An Ecological Aesthetic in Restructuring Urban Landscapes

Two Cases in Seoul, South Korea

by

Byoung Wook Min

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Graduate Supervisory Committee:

Edward Cook, Chair
Katherine Crewe
David Pijawka

ARIZONA STATE UNIVERSITY

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ABSTRACT

As a significant level of the reformation and transformation of our society has been provoked by environmental deterioration, ecological approaches in environmental design have drawn much attention from professionals as an alternative world view and also as a practical design approach. Particularly in landscape architecture, ecological understanding has been at the very core of the profession since its emergence and plays an important role in the decision making processes.

While ecology supports the profession with an objective rationale, aesthetics plays another major role in providing various understandings about the aesthetic experience of people, which is rather subjective. However, the ways to seek the balance between them are still controversial. Furthermore, the conventional aesthetic value system of landscape appears to have limitations for guiding us to an appropriate appreciation, especially in dealing with newly emerging urban landscape patterns such as regeneration of post-industrial landscapes.

Understanding these issues, there have been continuous attempts to describe the relation between ecology and aesthetics, suggesting that a new approach known as "ecological aesthetics," can bring us a new set of viewpoints seeking a reunion of nature and culture, and science and art. It asserts that “there is a type of beauty” in the landscape associated with its ecological health which people could aesthetically appreciate; and therefore, revealing the

"hidden" beauty of nature in more visible ways should be the primary concern of today's ecological designers.

This research mainly consists of extensive literature research and a case study on two landscape restructuring projects of post-industrial landscapes in Seoul, Korea. The literature research redefines the tasks of landscape architecture based on the idea of ecological aesthetics, and the case study seeks the potentials and limitations of current design projects. This research proposes a framework for landscape perception and reflects on the lessons that would be useful for better practice and research.

Dedicated to my parents and those who have given me strength

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Chapter 1

INTRODUCTION

1.1. Background

For the last several decades, we have witnessed a significant level of reformation and transformation of our society provoked by environmental deterioration, human alienation, social disintegration, ideological conflicts, and other globalization. As a response, ecological approaches in the fields of environmental design and planning have grown as an alternative world view of the professionals as well as the general public. It has also been broadly recognized that sustainability is one of the most pressing concerns for our society and global security.

Since its emergence as a professional discipline, landscape architecture has emphasized ecological understanding at the core of its inheritance; and landscape architects have tended to care more about nature and ecology than other design disciplines. They tend to use the term “ecological” commonly to justify their designs and evoke a sense of “goodness” (McHarg, 1969; Mozingo, 1997; Steiner, 1999; Spirn, 2002). However, there is also an aspect of art in the discipline that focuses more on the visual preference of the landscape. Koh (1987) argues that environmental designers are distinguished by their professional concern for and their role in enhancing the aesthetic quality of the built environment.

The two different points of view on the profession are fundamentally caused by the diverse meanings and different interpretations of “landscape” and “nature” among different groups of people and schools of thought (Corner, 1997; Mozingo, 1997; Spirn, 2002). In fact, many ecologically oriented landscape projects turn out to be less scenically attractive; and conversely, more visually pleasing projects often tend to be less ecologically functioning (Gobster, 1999; Gobster et al., 2008; Hough, 1995; Nassauer, 1997, 1995, 1992; Thorne et al, 1991). It seems that there still have been long conflicts between the two groups in defining the role of landscape architecture: those who consider the profession as “conceiving and shaping complex systems” and those who see it as “part of the art of our time” (Mozingo, 1997; Spirn, 2002).

However, there have been continuous attempts to reconcile these two contrasting paradigms in landscape architecture and environmental aesthetics, claiming that a new aesthetic approach as known as “ecological aesthetics” can bring us a new world view seeking for the coexistence and reunion with nature and culture. This basically asserts that “there is a type of beauty in the landscape that is associated with its ecological health, diversity, and/or sustainability” (Gobster, 2008), and thus revealing the beauty in more visible ways should be the primary concern of ecological designers (Orr, 2002). Nevertheless, first because the ideas of both “aesthetic” and “landscape” are broad and ambiguous, second because the discussions on this issue are less evolved in design fields than philosophical and theoretical ones, it seems that there is not extensive

empirical research done or relevant design strategies formulated to apply to actual design implementation.

Reflectively asking ourselves if we are in a “truly” aesthetic environment and if the landscape that we create is contributing to the quality of our life, it would be very worthwhile examining the overall range of discussions and (re)defining the relationship between ecology and aesthetics so that we can advance the new theoretical foundation and a more concrete way of design for the 21st century.

1.2. PROBLEM STATEMENT

This study starts from a simple question “What is good design?” in landscape architecture. Since the main subject of landscape architecture is public open space, appropriately responding to contemporary social demands would be the most critical condition to be a good design. Therefore, this statement indentifies the most current issues that our society and environment face in terms of an emerging new urban landscape typology, concerns about the quality of life, and issues that ecological design has.

▪ Newly Emerging Urban Landscape Patterns

If “revolution in the aesthetics of nature often takes place when people (should) start appreciating the parts of nature formerly regarded as aesthetically negative” (Saito, 1998), today’s situation regarding the urban environment probably deserves significant attention when considering a new aesthetic

paradigm. For example, recently completed landscape projects such as Landschaftspark Duisburg-Nord, Germany, Downsview Park, Toronto, Canada, Fresh Kills, New York, U.S.A., and other projects situated on post-industrial and brownfield sites are highly associated with ecological approaches. These do not seem to be easily appreciated within the traditional aesthetic value system of “the beautiful” or “the picturesque.” They are rather rough and coarse in appearance while having “certain” meanings and narratives that interest and encourage people to engage. Although there are a number of sites with these distinctive characteristics emerging, there is not much research about how those sites can and should be aesthetically treated and perceived.

- **Increasing Concerns of the General Public for the Quality of Life**

The attention of aesthetic theorists has shifted in last several decades from a traditional positivistic look at art objects and from the reflective discussion of the idea of beauty to the current concern for subjective or experiential interactions with environment (Berleant, 1997, 1988; Koh, 1987). This might indicate that the main agent of aesthetics has started to change from “art lovers” to the general public and their concerns. This may be especially significant when environmental well-being and democracy are one of the most critical underpinnings to support common wealth and the sustainability of our society.

The main subject of landscape architecture is public (open) spaces and thus, the everyday life of the general public. However, a large part of its design theories rely upon architecture and other design disciplines due to the inherent

inclusiveness and large extent of the field (Corner, 1999; Meyer, 1997). While architecture, whose subjects are mostly static objects has a long tradition of focusing on forming principles rather than “environment (Koh, 1987).” Regarding the nature of the profession which mostly deals with public open spaces, aesthetics as a design theory in landscape architecture still needs more efforts to become more relevant to social issues concerning aesthetic-related matters in ordinary life. Therefore, a new paradigm of environmental aesthetics should explicitly redefine the relationship between the urban landscapes and the public inhabitants.

- **Negative Perception on Ecological Design**

In order to cope with the current environmental degradation and deterioration, ecological approaches are widely considered as one of the most desirable solutions in current design and planning areas, although its aesthetical values are not broadly appreciated by the general public. Even some designers seem to think that they would have to sacrifice the aesthetics to follow an ecological approach. Jencks (1995) elucidates that one of the potential factors in the poverty of good ecological design today could be due to the people’s perception that many ecological design products are not visually attractive or physically comfortable. Design is a profession that, conceptually, activates the communication between the designed products and users, and thus well-established communication is one of the most important aspects to assess whether the design is successful. This potential slump of ecological design of

“unattractiveness” of ecological design to the public might be attributable to some kind of inability to effectively communicate. If an analytical framework of landscape aesthetics could effectively respond to communication issues, and further provide prescriptions to the involved players - the designers, designed products[1], and perceivers - then attempting to seek a possible alternative aesthetic would be very worthwhile.

For either newly created or restructured landscapes, it seems that the conventional aesthetic value system does not guide us enough to an appropriate appreciation both in professional and public realms. Also, the quality of public open space has become increasingly important in urban life as democracy and public participation in our society have become more important. Nonetheless, there has been a lack of information of “everyday” aesthetics which can inform the public about the quality of their environment. Lastly, criticism has been made that ecologically designed products, especially landscapes and buildings, do not have adequate “aesthetic” values to satisfy both designers and the public. For these reasons, an alternative aesthetic is worthy of more discussion and examination in both theory and practical applications.

1.3. RESEARCH OBJECTIVES AND QUESTIONS

Thus, based on the big question, “How can landscape design contribute to the current urban context?” the main research objectives are formulated:

[1] Design products in landscape architecture in this research are urban open spaces and built or modified landscapes in urban areas.

Firstly to understand the conceptual framework of how ecology and aesthetics work in performing landscape design and planning;

Secondly to seek an aesthetic that can reconcile the conflict between the two contrasting paradigms in landscape architecture, one that considers quality as ecology in the physical landscape, and the other that considers quality as the aesthetic experience of humans;

Thirdly to clarify the potential gap between landscape and people as well as the role of landscape design;

And lastly to propose practical ways of design that can effectively support and activate the communication. The following three main research questions are to be answered in this research.

1. What is an ecological aesthetic in the current situation of urban landscapes?

This question particularly asks how ecological aesthetics has emerged and what it implies about today's urban landscape. The answer includes delineating the fundamental relationship between ecology and aesthetics in urban landscapes, and then outlining the characteristics of ecological aesthetics. Exploring the factors influencing the perceptions of people on urban landscapes and summarizing the factors, particularly related to the design implementation of landscape architecture, are to follow in this discussion. Furthermore, in this regard, the definition of ecological design in landscape architecture is to be argued.

2. How can landscape design realize the idea of ecological aesthetics?

There can be a number of ways that landscape architects interpret ecological aesthetics into their design practices. According to the meaning of ecological aesthetics and ecological design in landscape architecture, the answer includes the task of landscape design and the ways to carry it out. Therefore, the answer is to redefine the main design subjects that landscape architecture should deal with for the idea of ecological aesthetics previously defined, and then to explore some design concepts (languages) that support the design subjects identified. These design languages are to be utilized as a framework in the empirical research following to examine the communicational issues among landscape, landscape architects, and people.

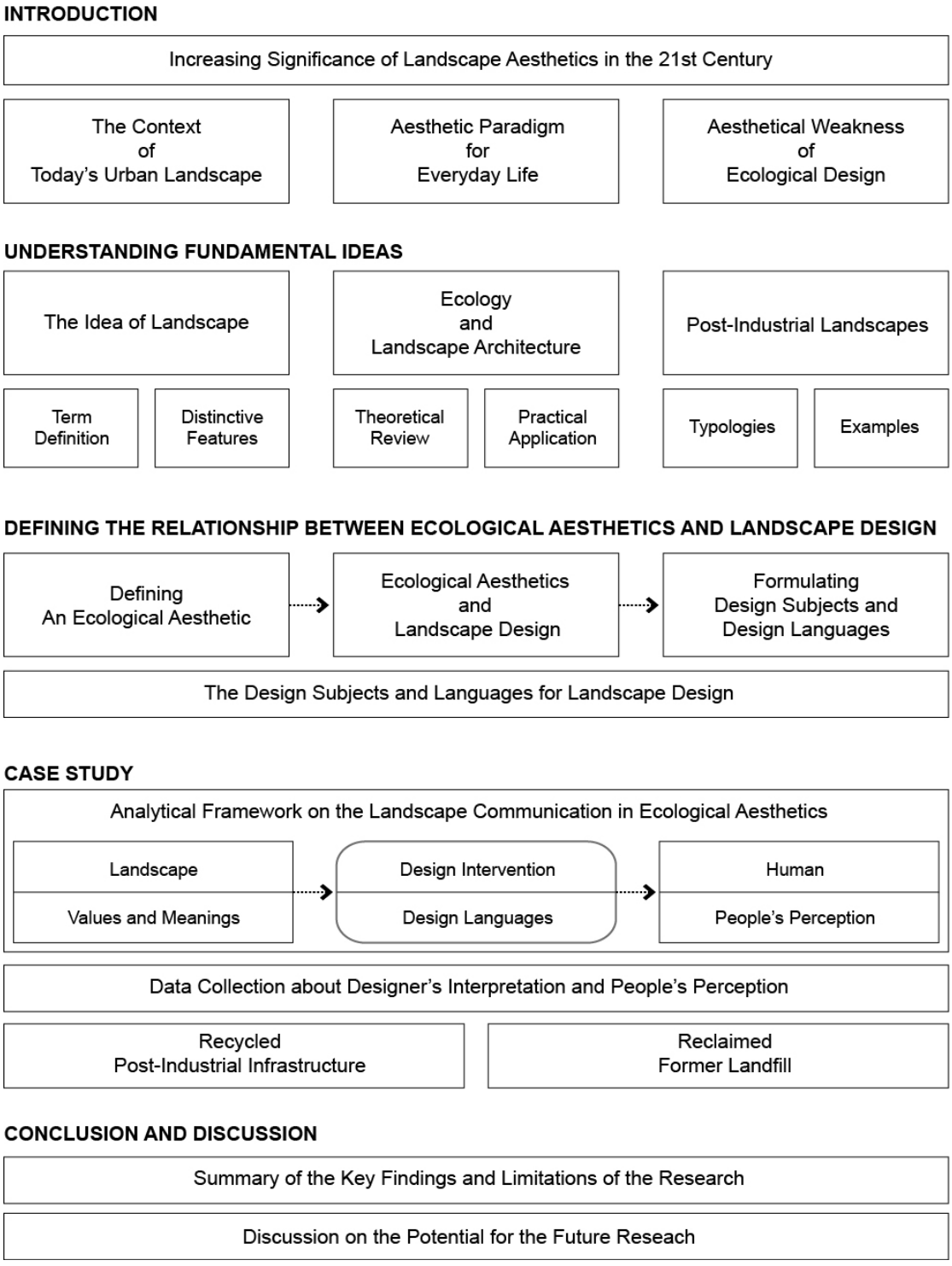
3. What are the characteristics of the gap between landscape design and public perception in ecological aesthetics?

Assuming that there are some differences in the ways of understanding and appreciating a landscape between designers and the public, this research attempts to clarify the gap by implementing a case study on two landscape design projects in Seoul, Korea. The case study is to inspect how the design subjects and languages are applied in an actual situation and how the public perceives the landscape in their own understandings. Supposing different typologies of landscape require different approaches from designers, the final answer of this question is deduced from the patterns of the correlations between designers' attempts and users' perceptions.

Chapter 1 has identified the subjects and significance of this research clarifying the problems, research objectives, and questions. In chapter 2, an extensive literature review investigates the fundamental ideas and their relations about landscape, ecology, post-industrial landscapes, and the position of landscape architecture. Also, it attempts to frame an ecological aesthetic in the current social and environmental context, and to define the meaning of ecological design in landscape architecture. It finally proposes the tasks of landscape design by means of design subjects and design languages which are used as a hypothetical framework for the empirical case study following. Chapter 3 presents the research method used in the case study. It includes the importance of case study, the context of the site, an analytical framework, and detail techniques used in interview and survey. Chapter 4 is a case study on two cases in Seoul, South Korea. It consists of the descriptive analysis on the results of the case study and more comprehensive discussions on both cases. Based on the results this study proposes a conceptual framework in the end of the chapter. Chapter 5 summarizes the key findings from this study and leads to critical discussions. It also identifies the limitations and the subjects of future research.

Research Outline

Figure 1.The Structure of Research



Chapter 2

FRAMING AN ECOLOGICAL AESTHETIC

First part of this chapter consists of an extensive literature research providing a fundamental understanding about landscape, ecology, aesthetics, and their meanings in the current research and practice of landscape architecture. The rest part of the chapter focuses on elaborating the nature and significance of ecological aesthetics and redefining the concept of “ecological design.” Lastly, this chapter more specifically argues how the idea of ecological aesthetics can be applied in the implementation of landscape design in terms of design subjects and design languages which are used as a analytical tool in the case study followed.

2.1. LANDSCAPE AND ECOLOGY

Definition of Landscape

It is very important to understand this rather philosophical question, “What is the meaning of landscape?” before exploring more specific topics in this research because on one hand, the answer provides the most general description possible of the phenomena to which it is applied; and on the other hand, lack of philosophical understanding of the concept might weaken the development of a theory. The term, landscape, has diverse meanings in its applications and different disciplines. It ranges from rural scenery, which is the most conventional concept, to urban scene or even to “field” of urban setting,

such as *townscape* and *streetscape* that today's geographers and environmental designers and planners commonly employ (cf. Corner, 1999, 2006; Bourassa, 1991). However, the origin of the word "landscape" comes from the Dutch word *landschap* and *landscap* meaning "painting representing natural scenery." The concept also covers the meaning of "region", based on the fact that the structural combination is *land* "land" + *-scap* "ship." When it is used as a verb, it means "to lay out lawns, gardens, etc., plant trees for the sake of beautification" which was first recorded in 1927 (Online Etymology Dictionary: http://www.etymonline.com).

The usage of the word is very versatile as well as somehow fuzzy in many fields; for example, in geography where the term was initially used, terms such as *region*, *area*, and *environment* have largely replaced landscape as the stated objects of scientific geographical study (Bourassa, 1991). Furthermore, Meinig (1979) articulates ten possible versions of landscapes that are landscape as nature; landscape as habitat; landscape as artifact; landscape as system; landscape as problem; landscape as wealth; landscape as ideology; landscape as history; landscape as place; and landscape as aesthetic. And it has also become a very popular term for those who are engaged in architecture and urban design nowadays. Since the very beginning of the 1990s, a number of architects started to habitually use or apply the term as their design strategies (Lootsma, 2002). However, just like in geography whose usage of landscape is imprecise and ambiguous (Cosgrove, 1984), the concept of landscape seems to be interpreted and applied differently by each architect through their work: some refer to it as physical forms such as vegetations associated with their buildings

while some see it in more abstract concepts such as its attributes of evolution or change. Its popularity nowadays is probably due to its versatility in application as well as providing a positive impression of being “green” or environmental friendliness.

Landscape and Environment

Much of the literature in landscape architecture and geography especially has drawn a common conclusion about landscape that it is a cultural (social) product or image based on which we “differently” conceive and interpret our environment (cf. Cosgrove, 1984). For instance, Nohl (1988) offers an example: “if we ask people in a city what nature means to them, there will be a whole bunch of diverse answers. People associate a multitude of qualities with nature such as health, peace, loneliness, freedom, and originality.” And these different images are influenced and modified by an uncountable number of variables coming from cultural differences, history of the place, individual experiences, educations, geographical contexts, and so on. Over time, landscapes indeed accumulated layers with every new representation, and these certainly thicken and enrich the range of interpretations and possibility (Corner, 1999). Therefore, any culture can read the local landscape’s autobiography to discover itself; and moreover, this can be seen as positive and constructive in a way considering the fact that the majority of this landscape is something that more honestly reflects the underlying forces to which it responds (Motloch, 1991).

In order to explore the meaning of landscape more precisely, it is also worth distinguishing the words, environment and landscape, while they are often used interchangeably without conscious. The meaning of environment refers to “that which environs or surrounds us” (Webster Dictionary, 2009), and we as observers are supposedly located in the center of it. Similar to landscape, environment is always in a way bound to the observer and his place of being. It may be nature in a natural state or a cultural environment, and it often includes completely artificial, man-made environment such as a building and interior as well. Sepänmaa (1986) points out that the concept can even be broadened to imaginary scenes, dreams, thoughts, and other related extensions of reality.

Although the meanings of both landscape and environment are extremely varied, there are some arguments identifying one another. While landscape implies rather cultural perceptions, the general notion and usage of environment probably tend to more frequently refer to the scientific and ethical aspect of the term such as environmentalism, environmental degradation, etc. Bourassa (1991) argues that environment obviously shares an objective, scientific connotation with the early geographical usage of landscape. In regard to this, Meinig (1979) provides an interesting distinction that “environment sustains us as creatures; landscape displays us as culture”; and “landscape is defined by our vision and interpreted by our minds.” Also, Appleton (1980) states that landscape is “the environment perceived, especially visually perceived,” which focuses more on the characteristic of visual perception in landscape. In other words, if environment is perceived by people, it can turn into landscape. It is more

apparent particularly in the field of aesthetics that the meaning of landscape has a sense of “perception.” Bourassa (1991) asserts that landscape implies the setting for everyday life and the aesthetics of landscape is the aesthetics of the everyday experience. In this sense, landscape here avoids merely being scenery where an observer sees it in a distance, and even emphasizes the observer as an existential insider who actually experiences and interacts with it (Berleant, 1997).

Ecological Principles

Ecology stands for a scientific discipline that is concerned with the relationships between organisms and their past, present and future environments (ESA, 1989). Begon et al. (2006) also clarify that ecology is interdisciplinary scientific study of the distribution and abundance of organisms and their interactions with their environment. Thus, it provides an understanding for protecting or enhancing: natural processes, such as succession and water flow; biodiversity, including rare species, fish and wildlife populations; and landscape elements, such as wetlands and stream/ riparian corridors (McHarg, 1969; Spirn, 1984; Hough, 1995; Steiner, 1999). Forman (2002) emphasizes the importance of the science of ecology in landscape architecture which extensively includes key portions of many other physical sciences such as geology, soil science, hydrology, and microclimatology that landscape architects have studied and applied. Furthermore, ecology also provides a practical framework through its inherently holistic and dynamic approach reflected in a system thinking and process-ordering focus.

There have been a number of attempts to define the ecological principles in the field of landscape architecture. Nevertheless, it is still not easy to distinguish the ecological principles from one another since the characteristics of nature as an organic system are highly interrelated. Yet, it is worth attempting to categorize them and examining how to apply them to actual landscape design and planning practices. These principles are particularly important because they are a fundamental base on which landscape architects can formulate their design languages and more reasonably interpret their meanings, whether directly or indirectly. Based on current ecological theories, five principles of an ecological approach are extracted and argued here: *Process, Carrying Capacity, Order, Diversity, and Economy (Efficiency)*.

Process:

The principle of process has been underlined by most, if not all, ecological designers and planners in landscape architecture. This principle implies that in general a landscape should be understood not as a static object, but as a process which has a lot of living organisms inhabiting it and on-going flows of energy and matter since landscapes evolve over time in response to ecological forces (Hough, 2004; Motloch, 2001). According to the ecosystem theory, this principle gives an understanding that, based on the temporal aspects of nature, an ecosystem is self-organizing and intelligent, and establishes the most efficient and integrated energy flow and material cycle system. Pulliam et al. (2002) assert that any given piece of the landscape is an open system, receiving and

contributing matter, energy, organisms, and information from and to nearby and even distant locations. Hence, designers and planners should consider individual sites in the context of broader landscape dynamics.

This principle can also branch out to another concept of regeneration of natural energy. Lyle (1994) describes nature as a regenerative system, so our design should support nature's regenerating capability and create forms to sustain and enhance natural processes. Besides, from careful examining of this ecological principle of process, we could also find a possibility of emerging alternative design aesthetics against the conventional ones based on appreciating static objects. Hough (2004) argues that when nature is seen as the form of a continuum which reveals its natural history and the continuing cycle of natural processes, the argument of what is beautiful or what is less so in the landscape becomes then of a very different order of meaning. Corner (2006) even attempts to employ and adapt this idea to urbanism combining not only natural but also social, cultural, and political processes in cities seemingly based on the theory of radical ecology.

Phasing plan[2] might be one of the most widely used design and planning methods to apply this concept of process in actual practices. James Corner, a landscape architect at Field Operations in New York, has frequently adopted this method, especially when dealing with relatively large scale projects such as Fresh Kills Park (2004) in New York and Downsview Park (2004) in Toronto

[2] It can be considered as a scenario-projecting plan after the design or planning is applied. Normally the time scale varies depending on the context of the project. Fresh Kills Park employed six phases in a forty year time frame for the new bio-habitat evolving program.

(Field Operations, 2006; Waldheim, 2006). In that phasing plan, he attempts to simulate how the site would evolve along the timeline by placing distinct programs on each phase such as “seeding,” “infrastructure,” “programming,” and “adaptation.” To be most accurate in this plan, a holistic and interdisciplinary cooperation is inevitable. In fact, according to the master plan, he worked with twelve different expert groups as well as community advisory groups to complete this plan (cf. Field Operations, 2006).

Carrying Capacity:

Odum (1971) stresses the significance that the carrying capacity of an ecosystem is neither variable nor infinite for human interference. Therefore, the principle of carrying capacity means that we should understand these limits and adjust our living patterns to follow them. Lyle (1994), however, argues that it is difficult to define the limits and know what those capacities are while sustainability requires using natural processes within their capacities. He further explains that mostly due to the many variables involved, applying the concept to other systems has met with limited success. Especially where human activity or habitation is concerned, complex and almost unpredictable behavioral patterns (including aesthetic preferences, material appetites, investment decisions, desire for profits, and others) enter the picture, making limits definable only in very general terms (Lyle, 1994).

The natural ecosystem has a resilience that provides the capacity to absorb shocks while maintaining its function; so when a change occurs,

resilience provides the components for renewal and reorganization (Berkes et al., 2002). Therefore, designers and planners should understand the limits; minimize supposedly negative human disturbances; and be able to project the possible consequences in environment so that the ecosystem can be restored and recharged with its own resilience.

Pursuing compactness of the built environment can be one of the concrete and tangible applications of consideration of the carrying capacity. Compactness is a widely accepted urban design strategy to achieve more sustainable urban form (Jabareen, 2006; Beately, 1995; Beatley et al. 1997). Intensification of urban form enables the protection of more natural landscape outside of the city, and thus gives the least stress to the ecosystem. It can also minimize transport of energy, water, materials, products, and people. In addition, greening brownfield sites can be a good example of a landscape architectural endeavor to take care of the carrying capacity of ecosystem. Based on the recycling and reusing strategy, turning the former pollution-generating objects into urban open space can provide enormous ecological and cultural benefits for the residents of a city (De Sousa, 2004).

Order:

The principle of order, which basically comes from the hierarchy theory, observes that there is a hierarchy in all landscape systems, and provides an understanding of the complexities of ecological systems particularly when they are large landscapes (Pulliam et al, 2002). Lyle (1994) categorizes this principle into three different modes of order: “structural order,” “functional order,” and

“locational patterns.” The structural order is linked to concepts of scale that represents the spatial or temporal dimensions of an object or process. Forman (1995) also elucidates that each landscape at different scale exhibits a certain spatial pattern, which is produced by a certain causative mechanism or group of processes. Thus, it refers to orderings of subsystems within systems, which in turn are components of systems at the next higher level and so on (Pulliam et al, 2002). The functional order describes the flow of energy and materials that distribute the necessities of life to all of the species within the structure, and they operate within certain rules that define the behavior of ecosystems (Lyle, 1994). The locational patterns signify that every ecosystem is determined by, and thus responsive to its location, the environment in the particular place. The three modes are not separable and highly interact with each other.

This idea, consequently, is particularly significant when landscape architects classify and understand landscapes particularly during the analysis phase of a design process, and to project how organisms within the system will interact differently after a change occurs. Furthermore, Hough (2004) explains, by using the term “connectedness,” that it is not simply a narrow band but is linked by smaller ecological elements to higher or bigger ones throughout the metropolitan area. Therefore, landscape architects should understand its larger context to appreciate a local place and vice versa. Van der Ryn et al. (1996) also stress the importance of tracing the environmental impacts of existing or proposed designs and using the information to determine the most ecologically sound design possibility.

Diversity:

Here the principle of diversity involves cultural, social, and biological complexity of elements in unity. For the biodiversity, the definition depends on the level at which it is viewed: genetic diversity within a certain species, the total number of types of living organism, and the diversity of ecosystems within a large area (Vroom, 2006). Cultural and social diversity is regarded as a precondition for its citizens' quality of life (Jacobs, 1961; Talen, 2006). Hough (2004) also underlines the importance of diversity for the reason that it provides living creatures with choice so that they can go for any of their preference based on the situation.

The principle of diversity also can involve a sense of place or identity of place. Having seen the devastation of local culture and homogenized landscape by modern globalization over the world, this concept implies that not only natural but also built environment should be biologically and culturally diverse so that it can ensure opportunities of choice to its inhabitants. For that reason, vernacular landscape and architecture, which are responsive to their natural and cultural contexts, are considered to be ecologically valuable.

According to the "edge effects" in shaping landforms, arranging spatial programs aims at increasing biodiversity. Edges between two different ecologies, such as land and water; forest and grassland; estuary and ocean; and crop and orchard, are considered as rich ecotone where we can find highly diverse organisms (Hemenway, 2001; Mollison, 1991). Thus, creating edges and maximizing the length of them in terms of vertical and horizontal forms of

landscapes is a useful design strategy to increase and sustain the biodiversity (Thompson, 2002). It has been also argued, especially by many New Urbanism theorists (cf. Duany et al, 2000), that increasing density and applying mixed land use can promote more desirable social and cultural features in urban area (Beatley, 1995, 1997; Jabareen, 2006; Talen, 2006).

Economy (Efficiency):

Concerning the carrying capacity, there is an interrelated ecological principle known as the principle of economy (efficiency)[3]. Knowing that the best or the most significant results usually come from the least amount of effort and energy expended, this principle implies that maximum environmental, economic and social benefits are available from minimum resources and energy. This also means the idea of "doing things small" since making small mistakes is infinitely preferable to making very large ones (Hough, 2004).

This principle shares the basic idea of McHarg's "fitness" where each area has an intrinsic suitability for certain land uses and finally that certain areas lend themselves to multiple coexisting land uses. Hence, identifying the suitability of an area enables the most economic and efficient land use in any given context. He also asserts that not only the considerations of topography, infrastructures of transportation, and site engineering, but also the natural resource, social, and aesthetic values should be included and integrated in this analysis. McHarg (1969) also stresses that we should bring the creative fitness and well-being of

[3] Hough (2004) names this as "the principle of economy of means" or "the principle of least effort,"

our environment not just by economic and technological reasoning, but by thorough examination of existing natural and social contexts. Forman (1995) also makes clear, “we hypothesize that for any landscape, or major portion of the landscape, there exists an optimal spatial arrangement of ecosystems and land uses to maximize ecological integrity.”

Suitability analysis can be one of the best examples that reflect the landscape architectural consideration on efficiency. It has been broadly used by landscape planners, which is “the process of determining the fitness, or the appropriateness, of a given tract of land for a specified use” (Steiner, 1999). Thus, the result of this analysis represents the most economic and efficient spot for the specific purpose. Another example can be drawn from the energy-responsive way of site design technology. A number of architects and landscape architects have developed this idea into concrete design strategies such as placing buildings and plant communities considering sun orientation, applying renewable energy-systems, collecting rainwater, recycling grey water, and so on.

An ecological approach is valid and useful in designing and managing urban environment especially since we have witnessed various environmental issues threatening our society and global security. This chapter has attempted to articulate the relationship between the science of ecology and landscape architecture. Ecology is deeply rooted in the philosophical thinking as well as practical methodologies in landscape architecture, and in fact, has provided a great understanding that landscape architects can utilize in their design and planning practices. As shown in the discussion, all principles are conceptually

and tangibly interconnected since an ecological approach in all landscape projects, in general, requires a holistic and interdisciplinary approach. Then, it could be projected that a new role of landscape architects could be evolved responding in the new way of cooperation with other disciplines. As knowledge holders and actual implementers, landscape architects have strong potential, and probably responsibility, to lead the interdisciplinary work force.

Urban Ecological Landscape

Distinguishing ecological landscape among other types in urban areas is an obstinate task in many ways because it is difficult to define and quantify the degree of ecological function of a landscape; and landscape itself already has diverse meanings as previously discussed. However, in a broad sense, urban landscapes could be categorized into two groups. Hough (2004) elucidates that the first one is the nurtured “pedigreed” landscape which is formally designed and requires relatively high level of maintenance, and the other is the “fortuitous” landscape of naturalized urban plants. Although both could contribute to urban ecological health, the latter can be regarded as a more ecological landscape if we appreciate its self-organizing and evolutionary features connected with the natural process which requires little human maintenance while the survival of the first one very much depends on high energy inputs and management. He further explains that those landscapes can be found everywhere in city from cracks and gratings in the pavement to an abandoned waterfront site which supports habitats for hundreds of species of birds (Hough, 2004). If we consider that the

pedigreed one has already been broadly appreciated by the urban public, then the latter one is more deserving of attention and research in the disciplines dealing with urban environment.

Yet, although an urban ecological landscape may tend to be more “fortuitous”, it might not always be necessary to distinguish a landscape by whether it looks neat or it is designed or it is naturalistic. But, rather importantly, it is essential to examine its structural system that supports how the landscape works and processes. Thus, we could define “ecological landscape” as a landscape that does not produce waste nor requires much energy and maintenance; and so, it tends to consist of native and indigenous species that have been systemically optimized for the environment to which the landscape belongs. In other words, in order to identify if it is an ecological landscape, we basically have to determine it based on how self-sustaining it is. In this sense, the ecological principles previously discussed can be a useful base to formulate the indicators for examining ecological landscape. However, in this research, the main focus is not about ecological landscape itself, but rather about the efforts and issues that people make a landscape supposedly more ecological and the public perception of the landscape.

2.2. LANDSCAPE AESTHETICS

Landscape Aesthetics

In order to further explore aesthetics of landscape, it would be necessary to have a good understanding about the area of aesthetics in general. Aesthetics

have been a subject of philosophical enquiry perhaps since the beginning of human thought. The word, aesthetic, is derived from the Greek *aisthesis* which means sensory perception, experience as well as feeling (Vroom, 2006). According to the Oxford English Dictionary, aesthetics refers to “the science which treats of the conditions of sensuous perception” and “the philosophy or theory of taste, or of the perception of the beautiful in nature and art.” Additionally, it is also often referred to as “critical reflection on art, culture and nature” (Kelly, 1998). However, while aesthetics is a philosophical science in general, there is a critical issue to be addressed especially when it is applied in design and planning fields as a practical theory, which is that aesthetics is after all conceptual and not so much empirical (Sepänmaa, 1986). Thus the term, aesthetic, might be too fuzzy to be actually useful sometimes. Koh (1988) exemplifies, for instance, “design students and professionals, when asked about seemingly whimsical designs, often answer, ‘it is just aesthetics,’ while non-designers and lay persons in similar circumstances would respond, ‘it is just design…’” Nevertheless, Sepänmaa (1986) argues that the task of aesthetics is to be theoretical and thus create models for specific research, otherwise it is just a comment showing whether the art object is interesting or not. This signifies that aesthetics should be a theoretical frame that can be adapted for any art or design research.

