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# The Visual Mechanisms of Seeing in Experiencing the Interior

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***Abstract***

*This paper discusses the visual mechanisms of seeing and their significance in experiencing an interior space. The discussion investigates what the observers can obtain from seeing activities. The aim is to emphasise on the role of seeing as a way of constructing the relation between human and the interior environment. The paper explores the mechanisms of seeing by focusing on two different ways, which are seeing in a static position from a point of observation, and seeing while moving through a path of observation. The exploration in a hospital setting finds out that seeing from a point of observation gave a visual range determined by the body's shaft motion, head motion, and eye movement. This way of seeing produces visual information on interior space, which consists of vertical and horizontal fields. Seeing while moving will create a path of observation that gave an optical flow containing dynamic and continuous visual information. The understanding of seeing mechanisms in interior environment can generate a design with better human-interior relation.*

*Keywords: seeing, interior, relation, visual mechanism, visual information*

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## Introduction

Seeing is an important mechanism to understand the relation between the body and the interior environment. Human feelings and experiences within an interior can be identified through the relationship between such setting and the body. Our senses, particularly the visual, connect our body to the surrounding environment. An experience of the interior environment evolves from the mechanism of seeing the environment and the performance of the body in connection with the setting. The relation between the constructs of subjective responses and experiences from physical space demonstrates the quality of space where human body is present (Atmodiwirjo & Yatmo, 2018).

Visual discourses in interior focus on the visual or vision-centred perspective on interpreting knowledge, truth and reality (Buci-Gluckmann, 2013). Design of interior space tend to put particular emphasis on visual beauty, displaying visual effects that are rich in decoration (Piotrowski, 2011), suggesting visual domination and the the presence of the hegemony of vision as influenced by the ocularcentric paradigm (Pallasmaa, 2012). As such domination of visual beauty attracted many critics, Sowers (1990) suggests the need to rethink the focus of the visual expression.

This paper discusses the visual mechanism of seeing and its significance in experiencing an interior space, as an attempt to balance the domination of visual beauty. The discussion investigates what the observers can obtain from seeing activities, beyond just obtaining visual experiences. We intend to emphasise the role of seeing as a way of constructing the relation between human and the interior environment, informing how the interior should be designed to generate a better human-interior relation.

## Seeing as a Transaction

The seeing activities demonstrate a transaction between architecture as a giver of the view and humans as the receiver of a view as part of the space experience. Such transactions could be explained as a mediation between the experience process carried out by the body in response to the surrounding environment (Yatmo & Atmodiwirjo, 2013). According to Bernie (1996), transactions are forms of interrelated units. An example of a transaction can be seen in the meeting of two people. Sooner or later, they will indicate that they know the existence of each other, giving a form of stimulus. Moreover, someone will react to something or someone related to the stimulus, providing a response transaction by creating an exchange dialogue.

In this sense, an analysis of transaction aims to highlight how each stimulus resulted in a particular response transaction.

Viewing activities is seen as a unit of transaction when the environment acts as a stimulus by reflecting light on the surface, and the observer responds by capturing light reflected from the surface (Pallasmaa & Robinson, 2015; Gibson, 2014). As an attempt to elaborate more on the stimulus-response transactions between humans and the environment, this paper focuses on three particular transactions, which are the *seeing-perceiving*, *seeing-understanding*, and *seeing-experiencing* transactions, as the following.

*Seeing-perceiving* becomes a stimulus-response transaction with emphasis on the process of how eye perceives a visual information and develops meaning from such information (Ozdemir, 2010; Chen, 2014; Teyssot, 2010). In seeing-perceiving activities, the environment acts as a stimulus by providing quality physical characteristics of the environment, providing information on shape, colour, dimensions, distance and other visual information. The observers respond by associating and categorising physical characteristics in the environment based on the observer's memory treasury, developing a new category or simply adding to the old categories (Pallasmaa & Robinson, 2015).

*Seeing-understanding* as a stimulus-response transaction emphasises the cognitive role of how the brain performs a visual information process, forming a mental-thought in deciding the strategies chosen to respond to the visual information (Ijsselsteijn, et.al, 2006). Different than seeing-perceiving which focuses more to the process of delivering visual information until it can be absorbed in the function of vision, seeing-understanding develops more information processing in the brain to produce a choice of responses.

