Chapter 2

Literature Review

This chapter is a review of the theories, literatures and former research as a research background, including literatures pertaining to environmental behavior studies, visual preference, and discussions relevant to issues with regard to those theories.

This chapter can be divided to following parts:

- Environmental behavior studies
  - Environmental perception
  - Aesthetic response to environment
- Visual preference
  - Reviews of visual preference
  - Visual preference and the built environment's characteristics

2.1 Environmental Behavior Studies

2.1.1 Environmental Perception

According to Rapoport (1977) "perception" can be classified into three usages as followings:

- Firstly, people perceive or experience through all sense modalities which are hearing, sight, smell, taste, and touch. It is called environmental perception.
- Secondly, the term of perception is applied to the environmental cognition. This usage can be understood that when people come to know the environment through information which is not experienced directly, people understand, learn, and apprehend the environment by messages from media and other information systems.
- Lastly, people evaluate the perceptions in term of preference. The preference can be evaluated the experience and indirectly known environments as advantage or disadvantage, desirable or undesirable, good or bad. This usage accounts for environment evaluation or preference.

Rapoport's categorization shows that perception, cognition, and preference are intertwined process of people's response to the environment which can explain how the environment is perceived, remembered, and valued (Rapoport, 1976). The study of perception, cognition, and preference are intertwined and it is hard to separate each process.

According to Down and Stea (1973), perception has more direct sensory references than cognition. Cognition needs not be linked with immediate behavior and proximate environment. Perception is a subsystem of cognition and a function of cognition. Perception can be defined differently, but it is always conceptualized as a response of people to environment. Studies on perception, including cognition, are helpful to the environmental design. For example, empiricist and gestalt theories are perceptual theories that can be applied to that field (Suthasupa, 1994).

Besides, Ittelson (1973) suggests that environmental perception is including five interrelated levels of response and analysis, which are affect, orientation, categorization, systematization, and manipulation. This complex process involves emotional responses coupled with cognitive judgments relating to the identification and analysis of environmental features as well as an acknowledgement of the interactive nature of the interface between observer and environment. He also purposes that those levels continuously interact and change over time, and are also a function of how an observer chooses to conceptualize the environment under observation.

Appleton (1975) suggests that the way in which an observer chooses to evaluate and conceptualize an environment is linked to two key theories that he has defined as 'Habitat theory' and 'Prospect-refuge theory'. Habitat theory describes that satisfaction in aesthetic, which is experienced in the contemplation of landscape, is risen from the spontaneous perception of landscape features in their shapes, colours, spatial arrangements and other visual attributes. Those play the roles as sign-stimuli indicative of environmental conditions favourable to survival, whether they really are favourable or not (Appleton, 1975: p69). Prospect-refuge theory relates to the notion that we tend to evaluate an environment in terms of the opportunities to see (prospects) and the opportunities to hide (refuge). Appleton purposes that these two theories underpin our understanding of the aesthetic properties of an environment. Certain aspects within an environment have the power to attract attention and therefore act as magnets due to dominant features or visual focal points. Buildings, under Appleton's theory, can provide effective symbolic substitutes for natural environmental features and can therefore also serve as magnets or places of prospect-

refuge. Appleton cautions that the existence of a wide variation in the aesthetic potential of particular places must be accepted and there are bound to be variations in preference in this regard (Appleton, 1975: p246).

According to Lynch (1960) perception and evaluation of urban environments is a two-way process. Environmental images arise as a result of this two-way process and these images. Lynch asserts comprise three components: identity, structure and meaning. Identity has to do with the notion that each environmental image is a separate entity and distinct from other environmental image. Structure relates to the spatial and relational patterns inherent in an environmental image. Meaning relates to the practical or emotional meaning that the environmental image holds for the observer. Lynch (1960) identified five key elements that contributed to a particular city's identity: landmarks, paths, districts, edges, and nodes.

