |
| P04 entered the lobby also through the north door, walked forward until seeing a standing sign. She read the sign, got the information of the location of destination and walked towards the corridor. However, being unsure, she turned her body around, saw the north stairs and walked slowly towards the stairs, saw and read a BPJS sign and decide to go upstairs. | 1. the door (a way to enter the building) 2. the lobby (the position of the participant) 3. the standing sign (inform the location of destination) 4. the corridor (a possible way to the destination) 5. the north stairs (a possible way to the destination) 6. the sign of BPJS patient (inform the direction) 7. the north staircase (a way to follow the direction) | |
| P06 entered the lobby through the main entrance’s south door, He walked forward and saw a directory sign, got the | 1. the south door (a way to enter the building) 2. the lobby (the position of the participant) | |
P08 entered the lobby through the main entrance’s north door, walk forward and searching cues by looking around. He saw a standing sign, got the information of location, turned his body to the right and walked forward. As he saw the south staircase, he decided to walk toward it and go upstairs.

These examples showed that in the relatively same location, a visitor could use different type and different amounts of objects as the cues to guide his/her movement. But the different use of objects did not necessary lead to a different final decision. P01 and P04 took the same final decision (“go upstairs through the north staircase”) although P04 used more objects than P01 did. It seemed that the decision and action to take did not only depend on the type of objects used as cues but also on how the visitor ‘read’ the relations between those objects.

The result of the study also indicated that the type of object to be used as cues and what relation could be made between them also affected by the movement maneuver of the subject. How and to what direction the body moved in object-searching mechanism would affect the object to be perceived used and read as information. The different actions taken by P01, P04, P06 and P08 in the first-floor lobby created different movement pattern as seen on figure 2.
Figure 2. The maps showing different movement pattern of P01 (a), P04 (b), P06 (c), and P08 (d) in getting to the outpatient department on the second floor.

4. Discussion
Wayfinding process involves some aspects such as knowing one’s position, knowing the location of the destination, knowing the route to get to the destination, knowing the arrival to the destination and knowing the route to go back to origin [8]. This study showed that during the process of searching and finding a destination, people would search for cues regarding those aspects.

The result of the study also showed the use of environmental objects other than signage and maps as wayfinding cues. Specific function or area help visitors to identify and mark a location. In a building with many rooms grouped in some departments like a hospital, easily identified and differentiated area would be a great help for wayfinding. This study showed the role of vertical circulation as wayfinding cue. The design of vertical circulation like stairs and elevator also played a role in showing a route to a destination, especially in a building with multi-level floor [10]. The door also could have a role as a non-textual cue that guides visitors to decide a way to choose. Another non-textual cue identified in this study is the condition of an object. An empty and abandoned room might indicate a displacement of function. All of the results indicated the role of environmental objects as non-textual information in wayfinding.

Wayfinding involved decision making and action taking to execute that decision [4]. This decision was taken based on information gained from environmental cues. This study has shown how every object of cues relate to each other affecting the decision to be made and action to take. Making a relation between object is common in the process of searching [11]. The mechanism of making object relation then should be incorporated as a base of wayfinding design.

5. Conclusion
Some essential points can be drawn from this study. Wayfinding strategies were based on the use of environmental cues. Instead of depending on signage and other textual cues, the findings suggest the needs to rethink the role of objects and object relations as the core of wayfinding strategies. The configuration of objects as a part of architectural space should be defined based on the understanding of object relation mechanism in the wayfinding process. This result also suggests that further research needs to be conducted to develop the idea of object relation as wayfinding strategies. Incorporating the understanding of wayfinding strategies in architectural design will enhance the quality of service and sustainable use of a public facility.

Acknowledgements
This research is part of T Mustikawati’s doctoral dissertation. The publication was funded by Hibah Publikasi Terindeks Tugas Akhir (PITTA) Grant from Universitas Indonesia. The author would like to express much gratitude to all who have contributed to this research, especially the management of
Rumah Sakit Saiful Anwar, Malang, Indonesia, colleagues in Health and Hospital Design Research Cluster, Department of Architecture, Faculty of Engineering, Universitas Indonesia and colleagues in the Department of Architecture, Faculty of Engineering, University of Brawijaya, Malang.

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