*Seeing-experiencing* is a unit of a stimulus-response relationship where someone gives a response by combining the substance from the experience of seeing and forms a series of activities into a story of seeing experience. (Siegel, 2011). Trevelyan (1977) explains that a person connects one image to another in seeing architectural forms, moving eyes from the plane of the wall to the pillar then to the column and the wall above the opening then to the opening, creating an alive way of seeing.

Atmodiwirjo et al. (2015) explore the patient’s visual experience, of how patients respond to the physical environment, elements and patterns of spatial configuration as stimuli by making changes in gestures, the direction of vision and development of motion walking through space. The visual experience emphasises on body connectedness with the spatial settings by addressing the involvement of motion changes in response to environmental stimuli. The study highlights how the patient's sensory response is triggered or controlled by spatial elements, producing experience in viewing activities. Other studies affirm such argument, demonstrating how spatial elements can shape a patient's experience in space (Sonke et al., 2015; Belfiore, et al., 2015; Lankston, et al., 2010; Nanda et al., 2012; Cusack et al., 2010).

Isaac et al. (2014) tested the accuracy of perceptions based on Gibson's idea of affordance demonstrates how an environmental change leads to a change of the perceptions of body size and boundaries. Exploring openings that could be changed in size, the experiment requires children and adult respondents to put their hands through the openings. The experiment demonstrates that the process of seeing an environmental object lead to the estimation of body size accuracy and the measurement of the changing object. The study found that adults possess a better level of accuracy in knowing their bodies both in body height and width in comparison to children.

**The Role of Seeing in Healthcare Environment**

Discussion of space and health emphasises the importance of space to support healing ritual activities (Stamenovic, 2014). Atmodiwirjo et al. (2015) investigate the importance of the visual experience of patients in healthcare space, highlighting how patients respond to the physical environment, elements and patterns of spatial configuration as stimuli by making changes in gestures, the direction of vision and walking through space. Emphasising body connectedness and spatial settings, Atmodiwirjo et al. found that the patient's sensory response is triggered or controlled by spatial elements, producing an experience of seeing activities which can affect the recovery process. Other studies offer similar arguments regarding the effect of spatial elements to the recovery process. Lewis et al. (2006) agreed that psychological state in individual influence both relative of health and disease. Psychological problems such as a states of anxiety and depression, contributing to negative reaction in physic healing process lead cause of death in chronical diseases (McEwen, 1993).

The process of healing demonstrates a process of response-stimuli relationship unit, shown when objects in the visual environment stimulate the observer and subsequently provides a response. In some studies, the visual objects that have a natural element demonstrate a higher impact on the recovery process. (Velarde, Fry & Tveit, 2007; Ulrich, 1984; Chen, 2014; Chang & Chen, 2005).

These studies also reveal that some seeing activities provide the patient experience role of positive distractions, resulting in changes in the perception of pain. For example, the visual approaches of healthcare environments have been known in giving a positive impact particularly for the patient of oncology, cardiac, diagnostic, and long-term care settings (Christenson, 2011).

The integration of visual arts in the healthcare setting is a common part of the visual approach. Elements such as colours, paintings, and visual art may encourage high levels of pleasure and induce a state of calm, but may also cause displeasure, leading to the increase of high levels of arousal which may provoke anxiety. Architects and designers need to carefully choose the appropriate visual approaches that contribute positively and to greater effects on the wellbeing and health to their patient, and therefore improve the healing process of patients in the healthcare environment. (Valdez & Mehrabian, 1994; Ulrich, 1991; Cusack et al., 2010). Considering physical environment in a process design of facilities for patient is a vital role in architecture for healthcare. In creating a positive experience of a patient, some aspects of interior such as the artwork, color and lighting give an interest to lower the level of patient's stress and negative moods (Belfiore et al., 2015).

Seeing activities create a form of linkages between health and architecture can occur through viewing activities. Despite its indirect health contribution, through understanding of seeing activities may inform how the patient perform holistically in space, affecting their recovery and better health conditions. The transactions of seeing-perceiving, seeing-understanding, seeing-experiencing and seeing-healing, discussed earlier, arguably demonstrate links that connects architecture and the condition of human health as a whole, from the mind, the body, and the feeling of a space informed by the visual sense.