Landscape Aesthetics and Landscape Architecture

One of the most obvious things about “landscape” is that the concept does not only include an art object, but also the fields where both art and nature meet

together. As “conventional” aesthetics mainly handles beauty and fine arts, it has been of great difficulty for aestheticians to give as much attention to landscape as to aesthetic objects (Bourassa, 1988, 1990). Thus, the subject of landscape architecture can be identified basically as a discipline dealing with combination of “art” and “environment”, which Sepänmaa (1986) defines as an aesthetic object. Moreover, if landscape architecture is a discipline of various actions representing nature in culture and cultivating the ways we live with nature (Corner, 1999), landscape architecture has a significant task that should neither solely subjugate nor obey nature, but rather support the interactive communication between culture and nature as a whole union. Then we can suppose that in order to pursue a more inclusive and holistic approach to design and planning, there needs to be a theory in landscape architecture providing a practical as well as philosophical framework. The field of aesthetics might be a useful foundation for that, and maybe it is possible for us to reflect on the association between aesthetics and landscape architecture.

Furthermore, unlike aesthetics in a work of art, landscape aesthetics should be directly related to our everyday life because landscape is a field in which human beings always reside and live. In fact, a lot of the research on landscape and environment carries on at least a bit of aesthetic issues. However, most of it has focused on the applicable aspects of aesthetics such as simplified visual preferences and physical attributes of the landscape rather than resolving more fundamental and philosophical issues. However, Appleton (1975), in his book *The Experience of Landscape* which was the first attempt to establish a

theory of landscape aesthetics, avoids the idea of conventional “beauty”; and instead of asking “What is beauty in landscape?”, proposes to ask “What is the source of that pleasure which we derive from the contemplation of landscape?”

In order to answer the question, it should be understood that there have been two contrast paradigms where one views landscape quality as an inherent physical attribute - objective, scientific, and biocentric; and the other sees it as the perception of the physical landscape by the human brain - subjective, private, evolutionary, and anthropocentric (Bourassa, 1988; Lothian, 1999; Gobster et al., 2007). Both paradigms have long histories, having their roots in the contributions of philosophers over many centuries. Much of the literature in landscape aesthetics contends that the separation of “nature and culture” is due to the Cartesian ideology which is one of the most deeply-ingrained ways of viewing the world in Western thought (Corner, 1990, 1997; Lothian, 1999; Glacken, 1967). In parallel with that, there is a vision of nature as culture which is based on Kantian philosophy and Darwin’s evolutionary perspective (Lothian, 1999). In opposition to naïve notions of objectivism, it primarily emphasizes the practice and behavioral science. And it is also often called “social constructivism” or the “social construction of nature.” This rather psychological perspective on landscape aesthetics has brought great attention to many theorists and practitioners with its possibility to be a solid research method. The following table shows the characteristics of each paradigm.

Table 1. Summary of Objectivist and Subjectivist Paradigm (Lothian, 1999)

Objectivist or physical paradigm	Subjectivist or psychological paradigm
Landscape quality is an intrinsic physical attribute	Landscape quality derives from the eyes of the beholder
Assessed by applying criteria to landscape	Assessed using psychophysical methods
Subjectivity presented as objectivity	Objective evaluation of subjectivity

These two paradigms have been parallel to each other for a long time in landscape architecture also. There have been continuous criticisms about an undesirable disunion between the two of them. For example, Corner (1997) asserts that “the tension within contemporary landscape architecture between the rational, analytical, and objective ‘planners’ and emotional, intuitive, mystical ‘artists’ is but one fallacious outcome of this larger, dualistic paradigm.” Mozingo (1997) further describes this skeptical continuum in the profession where there are two groups of people criticizing each other saying “aesthetic exploration is trivial; ecological regimen is determinism not design.”

Nevertheless, corresponding to the conflicts, it has also been argued that there are some mutual interactions existing between nature and its cultural perception in shaping the landscapes, and that it is essential for the sustainability of both nature and culture (Naveh, 1995; Nassauer, 1992, 1995). Naveh points out that “the interaction of culture with landscapes is a reciprocal, and even cybernetic relation: not only do cultural impacts shape our landscapes but our view of landscapes is also a product of culture and this, in turn, is affecting our relation to these landscapes” (Naveh, 1995). Gobster et al. (2007) also elucidate that as humans, our sensory system is tied closely to our emotions, and our

emotional pleasure has a fundamental influence on how we respond to the stimuli of our world. With the concept of “care”, Nassauer (1997) further expounds on *cultural sustainability* which refers to “ecologically beneficial practices that elicit sustained human attention over time.” She also asserts that “if practices are not culturally sustainable, their ecological benefits may be compromised as land ownership changes hands, as development pressures increase, or as different political viewpoints arise” (Nassauer et al., 2001).

While it is very controversial to objectively assess and maintain the quality of landscape or nature since it has inherently multifaceted characteristics, in order to appreciate the quality of landscapes in a sensible way, we should understand that landscapes include the aspects of artistic and scientific, subjective and objective, the anthropocentric and biocentric views. Arler (2000) stresses the importance of holistic understanding of landscape qualities in landscape design and planning in that it should include not only expressions of the private preferences of viewers, but also objective values that could be shared.

It has also been argued that there has been a lack of theories, especially aesthetic or “design” theories, supporting the practice of landscape architecture (Corner, 1999). It is seemingly due to its inherent inclusiveness of the concept of landscape as well as its stronger focus on technical aspects (Corner, 1990). Also aesthetics here has a great potential for providing a philosophical and practical framework to bridge the gap between “knowing” and actually “practicing.” Through more discussing theoretically and practically on the objectivist and subjectivist paradigms, there might be an opportunity to reconcile this lingering

conflict in landscape architecture, and to further provide a better understanding of how our world works.

Context and Aesthetic Experience

According to the literature in environmental and landscape aesthetics, it is certain that there are interactions between the landscapes and humans, and aesthetic experiences occur during the interactions (Zube et al., 1982). However, there are also a countless number of variables that possibly influence the way we perceive the landscapes. For instance, as the definitions of nature and landscape vary significantly depending of the socio-cultural background to which perceivers belong (Cosgrove, 1984; Spirn, 2002), the aesthetic experience for them should also differ from one another. This can be understood as a contextual issue which can be grouped into two kinds of contexts: landscape context and situational context (Table 2).

Table 2. Components of Context (Gobster et al., 2007)

Landscape Patterns and Features		Aesthetic Experience Type
Landscape Context		Situational Context
Land use	Landscape type	Familiarity & past experience
Spatial extent		Mood
Ownership type		Expectations and intentions
Cultural history		Activity (e.g. work, leisure)
		Social setting (alone, w/others)
		Socio-cultural norms

The landscape context includes the physical attributes of the landscapes, land use patterns, ownership, etc.; and the situational context covers from individual memory of a perceiver to socio-cultural norms due to education and

history. According to the idea that aesthetic experiences can be highly influenced by contextual characteristics, the aesthetic experience can be evoked by diverse aspects and attributes of the context. In particular, different landscape types can affect the aesthetic experience of a perceiver differently, and so humans can have different levels of perception for each type of landscape. For example, publicly owned landscapes of large extent that are perceived as wildlands or wilderness are likely to be the settings for leisure activities, and evoke experiences that most people associate with scenic beauty. Conversely, privately owned landscapes of large extent that are dedicated to agriculture evoke personal expectations and cultural norms of people working in harmony with nature, and an experience type that is related to human care (Gobster et al., 2007).

2.3. POST-INDUSTRIAL UNBAN LANDSCAPES

Definition of Post-Industrial Landscapes

In the process of building cities and accommodating the growth of cities, particularly during the industrialization or modernization, we created a number of excessive urban structures and spaces which are not responsive to the standards of our society and environment nowadays. Due to their economic, social, environmental, or even political issues, some of them are still in use, but some have been no longer serviceable.

Consequently, over the past few decades, globalization, deindustrialization, industrial relocation and economic (re)conversion have had a

profound effect on traditional industrial areas all over the world and produced a vast array of outdated industrial facilities and various impacts, which are generated from them. They are former factories, water supply facilities, landfills or even mega infrastructure such as thoroughfares and overpasses. In order to cope with this phenomenon, there are emerging efforts to address the legacy of contaminated and derelict lands that have been left by past industrial activity (Hough, 2001).

In North America and Europe especially, these efforts have led to a kind of "inner city recovery," as thousands of under-utilized brownfield sites have been cleaned up and redeveloped. Brownfield here is generally defined as abandoned and underutilized industrial properties that are known or suspected to be contaminated (Russ, 2000). The most widely accepted definition of brownfield is the one provided by the US EPA (1997, p.1), which defines them as "abandoned, idled, or under-used industrial and commercial facilities where expansion or redevelopment is complicated by real or perceived environmental contamination." De Sousa (2003) also points out that this term is used to refer to both known contaminated sites and those only suspected of being so because of previous land-use activities (e.g. waste disposal, manufacturing, service stations, etc.).

In short, post-industrial landscapes can be summarized as sites that have been affected by the former uses of the site and surrounding land; are derelict or underused; have real or perceived contamination problems; are mainly in developed urban areas which require intervention to bring them back to beneficial use.

Typologies of Post-Industrial Landscape Restructuring

Preservation:

Hough (2004) argues that the recognition of value in the waste lots, the derelict railway sidings, gap sites awaiting redevelopment but currently not managed, where weeds grow up and a sense of freedom can create cultural excitement. Thompson (2002) supports this idea considering the possibility of a different philosophy of landscape management and design. She goes on with this discussion proposing that those sites could be alternative urban parks which might encourage the cyclical nature of plant growth and succession, and provide supplementary cultural outdoor activities that only can happen within that context. Furthermore, functioning as small patches and corridors with their high ecological values, those remnant spaces might greatly contribute to a higher green matrix system as well (Thompson, 2002).

Natur-Park Südgelände in Berlin, Germany shows an attempt to link natural conservation and recreational use in an urban area. The site of the park had been an abandoned rail yard for more than four decades, and became urban woodland with diverse plants and animals. The woodland has now become a popular urban park after some careful design interventions were applied, such as limited access and raised walkways. However, due to the relatively small size of the site, some are worried that there is too much human disturbance to the ecosystem in the park, and that the facility arrangements should be adjusted (Kowarik et al., 2005). While accepting the visible and tangible process of nature is important in many ways and attractive to the public (Van der Ryn et al., 1996;

Keil, 2005), a more conscientious design intervention seems to be required so that the ecological processes and cultural appreciation can be more sustainably balanced without interrupting the ecological processes within the site (cf. Kowarik et al., 2005).

Revitalization:

The abandoned sites from the industrial period have become an urgent concern in almost all the industrialized countries, and those landscapes have great potential to improve the biodiversity and ecological function as well as provide accessible, natural open space for public use (De Sousa, 2004; Hough, 2004; Hands et al., 2002). To scope with lots of complex environmental problems and to increase the ecological quality of the urban environment, an ecological approach is often employed, and many of them are regarded as successful.

Landschaftspark Duisburg-Nord in Germany is a good example of ecological landscape integrated with the remnant former factory structures (Shaw, 2002). One of the reasons why this project can be deemed to be a successful ecological approach could be that it has provided a new landscape aesthetic which integrates diverse cultural activities with revealing ecological processes. The landscape in the site is not just a visual object but actually a working system ecologically evolving itself as well as incrementally cleaning the soil contamination and purifying the water system (Keil, 2005). It might have been untidy wilderness with industrial residues, thus simply ugly and disfavored by the public; however, its aesthetical quality has been appreciated by the visitors due

to the implicitly contained meaning of ecological history (Keil, 2005). Revealing the meaning of the natural processes and history could be one reason; another main factor of the success can be attributed to the careful design intervention. Henne (2005) argues that when the irregular shape of wilderness is juxtaposed with the regular form of an artifact so that a visual contrast can be achieved, the perceived aesthetic quality can be increased. This principle is especially interesting in today's context of cities in which we could easily find the residues of industrial activities from previous decades, so it should be deserving of more attention in design research.

The following is another example showing how design engagement can enhance visual preference. Hands et al. (2002) have conducted an experiment in the city of Niagara Falls, Canada, to assess visual preference in ecological rehabilitation sites. The conclusion is that the use of "vernacular cues to care" such as bird boxes and large rocks, and the amount and diversity of color in the landscape increase the visual preference while sparseness of vegetation was a major reason for negative preference (Hands et al, 2002). This implies that wilderness with a certain amount of artificial interfaces in which people can actually interact with the landscape is often more preferred by the public than wilderness itself which might look just messy and inaccessible. Nassauer (1995) emphasizes the importance of the cues that indicate human intention in ecological landscapes. She argues that using cues is a means of adapting cultural expectations to recognize a new landscape which has greater biodiversity.

Restoration:

Restoration of riparian landscape can be another representative example of ecological landscape design. Restoring rivers has also become a common practice in ecological restoration among industrialized countries for the last few decades. Reconsidering the negative images of the past civil-engineering-oriented, concrete-covered urban rivers, there has been a paradigm shift in the practice of river engineering toward more naturalizing, thus, ecologically well-functioning rivers (Boon et al., 2000). Although there needs to be more research done to justify a general statement about the relationship between aesthetics and ecological quality, one of the interesting lessons we can find, particularly in the project of ecological restoration of riparian landscape, is that there is a relatively strong proportionate relationship between aesthetic preferences and ecological quality (Junker et al., 2008).

However, there are some difficulties in introducing ecological innovation to riparian landscape. Nassauer (1992, 2001) argues that the public tends to perceive the riparian landscape as already beautiful, perhaps just because there is water and natural landscape which is one of the well-known and favorable compositions that people have in mind, while there is much to be ecologically compromised. To overcome this issue, she further stresses the importance of culturally sustainable innovative design and planning which can help increase public knowledge so that they can appreciate it not as a static object, but as a continuing process.

Energy-Responsive Design:

Once it is related to energy issues, it might be meaningful if we look at the landscapes closely connected with our dwelling systems. It does not mean that other urban landscapes do not have the functions of energy efficiency in our life; for example, many of us know that there are critical elements that could reduce urban heat island effect, but the nearer ones are more easily influenced by our "care", ecological maintenance, and design modification due to physical proximity and belongingness in regard to energy efficiency (cf. Nassauer, 1997; Mollison, 1991). If so, a residential or housing site in urban woodland is potentially a good example to investigate the relationship between daily human interventions and ecological functions to pursue a better use of energy. In this case, the usage of landscape can be very diverse depending to which extent we define "energy." According to the concept of energy here, landscape can be used as a design material which, especially concerning passive solar energy, protects dwellings from the impact of seasonal climate by providing shade during summer and allowing sunshine during winter. Also, a water retention system that consists of diverse plants can be an energy saving water resource as well as a treatment system for the dwelling site. In a broader sense, if we consider food as an energy resource, an agricultural sector, such as an allotment garden, attached to the site could be another energy producing landscape that provides the dwellers with food and recycles waste materials from the site. Based on these reasons, we can find a number of good examples in Europe. For example, an ecological community called "EVA-Lanxmeer," Culemborg in the Netherlands shows a good

integration of energy saving technologies of landscape and housings also adopting a communal agriculture system (cf. Adriaens et al., 2005). Furthermore, many of the "Permaculture" sites suggest practical strategies of living with nature in regard to the energy efficient use of landscape (Hemenway, 2001; Mollison, 1991).

2.4. FRAMING AN ECOLOGICAL AESTHETIC

The Gap between Aesthetic Experience and Ecology

Although both the arts and sciences[4] are essential ways that we can understand the world, much of our response to the environment is determined through individual experience of landscapes. Moreover, even though ecological knowledge can help support an intellectual understanding of our environment, such knowledge does not necessarily translate into an aesthetic experience of ecologically beneficial landscapes (Nassauer, 1997, 1995, 1992). More specifically, landscapes that are aesthetically pleasing may not always reflect ecosystem health while in some cases, aesthetic and ecological values will be positively correlated. For example, landscapes such as wetlands and prairies under dynamic ecological processes and diversity may be perceived unattractive and rather messy, but people may not directly recognize their biological diversity and other functions for the whole environment. However, importantly, for all landscape types, people tend to interpret their aesthetic experience of landscape

[4] The relationship of the arts and sciences can be conceptually a representation of those of subjectivism and objectivism, culture and nature, anthropocentrism and biocentrism, and particularly aesthetics and ecology in this research.

as much as they are provided the information about its ecological quality (Gobster et al., 2007).

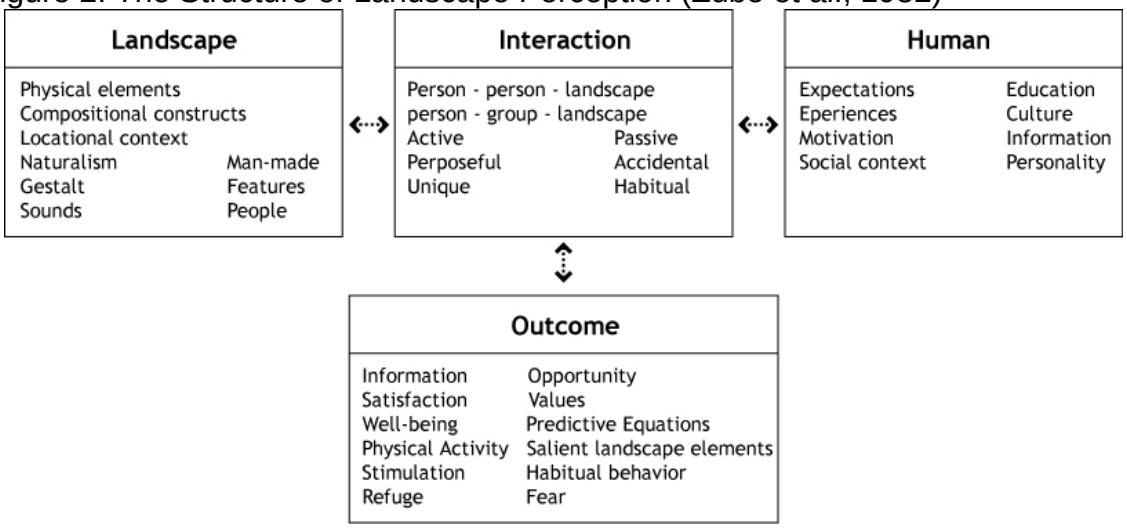
Responding to this issue, much of the literature and research has attempted to expand the scope of landscape aesthetics in order to better understand and reconcile the inherent distance between aesthetics and ecology in the field of landscape architecture. Regarding as a new paradigm of landscape aesthetics, this new aesthetics, so called “ecological aesthetics,” has largely been advocated to “address issues related to the protection of ecologically significant landscapes,” and bring a way of “an attack on traditional ideas of scenic beauty” (Gobster, 2008; Parsons et al., 2002). However, both of them share the idea that there is a type of beauty to be appreciated in the landscape, which is associated with its ecological health, diversity, and/or sustainability. Thus, the intrinsic attribute of ecological aesthetics is normative in that it is beneficial and desirable for humans to get pleasure from landscapes that represent sound ecological functions.

Consequently, to support the idea of ecological aesthetics more precisely, it is very important to understand the fact that there are interactions between aesthetics and ecology when people perceive the landscapes. Aesthetic experience and ecology have a mutual relationship: aesthetic experience can drive landscape change, for example, based on *habitat theory*[5]; and attention to

[5] The theory that aesthetic satisfaction experienced in the contemplation of landscape stems from the spontaneous perception of landscape features which, in their shapes, colors, spatial arrangements and other visible attributes, act as sign-stimuli indicative of environmental conditions favorable for survival, whether they are really favorable or not (Appleton, 1996).

ecological quality can also be influenced by the perceived aesthetic value of landscapes emphasizing understanding how people perceive and experience the beauty of all landscapes is central to achieving public support of, and compliance with, ecologically motivated landscape change (Figure 2) (Zube et al., 1982; Kaplan, 1988; Nassauer, 1995a, 1997; Gobster et. al., 2007). Furthermore, aesthetic experiences can promote and sustain better environment, which indirectly promote human well-being and welfare (Gobster et al., 2007). Nassauer (1995a; 1997) argues that landscapes that attract the admiring attention of human beings may be more likely to survive than landscapes that do not attract care or admiration, because people will be less likely to redevelop, pave, mine, or “improve” landscapes that they recognize as attractive. Therefore, perhaps, we can assume that the most desirable relationship between aesthetic experience and ecological health should be complementary and balancing toward each other.

Figure 2. The Structure of Landscape Perception (Zube et al., 1982)



Landscape Aesthetics and Environmentalism

It has been discussed in some literature that there are some notable distinctions between scenic (conventional) and ecological aesthetics (Koh, 1988; Gobster, 1999, 2008). However, one of the most distinctive aspects of ecological aesthetics is that the essential ideas of it lie in environmentalism. However, environmentalism has long been embedded in environmental aesthetics and landscape aesthetics. Hettinger (2008) emphasizes the importance of aesthetic value in protecting the environment saying, “environmental degradation is a serious problem in large part because it involves the destruction of substantial aesthetic value. Indeed, if wilderness, the rural countryside, and neighborhood trees had little aesthetic value (or negative aesthetic value), both the practice - of and justification for - environmental protection would be seriously weakened.”

In fact, the relationship between environmentalism and landscape aesthetics have sources in the aesthetics of nature developed in the eighteenth century; and thus, “appreciation of and concern for the environment” in both Europe and North America were fostered by picturesque-influenced tourism in eighteenth century aesthetics of nature (Carlson, 2007). The pictorial (scenic) approach to nature has been challenged and criticized mainly because it considers nature as a series of landscape paintings that is static and two-dimensional where experiencing nature or landscape is truly rather multisensory and requires more interactive engagement (Carlson, 1998, Saito, 1998; Berleant, 1997). Moreover, it is hard to apply the conventional aesthetics of nature in the recent landscape situation of urban environment because the conventional

conceptions of scenic beauty do not explain some distinctive landscape patterns such as wetlands and wildlife habitats that are normally considered visually unattractive and even messy. In the response to the criticism on conventional aesthetics of nature, ecological aesthetics has been supported by a number of philosophers, aestheticians and practitioners in design and planning fields. It was initially based on the tradition of Aldo Leopold who attempted to link natural beauty to ecological integrity and stability (Carlson, 2007). Therefore, ecological aesthetics has both moral and environmental responsibilities to ecological health at the core of its concept (Carlson, 1998; Saito, 1998). In this sense, it also implies the criticism that traditional aesthetic appreciation is somehow morally vacuous (Carlson, 2007).

Landscape Appreciation as a Cognitive Process

Although aesthetic experiences are initially triggered by affective (emotion-based) processes, ecological aesthetics suggests that landscape perception could be considered as a special cognitive instrument, and thus landscape as a special cognitive object (Nohl, 2001; Gobster et al., 2007; cf. Lang, 1988). Thayer (1989) argues that the experience of sustainable landscapes will likely be highly dependent upon information content. Much literature argues that to appropriately appreciate nature is to appreciate it by “its own terms,” which is natural science, and thus ecology (Carlson, 2007, 2004, 1998; Saito, 1998). In particular, Allen Carlson and other objectivist theorists (e.g. Parsons, 2002) promote an aesthetic that calls for some kind of distance or separation between the object and the

subject of aesthetic experience. Carlson argues that appreciation of nature is a necessary consequence of acquiring some level of scientific information about it; he terms this thesis ‘scientific cognitivism’ (Carlson et al., 2008). Carlson (2008) also states that “The idea is that scientific knowledge about nature can reveal the actual aesthetic qualities of natural objects and environments in the way in which knowledge about art history and art criticism can for works of art. In short, to appropriately aesthetically appreciate nature “on its own terms” is to appreciate it as it is characterized by natural science.” Also, local and regional narratives, folklore, and even mythological stories about nature are endorsed either as complementary with or as alternative to scientific knowledge (Sepänmaa, 1993, Saito, 1998, Carlson, 2007). This implies that aesthetic perception involves extracting information, knowledge and stories from the landscape as much as possible. Nohl (2001) also emphasizes the power of a cognitive understanding by stating “The more a beholder is successful at this, the greater is his emotional and expressive benefit.” Hence, aesthetic perception may be viewed as a way of gaining sensory cognition or information by perception.

Expounding on the importance of the knowledge and information, Graham (1997), as an art philosopher, adds an interesting idea attempting to validate the possibility that the aesthetics of nature can be a matter of objective judgment. He articulates the reason why works of art can be objectively judged. They are objects shaped by meaning and purpose of nature. It implies that they are not entirely at the disposal of the “free play of the imagination” of those who choose to look at them. This signifies that we should not avoid striving for a more

intelligible and comprehensive interpretation. Thus, he further states that as understanding the intentional context of nature is best described in the science of ecology, ecology can supply the intelligibility and depth to judge the aesthetic of nature.

In addition, the discipline of semiology can be one of the most fundamental bases to support this idea. It has actually influenced the thinking of a number of architects dealing with built environment (Lang, 1988). However, as a landscape has diverse meanings and can be interpreted in innumerable ways as discussed in the previous chapter, this theory also can provide a very useful thinking structure that landscape architects can adopt in research of landscape aesthetics. The theory specifies a relationship among symbol, which is landscape here, thought, and referent. A landscape (symbol) consists of a structure of fauna, flora, and artificial composition of design. This structure is the signifier that triggers the thoughts or meanings. These thoughts can vary from individual to individual or from group to group since the referent is different (Lang, 1988). Furthermore, categorizing levels of semiological perception of aesthetic experience in the landscape would be very useful in order to examine the overall structure of aesthetic perception.

Nohl (2001) attempts to classify the levels of perception into four stages, which range from rather emotional to highly cognitive such as perceptual level, expressive level, symptomatic level, and symbolic level. He groups the perceptual and the symptomatic levels as contributing to the narrative function of a landscape (aesthetic information with reference to the factual landscape), and

the expressive and the symbolic levels to its poetic function (information with reference to the psyche of the viewer). More importantly, one of the most challenging tasks that ecological aesthetics should deal with is probably balancing both the “narrative” and “poetic” aspects according to the context of the landscape (Nohl, 2001).

This idea may not be perfectly relevant since the landscape perception is a rather everyday-aesthetical experience which includes not only rational reasoning, but also emotional feelings a perceiver could subjectively have. Moreover, it is almost impossible to explain it merely by logic since perception is always associated with feelings and emotions. Therefore, Nohl (2001)[6] proposes that an *aesthetic truth* should be separated from a *logical truth*, and that the aesthetic truth is not based on principles following the laws of logic, but rather characterized by personal preference such as “interesting or boring”, “like or dislike,” etc. Hence, summarizing in a nutshell, landscape, as an aesthetic object, is always characterized by its appearance as well as by the meaning it bears.

Then, it is surely assumable that quite different information or cognition is evoked in the aesthetic experience of landscape, and the larger and more moving an aesthetic pleasure is , the more a person is able to draw out aesthetic knowledge from the landscape on all of these aesthetic cognitive levels (Nohl, 2001). Consequently, while the concept of aesthetics and ecological relationship is descriptive rather than normative, ecological aesthetics proposes to achieve normative outcomes that would be beneficial for both humans and the

[6] The original idea that Nohl employs here is based on the notion of the philosopher Baumgarten (1714-1763).

environment. Based on the fact that there are certain cognitive processes, there is also an opportunity for some kind of human intervention to influence the perception as the complexity of human perceptual response also suggests that knowledge and cognitive processes can change perceptions (Nassauer, 1995a, 1997; Gobster et al., 2007). It is worth considering the role of ecology as one of few references to properly appreciate the landscapes; and perhaps, the concept of ecology as well as landscape aesthetics can be expanded for more valuable opportunities.

Conventional Aesthetics and Ecological Aesthetics

Before discussing the attributes of ecological aesthetics, it is worth reconsidering and re-summarizing the general concept of landscape perception. The literature (Gobster, 2008; Zube et al., 1982) elucidates several characteristics of landscape perception: first, landscape perception has multisensory qualities, so the information that landscape provides is received through multiple senses and processed simultaneously. Second, the perception has spatial and temporal qualities shaped by cumulative experience over space and time. Third, perceptual response to landscapes can be multidimensional, which means that people respond to landscapes aesthetically and also in terms of perceptions of ecological health, safety, cleanness, and others. Fourth, landscape perception is cognitive as well as affective, and thus not perceived only in terms of visual preference but also through symbolic meanings and motivational messages. Thus, there should be a kind of balance between

cognitive and affective perception of the landscape in order to be able to appropriately appreciate the landscape within the given context. Fifth, the outcomes from the interactions between landscape and human are varied such as preferences, choices, uses, and experiences. Moreover, the interaction calls forth action that can lead to behavioral and environmental change.

Based on these concerns, assuming ecological aesthetics has distinctive characteristics compared to conventional aesthetics, some of the literature elucidates the features of ecological aesthetics (Koh, 1988; Gobster, 1999); however, not much of it has mentioned how those features can be translated into practical design languages. In general, ecological aestheticians assert that, especially in the U.S., the landscape preferences grew from the romantic and transcendentalist artistic movements in the 18th and 19th centuries, which mainly are represented in landscape paintings, poetry, and gardening style in the same age (Parsons et al., 2002). Thus, conventional aesthetics tends to focus more on aesthetics of formality and style, so that the aesthetic experiences mainly consist of passive contemplation on the object. Also, Gobster (1999) argues that landscapes in conventional aesthetics are not natural but naturalistic interpretations that were carefully composed to adhere to formal aesthetic design principles. He further stresses that landscape designers of the time emulated these artistic techniques to produce “stylistic renditions of nature as portrayed in paintings.” However, ecological aesthetics focuses on more active engagement of humans in the landscape (cf. Berleant, 1992, 1997), which is also supported by the fact that landscape experience is multidimensional rather than merely

visual. Additionally, it also stresses our knowledge about our ecosystem health, sustainability, and part-to-whole systemic relationships when we perceive the landscapes (Parsons et al., 2002), so that we can appreciate the deeper symbolic meanings embedded in them. The following table shows some major distinctions between scenic and ecological aesthetics in landscape.

Table 3. Distinctions of Landscape between Scenic versus Ecological Aesthetics (Gobster, 1999, 2008; Parsons et al., 2002)

Conventional (Scenic) Aesthetics	Ecological Aesthetics
Visual/ static/ inanimate	Multimodal/ dynamic/ animate/ ephemeral
Picturesque/ formal/ composed/ face value	Vernacular/ symbolic/ indicator species
Bounded/ fixed/ framed/ specific places	Surrounding/ entire landscape/ ambient
Naturalistic/ dramatic/ vivid/ scenic	Natural/ subtle/ unscenic
Tidy/ scenery	Messy/ ecological processes

Factors Influencing Landscape Perception

Although the concept of design can be broadened even to many other issues such as philosophical matters (cf. Orr, 2002), the primary target of design in general is to create or modify the physical subject based on and considering socio-cultural as well as environmental aspects. In this sense, the target should be the setting of physical landscape in landscape design. Hence, it is very important to inquire into the physical factors of the landscape which influence the aesthetic experience.

One of the most influencing factors may be scale. Gobster et al. (2007) clarify that there is a certain scale that humans engage with environmental phenomena called the “perceptible realm,” and normally essential ecological phenomena happens outside of the perceptible realm. Thus, the phenomena may not be immediately perceived by people.

Also, temporal change has a great potential to affect the way people perceive the landscape. Since landscape is not a static object but is a system of living organisms, the landscape changes over time such as seasonal transformation, time of day, succession of vegetations; people tend to have different emotional perception depending to which time they belong. For example, we receive different impressions from spring and fall, and from morning and late in the afternoon, probably due to the difference of the amount of light, colors and shapes of the landscape, etc. With regard to this, Gobster (2008) efficiently summarizes the various factors of landscape that can influence the aesthetic experience (Table 4).

Table 4 Some Factors Influencing Aesthetic Experience of Landscape (Gobster, 2008)

Domains	Dimensions
Perceptible dimensions	Non-perceptible – visual – multi-sensory
Change	Movement, weather, time of day effects, wildlife, succession, disturbance
Types	Region, ecotype, place
Scale	Detail/ site/ whole landscape
Ambience	Focal/ fixed/ framed – open/ surrounding/ unbounded
Naturalness	Wild-human dominated, designed, vernacular

These factors are particularly important when formulating a set of design languages since ecological aesthetics as a design theory should consider each of them and their relationship. Some have attempted to propose “new” design principles in landscape architecture (cf. Koh, 1988; Mozingo, 1997). However, the principles are still too conceptual and fuzzy to directly apply to actual design practices. Thus, one of the major parts of this research is to clarify and

reconsider a set of design principles which enables not only for designers to more practically apply in the projects, but also for users to have better communication (interaction) with the landscape.

2.5. ECOLOGICAL DESIGN AND LANDSCAPE ARCHITECTURE

Ecological Design

The theory and practice of ecological design have placed a new emphasis on not only the physical interface between the built and natural environments, but also on the potential cultural effects of integrating ecological systems into the built environment. Thus, the idea of ecological design is broadly understood today. Considering landscape as a subject of design and a product of our culture, there can also be numerous typologies of the ecologically designed landscapes. Therefore, it would be very helpful if there were some frames to better understand the overall typologies of ecological design in landscape architecture. A number of theorists and design practitioners have outlined and defined the realms of the current ecological design practice. Mozingo (1995) proposes simple yet concrete professional categories where ecological landscape design can involve:

- preservation of existing, functioning ecological systems;
- enhancement of reestablishment of degraded ecological systems;
- intensification of ecological processes to mitigate potential or existing ecological degradation;

- environmental interventions which reduce non-renewable resource consumption

Sharing the common understanding about ecological design with Mozingo, Brown et al. (1998) also delineate the range of ecological landscape design into groups of four as following:

- designs in which pre- and/or post-construction ecological conditions are monitored;
- designs that are associated with replicating specific abstract landscape structures and functions;
- designs that have more visual connotations and conjure images- images of particular floral communities, of curvilinear forms, of unobtrusive responsiveness;
- designs that are linked to preservation or restoration of some current or earlier situation

Vroom (2006) makes clear the definition of ecological design claiming that it is sustainable design whose basic premise is first to allow the ongoing process that sustains life to remain intact and to continue to function along with development, and second, is to provide urban populations with opportunities to enjoy the sensory and symbolic delights inherent to natural and semi-natural environments. He also gives four categories of the ecological implementation, referencing Franklin (1997) and Hough (2004), involved in landscape design and planning process, which are the following:

- the design of sustainable water systems such that full attention is paid to hydrological cycles and the prevention of erosion;
- the establishment of connecting zones between urban open spaces and the countryside
- the protection of wildlife and;
- the application of ecological principles in planting plans

The work of David Orr (1996) and John Lyle (1994) probably represents among the most complete working definitions of ecological design. They articulate the concept of ecological design that:

- integrates operational design functions with ecological processes;
- maximizes use of renewable energy and minimizes use of fossil fuel;
- preserves biological and cultural diversity;
- utilizes the possible recycled materials;
- creates wastes only within the capacity of the environment to assimilate them;
- focuses on whole systems (not parts), and on accounting for all costs.