Turning to environmental perception and evaluation, Rapoport (1977) suggests perceptual inputs pass through a series of filters that include cognitive judgments and affective responses. He suggests that the built environment partly organize the meaning and communication and the environment can be conceptualized as a form of communication (Rapoport, 1977: p325). Previously, Rapoport considered this communication to be of a somewhat universal nature that can be read, understood, and may elicit appropriate behaviors (Rapoport, 1977: p326). However, Rapoport (2005) considers that the level of congruence between the built environment and users or observers is influenced by cultural factors. Once again, it stands to reason about the construct of environmental quality which is multidimensional and complex itself (Craik & Feimer, 1987: p894). The construction of environmental quality is generally the focus of research in environmental aesthetics, and Nasar (1992)

considers that environmental aesthetics now stands as a unique and independent field of inquiry.

2.1.2 Aesthetic Response to Environment

Environmental Aesthetics

Environmental aesthetics has to do with appreciation of the environment as it affects our senses in a pleasing way (Carlson, 2000). According to Nasar (1992), environmental aesthetics are concerned with the interface between the objective physical characteristics of human habitat with the subjective responses of humans to such environmental characteristics and environmental aesthetics represents the interface of two areas of inquiry: empirical aesthetics and environmental psychology (Nasar, 1992: pxxi). Empirical aesthetics in this context refers to the systematic study of aesthetics using experimental methodology with a focus on issues such as pattern perception, experience of settings and vistas, and definitions of constructs such as complexity, simplicity and congruity (Nasar, 1992). Nasar (1992) also notes that the distinction that has been identified between sensory aesthetics, formal aesthetics and symbolic aesthetics. Sensory aesthetics has to do with the pleasurableness of the sensations received from the environment (Nasar, 1992: p11). Formal aesthetics relates to the perception and appreciation of the somewhat more quantifiable characteristics of an environment such as shapes, complexities and so on. While symbolic aesthetics focuses on the associational meanings that an environment may convey. However, this study has been focused only sensory aesthetics.

Response to the Environment

Response to the environment is considered to include numerous and complex perceptual, cognitive and affective responses which in turn prompt behavioral responses (Ward & Russell, 1981). At this point, it may be appropriate to provide further explanation and discussion of the roles of cognition and affective appraisal in relation to environmental perception and evaluation.

Indeed, in term of environmental aesthetic response, affective appraisal and cognition judgment play important roles. Environmental responses include a complex interaction of affective and cognitive responses to environmental stimuli (Kaplan, 1987; Nasar, 1994; Rapoport, 1977; Ulrich, 1983; Zajonc & Markus, 1982). However, affective and cognitive responses may be of a non-linguistic nature and therefore difficult to quantify (Osgood, Suci & Tannenbaum, 1957).

Cognitive responses are considered to involve the processing of visual information along with a level of categorization and inferential processing that may or may not be conscious (Kaplan, 1992; Ulrich, 1983). Cognitive responses are considered to be learned to a certain extent and may therefore be open to influence from factors such as values, attitudes, culture, age, educational level, gender, past experiences and so on (Ulrich, 1983). Cognitive responses may result in cognitive judgements as a consequence of cognitive processes that recognize, categorize, predict and evaluate environmental stimuli (Kaplan, 1992).

In attempting to measure meaning in terms of affective appraisal and cognitive judgements, Osgood, Suci, and Tannenbaum (1957) found three key factors: evaluative, potency and activity. The evaluative factor was linked to measure variables such as good-bad, beautiful-ugly, and pleasant-unpleasant; the potency factor was linked to variables such as large-small, strong-weak, and rugged-delicate;

while the activity factor was linked to variables such as fast-slow, tense-relaxed, active-passive, and so on. Osgood et al (1957) assert that while meanings may vary multidimensionally, the evaluative, potency and activity factors are stable. In addition, they suggest that the pervasive evaluative factor in human judgment regularly appears first and accounts for half to three-quarters of the extractable variance (Osgood et al, 1957: p72).

Russell, Ward, and Pratt (1981) suggest that the affective and cognitive components of environmental responses are highly interrelated and therefore difficult to separate, they also suggest that the affective component comprises three dimensions: pleasure, arousal and potency/dominance (Russell, 1988; Russell et al, 1981; Ward & Russell, 1981). These three dimensions are considered for summarising the emotion-eliciting qualities of environments (Mehrabian & Russell, 1974: p8). Previously, Ward & Russell purposed that these responses are highly interrelated in complex ways (Ward & Russell, 1981: p122). However, more recently it has been suggested that responses to affective qualities are linked to only two dimensions: hedonic (pleasure-displeasure) and arousal (inactive-active) and the potency dimension is now considered to represent more of a cognitive judgment than a dimension of affective quality (Russell, 2003).