Within these different seeing activities, connectedness between human and the environment is particularly apparent in the result of the initial process in seeing activities, namely seeing-perceiving. This paper emphasises the importance of seeing-perceiving activities, exploring the mechanism of perception in the activity of looking and absorbing what is seen.

The process of perceiving activities demonstrates a relationship between observer and architecture (Eisenman, 1992). The viewing mechanism shows the relationship between subject and object in the activity of seeing. The following paragraphs investigate the mechanism of seeing, tracing the mechanism of the visual function as a response of the environment, which occurs in the experience of seeing both in static and moving position of the body particularly within healthcare environmental setting.

*Seeing from a point of observation*

Blake (1990) explains the visual experience through a single static view, explaining the natural perspective and artificial perspective in understanding such a view. Blake highlights how visual experience is sine qua non from realism-perspective projection, which is interpreted as a theory-condition where there is no condition where the result does not occur. Without the perspective projection, there would be no absorption of reality; and without the reality, there is no perspective projection. Reality is a subjective perspective associated with projecting the image of the environment surrounding the observer. On the other hand, the artificial perspective is developed with mathematical accuracy, where the three-dimensional perspective is projected into a two-dimensional field.

In the right perspective, an artificial perspective field would reproduce a natural perspective from just one point of view. The eye creates a boundary with different angles of seeing at different points of objects against the observer, forming an observer's point of view of the object. Blake's explanation demonstrates how the visual experience from a single point of view is formed by the observer point and the points where the image projection is limited to the object. The point of view occurred in such visual experience is referred to as the visual range. The following illustration elaborate further how the visual range or between objects and observers inform the mechanism of the patient's visual experience.

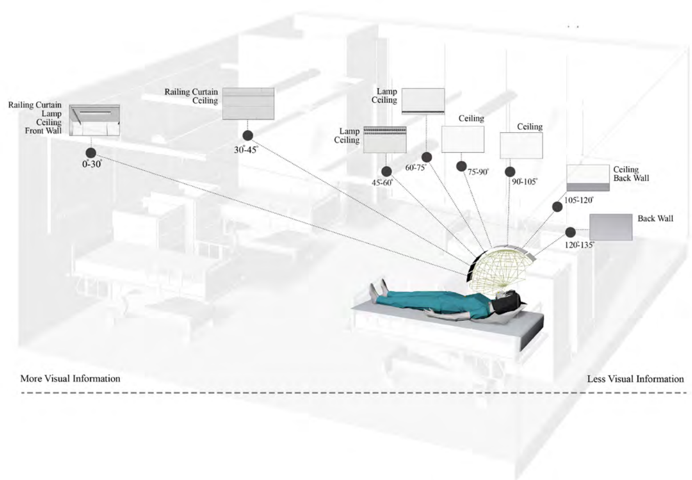


Figure 1
The visual range of a patient in a static view condition

Figure 1 demonstrates the seeing process of a patient in a static view of her bed, creating a visual range which the patient may experience. The visual range occurs in such static view emerging through changes in the eye fixation point while seeing the different details of the objects around the patient. Changes in the fixation point are influenced by observers' attention to particular object features, such as the colour of the shape and dimensions of the object. The sharpness of view occurs through motion and adjustments to the central eye within the range of the visual range. The visual range in the discussion of the eye structure-function does not provide a measurable range, and only explains the formation and mechanism of the visual range. A measurable visual range can be a basis for placing visual objects so that they are in a comfortable position for the observer, creating a more optimal arrangement for the patient’s movement.

The position of one’s view is determined by fovea, the central area of the eye that encourages the movement of the eye to carry the position of the view in the central area of the eye, demonstrated by the system of eye movements. In this sense, the eye will always return to its central position after it moves to follow the details of the object, demonstrating a process called fixation. Eyes tend to follow moving objects or visual information in comparison to non-moving ones, returning to the position of the central area of the eye afterwards. Eye accuracy in seeing the process is driven by the ability of the eye to see details, supported by the motion of the eye that traces the object. The eye also explores objects to grasp details in various directions. In tracing an object, the eye tends never to repeat the same direction, and instead of trying another direction in exploring the entire visual object (Enderle, 2010).