Synthesizing the definitions above, the concise definition of ecological design might be “any form of design that minimizes environmentally destructive impacts by integrating itself with living processes,” and “effective adaption to and integration with nature’s processes” (Van der Ryn and Cowan, 1996). Moreover, if “a landscape is a space deliberately created to speed up or slow down the process of nature” (J.B. Jackson cited from Corner, 1999), ecological design in

landscape architecture can be defined as a means of supporting a healthy ecosystem and environment by landscape change through intentional design intervention. In addition, along with the definition of ecological landscape, the main idea of ecological design here needs to be clarified. Regarding the styles of designed landscape, ecological mimicry often becomes one of the main parts in ecological design; however, the “mimicry” of natural processes should be considered more than that of the natural(istic) forms.

Ecological Design as Didactic Art

Ecological design in a broad sense has a two-faceted mission to be considered. The first one is to technically succeed in achieving ecological health in the environment, which is more often recognized as representative ecological approach when we talk about ecological design; the other is that the design should be more culturally as well as socially appealing, and even didactic, to the public in terms of its own aesthetic languages. For the latter one, the role of ecological design should be also as importantly played in revealing and interpreting ecological systems, processes, and relationships in landscape design and planning. Thus, ecological design in landscape architecture attempts to provoke the people who experience the designed landscapes to become more aware of how their actions affect the environment, and to care enough to make positive changes.

David Orr is one of the proponents who has most stressed the importance of ecological approach in design in this sense. He argues in his book, *The Nature*

of Design (2002), “If it is not to become simply a more efficient way to do the same old things, ecological design must become a kind of public pedagogy built in to the structure of daily life. There is little sense in only selling greener products to a consumer whose mind is still pre-ecological... …The goal is to calibrate human behavior with ecology, which requires a public that understands ecological possibilities and limits.”

Furthermore, in his summary of eco-revelatory design, Eisenstein (2001) argues, “ecologically designed urban landscapes should communicate cultural ‘cues' for sustainable behavior; these landscapes should be implemented in partnership with ecological education efforts; and the cultural meanings and ecological place values created over time will be fundamentally local.” Examples of such design include rain gardens and treatment wetlands, the use of native plants, local building materials and energy-efficient architecture, as well as sculptural interventions in the landscape that call attention to the water cycle, to plant growth and decay, or to wind patterns. It is not sufficient to merely make use of natural processes in the design; it should also draw people’s attention, instruct or remind them about those natural processes, and highlight their own role in the processes.

Gobster (2008) also argues that design can disclose how underlying ecological process might be brought to the perceptible surface of landscape patterns, and can help strengthen the connection between the landscapes and the human experience by bringing essential functions and processes to sensory awareness. Hence, if it is one of the most important factors to be a successful,

ecologically designed landscape where design appropriately translates and delivers the correct information and meaning of the landscape to the users, the role of landscape architects should probably lie in facilitating and activating the communication between the landscape and the users. In other words, design intervention can not only enhance the visual quality of the landscape so that visitors can have better preference, but also make clear the stories and information, which the visitors might just pass over, embedded in the landscape. When knowledge is a chief feature of the aesthetic experience (Carlson, 1995), design should be able to help stimulate the visitors to support and care about the landscape.

Making Nature Visible

One of the most fundamental ideas about the role of design with regard to the ecological approaches commonly emphasized among the literature is to make the natural processes more vivid to people in terms of “visibility” and “observability” of the landscape (Hough, 2004; Mozingo, 1997; Van Der Ryn et al., 1996; Thayer, 1989). Above all, Van der Ryn et al. (1996) stresses the importance of the concept as “making natural cycles and processes visible bring the designed environment back to life.” Indeed, in order to properly appreciate the landscape, it is inevitable for the people to be able to see and then understand what is happening in it, and then the landscape can become more informative and eventually more appreciable to people. However, in ecological aesthetics, it should not be confined to the visual qualities of a landscape since

the concept of landscape as discussed in the previous chapters does not simply imply a “scenery” or “visual object” but rather a setting of physical and cultural complexity which requires the multisensory as well as intellectual interaction of humans (Carlson, 1998, Saito, 1998; Berleant, 1997).

Concerning the landscape design perspective, this idea particularly embodies the aesthetical attributes of a designed landscape that amplify the people’s multimodal experience in recognizing the landscape. It can be discussed in two aspects determined by the passive and active interaction of people with the landscape. The first one is design that helps reveal the “hidden” ecological processes so that people can see and eventually appreciate them; and the other, the active one is design that increases people’s knowledge of the “unfavorable” ecological landscape, which is based on the theory (Nohl, 2001) that when people know more about the landscape, they would get more pleasure in appreciating it.

2.6. WHAT TO REVEAL: THE DESIGN SUBJECTS

There may be a number of subjects where the concept of “making nature visible” could be applied in design implementation. Moreover, the subjects are closely interrelated to one another because the characteristics of nature should be understood as a whole living being. Saito (1998) states that we should view a natural object or phenomenon in its own larger context, whether spatial or temporal, so that we understand the role it plays in the drama of the life cycle or in the sustenance of an ecosystem. However, we tend to see what we are used

to or want to see. Hough (2004) argues that “much of our daily existence is spent in surroundings designed to conceal the processes that sustain life and which contribute, possibly more than any other factor, to the acute sensory impoverishment of our living environment.” Therefore, it is necessary to look at key subjects by examining what they are and how they relate to each other before starting the empirical research. This part of the research attempts to summarize them into several design subjects that need to and can be realized in landscape design implementation.

Ecological Functions

The linear way of urban development has caused excessive consumption of energy and resources, as well as discharge of environmental pollutants and wastes. Consequently, it has transformed our environment into a very different ecosystem from the one belonging to nature. Chiefly in urban areas, all these changes have influenced not only the environment including air, soil, water and living organisms, but also the welfare of the urban dwellers (Spirn, 1984). So, it has been widely discussed among scholars and practitioners that urban settings and built environment should be sustained as natural environment does with its regenerative system (Hough, 2004; Spirn, 1984; Lyle, 1994).

In this sense, our seeing and understanding how nature actually works and what the functions are should be very fundamental in creating and maintaining sustainable (regenerative) environment. Then, it is appropriate to set “revealing ecological functions” as the primary objective of ecological design in

landscape architecture. The definition of ecological functions may considerably vary depending on context. However, it can mainly be defined by flows of energy, water and substances. So, the functions include transfers and storage of water, biogeochemical transformations, primary productivity, decomposition, and community/ habitat in most types of landscape. However, a critical question still remains for ecological designers in regard to what parts of the ecological functions can actually be revealed to form. The question is very hard to answer since many functions of ecological systems are invisible, and the natural processes are mostly too subtle to be noticed. Also, it has been argued that "what is visible is the surface manifestation of ecosystems and the material conclusions of ecological processes" (Mozingo, 1997).

Therefore, it is critical that people be able to appreciate the slowly and subtly moving ecological features not as a static piece of art but as something requiring knowledge and imagination. Design intervention in landscape architecture may have ways in order to facilitate this appreciation by shaping, arranging, and programming, etc., in certain aesthetic principles.

Temporality

Temporality is one of very distinctive characteristics that the concept of landscape uniquely possesses compared to other design objects. Landscape is a field that consists of living organisms and the dynamic influx and efflux of energy and matters, and thus is constantly subjected to short or long-term processes such as day and night, the monthly progress in seasonal time, the annual cycle of seasons connected with growth, propagation and death of organisms. It also

includes climate changes over centuries and geologic processes over millennia (Motloch, 2001). Accordingly, Fenner (2003) argues that aesthetic appreciation of natural objects and environments, including landscapes, differs from the aesthetic appreciation of works of art due to essential qualities such as the necessary involvement in nature of the fourth dimension – time – and therefore of change.

However, especially in an urban context, today's design tends to hide those processes in order to make the landscape appear neat. The conventional landscape design considers change due to natural processes not as a vital and imaginative force, but as a frightening or disappointing one (Mozingo, 1997). Hough (2004) also points out that much of our daily existence is spent in surroundings designed to conceal the processes that sustain life and which contribute to the acute sensory impoverishment of our living environment. Furthermore, the tendency for keeping constancy of visual image in a number of landscape designs is in opposition to the essential concept of ecological design. Believing the temporal element of biological processes has always informed the structure of space, ecological design aims at connecting our senses to the actual substances of the environment.

In the development of ecological design, it has been emphasized that revealing natural processes in order for the public to understand is one of the most critical subjects in which ecological design is involved (Hough, 2004; Orr, 2002; Lyle, 1994; 1999; Spirn, 1988). Spirn (1988) further illustrates the aesthetic interpretation of process as "an aesthetic that celebrates motion and change,

which encompasses dynamic process, rather than static objects.” Lyle (1994) also asserts that landscape form should be shaped to guide flows of the energy and material, and also to manifest process. He further envisions that "if we can manifest the inherent elegance of ecological processes in visible forms, those forms will become symbols for the times" and will be "meaningful, even beautiful, in terms of process and context." Actually, more and more designers are now recognizing change as a dynamic force which can add excitement to the space such as Gilles Clément’s Jardin au Mouvement at the Parc André Citröen and Peter Latz’s Kokeri Hansa at Duisburg-Nord.

Therefore, in order to appreciate the temporal changes, people should be able to find aesthetic value in the landscape as well as understand the elements of change and the processes behind them. Moreover, the understanding of the process needs to be supported by a framework of design statements which signals to the visitor that the landscape is intentional and not merely left to run wild. Nassauer (1995b; 1997) emphasizes the importance of “cue to care” by arguing “orderly frame needs to be constant, and the messy ecosystem is allowed its dynamic.” This signifies that there are some kinds of design arrangements that help people better understand an ecosystem.

History of Place

Whether the image of the past is negative or positive, being able to read the history of a site can significantly affect an individual in aesthetically appreciating, as well as in understanding, the ecology of the place. The narrative

value of a landscape or a place is connected with the existence of a background story and of historical events. Especially on a local scale, there are also places in the everyday environment that contain the memories of its inhabitants (Potteiger, 1998). Thus, Kolen articulates, “the spaces we have created over the centuries contain countless stories about our identity – stories we tell ourselves about ourselves” (Kolen, 2004).

Furthermore, history contains not only cultural aspects, but also it refers to the accumulated ecological layers of the landscape. Most landscapes have specific landscape elements associated with both of these. Wasserman (2002) asserts that history stays alive through story-telling, myth, ritual and language. Language encodes not only important cultural stories but also extensive knowledge of native habitats. Also, ecology of landscape plays an important role in forming the identity of a place as a part of history. Ecology is a scientific study about the interrelationship of organisms and their environment (Webster Online English Dictionary). Then, we could assume that the history of a landscape possesses the whole narrative about the interrelationship of the inhabitants and the environment, and thus should be a major part of the identity of the landscape, which could provide people with a strong sense of place attachment. Therefore, if strengthening the relationship between people and their environment is a fundamental idea in ecological design, then recalling the history (memories and stories) of a place would be a very effective stimulus for the public in order to have the better understanding of, and thus more sound relationship with, the landscape.

Visual Interest

Design is a cultural act, or a product of culture made with the materials of nature and embedded within and inflected by a particular social formation. Additionally, ecological design requires more than technical aspects of ecology. Cultural values of the landscape also play a vital role in supporting the sustainability of landscape, drawing people's attention to the landscape and increasing a sense of "care" leading to cultural sustainability (Nassauer, 1988; 1997).

Yet, it has been criticized that many ecological design projects have a lack of aesthetical attractiveness (Jencks, 1995). It may be due to its skewed tendency toward technologies; or belief among ecological designers and planners that "the ecological value of a landscape will speak for itself, that ecological value will replace or supersede aesthetic experience;" (Mozingo, 1997) or that ecosystems are too complicated for designers to frame as a form. Mozingo (1997) further stresses that there is no aesthetic language in many of current ecologically designed landscapes which mediates their ecological knowledge. Therefore, regarding ecological aesthetics, it may be one of the most challenging subjects for designers to deal with; and it needs to draw the highest attention from them especially when they are required to realize ecological qualities in appealing cultural languages (forms).

Sense of Security

Security is commonly defined as "freedom from danger or fear or anxiety"

(Webster Online English Dictionary). Feeling secured and safe is important for people to properly appreciate landscape where they are, and thus is necessary to be a desirable, public open space. In a certain type of landscape such as wilderness, Europeans and early Americans believed that the wilderness was a dangerous place until it was tamed by settlement (Cronon, 1996). People nowadays still seem to have such fear on wilderness-like landscapes and a stronger preference toward safe-looking and “neat” ones (Nassauer, 1995b).

Especially in an “ecological” setting which, supposedly, tends to look messy and untidy, people tend not to expose themselves to potential danger and inconvenience in the landscape such as getting wet or dirty, poisonous plants and animals, and even unpleasant odors, etc. Hence, they normally look for a location where they can ensure their “safety” from the probable risks while where they obtain certain sensory pleasures without obstacles. This subject is well described in the idea of “Prospect and Refuge Theory” in his book The Experience of Landscape by an English geographer Jay Appleton (1975). The theory suggests that there are two different desires: for opportunity (prospect) and safety (refuge) in a human. In the book Appleton predicts that, within a given landscape, preferred locations are found at interfaces between prospect-dominant and refuge-dominant areas, and these vantage points combine visual prospects without hindrance and a ready opportunity for concealment and/or withdrawal to a safe refuge. So, it is worth examining what design settings that are applied the theory can be and how they affect people’s response to the landscape.

Accessibility

Accessibility notionally means that “permission, liberty, or ability to enter, approach, communication with, pass to or from, or make use of” (Webster Online English Dictionary). In the geographical sense it implies movement, connection, flow, and arrival at places of destination. People search for ways and routes to move towards preset goals. The layout of roads, paths, lanes and promenades is focused on providing efficient access (Broadbent, 1973).

In the field of environmental design, creating access to a site involves answering questions such as how to reach, enter and move around within it (Vroom, 2006). Access can be classified according to the elements and features of the site to which access is given, and also according to the people or things to whom it is afforded (Lynch, 1981). As well as the elimination of barriers, the conditions to be met include efficiency, continuity, variety, spatial orientation, flexible use, and visual attractiveness (Lynch, 1960, 1984; Motloch, 2001). Thus, it has always had great influence on determining the character of an open space. Since accessibility includes the neighborhood vicinity, walkability, and ease of public transportation, etc., it could also contribute to defining it as a neighborhood park, community park, or regional/ national park.

With regard to the aesthetic experience of people, accessibility to the landscape is one of the primary preconditions to be satisfied when the physical interactions between humans and landscape are essential for appropriate appreciation of the landscapes. While accessibility physically establishes where the people can initiate the aesthetical experience according to the designer’s

intention, it includes not only entrance to the landscape, but also appropriate viewpoints and circulation patterns that enable people to aesthetically experience the landscape. Accessibility can be a complementary concept to the security discussed previously, because the pattern of access and circulation is deeply associated with people's feeling secured and comfortable to approach and be in the landscape. Therefore, it should be worth examining the design arrangements for reasonable accessibility considering good views, sequential experience, as well as visitors' security.

2.7. HOW TO REVEAL: THE DESIGN LANGUAGES

Each subject of ecological aesthetics has certain attributes and characteristics. According to them, there could be appropriate design languages possibly applied to make them more "visible" to people. From extensive literature review and examining existing cases, six design languages are to be summarized and argued here: articulating, symbolizing, contrasting, diversifying, framing, and distancing. The fundamental assumption is that, according to the context, certain design languages would work more effectively than others. Each of them has multiple correlations with the design subjects previously discussed; and the design languages are basically to be used as hypotheses tested in the empirical research as variables of designer's attempt.

Articulating

People tend to see landscape by how it looks rather than by how it works, if they do not know about it. This phenomenon is well-described in Mozingo's

statement (1997), “the viewer can read the signs, but cannot read the landscape.” Articulating in landscape design refers to comparatively more directly explaining the contents of a (part of) landscape than in other design languages, so that people can have a better understanding about the values and better aesthetic appreciation of the landscape. The degree to which this design language covers is broad, and it might be overlapped with other design languages. However, it mainly includes the direct written/ illustrated descriptions specifically about wildlife, vegetation or ecological mechanism of the landscape, as well as directly exposing the visitors to the actual ecological happenings such as built habitats for wildlife and designed water collection and circulation systems in the park. In a broad sense, providing spatial programs by means of a visitor center, information platform, and other plans for educational field trips can be included in articulating. Even though it might not be a very interesting way for designer’s creativity to be engaged in the design process, it could be one of the easiest ways for people to learn information about the landscape.

However, there could be a number of more sophisticated ways to “articulate” the values and meanings of landscape and the relationship between people and nature in terms of design. We could find good examples in the field of environmental art or earthworks ranging from Robert Smithson’s works in 1960s and 1970s to some contemporary installation arts such as works of a Dutch sculptor, Theo Jansen. Jansen’s kinetic sculptures which are solely powered by wind vividly delineate the relationship between the power of nature and artifacts, the mechanism of how nature operates cultural product. Thus, it is not just

“articulating” the values and meanings of the landscape mechanically but also delineating them more poetically. In this sense, combining with some cultural artifacts, landscape design can utilize this language more diversely as well as effectively based on the creativity of design. Based on its characteristic of direct delivery of information, this design language can be particularly useful in describing the design subjects: ecological functions, history of site, and temporality.

Symbolizing

Symbolizing here includes a group of design approaches mainly by abstracting main characters of a landscape in order for people to more easily and interestingly understand the meaning of the landscape. It could be understood by means of metaphor or paraphrase or exaggeration based on the substance of landscape. It can be a powerful communication tool in landscape design, particularly when the substance is hard to be read, and is often associated with abstraction of landscape features or functions. Hill (2004) argues, “metaphors are fundamental to human thinking in everyday situations, as well as in formal theory building. These abstractions appear to be vital to the human ability to form meaningful expectations about relationships and patterns.” This way of communication in environmental design stimulates creative thinking by helping to form trains of thought which supplement or avoid logical reasoning (Vroom, 2006) that might be too complicated for the general public to recognize. Thus, it can further stimulate the experience of landscape and assist human orientation in

space in an easier way. Also, there are some patterns of tendency in the way that people spontaneously recall when they encounter certain landscape features. For example, Spirn (1998) states that people tend to project parts of the human body onto the visible environment: a river has a head and a mouth; a mountain has a foot. In this sense, ecological mimicry can be compared to this concept. However, eco-mimicry is a component of sustainable landscape design; the mimicry of natural forms is different from this concept, symbolizing, which is the mimicry of natural processes, and thus it always accompanies a certain level of abstraction.

Particularly in many cases of ecological design, symbolizing, often abstracting, ecological functions or any meanings related to the history of place could help people to better appreciate the landscape. Also, just like in the field of literature, especially poetry, symbolizing can provoke interest and stimulate people to start paying more attention to the landscape. In other words, this process of understanding the meaning of the landscape would become a conceptual “cue to care,” when it does not physically show conventional beauty.

Contrasting

Contrasting is a concept based on the fact that differences between things make them more visible. It refers to juxtaposing or superimposing two or more contextually or physically different features simultaneously so that people can see the different character of the subjects more clearly. Accordingly, in the

perceptual field, the ability to perceive contrasts means a general condition for distinguishing forms and creating order (Vroom, 2006).

To some extent, the power of contrast in ecological design, especially in landscape architecture, has been emphasized by much of the literature (Spirn, 1988; Koh, 1988; Mozingo, 1997). It is because the profession of landscape architecture inherently has to deal with contextual difference between nature and culture. For example, many feel the contrast between the natural (wilderness) and the cultivated (geometric) is a source of wonder and delight (Gombrich, 1979). Furthermore, in most landscapes, the urban contrasts with the rural, and the contrast “survives changes over time, and marks the difference between repose and unrest, between culture and nature” (Vroom, 2006).

The reason why contrasting can be an effective design language in regard to ecological aesthetics is that it could provide a heightened awareness about what is happening and a more intense aesthetic experience in the landscape. Spirn (1998) argues that contrasts can tell stories about identity and difference, freedom and control, tradition and invention, use, abuse, and renewal. Additionally, since it has a strong symbolic effect (Vroom, 2006), contrasting geometric forms and patterns can remind the visitor of the human hand which guides natural processes, making paradox and oxymoron visible. Hence, by creating a static reference which contrasts with the dynamics of the landscape, the designer can not only make the ecological design more aesthetically acceptable to the public but can also make it more reasonable. Ecological

functions and temporal changes of landscape can be more visible, and visual interest can be increased by the tension between two different attributes.

Framing

Framing is a design language that is conceptually rooted in the idea of contrasting in the sense that it is giving some sense of order to the landscape. There are two ways of framing in this discussion. One is horizontal framing that gives a two dimensional order to a complicated-looking landscape with geometrical forms parallel to the ground, and the other is vertical framing that is perpendicular to eyes.

The fundamental difference between contrasting and framing depends on the way how the two features are physically positioned. Contrasting aims at extracting a certain aesthetical value by juxtaposing two features simultaneously. However, framing is more about superimposing a more solid-shaped, most likely artificially designed feature, on the top of a less-regularly shaped, natural-looking one. Nassauer (1995b) illustrates this design language, horizontal framing, by using her design work for Phalen Wetland Park in St. Paul, Minnesota, which employs a peninsula of turf ringed by a boardwalk to bring visitors to the wetland edge and indicate human intention. Also, vertical framing has been widely used in many design projects. It is normally shaped in a rectangular or circular window that limits the view of a landscape according to the designer's intent, so that it leads the viewers to focus on designated scenery. This can secure a sense of orderliness as well as of completeness when the landscape looks too

complicated or too plain. This design language can be also useful, like contrasting, to reveal ecological functions and temporality of the landscape based on the comparison between dynamic attributes of the landscape and the static artificial frame. It could also provoke visual interest as if the landscape becomes a framed picture.

Diversifying

The importance of visual variation in unity has been emphasized among conventional aesthetic studies especially in visual design fields (cf. Preble, 2008). It is the quality of having different forms or types. And the differences give a design visual and conceptual interest. Variation often comes with another concept known as unity. Unity describes the feeling that all the elements in a work belong together and make up a coherent and harmonious whole. Contrarily, variation provides diversity. The sameness of too much unity is boring and the diversity of uncontrolled variety is chaotic, but a balance between unity and variety creates life.

However, diversifying in ecological aesthetics implies increasing or enhancing visual variation that results from a variety of species. Thus, design here considers ways for how to increase biodiversity within the context, and how to extract and magnify the beauty out of it. Even though diversifying can independently provoke visual interest when there are various kinds of wild flowers in an open field for example, the aesthetic effect of diversifying can be strengthened with other design languages that have more orderly attributes such

as contrasting and framing similar to “variation in unity” in the conventional aesthetic principles. By vividly disclosing the diversity of species in landscape, this design language could help reveal ecological functions and enhance the visual quality.

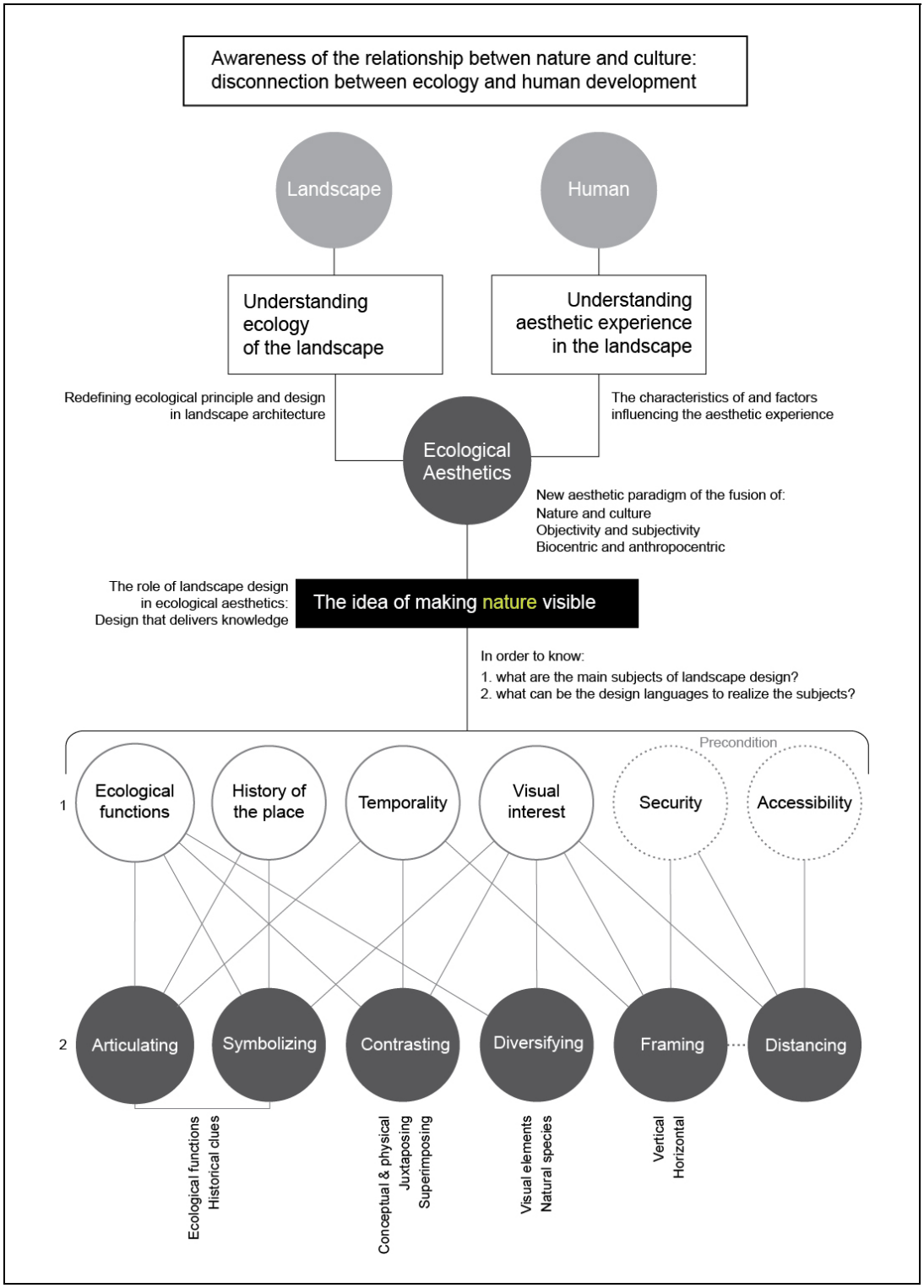
Distancing

Often associated with a sense of security that has been previously discussed, distancing is a design language which implies inserting physical or emotional space between people and landscape so that they can feel they are kept away from potential danger or inconvenience. Thus, it is especially effective when landscape contains somehow negative, repulsive, or unattractive features that people cannot bring themselves to appreciate the positive aesthetic value of the storytelling of landscape.

Saito (1998) illustrates, “we feel negatively toward many of these pesky creatures because they sometimes cause health hazards. Bats may carry rabies, flies and mosquitoes various diseases, and some snakes and spiders are poisonous. We also fear for our safety when we are confronted by other creatures with overpowering might and/or huge size, such as sharks, lions, and bears. However, if we can bracket our concern for our safety, we can attain enough composure to observe and appreciate the aesthetic value of these dangerous creatures.” However, this is not only for the people who avoid direct contact with “messy” landscape, but also for the landscape to be protected from too much disturbance generated by humans.

Furthermore, having distance in between can also visually hide the “unpleasant” features of the landscape and even enable the viewers to have better, often conventionally more attractive, scenery like we can find this sense of picturesque beauty in many landscape paintings. This language also can be more effective when it is associated with another language, framing, which could direct viewers to some focal point in the distant landscape so people could experience more aesthetically composed scenery. As a result, this design language primarily deals with two design subjects: security and visual interest.

Figure 3. Conceptual Structure of the Design Subjects and Languages



Chapter 3

RESEARCH METHOD

3.1. Sites for Case Study

The use of the case study method can be utilized to bring out many different kinds of information from investigating how the landscape design projects have been implemented in terms of the process, decision-making and outcomes of the projects. And this can inform future practice, research, theory, and/or education (Francis, 2001). Regarding the research objectives, the case study approach is particularly useful investigating how the current design projects are implemented and how the public perceived the landscapes.

In order to have this research meaningful, the cases should reflect the most up-to-date urban contexts today. Thus, this research implements a case study of the projects including two of the most common typologies of restructuring post-industrial landscapes. In this regard, we can think of the trend of urban regeneration and restructuring which is one of the most critical urban issues in many industrialized countries. Particularly in landscape architecture, the importance of regeneration of post-industrial landscapes and brownfields (De Sousa, 2004) as well as understanding the shift of the profession's role has been highlighted (Corner, 2006; Waldheim, 2006).

Considering this aspect of the research, two types of restructured post-industrial urban landscape are to be selected and examined in Korea for the case study. First one is a former manufactured site. There are a number of landscape

projects ever more related to the post-industrial issues which largely refer to the rehabilitation of the abandoned sites from the industrial period such as former factory sites, railway stations, and infrastructural facilities (De Sousa, 2004; Hough, 2004; Hands et al., 2002). Many of these sites have been converted into public open spaces improving the biodiversity and ecological functions. Thus, ecological approaches are often associated with designing and planning of in those sites.

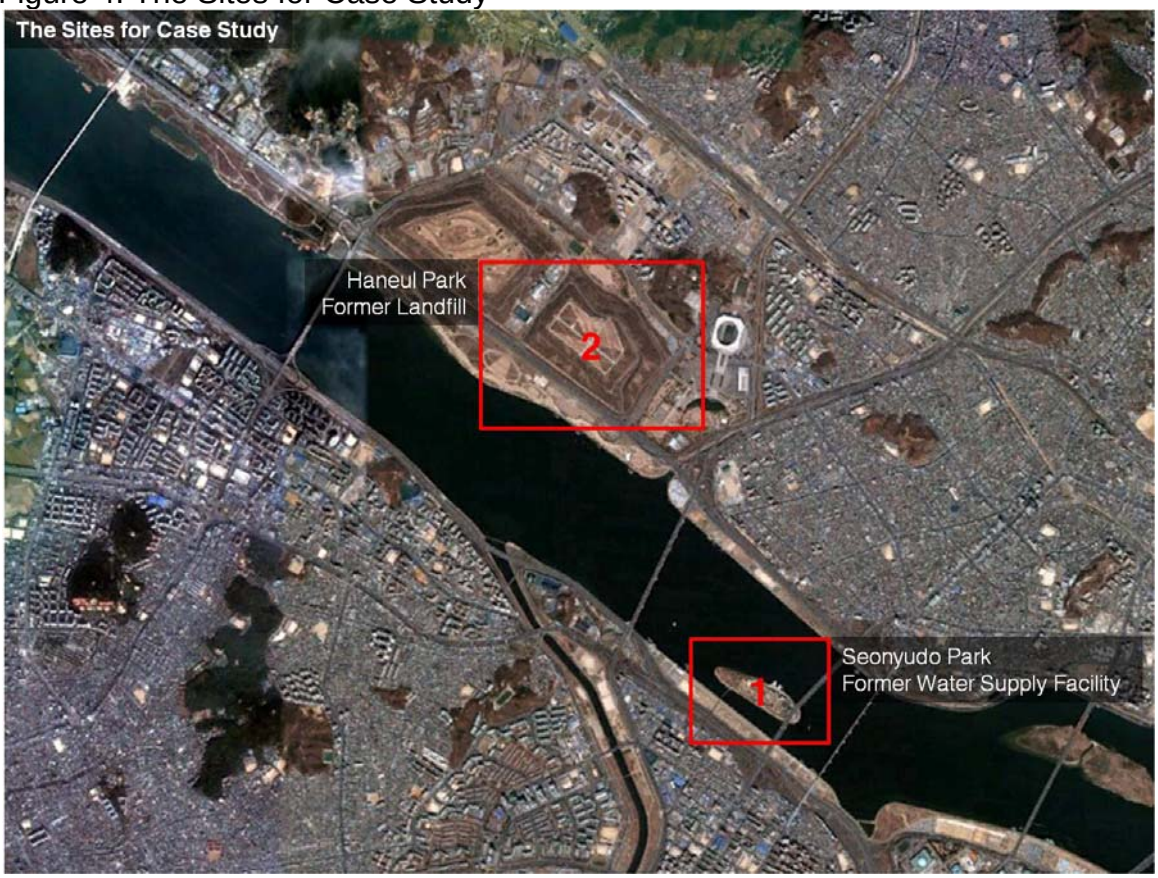
The other is landfill redevelopment. As most cities are producing the enormous amount of trash and waste matters every day, we have also built great a number of landfill sites as the result. These sites are normally located in and out of cities serving as a waste disposer for the urban system. However, for the high possibility of contaminating groundwater and soil, they often become critical hazards for the urban environment after their mission is done. So, various technologies are applied to solve these problems, and the sites are themselves often ecologically reclaimed to be urban open spaces opened to the general public.

However, in order to prevent possible cultural biases and share a common political, economic, and social background as a common dominator, the research is performed in the same cultural region, the city of Seoul, Korea. Also, Seoul is such a megalopolis that has been going through rapid urbanization and modernization generating most of, if not all, the urban issues discussed earlier. Thus, it is relatively uncomplicated to find those examples of post-industrial landscape projects compared to other places.

Table 5 The Sites for Case Study

	Typologies of Post-Industrial Landscapes	
Category	Post-Industrial Structure	Former Landfills
Project	Seonyudo Park	Haneul Park
Year	2002	1999
Location	Seoul, Korea	Seoul, Korea

Figure 4. The Sites for Case Study



3.2. THE CONTEXT OF SEOUL, SOUTH KOREA

The city of Seoul is the capital of South Korea, which is located in the middle of the Korean Peninsula, at 126° 59' E and 37° 34' N. The city is about 30.3 km from north to south and 36.78 km east to west whose total area is 605.41 square kilometers determining it a truly large metropolis. Geographically, Seoul sits in a natural basin. Surrounding the city are a number of peaks of 500 meters above sea level. Since the end of the Korean War (1953), Seoul has gone through an extreme industrialization which has acted as the main driving force for the economic growth of South Korea; and it has become the eighth biggest city in the world by population.[7] However, this urbanizing process has also produced a tremendous amount of industrial and domestic waste, and thus consumed a huge amount of land to treat it (The City of Seoul Website: http://english.seoul.go.kr/).