A range of descriptors has been linked to the hedonic and arousal dimensions and these have been found to be useful in quantitative studies relating to perception of affective qualities.

A sample set of these descriptors are detailed in Figure 2.1 wherein I and II represent the pleasure and arousal components respectively.

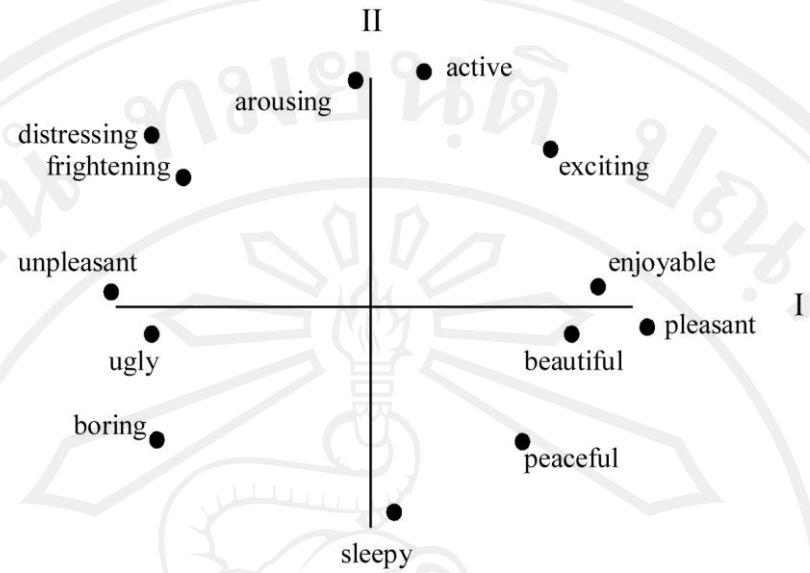

Figure 2.1 Affective descriptors of environments (Russell, Ward & Pratt, 1981)

Aesthetic Response to Building Attributes

Studying aesthetic response to the built environment is including cognitive judgments about building attributes, affect to the emotional reactions, and affective appraisal in terms of the connotative meanings that particular building attributes may convey (Nasar, 1994; Stamps, 2000). According to Hershberger (1992), forms, colours, and spatial configuration of the built environment that may influence overall aesthetic response; and, due to the variation among such elements, that the relationship between aesthetic response and the built environment may be difficult to describe and predict.

In context of aesthetic response to building attributes, Nasar (1994) considers that a complex process involving perception, cognitive judgments, affect and affective appraisals. Besides, the respondent's personality, affective state, intentions and cultural experiences, and so on, also impact on the process of perception, cognition and affective appraisal. In response to the complexity of this entire process, Nasar

(1994) proposed a probabilistic model of aesthetic response as detailed in Figure 2.2. These involve two dimensions of affective appraisal discussed earlier: the hedonic dimension (pleasure-displeasure) and the arousal dimension (inactive-active); and cognitive judgements concern to preference, size and congruity (Mehrabian & Russell, 1974; Osgood, Suci & Tannenbaum, 1957; Russell, 1988; Russell, Ward & Pratt, 1981; Ward & Russell, 1981).