Other than the static view which demonstrates the position of the visual range that is in a stable state, Rowe (2016) proposes a kinetic view that is defined as the view moves from an invisible area into a visible area. Other than the visual range produced by gaze view of the eye explored in the previous paragraphs, visual experience in static view can be further expanded through eye movements, neck movements, head movements and gestures (Gibson, 2014). In this sense, the direction and motion of the eye are not only determined by the eyeball’s natural movement of returning to the central area, it is also determined by the position of the body, gestures, head movements, and eye movements. The variety of views enabled by the body's shaft motion, head motion, and eye movement is arranged in the level of micro-kinetic view, which is a level of seeing without active body movement around the room. The space configuration that influences such kinetic view is not the continuity of space or flow of space, but rather the elements in the vertical and horizontal fields that form a space.

A micro-kinetic view brings a change in view by directing the position of the midpoint of the view to the next midpoint. Changes in views may occur during addition and subtraction to the overall visual range. The addition adds scenes of view, creating a series of visual scenes while subtracting the view places the view outside the visual range area. In this sense, the movement in kinetic views brings a variety of potential surfaces that can be viewed.

Other than eye fixation on the fovea that drives direction and movement of vision, Warren and Hannon (1990) explore the view in the condition of moving observer and found that the observer still has a high level of accuracy in establishing views of the visual object. The following section will explore the process of seeing during the process of active movement, creating a view flow that depends on the motion and direction of the observer in a path of observation.

*Seeing through a path of observation*

Seeing can also be carried out dynamically while the observer is moving through an architectural setting. Gibson elaborates further about seeing from a path of observation as a way of someone "to see something from no point of observation as well as from a given point of observation" (Gibson, 2015, p. 271). Ingold (2000) added that humans actually never perceive the environment from one fixed point since they are always in a continuous movement. The following movement narrative informs an example of the process of seeing through a path of observation around health care facilities.

> *A new patient went to visit a dentist in an outpatient department of a general hospital. This was her first visit to that hospital, and she was coming there unaccompanied. As she arrived at the main gate of the hospital, the vast number of buildings existing in the hospital area overwhelmed her. She tried to calm down and decided to find the building where the outpatient department was located. She then looked around and saw a big building with a large canopy of drop off and assumed that it was the main building of the hospital. She walked towards that building, seeing the main entrance and went inside the building through the main door, arriving in the first-floor lobby. The lobby was full of visitors, but she managed to see a large board containing a building directory. After reading the directory, she found out that the outpatient department was located on the second floor of the building. She looked around again,*

*searching for a stair to go to the second floor. After she found the stair on the corner of the lobby, she went to the stair and walked up to the second floor. On the second floor, she found another lobby with a row of counters at the centre. There was a signboard that read 'Admission' hanging above the counters. She looked at one empty counter, approached it and began the admission process.*

The paragraph above illustrates the movements of a patient during her visit to a hospital. The patient had to find a way to reach the destination. The illustration shows a series of movements as part of the patient's wayfinding process: movement to find the building where the destination was located, the movement to the right floor and movement to find the location of the destination within that floor.

As the patient moved, she employed her visual sense to search for cues that will lead her to the destination. As she looked around, she might have seen so many things, as part of the act of reading the environment (Carpmant & Grant, 2016; Mustikawati et al., 2017). In a wide variety of information that she obtained through her visual sense, she picked a particular element of space that matched her need and guided her subsequent action in the form of moving in a certain direction.

The movements of a person from place to place form an itinerary of movement, and demonstrate the path of observation. Figure 2 represents how the act of seeing carried out by the patient through these series of movements create a path of observation.