Also, a number of urban infrastructures which had supported Seoul's civic amenities such as water supply facilities, overpasses, and asphalt roads covering over the urban streams in the past have come to an end for multiple reasons. While they had remained as a source of great distress to the urban environment of Seoul, some of them have been transformed into urban public spaces functioning not only recreationally but also in an environmentally friendly way. Furthermore, the city's policy on the environment plays a role as one of the most

[7] As of the end of 2007, Seoul had a population of some 10,421,782 people with a total of 4,046,000 households (The City of Seoul Website: http://english.seoul.go.kr/), and if including the population of the surrounding urban agglomeration, it is the third biggest city in the world (http://www.biggest-cities.com/).

influencing factors leading to this phenomenon. For instance, especially in last two decades, the policy of the city government has particularly concentrated on enhancing Seoul's urban environment through a variety of "greening" and restoration projects such as Seoul Green Trust, Park Expansion Policy, Ten Million Tree Planting Movement, Green Roofing Movement, Tree Bank System, Ecological River Restoration, etc. (Landscape and Environment Division website at Seoul City Hall: http://green.seoul.go.kr).

3.3. ANALYTICAL FRAMEWORK

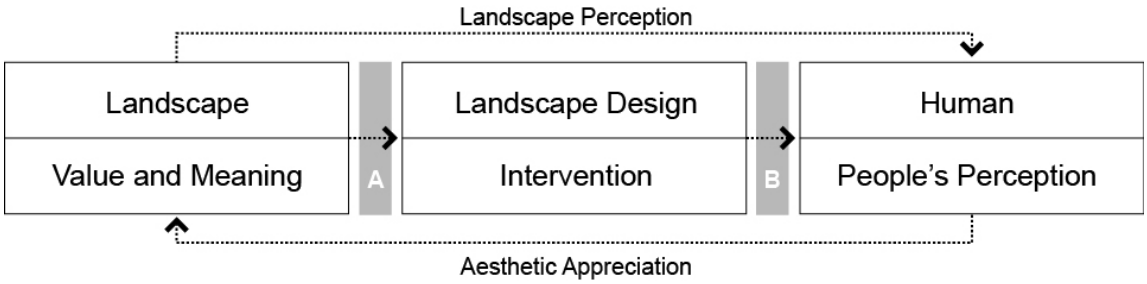
Two Links to Investigate

Regarding an ecological aesthetic in landscape architecture, there can be two fundamental subjects to be extracted from the discussion of ecological aesthetics and the task of landscape design. One is, for landscape designers as the knowledge holders and interpreters, how to deliver the value and meaning of the landscape to the general public through the forms of landscapes. The other is, for the general public are the actual perceivers, how to appreciate the value and meaning as well as appearance embedded of the landscapes. As a result, successful communication between designers and the public, the public and the landscape, and designers and the landscape is the key to achieving successful ecological landscapes in terms of the ecological aesthetic.

Accordingly, this research is basically composed of two phases (link A and B in Figure 4) of investigation in each selected project. In order to examine the information flow in the communication from the landscapes to humans, there are

two major links where human, both designers and the public, interpretations are involved. The first one (link A) is a link between the landscapes and the landscape architects where the landscape architects “ecologically” understand the value and meaning of the landscape and “creatively” translate it into their own design languages. The design principles they may apply in the projects are assumingly associated with the ones discussed in the previous chapter. So, in this phase, the possibility of general design languages can be tested and discussed as result. The second one (link B) is to see how the public perceives the translated information in the designed landscapes and if there is any noise interfering in the perceptive process.

Figure 5. Two Major Links (A and B) in the Communication with Landscape



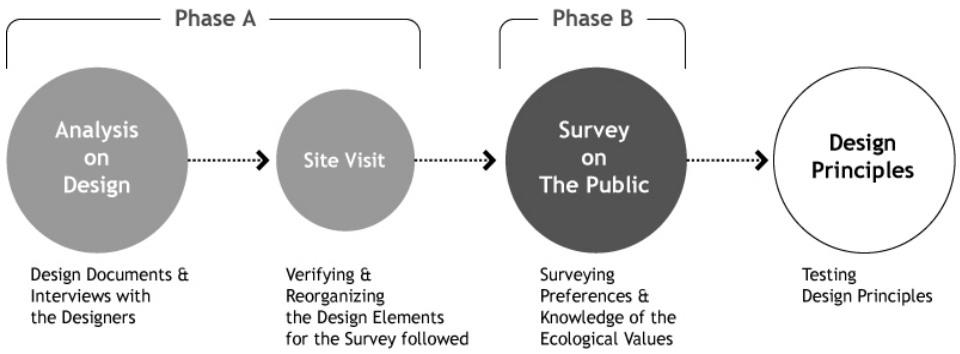
Link A: How landscape architects translate the value and meaning of landscape
Link B: How the public appreciate the value and meaning of landcape

Data Collection

For the first phase (link A), in-depth analysis on the design documents including plans, maps, drawings, and notes, and interviews with designers is implemented. All design projects generally produce those documents in the end, and they are considered to be some of the most reliable pieces of evidence which allow us to understand the designers’ intents and creativity in the

interpretation. When examining the documents alone leaves anything unclear, then interviews with the designers, whether directly or indirectly, were implemented to supplement the data. In particular, the designers are asked through which design features they attempted to convey the idea of ecological aesthetics. However, selecting design features did not solely rely on the designers' explanation. Other literature, design magazines, and presentation materials in which the designers talked about their concepts for the parks were included to be investigated. As an experienced expert, I also chose the design features based on the design languages discussed earlier.

Figure 6. Process of the Empirical Research



Consequently, those selected features for each site are used in the second phase (link B) of the research to test the public's preferences and understanding of the ecological and other values of the landscape. This phase does not only include the physical features of the landscape but also spatial programs proposed by the design; and the items that need to be analyzed are: the design concept, main subjects of human experience, various design features including planting, landforms, materials, circulation patterns, other facilities and

programs such as signs, boards, and the visitor center. These items are summarized as a checklist (Table 6). After the data is collected from the research on the design by documentations and an interview, it is worth visiting and checking the sites to see how the design concepts and languages have been applied and used. The site visit aims to, first, verify how actual design features function and appear mainly by observation and photographing, and second, reorganize, if necessary, the data so that it is utilized to articulate the questions on the spatial programs and pictures of the design features to be used for the public survey.

Table 6. Checklist for Design Analysis

Site	Design Concept	Subjects of Experience	Physical Design					Spatial Programs
			Planting	Landform	Circulation	Materials	Facilities	
Nanji Haneul Park	•	•	•	•	•	•	•	•
Seonyudo Park	•	•	•	•	•	•	•	•

The second phase (link B) mainly consists of surveying with questionnaires to the public who are actually visiting the sites, and interviews and observation are conducted to supplement the questionnaires. Surveyees between the ages of 18 and 80 are randomly selected at the entrances and on the main routes of the sites. In order to achieve a representative sample, respondents are selected from the park users during the day on both weekdays and weekends for three months (May, 2010 - July, 2010). The questionnaire is completed with 200 park users (100 per site) at the survey site.

Questionnaire Design

After the site visit and collection of design features, a questionnaire is designed to measure the aesthetic appreciation of the public. A number of techniques including open-ended, pre-coded, and Likert scale formatted questions are used in a logical order to address the research objectives. Since each site has different design objectives, contexts, and features, the questionnaire is also differently modified to each site. However, it basically consists of three groups of questions. First, there is demographic information to help us understand the characteristics of the respondent group such as gender, age group, traveling time to the park, visiting frequency, visiting purpose, education background on ecology and environment, the first rising image of nature, and primary sense to perceive landscape; second, each design feature is rated in terms of beautifulness, naturalness, compatibility to the site, and meaningfulness in a Likert scale. The last group contains: the respondent's general impression of the park, the lessons that the respondents have obtained at the park, and a section for proposing areas for improvement of the park.

The second group of questions is designed to assess the respondents' awareness of the value and meaning of the design features. They are asked to rate several photographs. Each photograph represents one or two of the design languages discussed in the previous chapter. However, in regard to the fact that most of the respondents were not experts on ecology and landscape design, the use of the terminology is highly restricted. Thus, in the questionnaire, those technical terms were translated into everyday words; and in the data analysis

phase following they were interpreted again to test the validity of the design languages.

The everyday words for the design subjects are: beautifulness for visual interest, naturalness for ecological values and temporality, meaningfulness for the sense of history and subjective poetic quality of the landscape. Compatibility to the site is used to evaluate the overall importance of the design feature on whether it is visually attractive or not, and artificial or natural. Therefore, compatibility can be used as a criterion for the respondents to judge if the design feature is valuable enough to be included in the park. In sum, beautifulness and naturalness aim to assess the qualities of visual attractiveness and “perceived” ecological value, while compatibility and meaningfulness are for personal understanding about the values behind visible aspects.

In the questionnaire, there are several photographs of the design features of the park. Each photograph then asks about four different categories, including beautifulness, naturalness, compatibility, and meaningfulness on a Likert scale. The Likert scale is a rating scale and is the most widely used scale in survey research. Here, this research employs a system of five ordered response levels (Table 7).

Table 7. The Likert Scale for Measuring the Aesthetic Experience

	Point				
	1	2	3	4	5
Beautifulness	Ugly	Slightly ugly	Moderate	Slightly beautiful	Beautiful
Naturalness	Artificial	Slightly artificial	Moderate	Slightly natural	Natural
Compatibility	Incompatible	Slightly incompatible	Moderate	Slightly compatible	Compatible
Meaningfulness	Meaningless	Slightly meaningless	Moderate	Slightly meaningful	Meaningful

Also, it is also important to analyze the correlation between the two groups, the group of visible aspects and of understanding the invisible meanings, in order to identify which category influences the other(s) in a certain circumstance. For instance, if the respondents rate the beautifulness high, naturalness low, and compatibility high, then it is assumable that the beautifulness is more likely to influence the compatibility. The Statistical Package for Social Science program (SPSS V. 16 for Windows) is used to analyze the collected data. For the descriptive statistics, the responses can be collated into bar charts, central tendency summarized by the mean, and dispersion summarized by the standard deviation. However, it is also possible to separate the result into two groups: the sum of 1 and 2 is negative and 4 and 5 is positive, as the responses are treated as nominal data. This method is used to examine the public's general preference on the design feature.

After central tendency test on each design feature, the one-way ANOVA and factor analysis based on correlation coefficients were used to define the relations among the variables for more sophisticated data analysis. The following table represents the possible combinations of the variables (Table 8).

Table 8. Analytical Matrix for the Likert Scale

No	Compatibility	Beautifulness	Naturalness	Meaningfulness
1	+	+	+	+
2		-	+	+
3		+	-	+
4		+	+	-
5		+	-	-
6		-	+	-
7		-	-	+
8		-	-	-
9	-	+	+	+
10		-	+	+
11		+	-	+
12		+	+	-
13		+	-	-
14		-	+	-
15		-	-	+
16		-	-	-

+: above mean/ -: below mean

Selection of Design Features

The selection of the design features was based on the criteria made by the synthesis of the design languages defined in the previous chapter and the analysis on each design concept and strategy including the interviews with designers, information from the design documents, and a number of site visits.

Total thirty photographs of the design features were chosen (eighteen for Seonyudo Park and twelve for Haneul Park). Each photograph represents one or two design languages and the design language(s) that the photographs contain was determined not only by the information given by the designers but also by me as a professional landscape architect. Since Seonyudo Park has more

complicated spatial arrangement resulting from recycling the former concrete structure with various design attempts, more design languages were selected than Haneul Park. Especially, symbolizing and contrasting were particularly found more because there were many recycled artificial structures and landscape juxtaposed with them. In Haneul Park a specific design language, distancing, was more found due to its unique physical setting that is mainly composed of cultivated and wild landscape and views toward the wild landscape at the observation areas. However, framing was not found in Haneul Park since there was no artificial structure framing, neither horizontally nor vertically, a view toward the wild landscape. The design languages included in each photograph is discussed in the following chapter.

Figure 7. The Number of Design Languages Selected in Each Case

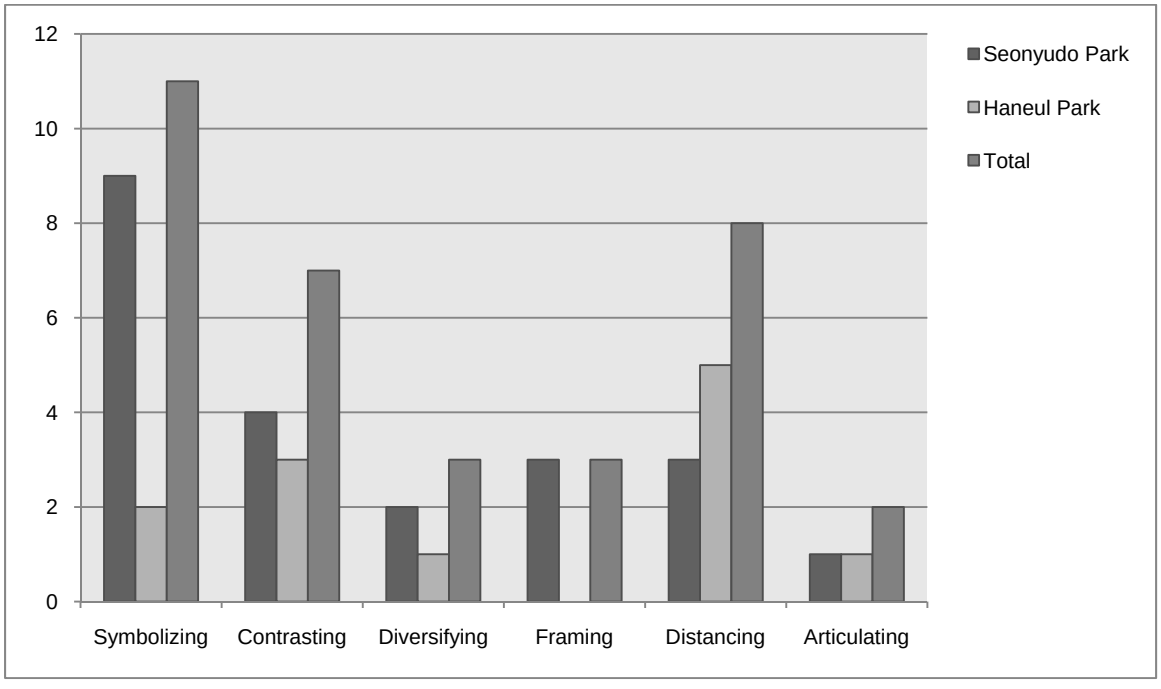


Figure 8. Selected Design Features (Seonyudo Park)

Distancing

Security + Visual Interest

Framing + Diversifying

Visual Interest + Eco-functions

Symbolizing

History + Eco-functions

Symbolizing

History

Symbolizing

History + Visual Interest

Framing

Temporality + Visual Interest

Cont.

Contrasting

Visual Interest + Temporality

Symbolizing

History

Articulating + Diversifying

Eco-functions + Temporality

Symbolizing

History

Symbolizing

Eco-functions + History

Contrasting + Framing

Temporality + Visual Interest

Cont.

Symbolizing

History + Visual Interest

Distancing + Framing

Security + Visual Interest

Symbolizing

Eco-functions

Contrasting

History + Visual Interest + Temporality

Contrasting

History + Visual Interest

Distancing + Contrasting

Visual Interest + Accessibility

Figure 9. Selected Design Features (Haneul Park)

Distancing + Diversifying

Security + Eco-functions

Symbolizing

History + Eco-functions

Symbolizing

History (Nostalgia)

Contrasting

Visual Interest

Distancing

Security

Contrasting

Visual Interest + Accessibility

Cont.

Distancing

Security + Accessibility

Articulating

Eco-functions

Symbolizing + Articulating

Eco-functions

Contrasting

Eco-functions + Visual Interest

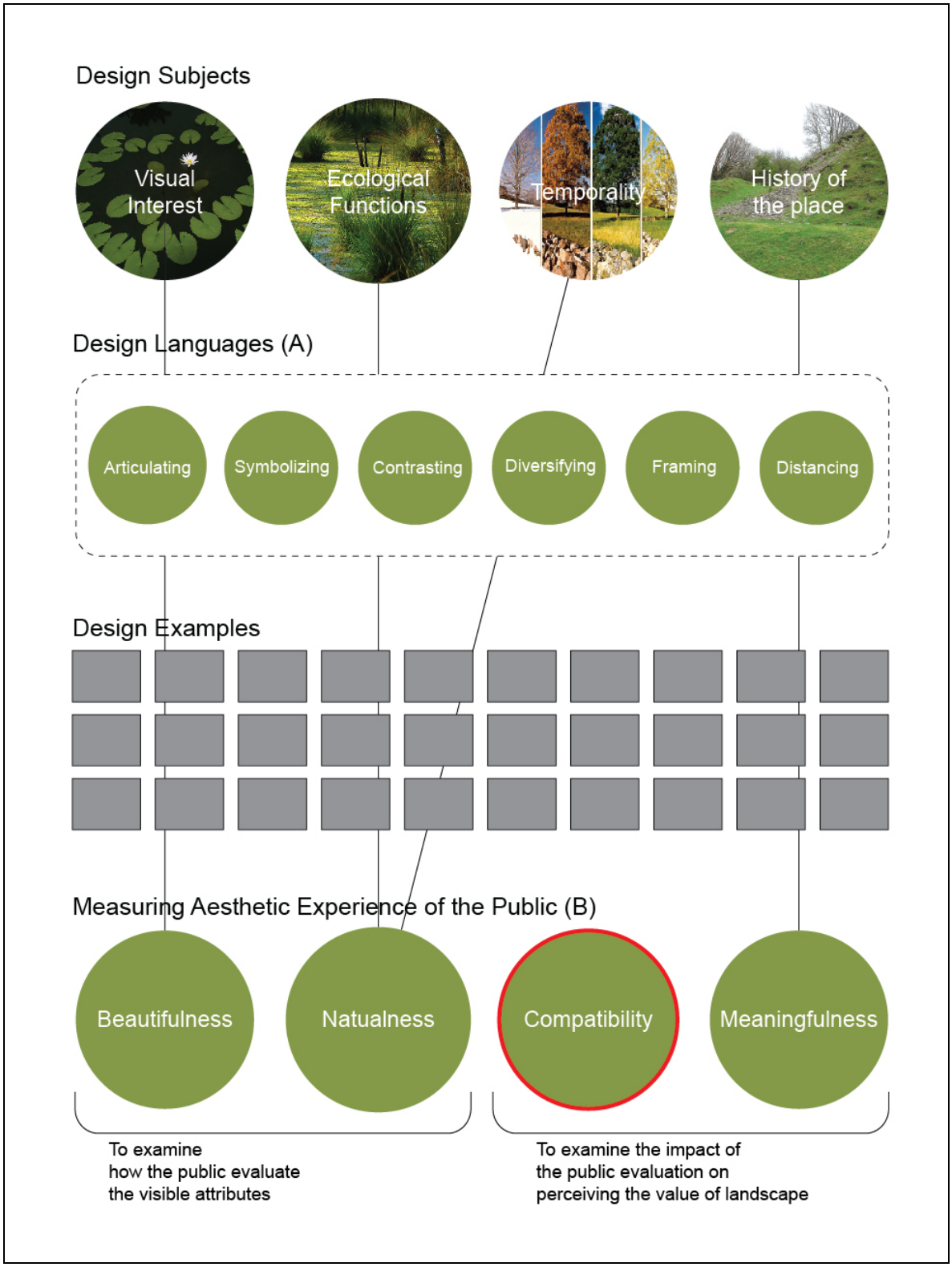
Diversifying + Articulating

Ecological Functions + Visual Interest

Articulating

Referential Photo

Figure 10. Measuring Aesthetic Experience



Chapter 4

TWO POST-INDUSTRIAL URBAN LANDSCAPES IN SEOUL, KOREA

4.1. FORMER WATER SUPPLY FACILITY: SEONYUDO PARK

- Project Title: Seonyudo Park
- Location: Yanghwa-dong 95, Youngdungpo-gu, Seoul, Seoul Korea
- Total Area: 110,407 ㎡
- Design: SeoAhn Total Landscape, Seoul, South Korea
- Client: Seoul Metropolitan Government

Overview

Seonyudo (선유도, 仙遊島) is one of the few islands in the Han River. The earliest image of the island is found in a landscape painting done in the mid 1700s. There had been a small mountain in the river, but the mountain gradually disappeared as it was used for rock mining during the early 20th century. From 1978 to 2000, there was the Seonyu Water Supply Facility providing potable water to south west region of Seoul. In the year of 2002, the island was transformed into a public park after holding a national design competition in 1999.

The design proposal from Seo-Ahn Total Landscape Design and Consulting Group was selected as the winner, and the park was completed and opened in April, 2003. Since then, it has been visited by over 6,000,000 people per year. The park consists of the History Museum of the Han River, Aquatic Botanical Garden, Garden of Time, Water Playground, etc. The history museum was built on the renovation site of the existing pumping facility, which displays

the geology, water quality, and riparian ecosystem of the Han River. It also exhibits various collections of cultural information of the place such as ancient remains and paintings showing the historic livelihood along the river. The Aquatic Botanical Garden exhibits ten thousand of the riparian plants, including impatiens textori, horsetail, water lily, hydrilla etc. The Garden of Time is designed to emphasize a sense of seasonal change by presenting more than one hundred different plants over several small gardens.

Figure 11. Seonyu Waster Supply Facility in 1980s (Source: http://blog.naver.com/esilvia)

Figure 12. The Site Plan of Seonyudo Park (Source: Youngsun Jung, 2010)

Designer's Ecology: Design Strategies and Intentions

The main idea of the design is recycling the former structures. Believing those imprints of the past can powerfully deliver a sense of place to the visitors, the design aimed to retain and transform the filtration plant, filters bed, settling pond, concentrator, control container etc. Furthermore, the design utilized the existing landforms and multilayered structures to create the unique circulation patterns and provide a sense of rhythm in the space. The design proposed four different spatial characteristics in the site: the riverside of the island for ecological restoration, area on the breast wall for cultural space, theme gardens along water flow in the island representing ecological values, and facilities for display, education, and maintenance. Consequently, the spatial program is composed of an environmental playground, an area of educational class and theme experience, gathering and event spaces, walking trails, as well as an ecological preservation area. According to the interviews and analysis on design documents, the main design strategies are summarized as:

- Recycling the existing structures
- Revealing the history of the site
- Combining aesthetics and technology
- Providing a sequential representation of ecology in the water garden
- Environmental education
- Ecological restoration around the island

One of the most distinctive spatial characteristics in this park is the fact that it has a number of vertical layers of circulation flow for pedestrian. Indeed,

regarding the design strategies, the circulation system plays one of the most distinctive and important roles in systemically connecting the main spatial programs including: the Garden of Green Columns, Water Garden, Garden of Time, Amphitheater, Seonyu Pavilion, and Water Playground.

As not demolishing but recycling the old structures is a fundamental design concept, most of the park was built on the existing structures, and the designers envisioned a certain type of aesthetics would be engendered from the contrast between concrete remnants and landscape in terms of the difference of speed in their change, and the way the landscape would take over the old artifacts (Interview with Joungsun Jung and Ukeon Jung, 2010). Having just a little amount of maintenance added to the structures, they also planned to let the remnant structures also be crumbling very slightly and gradually as time goes. What they intended is that the subtle change over time would provoke a poetic interest to the public while they visit there frequently.

Also, they intended to deliver a message of ecological process, especially with the natural water purification system, by symbolizing the water flow that travels through all the theme gardens. Although they still kept a series of existing water containers, they thought that people could enjoy and learn some lessons about how nature works from the design attempt. It is certain that the main idea is conceptually based on the idea of contrasting between the old artifacts and the landscape. Also, there are a number of design features that could represent the design languages previously discussed. For the analysis and the public survey,

some of key design features have been selected based on interviews with the designers and information from design documents.

The design languages that have been applied in Seonyudo Park vary widely. However, the most noticeable use was symbolizing, contrasting and framing. It is fundamentally due to the main design concept derived from the physical context that emphasizes recycling existing materials (symbolizing) and the harmony between artifact and landscape (contrasting and framing). In particular, the designers specifically stated that they were focusing on how to transform the meaning of natural water flows in the design features by using metaphor (symbolizing); and how to balance the contrast between the existing remnants and added (or emerged) landscape.

Separating the visitors from wild landscape by means of the observation deck and skywalk, distancing is mostly used for the riverside area for ecological restoration where relatively more landscape of wilderness can be found and the access is highly limited. Also, through raised walkways and bridge-like pedestrian structures, they intended to provide the visitors not only with a sense of security but also with a different viewpoint that enables them to have a unique aesthetic experience in the landscape.

As expected, diversifying is applied mainly along with framing or articulating. They employed a wide range of aquatic plants and native plants especially in the theme gardens. Some of them are carefully maintained to keep a certain sense of orderliness such as the picnic area on the breast wall and Garden of Green Columns, and while others are more sustained without much

maintenance effort such as the riverside area, Water Garden, and Garden of Time where you can find more diversity in plant species. However, diversifying is hardly used by itself considering the context of the park: a major area is composed of a series of concrete rooms (the theme gardens) and old structures which act as artificial and quite rigid frames already creating a certain sense of contrast. So, the design proposed to add diverse species of landscape materials within the frames as the designers intend to recycle many of the structures.

Lastly, articulating is often used in terms of signs and description boards that tell about the diverse plants and history of the site in different groups of landscape. However, there are few examples of the “less direct” ways of articulating found.

Perception of the Public

Demographic Information

In order to analyze the character of the park, a survey on the patterns of park users was conducted to one hundred randomly selected visitors. This survey asked gender, age, traveling time, visiting frequency, and the purpose of visit. For Seonyudo Park, more females (63%) than males (37%) answered the questionnaire, and a large group of females visited with their children. The most dominant generation groups were relatively young in their twenties (51%) and thirties (24%). Regarding visiting frequency, about the half of the visitors (47%) were first-timers, and 64.5% of them lived within a one hour-travelling distance. Just 1% of them lived in an adjacent neighborhood within a ten minute travelling distance. The purpose of visit shows that the majority (59.5%) came there to take a walk or meditate. Also, a number of young couples (20.7%) were found dating in the park. 9% of the respondents visited with an educational purpose, and it is supposed that those with children were included in this purpose. There were just a few people found exercising in the park, and it does not seem that the design was intended to support it as much as an ordinary neighborhood park does. In fact, relatively fewer people (6%) visited for exercise which is supposedly due to the few facilities for dynamic activities with the exception of the loop-circulation on the peripheral area. All these patterns imply that the park is recognized as a touristic place rather than a neighborhood park of daily urban life.

Table 9. Gender and Age (Seonyudo Park)

	Gender			Age					
	Male	Female	Total	18-30	31-40	41-50	51-60	61-	Total
Freq	37	63	100	51	24	8	8	9	100
(%)	(37.0)	(63.0)	(100.0)	(51.0)	(24.0)	(8.0)	(8.0)	(9.0)	(100.0)

Table 10. Traveling Time to the Park (Seonyudo Park)

		Frequency	Percent	Valid Percent	Cum. Percent
Valid	Less than 10min	1	1.0	1.0	1.0
	10-30min	28	28.0	23.3	29.3
	30min-1hr	35	35.0	35.4	64.6
	1-2hrs	25	25.0	25.3	89.9
	More than 2hrs	10	10.0	10.1	100.0
	Total	99	99.0	100.0	
Missing system		1	1.0		
Total		100	100.0		

Table 11. Visiting Frequency (Seonyudo Park)

	Frequency	Percent	Valid Percent	Cum. Percent
Hardly or first-timer	47	47.0	47.0	47.0
f≤1 per year	8	8.0	8.0	55.0
1 per year <f≤1 per month	24	24.0	24.0	79.0
1 per month<f≤1 per week	11	11.0	11.0	90.0
f>1 per week	10	10.0	10.0	100.0
Total	100	100.0	100.0	

Table 12. Purpose of Visit (Seonyudo Park)

	Responses		
	N	Percent	Percent of Cases
Walk and meditation	66	59.5%	66.0%
Date	23	20.7%	23.0%
Education	10	9.0%	10.0%
Exercise	6	5.4%	6.0%
Others	6	5.4%	6.0%
Total	111	100.0%	111.0%

Perceptive Patterns to the Design Features

Articulating

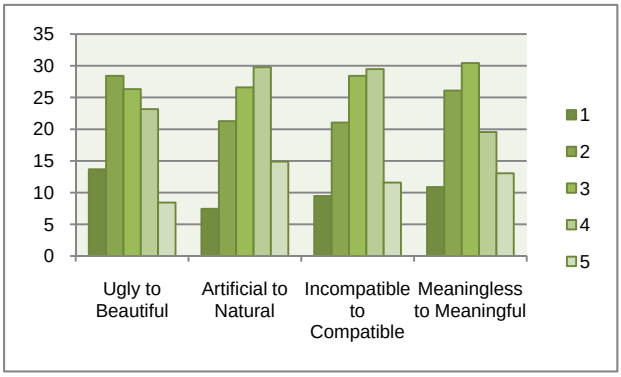
S09 shows the designers' attempt to articulate the values of the landscape by a description board in front of it. It seems that the respondents considered them neither beautiful (31.6% at Mean=2.84) nor meaningful (32.6% at Mean=2.98) while there is a statistically significant correlation between beautifulness and meaningfulness (the correlation coefficient is +0.678 at p=0.01); and naturalness and meaningfulness (the correlation coefficient is +0.564 at p=0.01). However, the responses show that the visitors thought this design feature fitted to the park (41.1% at M=3.13), more natural (44.7% at M=3.23) than artificial (28.7%), which should be due to the amount of vegetation shown in the picture. This means that they belived this was a part of the whole landscape, the park, yet they did not consider it aesthetically valuable.

Knowing that the correlation is significant between beautifulness, naturalness, and meaningfulness, it is assumable that people did not understand the ecological values of the landscape, which were actually articulated in the description board in front of the feature. Therefore, it can be inferred that people did not pay attention to the sinage or description boards as much as was intended. As a matter of fact, in interviews with three surveyees, they mentioned that they did not pay much attention to the description board explaining the native plants in the landscape, which could also influence their perception of the landscape. In contrast, there were four respondents who were not satisfied with

the quality and number of signs and wished to have more and better signs and description boards, hoping to know more about the landscape.

Figure 13. Articulating in Seonyudo Park

Photo ID: S09
Design subject: eco-functions and temporality



Distancing

Three different types of examples regarding distancing were tested: a scene from the observation deck toward the ecologically restored riverside area (S01), the same view but having more distance so that people can also see some part of the observation deck (S17), and a bridge in the Garden of Time (S12) where people can have a closer look at the landscape while they also keeping themselves at a certain distance from the landscape.

S01 and S17 are comparable since they are about the same style of landscape. The result of the comparison is interestingly different. The majority of the responses on S01 about beautifulness were negative (50%) while those answered positive were just 14.3% at Mean=2.51. Also the respondents did not find it meaningful either: positive is just 20.2% at Mean=2.54. However in S17, the responses clearly indicate positive tendency of people both in beautifulness (72.6% at Mean=3.98) and meaningfulness (68.5% Mean=3.85). What is significant about the pattern of the responses is that, while people have a tendency to appreciate large amounts of green, the respondents here showed their preference to the picture of less green but of more artificial object in it. So, there could be a number of other factors influencing this happening. First, there is an “unfavorable” artificial structure, a power-line tower, partially shown. People might think that it broke the nice natural scenery. Second, the weather is different in S01 and S17. S17 was taken in a sunny day, but S01 in cloudy situation. It could greatly impact the landscape perception. Lastly, another design language that S17 has, contrasting (framing) between natural landscape and the artifact of

strong geometry, could provoke a strong interest in people marking a difference from S01. In terms of compatibility to the park, people might have the expectation that the park should be equipped with a certain degree of artificial facility from seeing that S01 has a quite negative response in contrast with the one of S17. Also, the result about meaningfulness here seemingly does not refer to ecological quality or naturalness. There is no significant correlation, but it might be related to comfort, security, or neatness as S17 indicates more value in meaningfulness. S12 might be one of the successful examples of realizing the concept of distancing. The results of the perceptive patterns imply that people generally had positive responses in beautifulness (72.6% at Mean=3.92), compatibility (74.4% at Mean=3.90), and meaningfulness (64.9% at Mean=3.76). It consists of a straight boardwalk over a rich landscape and the trees creating canopy and shade which people normally look for during summertime. This is a quality, nicely juxtaposing cultural and natural features, that has been emphasized in the literature (cf. Nassauer, 1995b; Mozingo, 1997). Besides that, S12 contains a couple of children touching the trees, which alludes that this design feature allows human interaction with nature.

Figure 14. Distancing in Seonyudo Park

Photo ID: S01
Design subject: security, visual interest

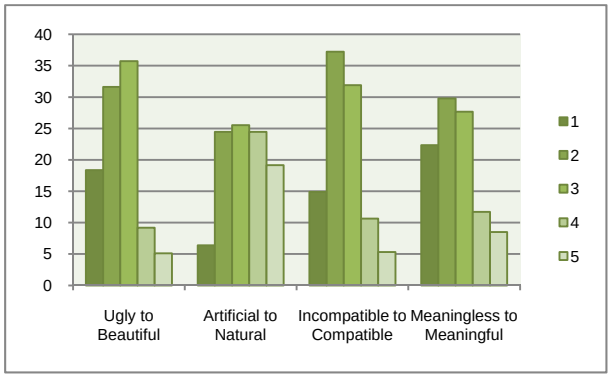


Photo ID: S17
Design subject: security, visual interest

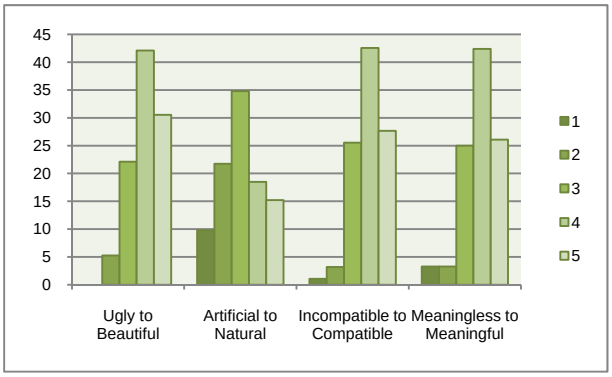
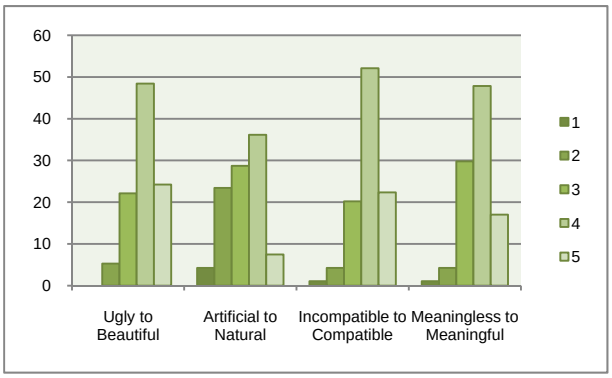


Photo ID: S12
Design subject: visual interest, accessibility, security



Distancing can be a valid design language here. However, in order to have it be applicable, the quality of platforms, security and neatness, should be established. Also, it seems that if there is an opportunity where people have a certain degree of interacting with nature, their aesthetic experience could be dramatically improved. While this can be dilemmatic for designers in applying distancing at the same time as providing interaction, this is where designers' creative intervention should take place with holistic consideration on each aspect.