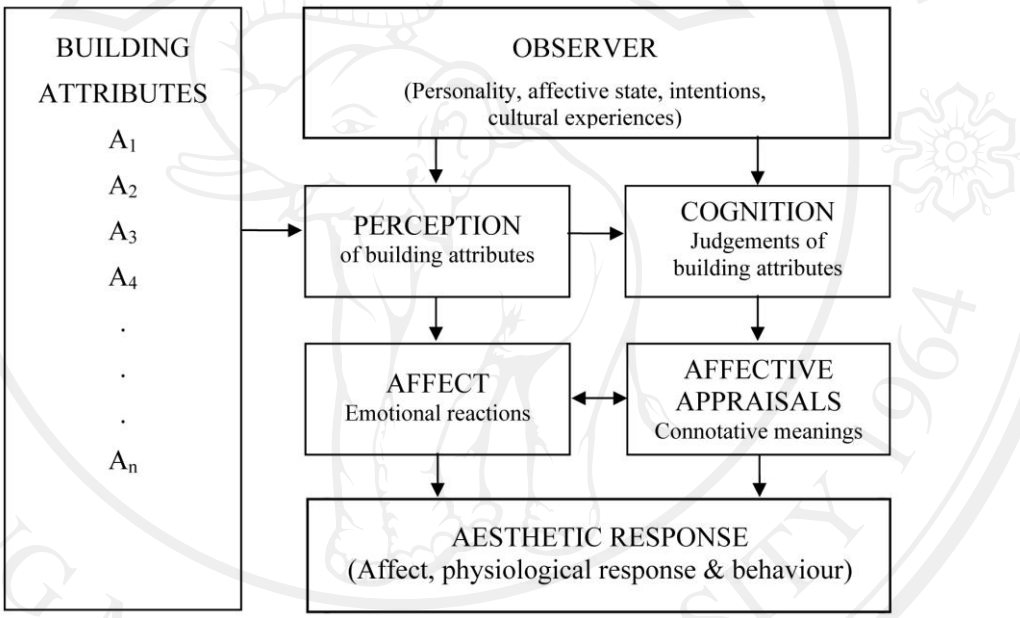

Figure 2.2 Probabilistic model of aesthetic response to building attributes (Nasar, 1994)

In the field of preference, a distinct from aesthetic judgment is considered to involve cognitive judgments about whether the building is liked or disliked. As with environmental preference, this type of cognitive judgment may be conscious or not and generally involves an assessment of the potential and capacity of an environment to meet human needs (Kaplan & Kaplan, 1982; Zube et al, 1982). In studies that focus on preference to objects or environments, the construct of these studies is

generally represented by the variable like-dislike (Caivano & Rimoldi, 1996; Herzog, 1992; Kaplan & Herbert, 1992; Tannenbaum & Osgood, 1952).

According to O'Connor (2008), components and dependent variables of the construct of aesthetic response can be represented as following table (see Table 2.1).

Table 2.1 Components and dependent variables of the construct of aesthetic response (O'Connor, 2008)

Component	***Dependent variables***
Affective appraisal (Evaluative dimension)	*Beautiful-ugly*
	Pleasant-unpleasant
Affective appraisal (Arousal dimension)	*Stimulating-boring*
	Exciting-dull
Preference	*Like-dislike*
Cognitive judgment: Size	*Large-small*
	Dominating-insignificant
Cognitive judgment:	*Congruity Harmonious-inharmonious*
	Fits/Contrasts with surroundings
	Sympathetic-unsympathetic

2.2 Visual Preference

2.2.1 Reviews of Visual Preference

Study on visual preference is often found in the studies of environmental perception. This literature is also mentioned to solve the topics of the research. Regarding to this, Rapoport (1977) suggests that, visual preference deals with an evaluation of the environment perceived through direct senses of environmental perception as well as media and memory of environmental cognition. There is a dichotomy between two parts of preference which are cognitive mediated and direct and immediate (Kaplan, 1987, 21).

Visual preference is considered a product of the interactions between people and environment or a response of people to environment stimuli. Visual preference shares characteristics of aesthetic response, involves the process of stimulus seeking, selection, processing, and response to stimuli (Im, 1983). The variables of visual preference are including physical, abstract, symbolic, or individual variables (Im, 1987; 1983).

The physical magnitudes of the environment such as color, size, form, texture, area, and perimeter and the basic properties are referred by the physical variables. They have been focused by designers to their characteristics and can be contributed to design approaches aiming at the visually pleasing environment. Complexity, congruity, and novelty are main factors of abstract variables, which have been the focus of visual preference studies because they are conceptualized characteristics of physical environment. For conclusion, visual preferences are an evaluation of the perceived environment and help the designers to develop visually pleasing products as perceived by viewers.

2.2.2 Visual Preference and the Built Environment's Characteristics

Peterson (1967) and Im (1987) confirm the relationship between visual preference and the built environment's characteristics. Peterson (1967) shows that physical attributes can affect the desirability of the visual appearance of the residential environment. Im (1987) proposes that visual preference can be affected by physical variables, including texture, color, and shape of space components, as well as ratios among various dimensions. It can be understood that visual preference is a dependent variable, the built environment's characteristic is an independent variable, and the requirement of the built environment' characteristics for achieving a desirable level of visual preference.