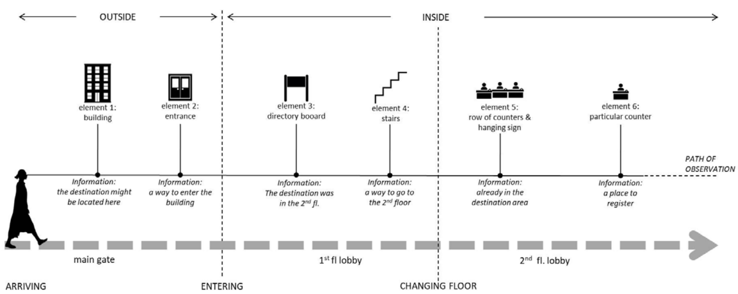


Figure 2
A path of observation created by a moving patient and the elements seen through it

Ingold (2000) argued that humans visually perceive environment not only from one fixed point but from a path of observation, a continuous itinerary of movement. Moving then becomes a mechanism of gaining knowledge of the environment, shaped by the passage between different places as we move. "We know as we go from place to place" (Ingold, 2000, p. 231). Through this statement, Ingold asserted that the knowledge acquired while moving through the path of observation is dynamic and always undergoes a continuous formation. As we continually move, our knowledge proceeds along the path of observation.

The process of wayfinding or navigating in and around a building is one example of how a person takes action of seeing while moving from place to place. People can navigate a building based on the information provided by the surrounding environment (Passini, 1992), particularly visual information. Therefore, when someone moves from place to place to find a destination, they actively search for the information needed to find the direction to the destination and make decisions regarding which way to go or what route should be taken. Mustikawati et al. (2017) called the action of searching for information to guide movement in wayfinding as visual cue-searching. These searches involved reading the surrounding environment by using visual senses to search and selecting the objects that carry information that will guide the next action. Therefore, the role of seeing in navigation is much more than just as visual experiencing but also as controlling and planning the whole movement.

Movements affect how the interior is seen by the observer in different viewpoints, as a movement in each point provides a specific viewing experience. Samuel (2014) explains such viewing experience in Villa Savoye, one of the famous designs of Le Corbusier. The use of circulation in this building provides the observer with the experience of walking through the building, as a form of an architectural promenade. By moving through the buildings, the observer is exposed to a dynamic visual experience. The flow of circulation enables the observer to see the interior of the building from multiple and different viewpoints that enable them to "make new and individual sense of the information presented by the building" (Samuel, 2014, p. 45).

There is a reciprocal relationship between seeing as perceiving and moving. Arguing that visual perception had an important role in the control of human movement, Gibson (2015) stated that "we must perceive in order to move, but must also move in order to perceive" (p. 213). We mostly use our eyes to specify a surface, an obstacle or an opening toward which we move. By having a good visual perception, a person can control his movement, determining when he must start walking, stopping or turning. Good visual control also allows control of the movement manoeuvres that determine when the observer must turn left or right or walk straight.

Different viewpoints provide an individual with a variety of visual information. This is because movement generates an optic flow, comprising of a succession of vistas connected by a transition (Heft, 2013). Heft explained that when an individual moves through a path in the building, the pattern of optical flow is generated within the vista. Movement allows the observer to establish a view that was hidden when a surface conceals another surface behind (Gibson, 2015). As the individual moves ahead, his field of view changes continually. Since moving forwards opens up vista ahead and closes the vista behind, a movement enables a person to see a portion of the environment that was unseen before, but he also leaves what he had seen behind. The observer is then defined as a 'reader' who has an active role in interpreting the building based on this movement. The structure of optical flow consists of potential information needed by someone who moves and navigates in a building. This pattern of visual information is temporal and specific to the path a person who navigates go through.

## Conclusion

Seeing as the visual mechanism that relates the human body to the interior environment has a significant role in creating a human experience in an interior space. Seeing is conceived as a transaction between human and architecture that involves the process of perceiving, understanding and experiencing the space. The activity of seeing is carried out both when one is in a static and dynamic position. Both positions of seeing affect how interior space is seen. A static position creates a point of observation that gives someone a visual range with views determined by the body's shaft motion, head motion, and eye movement. It enables one to experience and construct the interior environment based on their vertical and horizontal views. In contrast, a moving person sees through a path of observation. From this path, a person can see with different viewpoints, experiencing a diversity of views and obtaining a flow of information. This kind of information is important for someone who navigates in the indoor environment to control and plan the move to the destination. Therefore, the role of seeing is significant in creating the ways people experience and understand the interior space. Considering the visual mechanism that occur during the experience of seeing is an important aspect in interior design which can trigger a better relationship between human body and interior space.

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