Framing and Diversifying

The perceptive patterns of framing and diversifying can be discussed at the same time here since they have been applied often together in this case study. Besides, S09, an example of articulating, represents diversifying.

S02 is a sample that tests both framing and diversifying. It consists of a grid-patterned path system and diverse vegetation within the grid, which reflect Nassauer's idea about "Messy Ecosystems Orderly Frames" (Nassauer, 1995b). Indeed, many respondents (62.9% at mean=3.75) answered favorably about the beautifulness of this design feature although they consider it rather artificial (62.8%) than natural (13.8%) landscape at Mean=2.23. It seems that the strong geometrical grid influenced the perception of the public to consider it artificial although the planted area contains a variety of different vegetation.

The patterns of S06 and S15 imply the significance of the amount and qualities of vegetation in the landscape perception. Although they are in the quite similar context, in terms of location, weather, and physical setting of design, the responses in both show a difference in the beautifulness and meaningfulness. For S06, the majority of respondents turned out to be positive in beautifulness (56% at mean=3.63); and in meaningfulness, 54.7% were positive at mean=3.51. However for S15, just 34.6% of the respondents went positively in beautifulness at Mean=2.86, and 31.9% were positive in meaningfulness at mean=3.03. In fact, for S06 the vegetation (lotuses) was in season so that the respondents could observe a lot of greenness in the container. But in S15, the cattails were not as actively booming as the lotuses; and due to some maintenance purpose, they

were partially and temporarily removed; which might look shabby and untidy to the respondents. So, it also might be inferred that the visual quality of the actual landscape content could precede whatever design languages applied.

The feature of S09 was intentionally designed to reveal the diversity of native plants as the description board explains in front of the design feature. The responses indicate that people have a higher tendency to consider it meaningless (37%) than meaningful (32.6%) at mean=2.98 and they do not perceive it as beautiful either. Besides the need for better signage system both in the number and quality as discussed in the articulating section, it might be possible to enhance the visual preference by adding another design language, such as framing, on the top of the complicated landscape of diversity. Also what we could suppose here is that diversifying might work well when the landscape itself has a certain degree of visual quality. However, if it does not have as good visual quality as it has significant ecological diversity, other design languages could be accompanied in order to enhance or supplement the weakness of the visual aspect of the feature.

Figure 15. Framing in Seonyudo Park

Photo ID: S02
Design subject: visual interest, eco-functions

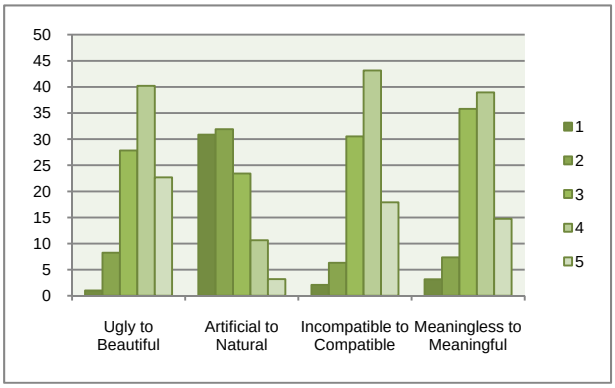


Photo ID: S06
Design subject: eco-functions and temporality

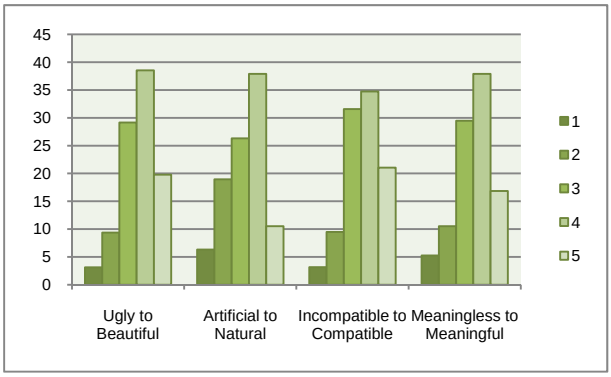


Photo ID: S15
Design subject: eco-functions and temporality

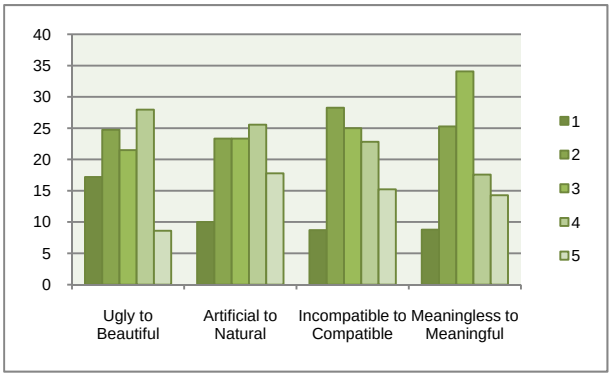


Figure 16. Diversifying in Seonyudo Park

Photo ID: S02
Design subject: visual interest, eco-functions

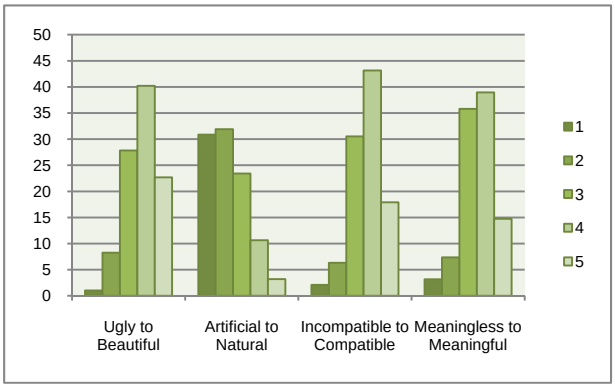
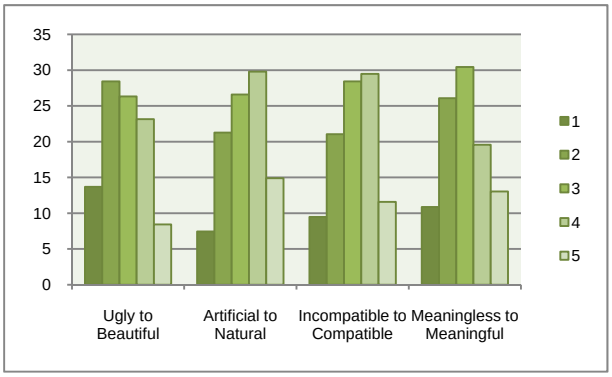


Photo ID: S09
Design subject: eco-functions and temporality



In general, it could be summarized that when both visual qualities in landscape content and frame are secured to a certain extent, the responses were positive reaction (S02). If either the landscape or the frame does not satisfy the degree of visual quality, people would respond negatively as shown in the case of S09. Thus, in order to improve the communication between the landscape and people, not only which design languages to choose, but also how to balance the combination in-between design languages would deserve much attention in design practices.

Contrasting

Constrasting is a widely used design language in designing Seounyudo Park. Especially knowing the fact that the design strategies that aimed at recycling the existing structures and bringing a particular aesthetic sense out of the combination between the remains and landscape, the idea of contrasting is found both conceptually and practically over the park. Three representative design features have been selected to discuss the different typologies of the application: a juxaposition of landscape and a modern design feature (S07), an irregular overlap of old remnants and landscape (S10), and a juxtaposition of old remnants and landscape (S11).

Among the three features, the respondents replied most positively to S07 (beautifulness: 46% at mean=3.48, compatibility: 54.3% at mean=3.59, and meaningfulness: 49% at Mean=3.40). It seemingly has the most distinctive constrast between the landscape and the artifact. Comparing these three examples, there was a surprising thing which is the responses about meaningfulness. Leaving aside the responses about beautifulness and compatibility, the results were expected to show that people would find more meaning in those having “historical” remnants in S10 and S11. However, the results show that people located more points in the meaningfulness of S07, but not very significant in S10 (36.2% at mean=3.19) and S11 (33% at mean=2.85) even though the two pictures contain vivid features of the historical clue. The reason that could be inferred that people might define “meaningfulness” as the

overal value of the design feature, probably not considering the historical value as much.

Also, there was a group of the respondents (5%) criticizing the main concept of the park design. Before the park was built, they expected this park to be a place with a “large lawn, groves of many tall trees, and ponds” which is a typical image of picturesque park. Also it does not seem that they understood the design intent for why this park would keep the “shabby” debris which do not visually appeal to them. This explains that there is a gap between designers and the public. Although the designers’ intent was fostering the sense of place by revealing the historical clues that could also provoke a unique sense of beauty, some in the public might not perceive it as meaningful. One of the reasons that could be inferred here is that the majority of the respondents (56.6%) have a particular image of nature as “wooded mountain and forest,” and this might have a role in their expectation for the park. Therefore, the “unique” image of the park might look positively interesting to some of the respondents. However, to those who have stronger expectations about the image of nature in a park, it could be dissapointing. Regarding the fact that the responses were positive on S07, one might conclude that there are different degrees of contrasting in terms of the shape, color, and age of the artifact. If people find more vivid contrast between an artifact and landscape, the aesthetic experience can be improved. Thus, for instance, the reponses on S10 and S11 could be different if some design efforts were made to those remnants such as lighting, color, or other ornamental attachment. Also, more knowledge on why this park keeps those historical

elements can influence their preference, based on the fact that there are group of people (4%) who were not content with the signage system.

Figure 17. Contrasting in Seonyudo Park

Photo ID: S07
Design subject: visual interest, temporality

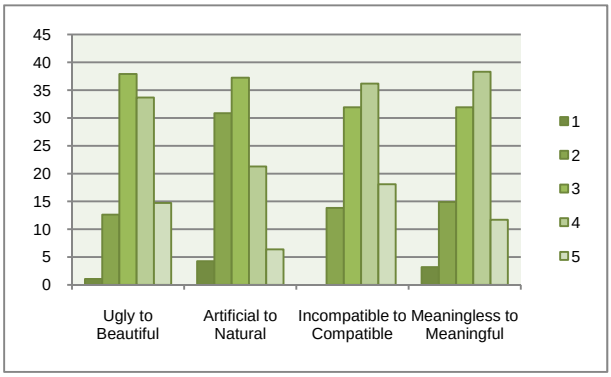


Photo ID: S10
Design subject: visual interest, temporality

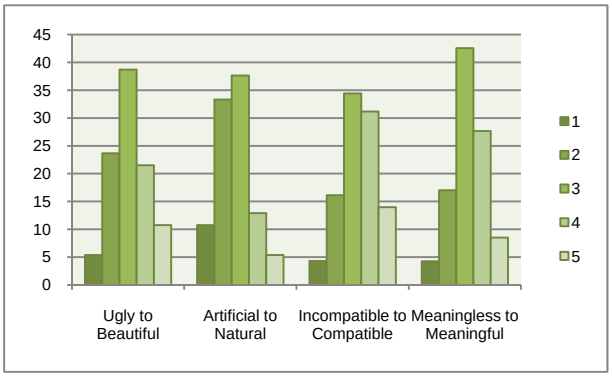
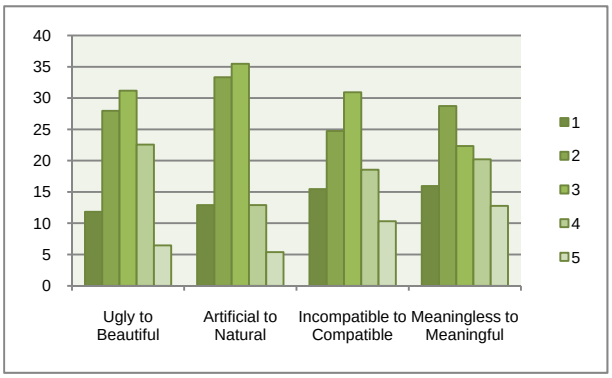


Photo ID: S11
Design subject: visual interest, temporality



Symbolizing

Symbolizing was the most widely applied in designing Seonyudo Park among the six different design languages. Designers also alluded that they were trying to realized the nature of the park through symbolizing (metaphor) such as being in the river, regeneration of water, and the history of place (Kim, 2004).

S03 is a water playground which is an example of symbolizing that represents a nostalgic image of riverside. Also the water used in the playground is from the natural water purification system right next to it. The respondents rated this design feature very positively in overall attributes. Even though 46.9% of the respondents perceived it as artificial (at mean=2.72), the majority considered it beautiful (76.8% at Mean=4.02), compatible (75.8% at Mean=3.93), and meaningful (72.6% at mean=3.88). In particular, a number of children playing with their parents were found on every visit to the site. Similar to the case of S12, a sense of human interaction with the landscape might play an important role in influencing the responses.

What is significant in S04 is that it contains a kinetic landscape feature, water, in comparison to other samples that have historical remnants such as S10 and S11. Not just being concrete debris, the water here actually reflects the identity of the park in that it is in the middle of the Han River as well as it used to be a water supply facility. It looks like the water influenced the pattern of respondents' perception dramatically. The majority responded that it was beautiful (51.6% at mean=3.15), compatible (40.2% at mean=3.20), and meaningful (41.5% at mean=3.16). The lesson which could be earned in this

case is that, as discussed earlier about the possibility of adding more design efforts in the concrete structure (S10 and S11), an element containing relevant meanings of the site could positively enhancing people's aesthetic experience.

S05 and S16 are both historical remnants covered with green vegetation. Both were intended to reveal the history of the site with a certain beauty of sculpture. While in beautifulness and meaningfulness are significantly correlated between S05 and S16 (beautifulness: +0.383 at p=0.01; meaningfulness: +0.357 at p=0.01), the respondents felt more favorable toward S16 in terms of the beautifulness (79% at mean=4.06 versus 51.6% at mean=3.47) and meaningfulness (63.8% at mean=3.73 versus 41% at mean=3.27). One of the big reasons influencing this difference could be the amount of green vegetation in the features. Actually, for S16 the majority of them (68.3% at Mean=3.59) perceived it as natural, but just 18.9% at mean=2.46 counted S05 as natural. What is significant and interesting here is that S05 can be considered as having more aesthetic values by a sense of conventional aesthetics such as a sense of rhythm found in the group of columns, beauty of space from in-between them, and more distinctive forms reminding the former use of the land. In fact, the design feature in S05 has become popular among many photographers and designers for the subject of their photography. However, it could be inferred that the public would appreciate rather the amount of green than such poetic sense of the spatial structure.

S08 implies another gap between the designers' intent and the perception of the public. S08 includes a valve which was used in the former water supply

facility. Now it has been installed as an environmental art, a sculpture in the park revealing the history of the site. The result of the survey indicates that the visitor considered it meaningful. However, in spite of its quality of direct storytelling the history, 36.2% (mean=3.12) of the respondents answered that it was meaningful. There could be several reasons for this phenomenon: first of all, what can be assumed is that history might not be a very significant factor influencing the meaningfulness that people would feel in landscape, or the respondents might not recognize the historical meaning of the object despite the description board in front of it. Also, it may be due to its location in that it is located on the periphery of the park. Also, it might be better if it showed its actual function more clearly revealing how it was used, rather than staying as a static sculpture.

S13 is an example representing a history farther back than the industrial era, a Korean traditional pavilion which is shown in an old landscape painting of Seonyudo in the 1700s, as well as actually interacting with the needs of the visitors as a shelter being the only “traditionally” designed object in the park. The responses were overall very positive in beautifulness (68.1% at mean=3.88), compatibility (64.1% at mean=3.72), and meaningfulness (56.6% at mean=3.55).

S14 and S18 were designed to mimic the natural water purification and its processes. The designers specifically stated that this metaphor could inform the importance of water and deliver its specific knowledge about natural water purification to the visitors. Both S14 and S18 were perceived favorably. In particular for S14, the majority of the respondents considered it beautiful (44.9% at mean=3.28), compatible (34.8% at mean=3.20), and meaningful (42.2% at

mean=3.21). This is one of a few historical remnants that actually are operated as a “recycled” function, purifying and providing water for the park. It has slightly complicated look including a series of water containers full of aquatic plants that purify the water. Also, it works as a big cascade with constantly flowing water, which marks a difference from S18. S14 and S18 have significant correlations: beautifulness (+0.338 at p=0.01), naturalness (+0.317 at p=0.01), compatibility (+0.442 at p=0.01), and meaningfulness (+0.378 at p=0.01). However, S18 did not provoke as strong an interest as S14. Being part of the water circulation system, S18 has the contents that are found in S14. However, there is a difference between them in terms of dynamics and location: S14 shows the actual process with kinetic water movement while S18 stays as a static water container. Also, S14 is located in the very beginning of the Water Garden where many people normally gather. However, S18 is a part of the peripheral water circulation system. This might influence the responses as well.

Having human interaction in the symbol (S03 and S13) could improve the aesthetic experience as is similar to the case of S12 in distancing. Also, symbols that kinetically function could provoke more interests than static ones (S03, S04, and S14). Regardless of the designers’ preference, people tend to appreciate the amount of green more than other factors (S16).

Figure 18. Symbolizing in Seonyudo Park 1

Photo ID: S03
Design subject: history, eco-functions

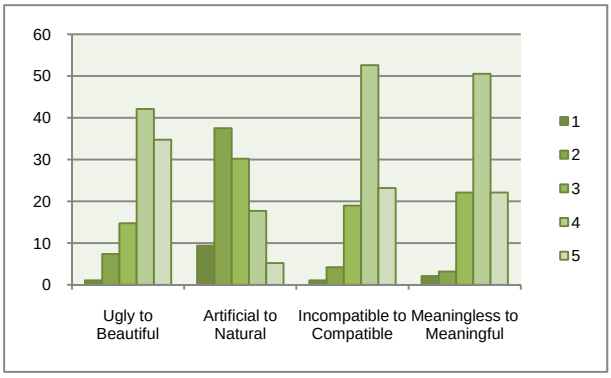


Photo ID: S04
Design subject: history, visual interest

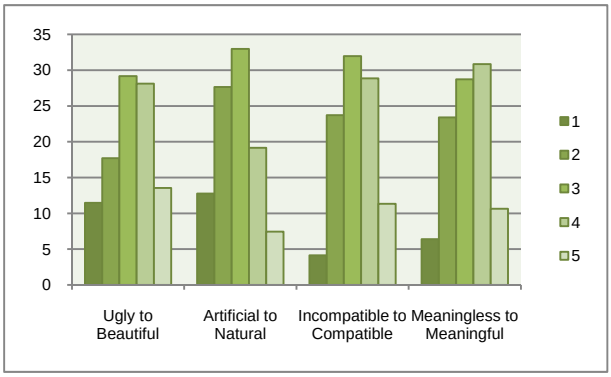


Photo ID: S05
Design subject: history, visual interest

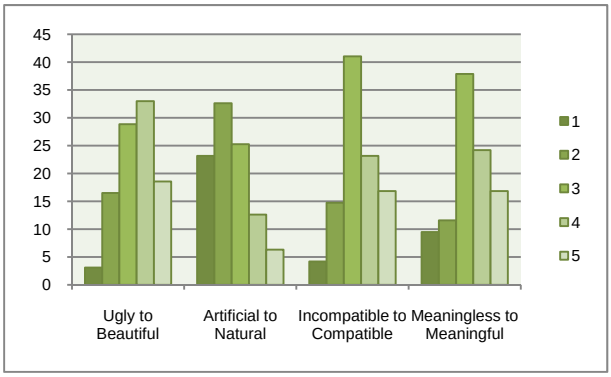


Figure 19. Symbolizing in Seonyudo Park 2

Photo ID: S16
Design subject: history, visual interest

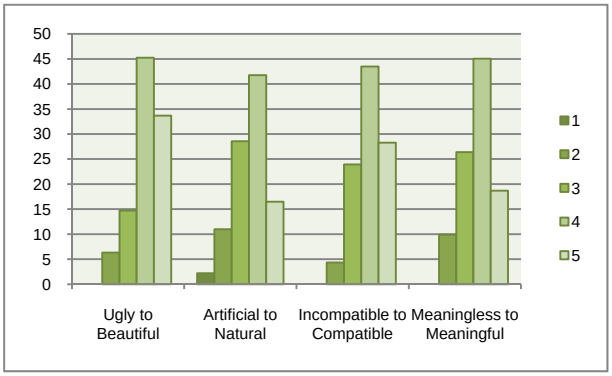


Photo ID: S08
Design subject: history, visual interest

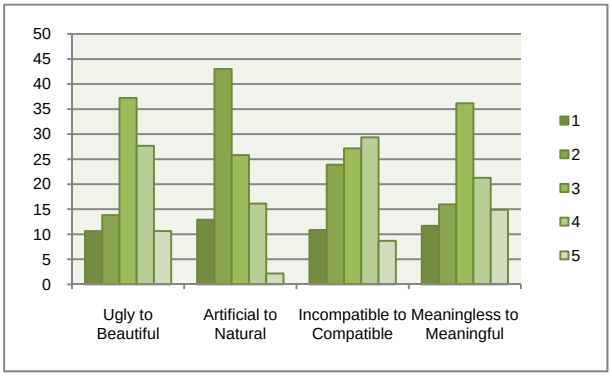


Photo ID: S13
Design subject: history, visual interest

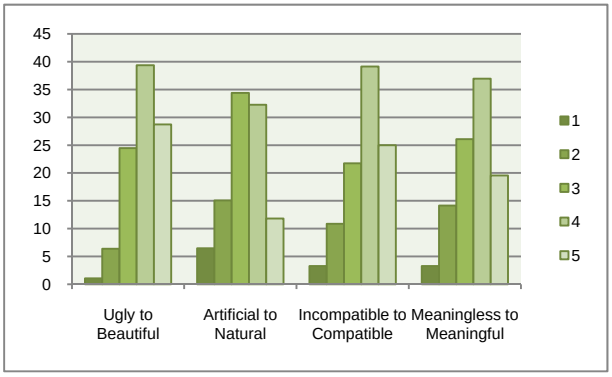


Figure 20. Symbolizing in Seonyudo Park 3

Photo ID: S14
Design subject: eco-functions, history

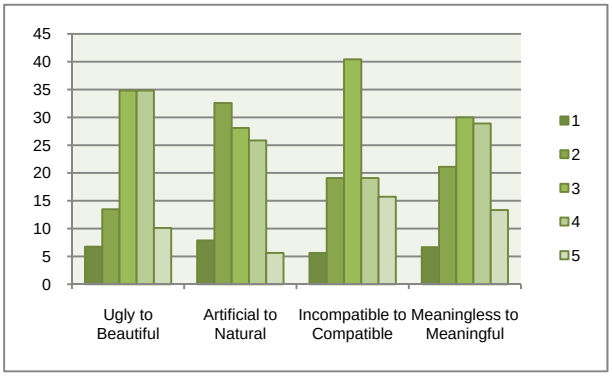


Photo ID: S10
Design subject: history, visual interest

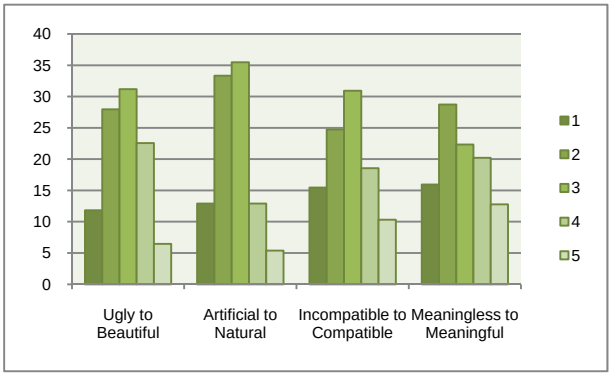


Photo ID: S18
Design subject: eco-functions

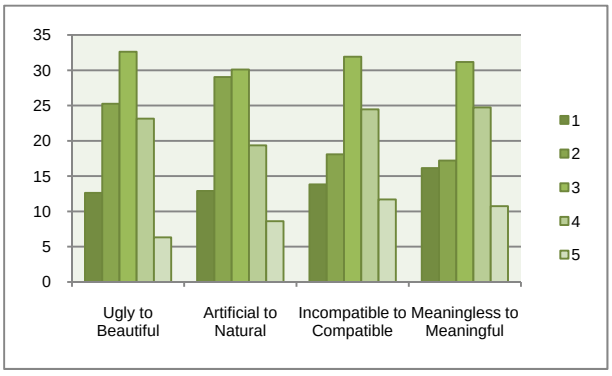


Table 13. Descriptive Statistics (Seonyudo Park)

		N	Mean	Std. Deviation	Skewness	
		Statistic	Statistic	Statistic	Statistic	Std. Error
S01	ugly to beautiful	98	2.51	1.06	0.40	0.24
	artificial to natural	94	3.26	1.21	-0.06	0.25
	not compatible to well compatible	94	2.54	1.04	0.49	0.25
	meaningless to meaningful	94	2.54	1.21	0.46	0.25
S02	ugly to beautiful	97	3.75	0.94	-0.42	0.24
	artificial to natural	94	2.23	1.10	0.60	0.25
	not compatible to well compatible	95	3.68	0.91	-0.52	0.25
	meaningless to meaningful	95	3.55	0.94	-0.45	0.25
S03	ugly to beautiful	95	4.02	0.95	-0.89	0.25
	artificial to natural	96	2.72	1.03	0.36	0.25
	not compatible to well compatible	95	3.93	0.83	-0.78	0.25
	meaningless to meaningful	95	3.87	0.87	-0.86	0.25
S04	ugly to beautiful	96	3.15	1.21	-0.21	0.25
	artificial to natural	94	2.81	1.12	0.15	0.25
	not compatible to well compatible	97	3.20	1.06	-0.03	0.25
	meaningless to meaningful	94	3.16	1.10	-0.13	0.25
S05	ugly to beautiful	97	3.47	1.07	-0.27	0.24
	artificial to natural	95	2.46	1.17	0.50	0.25
	not compatible to well compatible	95	3.34	1.06	-0.06	0.25
	meaningless to meaningful	95	3.27	1.16	-0.26	0.25
S06	ugly to beautiful	96	3.63	1.01	-0.51	0.25
	artificial to natural	95	3.27	1.09	-0.36	0.25
	not compatible to well compatible	95	3.61	1.02	-0.43	0.25
	meaningless to meaningful	95	3.51	1.06	-0.53	0.25
S07	ugly to beautiful	95	3.48	0.93	-0.07	0.25
	artificial to natural	94	2.95	0.98	0.25	0.25
	not compatible to well compatible	94	3.59	0.94	-0.09	0.25
	meaningless to meaningful	94	3.40	0.99	-0.34	0.25
S08	ugly to beautiful	94	3.14	1.12	-0.28	0.25
	artificial to natural	93	2.52	0.98	0.41	0.25
	not compatible to well compatible	92	3.01	1.15	-0.11	0.25
	meaningless to meaningful	94	3.12	1.20	-0.12	0.25
S09	ugly to beautiful	95	2.84	1.18	0.11	0.25
	artificial to natural	94	3.23	1.17	-0.18	0.25
	not compatible to well compatible	95	3.13	1.16	-0.17	0.25
	meaningless to meaningful	92	2.98	1.20	0.12	0.25

Cont		N	Mean	Std. Deviation	Skewness	
		Statistic	Statistic	Statistic	Statistic	Std. Error
S10	ugly to beautiful	93	3.09	1.05	0.11	0.25
	artificial to natural	93	2.69	1.01	0.34	0.25
	not compatible to well compatible	93	3.34	1.05	-0.21	0.25
	meaningless to meaningful	94	3.19	0.96	-0.10	0.25
S11	ugly to beautiful	93	2.84	1.11	0.08	0.25
	artificial to natural	93	2.65	1.04	0.35	0.25
	not compatible to well compatible	97	2.84	1.20	0.14	0.24
	meaningless to meaningful	94	2.85	1.28	0.19	0.25
S12	ugly to beautiful	95	3.92	0.82	-0.43	0.25
	artificial to natural	94	3.19	1.02	-0.21	0.25
	not compatible to well compatible	94	3.90	0.83	-0.74	0.25
	meaningless to meaningful	94	3.76	0.83	-0.45	0.25
S13	ugly to beautiful	94	3.88	0.94	-0.56	0.25
	artificial to natural	93	3.28	1.07	-0.31	0.25
	not compatible to well compatible	92	3.72	1.06	-0.65	0.25
	meaningless to meaningful	92	3.55	1.06	-0.43	0.25
S14	ugly to beautiful	89	3.28	1.04	-0.41	0.26
	artificial to natural	89	2.89	1.06	0.11	0.26
	not compatible to well compatible	89	3.20	1.10	0.06	0.26
	meaningless to meaningful	90	3.21	1.13	-0.14	0.25
S15	ugly to beautiful	93	2.86	1.25	-0.004	0.25
	artificial to natural	90	3.18	1.26	-0.10	0.25
	not compatible to well compatible	92	3.08	1.22	0.08	0.25
	meaningless to meaningful	91	3.03	1.17	0.15	0.25
S16	ugly to beautiful	95	4.06	0.86	-0.74	0.25
	artificial to natural	91	3.59	0.97	-0.46	0.25
	not compatible to well compatible	92	3.96	0.84	-0.38	0.25
	meaningless to meaningful	91	3.73	0.88	-0.32	0.25
S17	ugly to beautiful	95	3.98	0.86	-0.47	0.25
	artificial to natural	92	3.08	1.19	0.05	0.25
	not compatible to well compatible	94	3.93	0.87	-0.55	0.25
	meaningless to meaningful	92	3.85	0.96	-0.83	0.25
S18	ugly to beautiful	95	2.85	1.11	0.01	0.25
	artificial to natural	93	2.82	1.15	0.19	0.25
	not compatible to well compatible	94	3.02	1.21	-0.12	0.25
	meaningless to meaningful	93	2.97	1.23	-0.12	0.25
	Valid N (listwise)	84				

4.2. FORMER LANDFILL: HANEUL (SKY) PARK

- Project Title: Haneul (Sky) Park
- Location: Worldcup-ro 243-60, Mapo-gu, Seoul, Seoul Korea
- Total Area: 192,000 ㎡
- Design: Yanggyo Jin, University of Seoul, Seoul, South Korea
- Client: Seoul Metropolitan Government

Overview

Nanjido (난지도, 蘭芝島) used to be an island (島) located in the west side of Seoul. It was famous for the seasonal blooming of the orchids (蘭) and mushrooms (芝). Even during 1960s it was still an island with full of trees and flowers. However, since 1978 it had become one of the biggest landfills in Korea collecting the household's garbage and construction wastes for 15 years.[8]

Since an enormous amount of wastes had been thoughtlessly stacked up without a sanitary treatment, the landfill notoriously emitted the toxic leachate and noxious gas which eventually contaminated the Han River and neighboring ecosystems. The City of Seoul realized the significance of the environmental threat, and decided to restore the environment by starting "stabilization-treatment." It was implemented between 1991 and 1996 with lots of effort especially focusing on treating the toxic leachate by installing cutoff walls,

[8] According to the official statistics, the amount of wastes buried in those days is over 9.2 hundred million ㎥, which became two 98m high mountains in the area. It got a nickname "island of three major components" which are flies, dusts, and odors
(http://ebook.seoul.go.kr/web_http/form/r7EmailOpen.php?guid=O9L313U4X3).

preparing proper conditions for planting on the top of the landfill, grading the slopes, and drawing out the noxious gases from the ground (Chae, 2006).

Figure 21. Arial photograph of Nanjido in 1999 (Source: Noh, 2010)

Furthermore, the city government declared it would locate the new main stadium for the 2002 World Cup right next to the landfill and convert the landfill into a public park to restore the ecological value of the site. The basic method of construction is that they covered the surface of the landfill first with 1.5mm thick HDPE film to prevent it from spilling the toxic leachate; second, a 30cm sand layer was placed on the top of it as a drainage system, and last a 60cm soil layer was covered on that to establish the condition of vegetation's habitat. Moreover, 6,000m long and 1m deep cutoff walls as well as 31 collecting wells around the landfill were installed to block out the polluted leachate which could contaminate the underground water and the Han River.

In regard to recycling, 12,800m pipes were arranged to collect the methane gas from the accumulated trash whose amount is 165 ㎥ per minute, and 106 gas wells were placed over the site. This gas is now being provided to

the neighboring communities for heating. However, the gas production has decreased as the landfill has been settling at 4cm per year. Also, over 400,000 trees were newly planted, especially on the slopes of the landfill, to create proper flora and fauna. 24,000 imagoes and 14,000 larvae of dragonflies and butterflies were released and expected to support the ecosystem. In fact, The Public Corporation for Park Management in Seoul presents that the overall ecology of the site has been enhanced in terms of the number of species and the soil qualities (Table 14).

In order to understand the design strategies for the ecological aesthetic that this design project employed, it is necessary to look at which process this whole project was going through. Actually, resting on the east mountain of two landfills, Haneul Park is a part of the World Cup Park master plan that has four subdivisions. First, the master plan for the whole site was developed by M.A. (Master Architect), OIKOS, the landscape architectural firm at the very beginning of the project. Subsequently, the four sectional sites, including Pyounghwa Park, Haneul Park, Noeul Park, and Nanjicheon Park, were distributed to different landscape architectural firms to design. Since May 2002 when Haneul Park was opened to the public with the others, 1,850,000 people have visited every year (Chae, 2006). Unlike Seonyudo Park, Haneul Park does not have many spatial programs, but intentionally minimizes ordinary park facilities such as a cafeteria or a paved plaza, it is mainly composed of meadows of different groups of native grass and observation areas, with the primary intention that people could have subtle but unique experiences they miss in the ordinary urban setting.

Table 14. The Changes of Flora and Fauna in World Cup Park

	2000	2003	2004	2005	2006	2007	2008
Vegetation	F: 60	F: 68	F: 78	F: 90	F: 97	F: 79	F: 77
	S: 270	S: 438	S: 482	S: 485	S: 451	S: 436	S: 453
Wild Birds	F: 19	F: 29	F: 34	F: 29	F: 29	F: 29	F: 28
	S: 31	S: 56	S: 69	S: 57	S: 61	S: 62	S: 55
Amphibians	F: 6	F: 9	F: 9	F: 8	F: 7	F: 8	F: 9
and Reptiles	S: 8	S: 13	S: 12	S: 9	S: 11	S: 11	S: 14
Insects	F: 56	F: 51	F: 71	F: 62	F: 63	F: 71	F: 82
	S: 123	S: 233	S:279	S: 267	S: 272	S: 229	S: 322
Invertebrates	-	-	F: 25	F: 27	F: 31	F: 34	F: 36
			S: 27	S: 37	S: 41	S: 44	S: 48
Fishes	-	F: 6	F: 5	F: 6	F: 10	F: 8	F: 7
		S: 15	S: 8	S: 10	S: 17	S: 16	S: 14
Mammals	F: 2	F: 9	F: 8	F: 8	F: 7	F: 8	F: 5
	S: 2	S: 11	S: 10	S: 9	S: 8	S: 11	S: 8

F: Families, S: Species
http://worldcuppark.seoul.go.kr/ecosystem/status1_1.html

Figure 22. Final Master Plan of the World Cup Park, 1999 (Source: Jin, 2010)

Designer's Ecology: Design Strategies and Intentions

The site of Haneul Park was not a natural setting, but rather an artificial landscape resulting from the stabilizing operation of a landfill. The big idea of the park design is also recycling the existing structure of the landfill. After the initial detoxification treatment and physical stabilizing process, the design basically focused on showing how a new nature could emerge on a highly toxic environment. Therefore, one of the main design implementations was firstly to plant native vegetations which have relatively stronger tolerance to the contaminated land, such as flame grass, reed, evening-primroses, and buckwheat; and then to minimize human intervention (maintenance) to reveal the natural succession. So, the visitors could learn about the environment, as well as witness the symbolic beginning of new nature. Also, they introduced new energy technologies such as five wind turbines and a number of photovoltaic devices, and they utilize the renewable energy to operate all the lamps in the park and other facilities.

Figure 23. Section of the Original Landfill

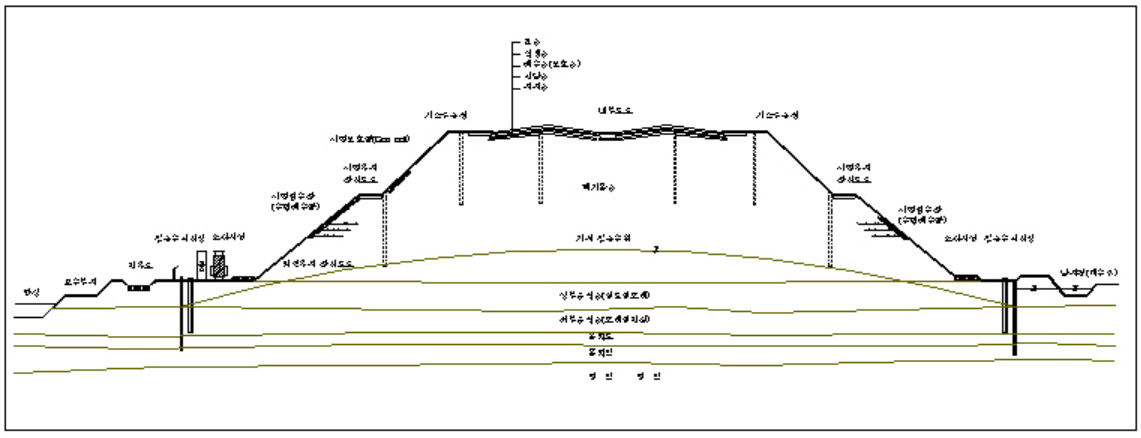


Figure 24. Site Plan of Haneul Park (Source: Jin, 2010)

According to the interview and analysis of the design documents, there are several design strategies emphasized as followed:

- Revealing the formativeness of the land resulting from the original drainage system
- Applying symbolic geometrical patterns with wild flowers that can be shown from the sky concerning the 2002 World Cup
- Introducing environmental art: land art and festivals etc.
- Using native vegetations that fit the toxic and arid environment
- Providing a calm and poetic environment in contrast to daily urban life
- Fortifying the habitats for wildlife

The chief designer (Yanggyo Jin) particularly stressed the significance of the symbolic meaning in the unique geometry of the original landfill (Figure 21). Believing that reminding of the unpleasant past can provide a chance of rethinking about our environment, he stated that by keeping the initial landform it could tell about the history of the site to the public while working as a land art. Furthermore, he brought a symbolic pattern of the planting that could be shown from the sky, butterfly, which is an indicator species that represents recovery of nature. However, he also emphasized a sense of openness in the park which could hardly be found in the city of Seoul. In sum, the he stated that this design concept could help not only create the unique flat landscape, but also satisfy the situation of the limited plants due to the shallow soil depth.

In a broad sense, there is big contrast between the top and the slopes of the landfill in terms of naturalness of landscape. After initially seeded and planted,

the slopes have been left as natural succession has taken place and shaped itself so that there can be more biodiversity obtained naturally. Consequently, human access is highly prohibited to support the natural succession and also for security issues.

In contrast, the top part of the landfill, the main area of the park, was designed for more human interaction. The design also is intended to create a certain sense of contrast there by means of juxtaposing the wild and tamed landscape in the geometrical pattern, which is supposed to provoke a visual interest. Also, the design specifically aimed at maximizing the experience of seasonal change by introducing certain herbaceous plants that change their colors and shapes according to the season. The designers especially expected that the golden color of the flame grass and reed in autumn and the greenness in spring would be a very meaningful experience for the urban dweller. For the environmental educational aspect, the design proposed a number of signs and description boards to explain the ecosystem and history of the site, as well as an information center that acts as a museum.

The design languages found in Haneul Park are a bit more limited than Seonyudo Park due to its inherent context and design concept. The design rather attempted to bring a subtle poetic sense of landscape itself than intervening in-between. However, there were certainly some of the design languages, except for framing, found in several design features, and it seems that the most common ones were distancing, symbolizing, and contrasting (Figure 22).

Owing to having both wilderness and actively used area at the same time, distancing was extensively used in terms of raised wooden decks and fences especially in the main approach and edges of the park where the two landscapes meet. Also, symbolizing was mainly found in the geometrical pattern and the several design features representing the history and characteristics of the site. One of the interesting things about contrasting in this park is that it includes not only the one between artifact and landscape, but also tamed and wild landscapes.

Perception of the Public

Demographic Information

The demographic pattern of the visitors in Haneul Park is similar to the one of Seonyudo Park. However, for gender, the visitors in Haneul Park had almost the same number, 51% in male and 49% in female. The generation groups that visited Haneul Park most frequently also consist of younger people of their twenties and thirties (70%). While there is no big difference in the pattern of travelling time compared to Seonyudo Park, no one could take less than ten minutes to get there due to the characteristic of its location. Also, just like Seonyudo Park, about half of the visitors (47%) were first-timers, and a bit more than half (55%) of them take less than one hour to arrive at the park from their home. The purpose of visit is one of the most distinguishable things in the demographic pattern relative to Seonyudo Park. Although it is similar to the case of Seonyudo Park in that the majority of visitors came to the park for walk and meditation or date (69.4%), more young couples (39%) were found having a date in the park The fact that just a few people (2.8%) came for education is quite comparable to Seonyudo Park, and more people (24.1%) visited the park mainly for exercise which is, probably, due to the physical suitability for hiking and mountain biking. Indeed, there were often groups of people found cycling and jogging. However, all these patterns make clear that the park is also used as a touristic place rather than solely a neighborhood park since 79% of the respondents replied that they visited the park less than one time per month.

Table 15. Gender and Age (Haneul Park)

	Gender			Age					
	Male	Female	Total	18-30	31-40	41-50	51-60	61-	Total
Freq	51	49	100	55	15	9	13	8	100
(%)	(51.0)	(49.0)	(100.0)	(55.0)	(15.0)	(9.0)	(13.0)	(8.0)	(100.0)

Table 16. Traveling Time to the Park (Haneul Park)

		Frequency	Percent	Valid Percent	Cum. Percent
Valid	Less than 10min	0	0.0	0.0	0.0
	10-30min	17	17.0	17.0	17.0
	30min-1hr	38	38.0	38.0	55.0
	1-2hrs	36	36.0	36.0	91.0
	More than 2hrs	9	9.0	9.0	100.0
	Total	100	100.0	100.0	

Table 17. Visiting Frequency (Haneul Park)

	Frequency	Percent	Valid Percent	Cum. Percent
Hardly or first-timer	47	47.0	47.0	47.0
f≤1 per year	12	12.0	12.0	59.0
1 per year <f≤1 per month	20	20.0	20.0	79.0
1 per month<f≤1 per week	12	12.0	12.0	91.0
f>1 per week	9	9.0	9.0	100.0
Total	100	100.0	100.0	

Table 18. Purpose of Visit (Haneul Park)

	Responses		
	N	Percent	Percent of Cases
Walk and meditation	36	33.3%	36.0%
Date	39	36.1%	39.0%
Education	3	2.8%	3.0%
Exercise	26	24.1%	26.0%
Others	4	3.7%	4.0%
Total	108	100.0%	108.0%

Perceptive Patterns to the Design Features

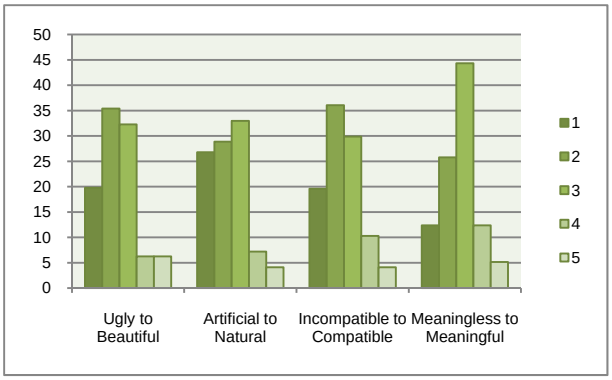
Articulating

Similar to the case of Seonyudo Park, there are a number of signs and description boards explaining the values and history of the landscape. However, articulating in terms of sophisticated design efforts was not found as often as the other design languages. This design feature above is a drainage channel that is a design effort to reveal the process of how the landfill is being stabilized instead of using culverts. The landfill is steadily sinking down as time goes on. The contaminated materials have been kept from the surface landscape by the separated drainage system. This drainage channel represents a device used to support the stabilization process.

However, the perceptive pattern on this design feature is overall unfavorable. The majority of the respondents considered it ugly (55.2% at mean=2.44), not compatible (55.7% at mean=2.43), and not meaningful (38.2% at mean=2.72). Basically, it is assumable from this result is that it does not have something aesthetically pleasing, as well as the respondents might not understand the value of this feature. As a matter of fact, although there is information explaining this system in the visitor center and booklets, there were no specific signs or description boards on this. Thus, if the visitors do not drop by the visitor center, they are supposed to understand it solely by the design itself.

Figure 25. Articulating in Haneul Park

Photo ID: H08
Design subject: eco-functions



Distancing

Distancing was one of the widely applied design languages. It is because there are basically two different groups of landscape typologies; one is the main part of the park which is mostly occupied by the visitors, and the other is the peripheral area where the natural succession happens. Thus, there is essentially a sense of distancing between the two.

H01 is a representative view from the park towards the wilderness area. The feature includes a variety of different vegetations growing randomly with even some faded Japanese hops on the ground. The majority perceived it ugly (34.8% at mean=2.82) while they considered it natural (76.0% mean=4.03) as well as meaningful (40.6% at mean=3.22). Also, what is significant here is that the respondents thought that it fits to the place (38.5% at mean=3.15), regardless of its relative ugliness. Therefore, they positively accepted this feature as a part of the whole and seemingly understood what was happening in the landscape. The beautifulness and naturalness here are negatively correlated: the correlation coefficient is -0.061 and it is statistically significant at p=0.01 level. It can be inferred from this that the respondents did not appreciate just its meaningfulness by its beauty, but by its naturalness. Then, in this case, the ecological aesthetic worked positively.

In H05, it seems to be the case that the landscape is beautiful as well as providing a certain degree of meaning to the public. The design feature includes a path with a fence along the wilderness area. All of the sections of this feature were highly rated. The majority perceived it beautiful (87.7% at mean=4.43),

natural (64.3% at mean=3.79), compatible (82.6% at mean=4.27), and meaningful (74.2% at mean=4.11). The significance of this feature can be distinguished when comparing it to H01. It is assumable that the respondents had flexible criteria not always judging beautiful landscape as meaningful. If they found something more than beauty in the landscape, they would appreciate it as meaningful. However, there is not only a sense of distancing, but also another possibly very strong factor influencing the aesthetic perception. In particular, the canopied tree and shade, just like the water in Seonyudo Park, might have influenced the results. Considering the fact that it was summer during the surveying, this kind of landscape could be more favored by the visitors.

H07 is a similar setting to H01. However, there are some differences in the landscape in that the canopied trees are closer to the observation space and there are no faded plants visible in the feature. Also, the bars of the observation deck are partially shown in the picture. The majority of the respondents regarded it beautiful (50.0% at Mean=3.34), natural (44.5% at mean=3.17), compatible (51.0% at mean=3.42), and meaningful (43.7% at mean=3.35). Except for naturalness, H07 and H01 are significantly correlated (+) in the other attributes. The correlation coefficient is +0.335 level for beautifulness, +0.350 for compatibility, and +0.420 for meaningfulness all at p=0.01. It is assumable that the respondents found H07 less natural because of the artificial objects, the bars, there.

Figure 26. Distancing in Haneul Park

Photo ID: H01
Design subject: security, eco-functions

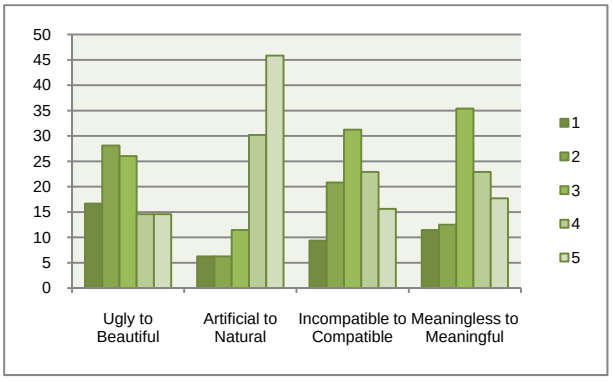


Photo ID: H05
Design subject: security

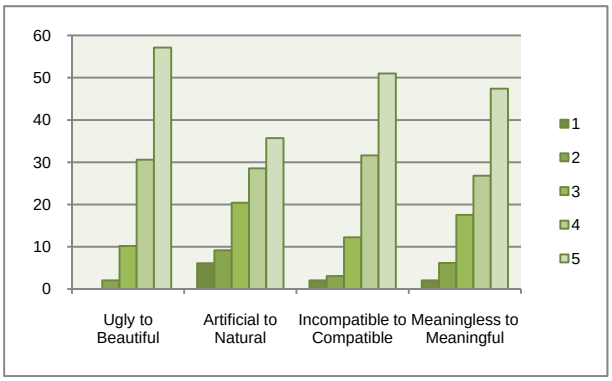
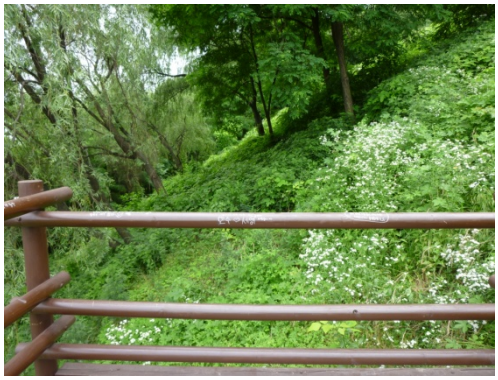
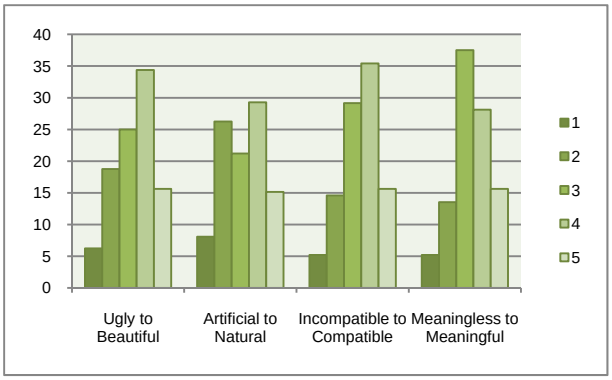


Photo ID: H07
Design subject: security, eco-functions





Diversifying

Diversifying, both directly and indirectly intended, was found in a number of design features. However, in a broad sense, there are two types of diversifying found in Haneul Park. The first one is a landscape where the eco-diversity has been primarily promoted by natural succession with little human intervention, and the other is one supported by more direct human intervention (design intent and maintenance). In this discussion, two representative features, H11 and H12, are included. (H11) is more intentionally controlled by the design with a certain degree of maintenance efforts, and H01 depends more on natural succession. And one referential image of the park (H12) was chosen to be compared with the others.

H11 is one of the landscape patterns on the top of the landfill. It is mainly composed of wild native plants, such as thistles, violets, wild lettuces, clovers, etc., spontaneously growing under ecological succession. However, there has been slight modification added in terms of landscape management. While basically keeping the wild landscape, the park keepers seed wild flowers in order to increase the visual quality, and also pluck out the weeds. As a matter of fact, the majority of the responses on the H11 are overall positive. The respondents perceived it as beautiful (63.9% at mean=3.93), natural (77.0% at mean=4.13), compatible (55.7% at mean=3.73), and meaningful (49.0% at mean=3.65).

In comparison to H12 (beautifulness: 52.5% at mean=3.61; naturalness: 56.5% at mean=3.69; compatibility: 51.0% at mean=3.5; and meaningfulness: 44.3% at mean=3.42) which consists mainly of Flame Grasses with few other

species, the correlation between H11 and H12 is statistically significant: beautiful: +0.538, natural: +0.408, compatible: +0.368, and meaningful: +0.470 at p=0.01. However, it is shown that the values of H11 are higher than H12 in all the attributes.

Therefore, it is supposed that the efforts of diversifying in terms of colors of flowers and many different forms of various species probably have some positive influence to the aesthetic experience of the respondents. Also, comparing H11 with H01, just a little design intervention such as seeding wild flowers can increase the beautifulness (3.94 versus 2.82 in mean) and meaningfulness (3.65 versus 3.23 in mean).

Figure 27. Diversifying in Haneul Park

Photo ID: H11
Design subject: eco-functions, visual interest

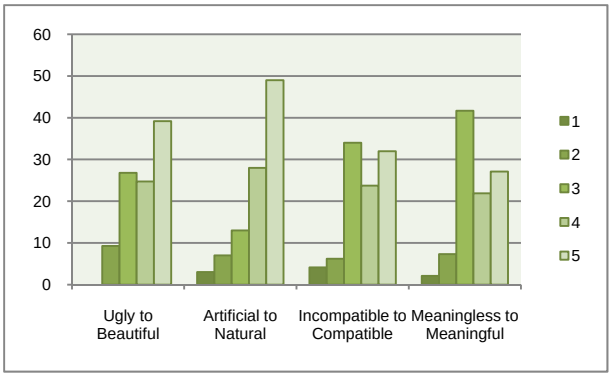


Photo ID: H01
Design subject:eco-functions

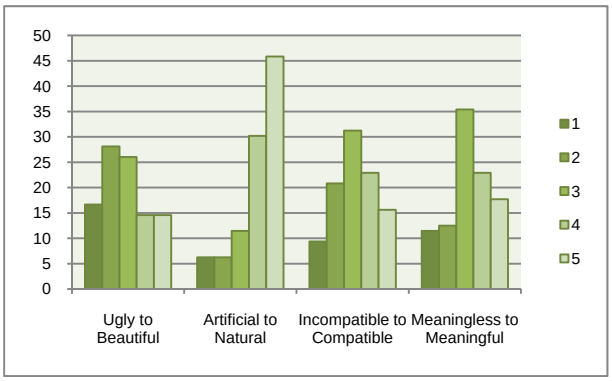
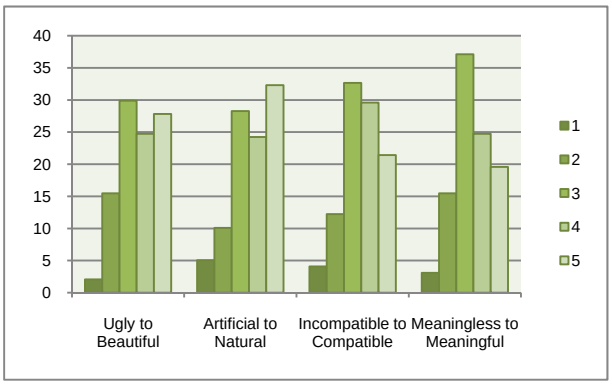


Photo ID: H12
*Referential feature



Contrasting

Contrasting that has been applied in Haneul Park has different characteristics in comparison to Seonyudo Park due to the fundamental difference of the context. Haneul Park consists of fewer artifacts then Seonyudo Park, and therefore more green landscape. The three typologies were selected to discuss contrasting in the Haneul Park.

H04 contains one of the most distinctive environmental arts in the park. It is not just a static sculpture, but an observation tower made of weathering steel. So the visitor can ascend the stairs in the sculpture and have a panoramic view of the whole park. Also, as an object, in terms of color (brown and green) and shape (formal and informal), it creates a certain degree of contrast in the landscape. The responses on H04 were overall positive. The majority perceived it as beautiful (57.2% at mean=3.53), compatible (52.5% at mean=3.37), and meaningful (43.3% at mean=3.25). However, perhaps due to the dominant feature of the artifact, the majority considered it as artificial (53.6% at mean=2.44).

H06 is composed of the whole view of the landfill at the ground level which includes another representative artificial structure, stairs. The perceptive patterns show that this view with the structure was highly favored by the respondents. The majority of them considered it as beautiful (75.3% at mean=4.03), natural (53.6% at mean=3.45), compatible (70.4% at mean=4.02) and meaningful (70.1% at mean=3.96). The biggest difference from H04 is in the naturalness. This is

probably because of the way the structure was placed on the landscape which follows the form of the landscape rather than standing out too much.

H10 represents a different typology of contrasting which is not between artifact and landscape, but between different types of landscape, wild and tamed. It consists of a landscape of Flame Grasses on one side, one of various kinds of native plants on the other, and a path in-between. The Flame Grass landscape is occasionally maintained by weeding out to keep a constant look while in the other, the maintenance is minimized to promote the ecological succession. It creates a unique sense of contrast when standing on the path. The majority of the respondents perceived it as beautiful (68.4% at mean=3.90), natural (66.7% at mean=3.86), compatible (64.9% at mean=3.91), and meaningful (55.7% at mean=3.70). It might be worth comparing with H12 which is composed of mostly the Flame Grass side. Comparing the means of two cases, H10 has significantly higher values in all the attributes than H12. It can be inferred that the respondents prefer a landscape of more contrast (or diversity) than one of less. Also, it would be worth comparing the three, contrasting between the wild and the tame (H10), the wild (H11), and the tame (H11). H10 is ranked higher than the others in appreciating beautifulness, compatibility, and meaningfulness. However, the amount of balancing would be a strong factor for designers to create optimum contrast.

Figure 28. Contrasting in Haneul Park

Photo ID: H04
Design subject: visual interest

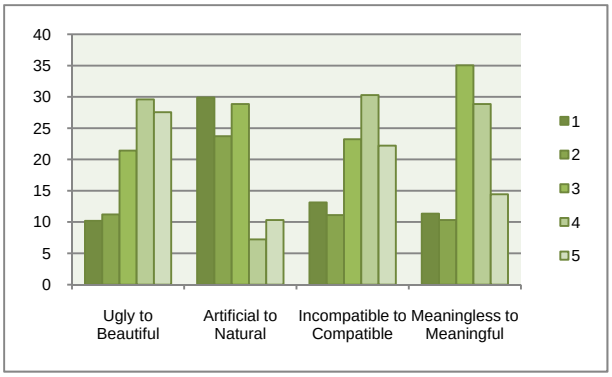
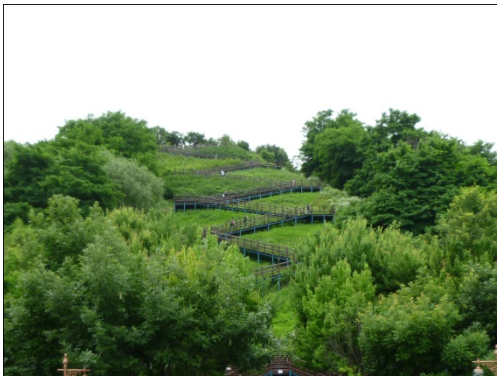


Photo ID: H06
Design subject: visual interest



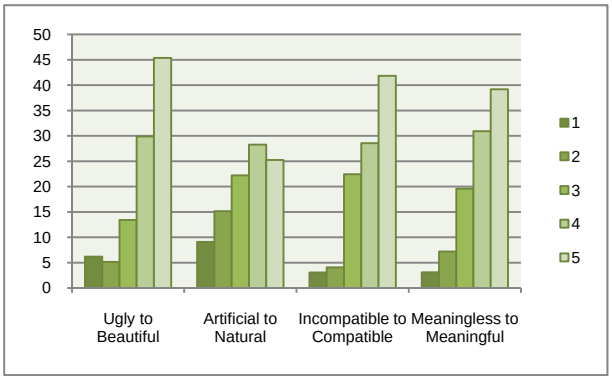
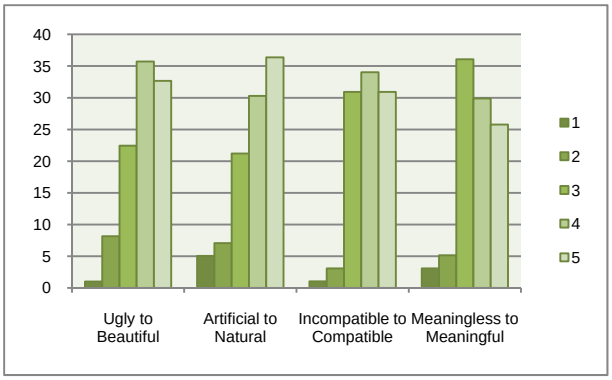


Photo ID: H10
Design subject:



Symbolizing

The application of symbolizing in Haneul Park is also distinguished from Seonyudo Park. While Seonyudo Park has more directly utilized its old debris as symbolic reminders, the design of Haneul Park basically reveal the original landform of the landfill by adding strong geometrical paths on the top of it (H02). Also, some of symbols were used to emphasize the environmental significance (H09) and history of the site (H03).

First of all, H02 is a design feature that is reflected in the principal design concept to delineate the form of the original landfill. So, the designer expected that this revelation would deliver the meaning of how the landfill has been transformed into such a beloved public open space, as well as the importance of our environment. The responses show that the visitors considered it beautiful (36.4% at mean=3.32), compatible (45.9% at mean=3.42), and meaningful (50.0% at mean=3.43). However, in spite of the proportionally large amount of green, the majority of them perceived it as artificial (59.6% at mean=2.38). It might be due to the influence of the strong geometrical paths.

H03 is, just like the Korean traditional pavilion in Seonyudo Park, a symbol that was design to remind the visitors of the past of the landscape. There used to be an orchard next to the site even before the landfill was established. And in Korea, there would be usually lookout huts (Wondumak, 원두막). So mimicking a typical lookout hut, the shelter was installed in the park and is actually being used by visitors. The majority of respondents were favorably reacting to this feature.

56.2% of them perceived this as beautiful (at mean=3.67), 70.5% as compatible (at mean=3.98), and 65.3% as meaningful (at mean=3.96).

Lastly, Haneul Park has employed a renewable energy system to minimize the use of fossil fuel in the park and to publicize the importance of the environment. It has utilized solar power and wind energy, as well as methane gas from the accumulated waste underground. However, the wind turbines are one of the most visually distinct features in the park. H09 was selected to see how the public would respond to the energy generating feature. The majority of the responses were also positive. They considered it as beautiful (74.3% at mean=3.94), compatible (71.5% at mean=3.80), and meaningful (52.5% at mean=3.73). One of the interesting findings about this feature is that, despite the visual influence of the artifact (wind turbine), the majority perceived it as more natural (35%) than artificial (28.7%) at mean=3.02. There could be a couple of assumptions made based on this pattern. One is that the respondents probably attached the significance of naturalness to the surrounding landscape rather than the wind turbine, and the other is that the connotation of a wind turbine that produces energy in an environmentally friendly way might influence the perceptive pattern.

Figure 29. Symbolizing in Haneul Park

Photo ID: H02
Design subject: history and visual interest

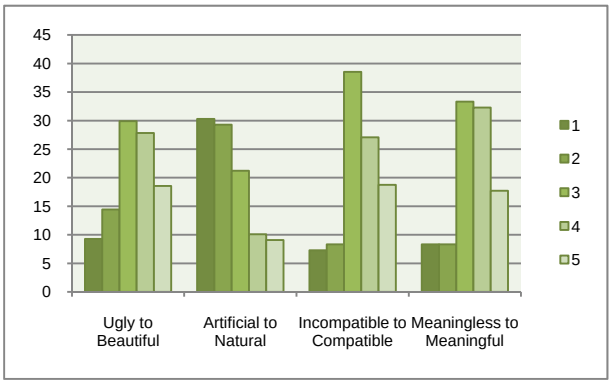


Photo ID: H03
Design subject: history and visual interest

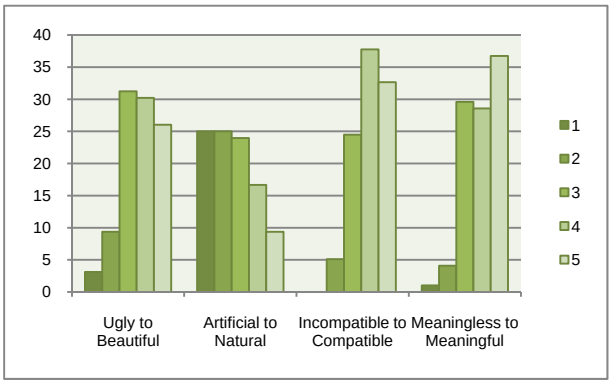


Photo ID: H09
Design subject: eco-functions and visual interest

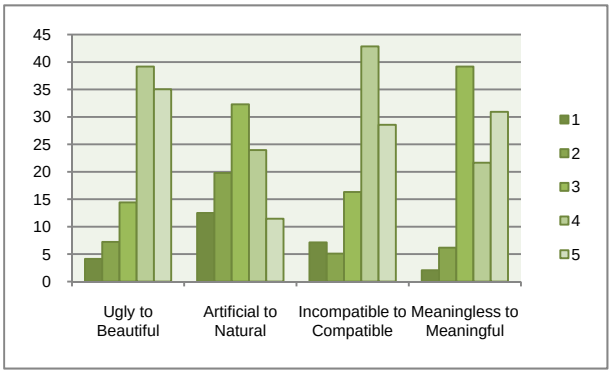


Table 19. Descriptive Statistics (Haneul Park)

		N	Mean	Std. Deviation	Skewness	
		Statistic	Statistic	Statistic	Statistic	Std. Error
H01	ugly to beautiful	96	2.82	1.29	0.28	0.25
	artificial to natural	96	4.03	1.18	-1.23	0.25
	not compatible to well compatible	96	3.15	1.20	-0.06	0.25
	meaningless to meaningful	96	3.23	1.22	-0.24	0.25
H02	ugly to beautiful	97	3.32	1.20	-0.31	0.25
	artificial to natural	99	2.38	1.27	0.65	0.24
	not compatible to well compatible	96	3.42	1.11	-0.37	0.25
	meaningless to meaningful	96	3.43	1.13	-0.51	0.25
H03	ugly to beautiful	96	3.67	1.06	-0.42	0.25
	artificial to natural	96	2.60	1.29	0.33	0.25
	not compatible to well compatible	98	3.98	0.88	-0.42	0.24
	meaningless to meaningful	98	3.96	0.96	-0.48	0.24
H04	ugly to beautiful	98	3.53	1.29	-0.57	0.24
	artificial to natural	97	2.44	1.27	0.56	0.25
	not compatible to well compatible	99	3.37	1.31	-0.47	0.24
	meaningless to meaningful	97	3.25	1.17	-0.38	0.24
H05	ugly to beautiful	98	4.43	0.76	-1.19	0.24
	artificial to natural	98	3.79	1.20	-0.77	0.24
	not compatible to well compatible	98	4.27	0.94	-1.40	0.24
	meaningless to meaningful	97	4.11	1.04	-1.03	0.24
H06	ugly to beautiful	97	4.03	1.17	-1.22	0.24
	artificial to natural	99	3.45	1.27	-0.43	0.24
	not compatible to well compatible	98	4.02	1.05	-0.93	0.24
	meaningless to meaningful	97	3.96	1.08	-0.88	0.24
H07	ugly to beautiful	96	3.34	1.14	-0.32	0.25
	artificial to natural	99	3.17	1.21	-0.09	0.24
	not compatible to well compatible	96	3.42	1.08	-0.39	0.25
	meaningless to meaningful	96	3.35	1.07	-0.22	0.25
H08	ugly to beautiful	96	2.44	1.07	0.61	0.25
	artificial to natural	97	2.33	1.08	0.48	0.24
	not compatible to well compatible	97	2.43	1.05	0.48	0.24
	meaningless to meaningful	97	2.72	1.01	0.15	0.24

Cont		N	Mean	Std. Deviation	Skewness	
		Statistic	Statistic	Statistic	Statistic	Std. Error
H09	ugly to beautiful	97	3.94	1.08	-1.05	0.24
	artificial to natural	96	3.02	1.19	-0.08	0.25
	not compatible to well compatible	98	3.81	1.13	-1.06	0.24
	meaningless to meaningful	97	3.73	1.04	-0.24	0.24
H10	ugly to beautiful	98	3.91	0.99	-0.60	0.24
	artificial to natural	99	3.86	1.14	-0.85	0.24
	not compatible to well compatible	97	3.91	0.91	-0.40	0.24
	meaningless to meaningful	97	3.70	1.01	-0.41	0.24
H11	ugly to beautiful	97	3.94	1.02	-0.41	0.24
	artificial to natural	100	4.13	1.08	-1.20	0.24
	not compatible to well compatible	97	3.73	1.10	-0.49	0.24
	meaningless to meaningful	96	3.65	1.03	-0.13	0.25
H12	ugly to beautiful	97	3.61	1.11	-0.23	0.24
	artificial to natural	99	3.69	1.17	-0.51	0.24
	not compatible to well compatible	98	3.52	1.09	-0.32	0.24
	meaningless to meaningful	97	3.42	1.07	-0.08	0.24
	Valid N (listwise)	90				

5.3. COMPREHENSIVE ANALYSIS

Main Design Concepts

There are some common ideas in comparing the design strategies of Seonyudo Park and Haneul Park: recycling the former post-industrial structures into public open space, revealing the history and meaning of the site through physical design efforts, and providing a distinct human experience from urban life. However, there are also some differences between the two cases with regard to the experience of visitors that the designers expected.

Seonyudo Park, which in general was designed to give a unique experience, resulted from the coexistence of the existing post-industrial remnants of the water supply facility and added/ emerging new landscape. The designers expected this kind of contrast would create a new aesthetics emphasizing a certain sense of unity: old and new and artificial and natural. Also, they hoped that the visitors would recognize the slight changes of weathering structures and landscape over the time and the meaning of nature and culture. They believed that the physical location and context, being in the middle of the Han River, would create distinctive characteristics of the park, calm and hidden from the high-rises of the surrounding city. Within this quiet setting, they also intended to deliver the importance of environment, especially water, to the visitors by establishing a series of theme gardens. Even though every garden has certain meanings associated with the main concept, the designers primarily used metaphor symbolizing the natural water system connecting through all of the gardens, and they anticipated that people would appreciate it.

Haneul Park, in contrast, also has a special location and context being on the top of the biggest landfill in Korea. In fact, there are just few locations where people would enjoy the openness and horizontality of landscape in Seoul which is full of high-rise buildings and urban structures. Therefore, the designer was aware of and attempted to keep this quality. Like Seonyudo Park, the design focused on the contrasting experience of being in a totally separated landscape from the urban settings.

Haneul Park does not have as many artificial structures as Seonyudo Park does. However, the main idea of the design also tried to emphasize the original engineered landform to reveal the history of the site. The designer also expected that the revelation of the past would alert the public to the importance of our environment, and at the same time would create a unique aesthetic sense that the public could not find often in ordinary parks in Seoul. So, rather than filling it with many new spatial features and programs that might disturb the openness of the park, the design focused on delineating the geometries of the surface and symbolizing a certain meaning about the environment. Also the geometrical pattern was designed to be seen not only from the view on the surface, but also the view from the sky being conscious of a possible camera shot during the World Cup event in Seoul in 2002. Furthermore, Haneul Park also considered a sense of contrast, between cultivated and wild landscape, in the park and the peripheral area as well as the landscape features within the park. Unlike Seonyudo Park is Haneul Park employed various technologies of

renewable energy, most noticeably the wind turbines, and this also was expected to support the sense of place creating a unique image.

The Images of Ecology among the Designers

According to the interviews with designers and analysis on the design documents, the concept of ecology extensively varies in each project. It is not just because the concept itself has diverse meanings, but also because designers are unconscious about it although what they have done can fairly fall in a category of ecological performance as Mozingo (1997) defines. It seems that landscape architects who have a cultural or more artistic point of view on the profession did not easily agree with the fact that their design products are ecologically oriented. For example, when Jung and Jung (2010) were explaining about Seonyudo Park at the interview, they asserted that they had never particularly thought of an ecological approach when they designed the park, saying that the title of “ecological park” was named not by them but by the city government.

“We have never said that it is an ecological design for the Seonyudo Park. We were just expecting that it would be good for an environmental education… and recycling of former industrial structure, we attempted to extract some sort of beauty out of the industrial landscape, and it has become in fact a field of environmental education. Well... Then there is the Han River right next to the island, so we tried to stress the importance of water which is one of the most critical natural resources in Korea. Also the island was used as a water supply

facility… Eventually we were hoping to let people feel or get some sort of education about the existence and importance of water without an imperative sense of being taught… Then people said that it was a unique park they had not experienced before" (Youngsun Jung, 2010).

However, when they were asked about how they advanced the design process, they stressed that the first thing was reading the landscape context including the idea of recycling the existing structures, and placing native vegetations and other designed elements. That is, however, the very core of the idea of "fitness" and the context-sensitive approach of ecological design (McHarg, 1969; Lyle, 1994).

Furthermore, Yanggyo Jin (2010), the chief designer for the Nanjido Haneul Park, also claimed that he did not design the park specifically with much consideration to ecology, but it just got named by other people and the city because it was transformed from a "toxic landfill" which had had a very different image and characteristics from the park. Nevertheless, since the inception, the park has had an increasing number of species and diversity based on its initial setting with naturally growing plants. Also, whether it is successful or not, the way he tried to convey a sense of the history of the land, revealing and accentuating the existing landform, can be an effective way as a part of ecological approaches in a broad sense. However, he did not agree that there had been any specific intention of an ecological approach, but rather said he was focused more on the emotional effect of the landscape. It could be inferred that the designers practice an ecological approach without being very conscious of the nature of it although

landscape architects are trained as an ecological designer compared to other spatial design professions[9].

Understanding the history and process of the site should be an essential condition to promote its sustainability especially when the landscape is a redevelopment or reclaiming project. Ecology refers not only to the habitats of living organisms, but also to the interrelationships among different species and systems. If ecology considers human beings as a species included in the ecosystem, culture, the most distinctive quality of human beings compared to other species, should be counted as an ecological concern when we plan and design ecological landscape. For example, “revealing the history of the site” is one of the main design concepts and objectives that two projects, Haneul Park and Seonyudo Park, aim to achieve, and this concept is a crucial part of ecological design approach in regard to cultural sustainability (Nassauer, 1997; Beatley, 2004).

[9] Mozingo (1997) states that one of the most distinguishable characteristics of landscape architecture is that it have deeply-rooted ecological thinking in its core.

Table 20. Design Concepts and Main Subjects of Experience

Site	Design Concept	Main Subject of Experience
Seonyu do Park	• Recycling the existing structures • Revealing the history of the site • Sequential representation of ecological process by water gardens • Environmental education • Ecological restoration around the island	• A sense of harmony: nature and Culture • A sense of history • Play with water • Knowledge about riparian landscape and natural purification system
Haneul Park	• Recovering ecology by technologies • Revealing the history of the site • Ecological symbols • Contrast to urban life: poetic experience • Juxtaposing cultivated landscape and natural landscape	• Openness and panoramic view • Meditation • A sense of environmental recovery • Seasonal changes in the landscape • Watching wildlife: keystone species

Design Languages and Perception

Articulating

Two design features (S09 and H08), one in each park, were used to examine the perceptive patterns to the features reflecting the idea of articulating. While S09 is a feature with direct articulating by a description board which the respondents are supposed to read, H08 depends rather on the design feature itself explaining the purpose of the feature without direct expressive means such as signs or description boards. The common idea is that management of the features was highly limited after the initial establishment so that the features are likely to be under natural processes. They both were perceived as not visually

attractive. The mean values are less (2.84 for S09 and 2.44 for H08) than 3.00. Also, the values on meaningfulness for both are some of the lowest among all the design features (2.98 for S09 and 2.72 for H08). As the values of beautifulness and meaningfulness are significantly correlated in both features (S09: +0.678 at p=0.01 level; H08: +0.530 at p=0.01 level), the results suggest that the respondents did not visually appreciate nor find significant meanings from the feature in both ways of articulating. However, the score for the compatibility in S09 indicates it's slightly above average (3.13). It is assumable that, even though the respondents perceived it not very visually favorable, they accepted it as a part of the park. It might be because it is a usual kind of landscape which they were already familiar with in the park.

Overall the result suggests there are some limits in applying the idea of articulating. It does not seem that the signs did not draw enough attention from the respondents. There were just a few people visiting the parks for the purpose of education (4% in Seonyudo Park and 3% in Haneul Park). Also, there was a group of respondents (5% in Seonyudo Park and 5% in Haneul Park) claiming there should be more signs and descriptions in each section of the park, which implies that there are people willing to learn about the landscapes. On the other hand, there was also another group of them (three people from the pilot interview) confessing that they were rather indifferent to the signs and the knowledge about the parks. It suggests that exploring how to draw more attention to signage might be one of the important tasks of designers.

Distancing

Three design features per site (S01, S12, and S17 for Seonyudo Park; H01, H05, and H07 for Haneul Park) have been selected and tested for the idea of distancing. Except for S01 and H01, the features were highly appreciated in beautifulness and meaningfulness. Also, in a rough way, there is a statistically significant correlation among beautifulness, compatibility, and meaningfulness in most of the features (S01, S17, H05, and H07) (Table 21). This implies that, in this design language, when people perceive a landscape as beautiful, then they tend to consider it as compatible to the park and meaningful to themselves and the reverse is also true. However, there is a significant disparity between two variables (S01 and H01). While they are in a similar context which is mostly composed of wild landscape and the observers look at it from a certain distance, the mean value of the responses of compatibility and meaningfulness to H01 is higher than that of S01 while both scores of the beautifulness are low (Table 13 & 19). Even though there is no significant demographic difference in the respondent groups of two parks, there are several potential factors that might influence this difference such as a visually unpleasant artificial structure (a power transmission tower), the difference in the weather, and the different expectations for each park as discussed earlier. Also, the contextual difference might be a strong factor. Both are isolated from the city to a certain extent. Seonyudo Park consists of many artifacts and landscape together while Haneul Park is mainly composed of natural landscape. This might have given the visitors certain expectations for the park. If so, the visitors could perceive S01 as an unwanted

feature in their mind based on the assumption that they expected to see more “modern” and “neat” landscapes in Seonyudo Park.

One of the interesting findings about distancing is that it works more effectively when it is combined with other design languages. For instance, S17 and S12 show how framing and contrasting can be associated with distancing and enhance the aesthetic experience of the visitors. Also, S12 and H05 show very positive responses in compatibility and meaningfulness. It might be because their settings allow more potential for close interaction with the landscape within a certain level of security. Therefore, in actual design, distancing can be a useful tool dealing with supposedly “unscenic” or “dangerous” landscapes in particular. Creative combination with other design consideration could dramatically increase the aesthetic experience of the visitor.

Framing

Framing was tested only in Seonyudo Park and no distinctive use of it was found in Haneul Park due to the contextual difference. S02, S06, and S15 were tested for horizontal framing in Seonyudo Park. Two of them (S02 and S06) were highly rated in beautifulness, compatibility, and meaningfulness. However, the perceptive pattern on S15 in beautifulness is quite negative (mean=2.86). Looking at how the correlation pattern (Table 21) is similar to the others, the pattern is probably due to the poor visual quality of the landscape in the frame. Therefore, it signifies that in order to activate the effect of framing, the landscape within the frame should also have some visual quality. Also, in this case, there is

a limit in that design cannot help people to appreciate the faded plants which might represent temporality of landscape. Perhaps, more knowledge about the temporal process of landscape could take place to support more proper understanding of this kind of landscape.

Diversifying

Intentional diversifying is reflected in S02, S09, and H11. S02 and H11 are good examples of a positive effect of this design language. Comparing H11 to H12, especially, suggests how a little care for the landscape (seeding seasonal wildflowers) could improve aesthetic experience. Also, H02 emphasizes the fact that the combination with framing or contrasting can accentuate the effect of diversifying. However, it does not seem that diversifying shown in S09 worked effectively. Even with the help of the description board for a better understanding of the landscape, the respondents did not perceive it meaningful nor beautiful (correlation coefficient is 0.678 at $p=0.01$). However, the majority of the respondents found it compatible to the park. It means that there is a certain value, but the overall design setting probably does not successfully highlight it, and thus the value could be reflected in the results of beautifulness and meaningfulness.

Contrasting

With regard to the contrast between artifacts and landscape, contrasting was more actively used in Seonyudo Park (S07, S10, and S11). However, Haneul Park has a unique kind of contrasting between tamed and wild

landscapes (H10). In the open-ended question “What is the major attraction of the park?” 16% of the respondents (the largest group in this question) answered that the major attraction of the park was the fact that it was recycled and the harmony between the remnants and the landscape. However, the statistic results in Seonyudo Park suggest that the public do not appreciate the combination of the concrete remnants and landscape as much as the designers’ intention (S10 and S11). It seems that overall the people may value the recycling idea, but may not really find the aesthetic importance and meaning from the design feature details. This is probably one of the biggest gaps found between the designers and the public. While the designers emphasize the materiality of the structure and landscape and their changes over time, the public still expects to see a neat landscape rather than rusty and weathering objects. For instance, the respondents marked a higher score in visual preference, compatibility, and meaningfulness in S09 which has a tidier and newer artifact juxtaposed with landscape. This is a general issue between designers and the public which might not only apply for this particular case in Seonyudo Park. A good understanding about how the public actually would perceive the designs that the designers propose is needed for the designers. Otherwise, their attempts would just be pleasing to some “art lovers.”

Symbolizing

There are a number of different typologies of symbolizing examined in both cases. Mainly eco-functions and history of the site have been found in

several design features (S03, S04, S05, S08, S10, S13, S14, S16, S18, H02, H03, and H09). In Seonyudo Park, the meaning of natural water purification and history of the site was transformed into the design features by using the existing urban debris. In contrast, revealing the existing engineered landform was a main design concept of Haneul Park with regard to symbolizing.

There are several valuable findings from Seonyudo. For example, the degree of human interaction plays a very important role in influencing the perceptive pattern. As shown in S03 and S12, the values of beautifulness (mean for S03=4.02 and for S12=3.92) and meaningfulness (mean for S03=3.87 and for S12=3.76) in those features are distinctively high. That signifies that if people can have active interaction with landscape, the level of aesthetic experience could be significantly increased. It can be more clearly understood if it is compared to static symbols such as S05, S08, S10, and S18 which do not have much interaction with people. Even though they have a certain design attempt to deliver the knowledge and sense of the place, the responses were not as high as those with strong human interaction (Table 13). Also, the amount of green might be another factor significantly influencing the perception here in particular comparing S05 and S16. As mentioned before, while people admit the importance of the idea of recycling the space, they would still appreciate more “visible green” than just revealing the pure materials.

Another interesting finding in both parks is that an old historical feature such as a Korean traditional pavilion (S13) and lookout huts (H03) were installed to deliver a sense of history as well as some practical function as a shelter. The

responses to this attempt were very positive as explained earlier. The potential factors are: first, it has nostalgic stimulation that appeals to people's emotions. So if people have a certain memory or acquired image of the place and it is fulfilled by the design, they would tend to respond positively. Second, those design features also do not stand as a static object but as a place where people can use and interact with a shelter in nature. As emphasized previously, having a certain degree of human interaction with the landscape could increase the overall value of aesthetic experience. Moreover, from the results of S04, S14, and H09, the importance of kinetics of the symbol is reemphasized. Aside from human interaction, delineating the sense of a moving nature, such as with flowing water and wind, can play an important role in enhancing the aesthetic experience in the landscape. For example, compared to S18 which uses the same design material (water), S04 and S14 were more highly appreciated by the respondents.

Correlative Patterns among the Variables

It is very important to map out the patterns of the correlations among the four variables, so that we can understand which one has a more significant link to another and how strong the link is. In fact, the four variables can be categorized into two groups. Beautifulness and naturalness are chosen to examine the more direct perceptive patterns about the landscape styles while the results of compatibility and meaningfulness are more about the cognitive aspect of how the respondents understand the value and meaning of the landscapes in their own ways. As the statistical method, factor analysis was employed to investigate the

correlation patterns among each variable by using SPSS V. 16 for Windows (Figure 28).

Overall, the resulting patterns of this analysis are very similar in both Seonyudo Park and Haneul Park. There is just one negative correlation found (beautifulness and naturalness in H01) and the others are all positively correlated, but it is not statistically significant (the correlation coefficient is -0.061 at p=0.01 level). Also, except for just a few samples, most of the correlation coefficients are statistically significant overall.

One of the most noteworthy findings in this analysis is that the correlations between the cognitive groups, compatibility and meaningfulness, have generally the strongest correlation while the perceptive groups have one of the weakest correlations. Whether it is about the historical or emotional aspect or ecology of the site, this pattern indicates that the way how and to which degree people find the meaning from the landscape plays the most important role in evaluating the overall quality of the landscape. And the correlations between beautifulness and naturalness do not seem to be statistically significant and constant, which means that people do not judge the aesthetical experience by the naturalness of the landscape. In other words, naturalness does not mean as much as beautifulness in valuing the overall aesthetic qualities of the parks. However, based on the correlations between naturalness and meaningfulness, people do not considerably associate the ecological values with the meaning of the landscape. Yet, the mean value of the correlation coefficients between naturalness and compatibility is slightly higher than the one between naturalness

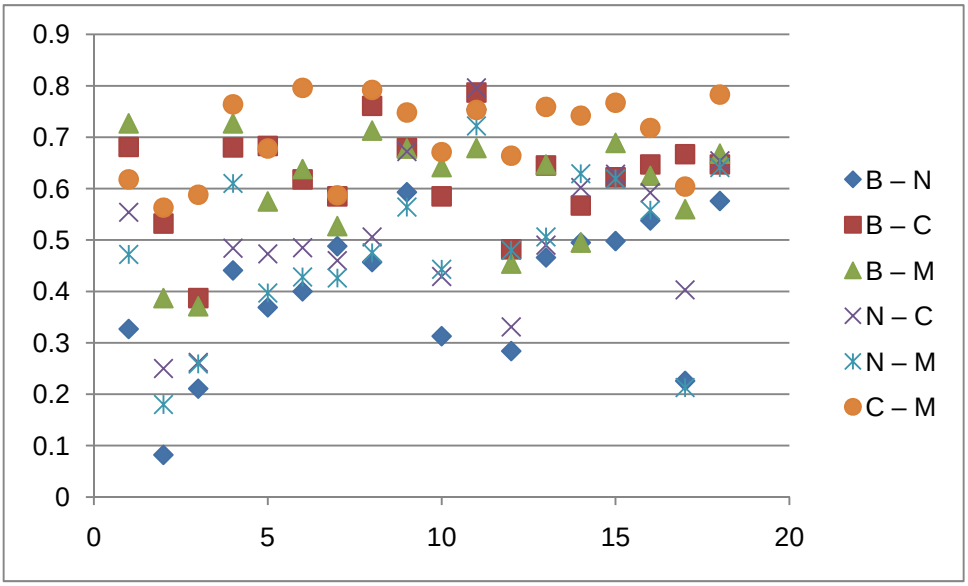
and meaningfulness. This suggests that although people do not find the ecological meanings from the landscape, and the way they appreciate it is significantly related to the naturalness to a certain degree, probably the amount of green as shown in S09 and S16.

Also, the correlation between beautifulness and the cognitive variables is in general statistically significant. The mean values of the correlation coefficients in both parks between beautifulness and compatibility and beautifulness and meaningfulness are significantly high (Figure28 and Table 21).This pattern can indicate that how beautiful the landscape is to each person influences the way one understands the meaning and appreciates the overall value of the landscape.

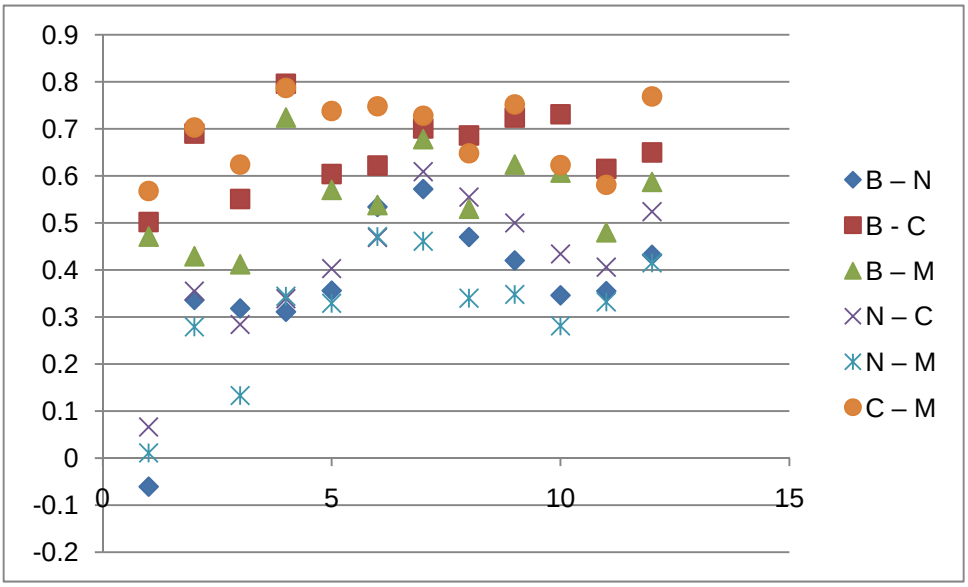
Among the four variables meaningfulness has the strongest correlation to compatibility. The score of compatibility represents the critical decision possibly made by the people if the design feature would be accepted as a part of the park. It means that meaningfulness plays one of the most important roles in appreciating the overall value of the landscapes. However, beautifulness is the key factor influencing the way how people find the meaning from the landscape. Then this syllogism signifies that landscape styles and forms, which physically determine a sense of beauty in a landscape, are critical in helping people consider about the meaning and value of the landscape in general. In other words, in general people are still more likely to appreciate the landscape by how it looks (beautifulness) rather than how it works or what meaning it bears.

Figure 30. Correlations among the Variables

Seonyudo Park



Haneul Park



Correlation coefficient at p=0.01 level (B: Beautifulness, N: Naturalness, C: Compatibility, M: Meaningfulness)

Table 21. The Correlations among the Variables

	Seonyudo Park							Haneul Park						
	B – N	B – C	B – M	N – C	N – M	C – M		B – N	B - C	B – M	N – C	N – M	C – M
S01	+0.327	+0.681	**+0.727**	+0.554	+0.472	+0.618	H01	-0.061	+0.502	+0.471	+0.066	+0.011	+0.568
S02	+0.082	+0.532	+0.387	+0.250	+0.180	+0.563	H02	+0.336	+0.690	+0.429	+0.355	+0.279	**+0.703**
S03	+0.211	+0.387	+0.371	+0.262	+0.259	+0.588	H03	+0.318	+0.551	+0.412	+0.284	+0.133	+0.624
S04	+0.441	+0.680	**+0.727**	+0.484	+0.610	**+0.764**	H04	+0.311	**+0.796**	**+0.724**	+0.339	+0.344	**+0.787**
S05	+0.369	+0.683	+0.575	+0.473	+0.397	+0.678	H05	+0.356	+0.604	+0.570	+0.403	+0.329	**+0.738**
S06	+0.400	+0.618	+0.638	+0.485	+0.428	**+0.796**	H06	+0.534	+0.622	+0.538	+0.469	+0.471	**+0.748**
S07	+0.488	+0.585	+0.527	+0.460	+0.426	+0.587	H07	+0.572	**+0.701**	+0.678	+0.609	+0.461	**+0.728**
S08	+0.457	**+0.761**	**+0.713**	+0.506	+0.475	**+0.792**	H08	+0.470	+0.686	+0.530	+0.555	+0.340	+0.648
S09	+0.593	+0.679	+0.678	+0.672	+0.564	**+0.748**	H09	+0.420	**+0.724**	+0.624	+0.500	+0.348	**+0.752**
S10	+0.313	+0.585	+0.642	+0.429	+0.443	+0.671	H10	+0.346	**+0.731**	+0.607	+0.434	+0.281	+0.623
S11	**+0.754**	**+0.787**	+0.679	**+0.796**	**+0.722**	**+0.753**	H11	+0.355	+0.615	+0.480	+0.406	+0.332	+0.581
S12	+0.284	+0.482	+0.454	+0.331	+0.480	+0.664	H12	+0.432	+0.650	+0.587	+0.524	+0.415	**+0.769**
S13	+0.466	+0.645	+0.647	+0.490	+0.506	+0.759							
S14	+0.495	+0.567	+0.495	+0.602	+0.629	**+0.742**							
S15	+0.498	+0.622	+0.689	+0.628	+0.619	**+0.767**							
S16	+0.538	+0.647	+0.625	+0.592	+0.558	**+0.718**							
S17	+0.226	+0.667	+0.560	+0.403	+0.213	+0.604							
S18	+0.576	+0.647	+0.668	+0.654	+0.641	**+0.783**							
Mean	0.418	**0.625**	**0.600**	0.504	0.479	**0.700**	Mean	0.376	**0.656**	**0.554**	0.412	0.312	**0.689**

Correlation coefficient at p=0.01 level (B: Beautifulness, N: Naturalness, C: Compatibility, M: Meaningfulness)
Mean values are of the absolute values of the correlation coefficients of each variable.

Other Factors and Aesthetic Experience

In order to see if the respondents' evaluation on the design features is influenced by other factors such as their demographic information, purpose of visit, preconceptions about nature, and knowledge on ecology, The One-way ANOVA test was performed to clarify if there is a considerable difference between them. Except for a few cases, the results did not confirm that gender, visiting frequency, traveling time, and the purpose of visit significantly affected the consequence of landscape perception.

However, in Seonyudo Park those who said that they had learned about nature and ecology from the park showed more positive responses in beautifulness, compatibility, and meaningfulness for S04, S07, S09, S10, S11, S14, S18. In particular, they rated higher than those in S09, S11, S14, and S18 which are overall not very much appreciated at the average. This signifies that the willingness toward learning about the landscape plays an important role in aesthetic appreciation. However, in Haneul Park there was no big difference found in the results between those who learned and who did not. It is probably because Seonyudo Park has more clearly defined spatial programs such as theme gardens and the natural water purification systems while Haneul Park is composed of more "free" spaces. So, it can be concluded that Seonyudo Park provides more clues to learn for the visitors, and thus the visitors would reflect those acquired understanding to their responses.

Table 22. Notional Image about Nature (Seonyudo Park)

		Frequency	Percent	Valid Percent	Cum. Percent
Valid	Wooded mountain and forest	56	56.0	56.6	56.6
	Wildlife	26	26.0	26.3	82.8
	Rice paddy and farm field	6	6.0	6.1	88.9
	Lawn at a park	7	7.0	7.1	96.0
	Others	4	4.0	4.0	100.0
	Total	99	99.0	100.0	
Missing	System	1	1		
Total		100	100		

Table 23. If the Park Has Provided the Insights about Ecology or Nature (Seonyudo Park)

		Frequency	Percent	Valid Percent	Cum. Percent
Valid	no	39	39.0	41.5	41.5
	yes	55	55.0	58.5	100.0
	Total	94	94.0	100.0	
Missing	System	6	6.0		
Total		100.0			

Table 24. Lessons Learned from the Park (Seonyudo Park)

	Responses		
	N	Percent	Percent of Cases
Kinds of plants and characteristics	13	17.3%	23.6%
Kinds of wildlife and characteristics	10	13.3%	18.2%
Natural purification and circulation of water	17	22.7%	30.9%
The overall importance of nature	31	41.3%	56.4%
Others	4	5.3%	7.3%
Total	75	100.0%	136.4%

Table 25. Notional Image about Nature (Haneul Park)

		Frequency	Percent	Valid Percent	Cum. Percent
Valid	Wooded mountain and forest	54	54.0	54.0	54.0
	Wildlife	22	22.0	22.0	76.0
	Rice paddy and farm field	13	13.0	13.0	89.0
	Lawn at a park	8	8.0	8.0	97.0
	Others	3	3.0	3.0	100.0
	Total	100	100.0	100.0	

Table 26. If the Park Has Provided the Insights about Ecology or Nature (Haneul Park)

		Frequency	Percent	Valid Percent	Cum. Percent
Valid	no	29	29.0	29.6	29.6
	yes	69	69.0	70.4	100.0
	Total	98	98.0	100.0	
Missing	System	2	2.0		
Total		100.0			

Table 27. Lessons Learned from the Park (Haneul Park)

	Responses		
	N	Percent	Percent of Cases
Kinds of plants and characteristics	13	13.4%	18.8%
Kinds of wildlife and characteristics	7	7.2%	10.1%
Self purification of the land	37	38.1%	53.6%
The overall importance of environment	38	39.2%	55.1%
Others	2	2.1%	2.9%
Total	97	100.0%	140.6%

Chapter 5

CONCLUSION

This chapter summarizes the exploration of ecological aesthetics in restructuring urban landscapes by addressing the answers to the research questions: the meaning and position of ecological aesthetics in current urban situation; the patterns of the gap between landscape design and the public's perception in ecological aesthetics; and the limitations and potential of landscape design in realizing the idea of ecological aesthetics. Finally, the chapter also reflects on limitations and suggests several recommendations for future research.

5.1. KEY FINDINGS AND DISCUSSIONS

The nature and significance of ecological aesthetics have been discussed throughout the literature research. The theoretical basis of this newly highlighted aesthetic study consists of the concerns about environmental sustainability, the quality of life, and democracy, which have been stressed by many environmental design and planning disciplines for a better future. Especially in landscape architecture, the newly emerging urban landscape typologies, known as post-industrial landscapes, often require a different value set in order for us to properly appreciate them as conventional aesthetics does not effectively explain them. It is because those post-industrial landscapes contain very complicated design issues such as recycling, detoxifying, and different philosophical approaches for the relationship between nature and culture; and thus, the physical outcomes of

these designs are quite distinguished from typical urban open spaces. However, conventional aesthetics focuses on the forms and physical beauty rather than the underlying processes and meanings that people should understand prior to proper aesthetic appreciation of the landscapes.

In handling these issues, ecological aesthetics has several distinct characteristics compared to the conventional aesthetics. First, it is a normative theory that calls for an action of people toward their environment. Considering the enormous environmental issues that we have faced, the attitude of aesthetic appreciation also needs to be adjusted so that the aesthetic experience can turn into responsible action. Thus, ecological aesthetics supports the idea of cultural sustainability which eventually will encourage people to care about valuable landscapes not judging by how they look, but by how they work and what they mean to our society. Then, the landscapes would not be just abandoned, but sustained for better purposes. Second, ecological aesthetics heavily relies on cognitive process rather than subjective visual preference in aesthetic appreciation. So, ecological aesthetics is concerned more about the content of the landscape than the style of it. Similar to the old wisdom that “the more you know, the more you can see,” it suggests that people should know about the value and meaning of the landscape such as what is happening, why it has been formed like this, and how significant the landscape is to our society. So, ecological aesthetics maintains the idea that this “knowing” process can greatly influence the way how people appreciate the landscape for whether it is understood as “conventionally” ugly or beautiful. Third, knowing that the aesthetic

appreciation of landscape has a very different nature from the fine arts in museums or architectural objects, ecological aesthetics in landscape emphasizes the experience of the general public rather than that just of “art lovers” or “elite critics,” and thus requires more active engagement of them with their environment. It is simply because landscape is the physical setting of their everyday life which is closely related to their quality of life. Therefore, people should know about it just like they know about their houses and gardens. Lastly, while conventional aesthetics often speaks about more philosophical ideas, ecological aesthetics can be utilized as a practical design theory providing certain design formulations as well as a philosophical stance. Eco-revelatory design is, for example, a way to realize the idea of ecological aesthetics in landscape architecture bridging the gap between theory and practice.

Based on the discussion about the nature of ecological aesthetics, the tangible tasks of landscape architecture have been defined based on the idea of “making nature visible.” In order to realize this big concept, it was assumed that there would be certain ways for designers to help make nature more visible to people. Consequently, mainly derived from literature research, the six design subjects that would need to be realized in design practice and the six design languages that could be applied have been discussed. The design subjects to be revealed or considered by design are: ecological functions, temporality, history of place, visual interest, sense of security, and accessibility. The design languages to be used to reveal the subjects are articulating, symbolizing, contrasting, framing, diversifying, and distancing. The design subjects include not only

technical aspects of ecological design, but also other potential contributors to the ecologically sustainable landscape based on the redefinition that ecological approaches should be holistic and inclusive. And the six design languages were used as criteria for the analytical framework to examine designers' intents in the case study following.

In the case study, this research has approached more specifically the relationship between physical design (designer's intentions) and the public's evaluation of the designed landscape. In order to investigate the designers' intentions, in-depth interviews, analysis on design documents, and site observation were implemented. For the public's evaluation, the respondents were asked to rate four different aspects of each design feature (beautifulness, naturalness, compatibility, and meaningfulness) by the five-level Likert Scale. The four aspects were designed to respond to the design subjects previously discussed. Beautifulness reflects the physical attractiveness. Naturalness is for "perceived" ecological values of the landscape. Meaningfulness is for historical or other values such as a sense of poeticness and nostalgia. Compatibility is used to see if the respondents think the design feature is valuable enough to be a part of the park. Also, the aspects can be categorized into two groups: one that includes the perceptive values of the landscape, beautifulness and naturalness, and the other that represents the cognitive decision made by the respondents, compatibility and meaningfulness.

Several valuable lessons have been learned in examining the designers' approaches. One of the most significant findings is that the designers in both

projects did not consider their design implementation as an ecological approach even though they considered much about ecological issues such as planting native vegetations, suitability analysis, recycling existing materials, process-oriented form projection, and introducing renewable energy. While this cannot be generalized for all the landscape designers, it seems that they regarded ecological design as a more technically oriented methodology rather than as a holistic design approach including both cultural and scientific aspects. Although there were several design considerations that they tried to combine ecological meanings with human experience such as symbolizing natural water purification system in Seonyudo Park and revealing the existing landform in Haneul Park, it should still be important for them to be aware of the inclusiveness of ecological approach. It is primarily because the designer's clear purpose always strengthens the outcomes of the design project, including people's aesthetic satisfaction as well as ecological health of the landscape. Second, if creative realization of "making nature visible" is one of the key tasks of ecological design practice, designers' understanding of the inclusiveness of ecological approaches is the fundamental basis on which to achieve both ecological soundness and architectural creativity in their design. Last, in order to cope with the false reputation that ecological design merely deals with technical aspects, it is essential that designers understand the social and cultural demand for sustainability and try to enhance the visual quality of ecological design products.

Besides the analysis on the design concepts of the two projects, chapter 5 has mainly investigated how the public perceived the selected design features

and inferred why they responded in that way. Also, in the end of chapter 5, the study examined what the general perceptive patterns of the public are, and eventually delineated a consequential framework depicting the perceptual structure of people which can be used for better design practices and future research.

First, this study reconfirmed that there is some gap between designers' ideas and the public's perception in several cases. For example, in Seonyudo Park, there were a number of design features where the designers tried to deliver a sense of history and time through revealing the materiality of the concrete debris especially in contrasting and symbolizing. However, except for a few cases, it does not seem that the respondents perceived them as meaningful as other "neat" structures such as a modern wooden deck and a wall fully covered with green ivies. Also, if a design concept is too abstract, it can mean only to the designers when they justify their decision making in shaping the landscape, not telling the story to the actual users. In Haneul Park, the geometry of the butterfly shape and revealing the existing landform to convey the history and environmental significance of the site were not fully understood by the visitors. But, instead they appreciated the openness and flatness of the landscape regardless of the designer's intentional modification. As a result, there is an important lesson to be gained from this phenomenon. In both landscape design projects, their design approaches could be categorized as a top-down way in that the designers analyzed the issues and formulated the design concepts, and they represented the design products in their own ways without hearing what the

people would think. Considering the idea of ecological aesthetics (or ecological design) is highly associated with the public's awareness and engagement for the landscape, especially for large public open spaces like Seonyudo Park and Haneul Park, it would be very useful for the public to participate in the design process rather than merely accepting the final products. Then, the bottom-up ways of design would eventually contribute to bridging the gap.

Another valuable significance of the study is that it proposed a set of practical design languages and reconsidered them carefully through the empirical research. All the design languages were found to have both potentials and limitations. Some of the limitations could be supplemented by the modification of the design language itself, such as more eye-catching design for a signage system articulating for example. Also, more importantly this study bears emphasis that there needs to be an integrative design approach with other less physical treatment; for instance, an onsite educational program rather than one in a separated visitor center, which would also require the designers' creativity for how to embed this kind of "software" into the "hardware."

Probably most importantly, this research has come up with a conceptual framework that delineates the patterns of how uniquely people value the four aspects of beautifulness, naturalness, meaningfulness, and compatibility in landscape; and how differently they are correlated. The result suggests that the two cognitive ones, meaningfulness and compatibility, are closely correlated while the perceptive ones are not as significantly correlated. Also, beautifulness and the cognitive ones have strong correlations. This result implies that people

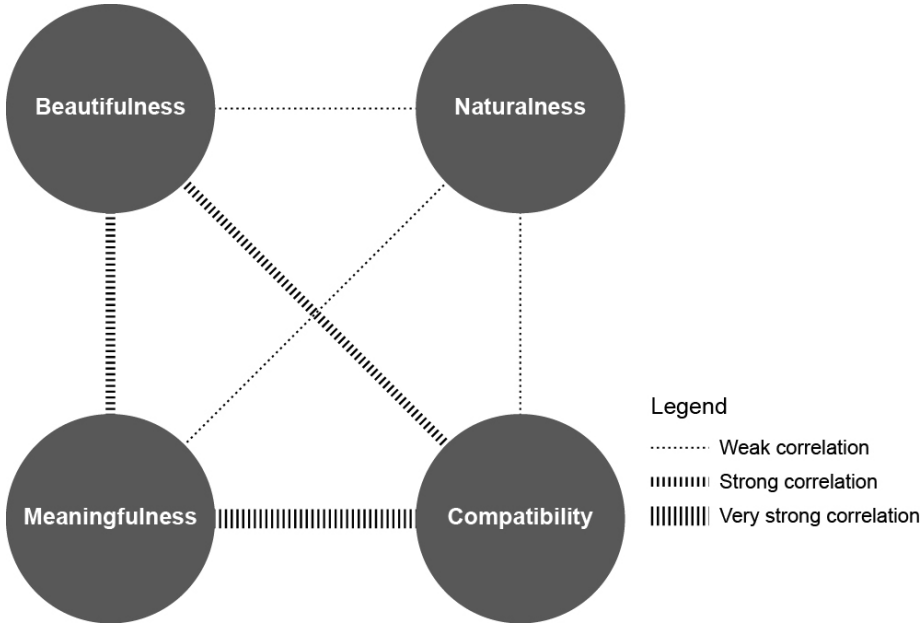
tend to find rather “deep” meanings and values when the landscape is visually attractive enough. Also they are more likely to draw a higher degree of visual interest from more meaningful and compatible features. However, naturalness was found to be the most isolated category neither significantly influencing beautifulness nor the cognitive ones, which means that people have not expanded their appreciation about naturalness to the collective aesthetic experience. Also, their appreciation in terms of meaningfulness and compatibility does not considerably depend on naturalness.

Naturalness serves as a collective concept representing perceived ecological functions and people’s cultural understandings about nature. Although there have been on-going philosophical discussions about the meanings of nature and its relation with culture by many theorists and practitioners (cf. Cosgrove, 1984; Spirn, 1984, 2002; Naveh,1995; Hough, 2004), this research found that the notions of the public about nature were very confined into a few representative images such as a wooded forest and mountain or a landscape with wildlife. Furthermore, the framework elucidates that the evaluation of landscape relies heavily on its visual characteristics which are the organization and appearance of spatial features.

The conclusion of these findings has reached to a conceptually similar point to many others, particularly the research of Nassauer (1995a, 1995b, 1997) about balancing ecological qualities of the landscape and the vernacular aesthetic expectations. This lesson perhaps suggests that landscape architects should think more in terms of improving the existing values of human experience

(beautifulness) in landscape than thinking in terms of how design features can change the ecological values (naturalness) of the landscape itself because, even if it is superficial, it would lead to good ecological outcomes anyway.

Figure 31. Conceptual Framework of the Correlation among Beautifulness, Naturalness, Meaningfulness, and Compatibility

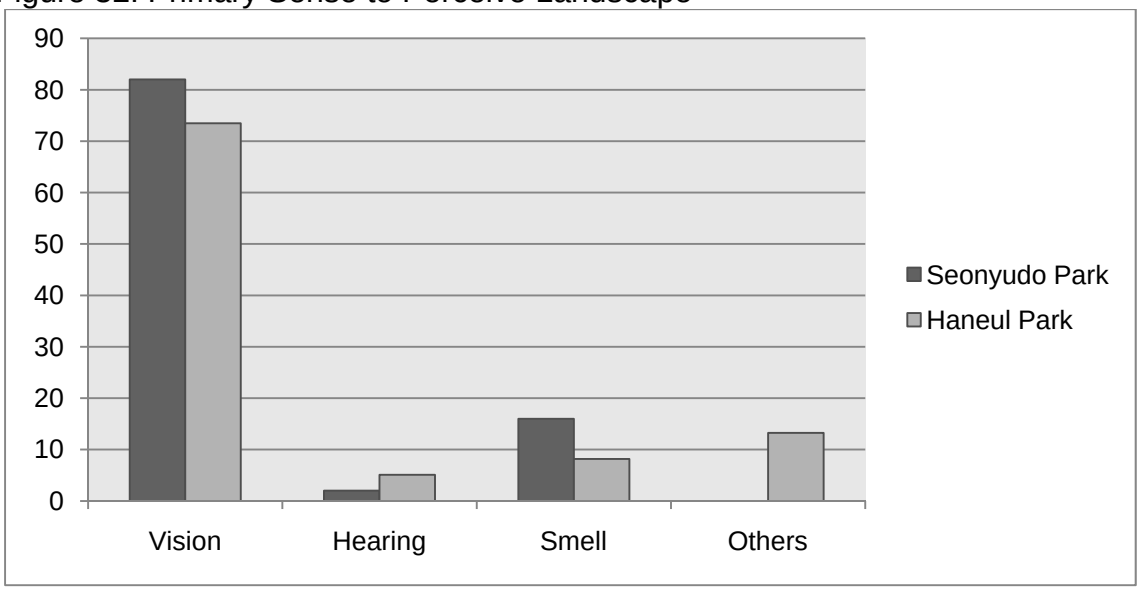


Back to the beginning of the research, lingering philosophical dichotomies between nature and culture, science and art, and objectivity and subjectivity, eco-centric and anthropocentric have been inherent in the very heart of landscape architecture. Taking any of these into account, design can be successful not by choosing one side or the other, but by attempting to explicate the dichotomy itself as a central truth about our life in this world. Therefore, the role of landscape architecture is to keep trying to find out the spatial patterns of the physical world that operate on both sides and wherever possible, to apply the ideas affecting the quality of subjective experience into our environment.

5.2. LIMITATIONS AND FUTURE RESEARCH

There were several limitations found in performing this study. First, the cases are not everyday landscapes. The study could have investigated more sincere and straight responses from the dwellers if it had been, for example, a residential site. Ecological landscape directly attached to dwelling systems perhaps has the highest possibility for people to get to know about the benefits of the landscape. Second, though landscape experience is multimodal, this research also was limited to the visual sense of the respondents; and other senses such as hearing, smell, and touch were discounted. However, the survey results represent that the majority of the respondents rely on vision as the primary sense to appreciate the landscapes (Figure 30). Due to the limited research time, not performing the investigation on how differently people would perceive the temporal changes of the landscapes is another regretfully missing point in this research.

Figure 32. Primary Sense to Perceive Landscape



Despite the limitations stated above, the significance of this study lies in its attempt to objectively demonstrate the communication patterns in current landscape projects and to bridge the gap between research and design and experts and the general public. Also, this research can be a good stepping stone for related future researches. For example, studying the difference between multiple cultural groups would be a great contribution to this area. Also, investigating how differently a group of experts, landscape architects, and the public perceive a landscape could generate meaningful knowledge for narrowing the gap between them.

Furthermore, even though this research did not employ a way of comparative case study, this framework can be refined and used for comparing multiple cases to see how differently the landscapes narrow the gap between naturalness and the others. Comparing the difference between them would be useful to evaluate the effectiveness in applying the idea of making nature visible. For instance, as shown in Table 21, the correlation coefficients of naturalness and the others in Seonyudo Park are bigger than those in Haneul Park, and this implies that people in Seonyudo Park associated naturalness with the design features more than Haneul Park. It might be inferred that Seonyudo Park has more artificial structures that could accentuate the naturalness of landscape (contrasting and framing). Also, it might be understood that the overall design attempts in Seonyudo Park to narrow the gap were more successful. Except for design languages, there needs to be more specific research endeavor to clarify the factors influencing the relation between naturalness and the others.

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Interviewed Landscape Architects:

Noh, Sunjoo (Principal Landscape Architect of Haiin Landscape Design, Sungnam, Korea): Design associate of OIKOS who initially proposed the master plan of the World Cup Park

Suh, Mikyung, (Director of CA Landscape Design, Seoul, Korea): Design associate of OIKOS who initially proposed the master plan of the World Cup Park

Jin, Yanggyo (Principal Landscape Architect of CA Landscape Design, Seoul, Korea): Chief Designer for the Haneul Park

Jung, Youngsun (Director of Seo-Ahn Total Landscape Design and Consulting Group, Seoul, Korea): Chief Designer for the Seonyudo Park and Yeouido Ecological Stream Park

Jung, Ukeon (Associate of Seo-Ahn Total Landscape Design and Consulting Group, Seoul, Korea): Designer for the Seonyudo Park

Lee, Jinhyung (Associate of Seo-Ahn Total Landscape Design and Consulting Group, Seoul, Korea): Designer for the Yeouido Ecological Stream Park

APPENDIX A

QUESTIONNAIRE SAMPLES

안녕하세요.
저는 미국 아리조나 주립대학교에서 도시공원의 미적인 아름다움과 생태적 건강성의 관계에 대한 연구를 하고 있습니다. 이 설문지는 이 연구을 위한 기초자료로 쓰일 예정이며, 귀하의 개인정보가 악용될 위험은 없습니다. 귀하의 의견과 가장 가까운 항목을 고르거나 기타 다른 의견이 있으면 간략하게 답해주십시오. 설문지 작성 중 궁금한 점은 언제든지 질문하십시오.
민병욱

(1) 귀하의 성별은?

a. 남자 b. 여자

(2) 귀하의 나이는?

a. 18-30세 b. 31-40세 c. 41-50세 d. 51-60세 e. 60세 이상

(3) 이 공원에서 얼마나 떨어진 곳에 거주합니까? 선택: (도보 | 대중교통 | 자전거 | 자가용)

a. 10분 이내 b. 10~30분 c. 30분~1시간 d. 1~2시간 e. 2시간 이상

(4) 이 공원을 얼마나 자주 방문합니까?

a. 거의 오지 않는다 b. 주____회 c. 월____회 d. 년____회

(5) 이 공원을 방문한 목적은 무엇입니까?

a. 산책 및 사색 b. 데이트 c. 자연학습 d. 운동 e. 기타 _____

(6) 학교에서나 다른 매체(TV, 책 등)를 통하여 "생태" 또는 "환경"에 대해서 접한 적이 있습니까?

a. 있다 b. 없다 c. 모르겠다

(7) 개인적으로 "자연"을 정의하라고 하면 가장 먼저 떠오르는 이미지는 무엇입니까?

a. 교외의 우거진 나무와 숲 b. 야생 동식물 및 곤충 c. 시골의 논과 밭

d. 공원의 넓은 잔디밭

e. 기타_____

(8) 자연 또는 자연스러움을 느낄때 가장 의존하게 되는 감각은 무엇인지 순서대로 번호를 써 주세요.

a. 시각 (형태, 색깔) ____ b. 청각 (소리) ____ c. 후각 (냄새) ____ e. 기타 ( ) ____

(9) 각각의 사진을 보고 사진 아래 항목에 대해서 느끼는데로 등급을 매겨주십시오.

	1	2	3	4	5	
아름답지않다	○	○	○	○	○	아름답다
인공적이다	○	○	○	○	○	자연적이다
어울리지않는다	○	○	○	○	○	잘어울린다
재미없다	○	○	○	○	○	의미있다

	1	2	3	4	5	
아름답지않다	○	○	○	○	○	아름답다
인공적이다	○	○	○	○	○	자연적이다
어울리지않는다	○	○	○	○	○	잘어울린다
재미없다	○	○	○	○	○	의미있다

	1	2	3	4	5	
아름답지않다	○	○	○	○	○	아름답다
인공적이다	○	○	○	○	○	자연적이다
어울리지않는다	○	○	○	○	○	잘어울린다
재미없다	○	○	○	○	○	의미있다

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아름답지않다	○	○	○	○	○	아름답다
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어울리지않는다	○	○	○	○	○	잘어울린다
재미없다	○	○	○	○	○	의미있다

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어울리지않는다	○	○	○	○	○	잘어울린다
재미없다	○	○	○	○	○	의미있다

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아름답지않다	○	○	○	○	○	아름답다
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어울리지않는다	○	○	○	○	○	잘어울린다
재미없다	○	○	○	○	○	의미있다

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어울리지않는다	○	○	○	○	○	잘어울린다
재미없다	○	○	○	○	○	의미있다

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인공적이다	○	○	○	○	○	자연적이다
어울리지않는다	○	○	○	○	○	잘어울린다
재미없다	○	○	○	○	○	흥미/의미있다

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어울리지않는다	○	○	○	○	○	잘어울린다
재미없다	○	○	○	○	○	의미있다

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어울리지않는다	○	○	○	○	○	잘어울린다
재미없다	○	○	○	○	○	의미있다

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어울리지않는다	○	○	○	○	○	잘어울린다
재미없다	○	○	○	○	○	의미있다

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인공적이다	○	○	○	○	○	자연적이다
어울리지않는다	○	○	○	○	○	잘어울린다
재미없다	○	○	○	○	○	의미있다

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인공적이다	○	○	○	○	○	자연적이다
어울리지않는다	○	○	○	○	○	잘어울린다
재미없다	○	○	○	○	○	의미있다

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인공적이다	○	○	○	○	○	자연적이다
어울리지않는다	○	○	○	○	○	잘어울린다
재미없다	○	○	○	○	○	의미있다

	1	2	3	4	5	
아름답지않다	○	○	○	○	○	아름답다
인공적이다	○	○	○	○	○	자연적이다
어울리지않는다	○	○	○	○	○	잘어울린다
재미없다	○	○	○	○	○	의미있다

	1	2	3	4	5	
아름답지않다	○	○	○	○	○	아름답다
인공적이다	○	○	○	○	○	자연적이다
어울리지않는다	○	○	○	○	○	잘어울린다
재미없다	○	○	○	○	○	의미있다

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아름답지않다	○	○	○	○	○	아름답다
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어울리지않는다	○	○	○	○	○	잘어울린다
재미없다	○	○	○	○	○	의미있다

	1	2	3	4	5	
아름답지않다	○	○	○	○	○	아름답다
인공적이다	○	○	○	○	○	자연적이다
어울리지않는다	○	○	○	○	○	잘어울린다
재미없다	○	○	○	○	○	의미있다

(10) 다른 공원과 비교했을 때 이 공원의 가장 큰 매력은 무엇이라고 생각하십니까?

_____

_____

(11) 이 공원을 방문한 이후에 자연 또는 생태에 대해서 새롭게 느낀 점이 있습니까?

a. 예 (아래 12번 문제에 답해주세요) b. 아니오

(12) 무엇에 대해서 새롭게 느끼게 되었습니까?

a. 식물의 종류 및 특성 b. 수생 동물의 종류 또는 특성 c. 물의 자연 정화 능력

d. 전반적인 자연 및 생태 환경의 중요성

e. 기타: _____

(13) 이 공원에 바라는 점이나 개선해야할 부분이 있다면 간략하게 말씀해주세요.

_____

_____

설문에 참여해주셔서 감사합니다.

안녕하세요.
저는 미국 아리조나 주립대학교에서 도시공원의 미적인 아름다움과 생태적 건강성의 관계에 대한 연구를 하고 있습니다. 이 설문지는 이 연구을 위한 기초자료로 쓰일 예정이며, 귀하의 개인정보가 악용될 위험은 없습니다. 귀하의 의견과 가장 가까운 항목을 고르거나 기타 다른 의견이 있으면 간략하게 답해주십시오. 설문지 작성 중 궁금한 점은 언제든지 질문하십시오.
민병욱

(1) 귀하의 성별은?

a. 남자 b. 여자

(2) 귀하의 나이는?

a. 18-30세 b. 31-40세 c. 41-50세 d. 51-60세 e. 60세 이상

(3) 이 공원에서 얼마나 떨어진 곳에 거주합니까? 선택: (도보 | 대중교통 | 자전거 | 자가용)

a. 10분 이내 b. 10~30분 c. 30분~1시간 d. 1~2시간 e. 2시간 이상

(4) 이 공원을 얼마나 자주 방문합니까?

a. 거의 오지 않는다 b. 주____회 c. 월____회 d. 년____회

(5) 이 공원을 방문한 목적은 무엇입니까?

a. 산책 및 사색 b. 데이트 c. 자연학습 d. 운동 e. 기타 _____

(6) 학교에서나 다른 매체(TV, 책 등)를 통하여 "생태" 또는 "환경"에 대해서 접한 적이 있습니까?

a. 있다 b. 없다 c. 모르겠다

(7) 개인적으로 "자연"을 정의하라고 하면 가장 먼저 떠오르는 이미지는 무엇입니까?

a. 교외의 우거진 나무와 숲 b. 야생 동식물 및 곤충 c. 시골의 논과 밭

d. 공원의 넓은 잔디밭

e. 기타_____

(8) 자연 또는 자연스러움을 느낄때 가장 의존하게 되는 감각은 무엇인지 순서대로 번호를 써 주세요.

a. 시각 (형태, 색깔) ____ b. 청각 (소리) ____ c. 후각 (냄새) ____ e. 기타 (ex.바람) ____

(9) 각각의 사진을 보고 사진 아래 항목에 대해서 느끼는데로 등급을 매겨주십시오.

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아름답지않다	○	○	○	○	○	아름답다
인공적이다	○	○	○	○	○	자연적이다
어울리지않는다	○	○	○	○	○	잘어울린다
의미없다	○	○	○	○	○	의미있다

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아름답지않다	○	○	○	○	○	아름답다
인공적이다	○	○	○	○	○	자연적이다
어울리지않는다	○	○	○	○	○	잘어울린다
의미없다	○	○	○	○	○	의미있다

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인공적이다	○	○	○	○	○	자연적이다
어울리지않는다	○	○	○	○	○	잘어울린다
의미없다	○	○	○	○	○	의미있다

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아름답지않다	○	○	○	○	○	아름답다
인공적이다	○	○	○	○	○	자연적이다
어울리지않는다	○	○	○	○	○	잘어울린다
의미없다	○	○	○	○	○	의미있다

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어울리지않는다	○	○	○	○	○	잘어울린다
의미없다	○	○	○	○	○	의미있다

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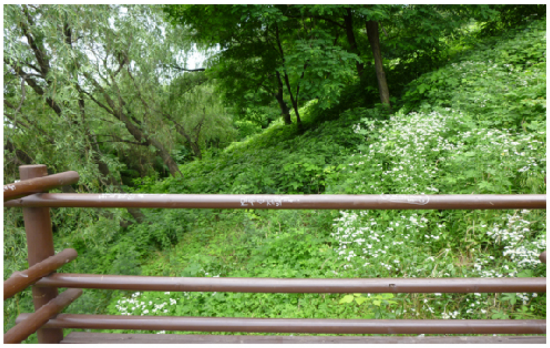
어울리지않는다	○	○	○	○	○	잘어울린다
의미없다	○	○	○	○	○	의미있다



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인공적이다	○	○	○	○	○	자연적이다
어울리지않는다	○	○	○	○	○	잘어울린다
의미없다	○	○	○	○	○	의미있다

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아름답지않다	○	○	○	○	○	아름답다
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의미없다	○	○	○	○	○	의미있다

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아름답지않다	○	○	○	○	○	아름답다
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어울리지않는다	○	○	○	○	○	잘어울린다
의미없다	○	○	○	○	○	의미있다

	1	2	3	4	5	
아름답지않다	○	○	○	○	○	아름답다
인공적이다	○	○	○	○	○	자연적이다
어울리지않는다	○	○	○	○	○	잘어울린다
의미없다	○	○	○	○	○	의미있다

(10) 다른 공원과 비교했을 때 이 공원의 가장 큰 매력은 무엇이라고 생각하십니까?

_____

_____

(11) 이 공원을 방문한 이후에 자연 또는 생태에 대해서 새롭게 느낀 점이 있습니까?

a. 예 (아래 12번 문제에 답해주세요)　　b. 아니오

(12) 무엇에 대해서 새롭게 느끼게 되었습니까? (해당사항 모두)

a. 식물의 종류 및 특성　　b. 야생 동물의 종류 또는 특성　　c. 땅의 자연 정화 능력

d. 전반적인 자연 및 생태 환경의 중요성

e. 기타: _____

(13) 이 공원에 바라는 점이나 개선해야할 부분이 있다면 간략하게 말씀해주세요.

_____

_____

설문에 참여해주셔서 감사합니다.

APPENDIX B

ANSWERS FOR OPEN-ENDED QUESTIONS

Seonyudo Park

ID#	What is the major attraction of the park?
1	N/A
2	It is a water park, environmentally recycled park.
3	It has good location and convenient transportation.
4	It is near the river. I can feel mush sense of nature.
5	I can enjoy a sense of nature.
6	It has a nice prospect towards the Han River.
7	Good organization and convenience
8	N/A
9	I like the way it has plenty of water containers and wildlife there.
10	N/A
11	Harmony between artifacts and natural features
12	It is near the river having a nice view towards the river.
13	Man-created beauty along with nature
14	N/A
15	N/A
16	Big bridge
17	A variety of things to see in this big park
18	Lots of wind, good location with the river, and good transportation
19	It has a good location and nice landscape. nice place to take a picture!
20	The fact that the existing structures were recycled, and the public can learn and enjoy them.
21	I feel grateful for the recycled landscape and learn the importance of nature
22	There are more natural features than artificial ones.
23	Lots of shade
24	Big size and family friendliness
25	Lightscape at night
26	N/A
27	There is the river near the park, and the park is quiet.
28	N/A
29	Seonyu bridge and water purification system
30	The amount of green
31	The location being on the river
32	N/A
33	The big size. It's very artificial in general but I can feel a sense of nature there. Everything is well organized. There is not just a park but also cultural amenities and sometimes I feel like I am in the very middle of a forest.
34	Despite relatively small size, a variety of paths divide the space…very walkable. The fact that it's an island.
35	I can see the Han River.

36	I can see the Han River.
37	The location being on the river
38	The location being on the river
39	The location being on the river
40	Ecological education
41	It is worth visiting this park for the ecological education
42	Good prospect towards the Han River
43	Good view towards the Han River and well organized forest
44	Wildlife like water striders and frogs. They are good resources for environmental education.
45	Nature in the city
46	Relaxing time in urban life
47	More environmental friendliness and less artificial feeling
48	I like the way this park attempts not to pop up in the natural landscape, but to be melted in it.
49	The fact that it has been recycled
50	Unifying the existing structure with nature
51	A lot of fruit trees
52	I find ourselves living together with nature
53	Its location that is close to my house
54	It is near the river
55	Big size
56	The shrill chirrup of a cicada
57	It looks natural that it has been recycled.
58	Not only benches but also sitting places where I can lie down such as pergolas. Quiet… and diverse species of plants
59	The fact that it has been recycled
60	It looks natural that it has been recycled, and people enjoy there.
61	It is very pleasant to walk in this park
62	Its island feeling, a forest being in the middle of water
63	Creating new landscape keeping the existing structure
64	Paths of wooden deck
65	Neatness, easy transportation, big size, good reputation
66	I thought it was big nature. Pretty! Pretty!
67	I can stay away from the city for a while. I can recall the past through the existing structures.
68	Its unique feeling of being in an island within a city
69	The way the water circulates the whole park..but it does not look clean. Needs more lawn area.
70	N/A
71	Nothing too special
72	Good landscaping

73	N/A
74	N/A
75	Overgrown vegetation. Sound of water
76	Green space in city. Good nightscape!
77	It is near the river. There would no accident caused by bikes or inline skates.
78	N/A
79	The artificial stream is well utilized by children. In general the park is well managed.
80	Not too crowded. The way leading to the park from the subway station is quiet.
81	N/A
82	Harmony between artifacts and natural features
83	Diverse vegetations
84	The park has fresh atmosphere since it is near the river. Clear and clean feeling…
85	Ecological park in city, the water purification system
86	Big size and cleanness
87	Beautiful trees and cool wind
88	Insects and frogs that are good for environmental education for children
89	Good location and transportation
90	Diverse visual experience and the harmony between naturalistic landscape and artifacts
91	A sense of unity that natural landscape grows over the existing structures
92	Good place to photograph
93	It’s near the river. Good place to photograph.
94	Lots of trees, and well organized.
95	N/A
96	Harmony between artifacts and natural features
97	I can feel a sense of nature in the middle of the city.
98	The fact that it is on the river
99	The fact that it has been recycled
100	N/A

Seonyudo Park (Cont.)

ID#	What would you like to have this park to be better?
1	N/A
2	More seasonal maintenance for facilities and plants
3	Trees are too small. The park needs more overgrown trees.
4	It needs another pedestrian bridge to the north side of the river.
5	It needs more amenities.
6	Nothing
7	It needs better description on the water purification system for children.
8	N/A
9	The sense of difference that does not fit in the park.
10	N/A
11	It needs more shade.
12	Nothing
13	N/A
14	More shade
15	More shade
16	More shade
17	The water is dirty
18	It needs some shelters when it rains.
19	N/A
20	The visitors need to care more about nature and the public order.
21	It needs more wild plants.
22	More amenities
23	It needs water fountains and playgrounds
24	N/A
25	It needs better transportation
26	It needs more restrooms and better transportation
27	I hope this look lasts as it is. Young people reserve to express affection too much. People should not collect the pollen fruits.
28	N/A
29	Needs more space for matting
30	N/A
31	N/A
32	N/A
33	It needs more signs! And the signs are somehow invisible..
34	Having many paths is, on one hand, good, however, I would have many of them unpaved so that the park would have more sense of nature.
35	It needs more restrooms and convenient stores
36	More restrooms, drinking fountains, and bending machines please!

37	Good enough
38	N/A
39	N/A
40	More overgrown forest needed
41	It needs more space where children can more engage
42	It needs more rest spots
43	It needs more fruit trees
44	Bike paths
45	Description on each section
46	N/A
47	It needs more public relations and promotion as well as educational programs
48	N/A
49	N/A
50	N/A
51	Too much sense of artifact does not give me a big impression. But there are a number of places like this, which is good for our environment.
52	Needs more fishes in the ponds
53	Decorate what it has to decorate!
54	It is too much artificial… not too much to see.
55	It needs more playgrounds for children
56	It needs more playgrounds for children
57	I would like to have more unpaved paths.
58	N/A
59	It needs better restrooms, drinking fountains
60	There needs more botanical flowers or flower beds to attract people..
61	It needs more restrooms
62	It needs unpaved path
63	More garbage bins
64	Too much artificiality
65	More various menu items in the cafeteria, cleaner interior, too expensive. More sign and descriptions for the ecological meanings
66	More sanitation for children
67	There is no smoking area. The right of smokers should be considered. And not too much to see compared to the size.
68	N/A
69	N/A
70	N/A
71	N/A
72	More shade
73	N/A
74	N/A

75	N/A
76	N/A
77	N/A
78	N/A
79	N/A
80	Nothing
81	The park is too small. Water is dirty. I would like to have some music playing over the park.
82	More amenities
83	More convenient stores and restrooms
84	Stagnant water on the paths.. It stinks and is dirty.
85	Nothing
86	I would like to see more animals.
87	N/A
88	Signs, too many pigeons… I would like to have more botanical flowers.
89	Good that I don't see bikers and inline skaters that would threaten the children. Not enough signs and descriptions on the plants.. Need more.
90	I would want to have better accessibility. More sense of unity in the park in general.
91	More cultural events like musical a concert during weekdays
92	N/A
93	Needs more botanical flowers
94	N/A
95	N/A
96	The pavilion does not fit in this place. It should be replaced.
97	N/A
98	N/A
99	Some of the artificial structures need to be discarded based on its actual utility. Needs some more wildlife in the water exhibition area. More trees both broadleaf and needle leaf for better forest.
100	N/A

Haneul Park

ID#	What is the major attraction of the park?
1	Nice prospect from the top of the park. The stairway to the park is well mixed with the landscape and convenient.
2	Its location being in the middle of the city while having nice natural landscape
3	Big sky in the city when it is nice weather!
4	I can get close to the sky and touch the clouds here!
5	Lots of forest
6	Cool wind and nice view
7	N/A
8	Green prairie, clean air
9	Always clean and nice music
10	Nice resting spot
11	It is hard to climb up to this place but I like the fact that I could touch the sky, and its size is big and unique.
12	Very natural!
13	The fact that it was recycled from a former landfill with full of natural features such as birds, insects. I love smell of grass and the wind blowing here.
14	Big size, its location on the high place near the river. Lots of trees and grasses.
15	Peace park was very good having ponds and wet ecology with various birds
16	Vastness and nice paths. Sense of wilderness
17	Cool wind and nice view
18	Its location in high place having nice prospect
19	Big size, nice prospect, environmental friendliness
20	Wide view and green space
21	Its location and nice prospect as well as vastness and wide view.
22	Vastness
23	Its location in high place having nice prospect not being seen buildings around
24	Near the sky
25	Nice view. Good to walk and fresh air
26	Big park with unique prospect
27	Its size and near the sky
28	Near the sky, good prospect
29	Nice prospect
30	Nice prospect, good music, a bit too artificial but lots of wildlife compared to other parks
31	Less artificial than other parks
32	Its location being high. Panoramic view
33	Openness, pretty paths, music
34	Flame grass and wind turbines
35	Wind turbines, flame grass, surrounding atmosphere

36	Sky, clouds, flame grass
37	Big forest(?), cool wind, naturalistic paths
38	Big sky
39	Being natural! Naturalistic!
40	It is being natural not being too artificial
41	Big openness. Close to the sky
42	Openness and open paths
43	N/A
44	N/A
45	Composure and resting in city
46	N/A
47	Lots of air due to its location being in a high place
48	Freshness
49	Pretty observatory
50	Big size, grass, trees
51	Sky and cool wind
52	I can enjoy both urban prospect and natural ecosystem at the same time
53	Good place for environmental education
54	Nothing special
55	Wind
56	Its location being close to the sky, wind
57	Its history that it was recycled from a landfill
58	Its process that I walked hard here and finally got to the top…
59	It is hard to get here but I like there are not too many people. Nice sky
60	N/A
61	Although it is artificial, its location of being close to the sky and its naturalistic looking are good
62	It is amazing that the natural landscape has grown on the top of the garbage
63	Openness on the flame grass field and nice prospect
64	Cool wind and walk in clouds. Openness and sky!
65	The stairway
66	The stairway and natural looking
67	The stairway and the openness
68	The stairway
69	Sounds of insects and trees
70	Openness, meeting nature after hard climbing
71	Its location being close to the sky. The unique prairie feeling
72	N/A
73	I can experience nature in the city

74	Panoramic landscape. Stairway
75	Big size and good prospect. Children like it running around.
76	Lots to see being next to the stadium
77	N/A
78	Bush clovers. The flame grass field would be great in autumn
79	Wind turbines. Lots of wind
80	The fact that it was recycled from a former landfill.
81	Big sky
82	The largeness. Lots of paths. Good place for photographing. Lots space to sit. Fresh air. More interesting, more seeing. I would like to come here with my family again.
83	Its location being in a high place. Good prospect
84	The flame grass field fits in here.
85	The location being near the downtown. The fact that it has been recycled from the landfill.
86	The flame grass field, acacia trees, and the fact that it has been recycled.
87	Wind turbines and flame grass
88	Not crowded and quiet
89	Dense forest!
90	Openness
91	It's a plateau. I don't know much since this is the first time.
92	N/A
93	Largeness and not crowded
94	Largeness and not crowded
95	Largeness and cleanness
96	Nice prospect
97	Good prospect and quietness
98	Naturalistic flame grass field
99	Located in a high place, having naturalistic paths and resting space
100	It's large and the buildings are not seen. I feel like being in a countryside.

Haneul Park (Cont.)

ID#	What would you like to have this park to be better?
1	More water fountains
2	More maintenance to the messy landscape
3	More vending machines!
4	N/A
5	I would like to keep this as it is.
6	Nothing
7	N/A
8	Everything is well organized, but too many ants here
9	I would like to keep this as it is.
10	More resting area, restrooms and water fountains
11	More water fountains
12	More restrooms and garbage bins. Cafeteria and vending machines..
13	Cafeteria
14	Cafeteria
15	Bad smell from the gas pipe, I would like to have more naturalistic looking benches.
16	More diverse vegetation
17	More water fountains
18	N/A
19	N/A
20	Please no chemicals on the green
21	Signs and descriptions on the landscape
22	Approaching time to the park is too much
23	I would like to have some parking lots near the park or the approaching path short
24	More shade
25	Needs ice water, more resting spots
26	Cafeteria and more identity…
27	More identifiable paths.. It's confusing.
28	N/A
29	Nothing
30	N/A
31	Nothing
32	More benches and flowers
33	Broken faucet in the restroom. Not enough restrooms. Signs and descriptions..
34	N/A
35	N/A
36	Hard to climb up here
37	N/A

38	Needs better accessibility
39	Better signage system
40	No more artifacts
41	Good.. But there is no shadow on the way climbing up here
42	Too hot to climb up here in summer
43	N/A
44	N/A
45	More resting spots and flowers
46	N/A
47	More signs and descriptions
48	N/A
49	More amenities
50	More water fountains
51	The grass is messy. Needs more maintenance
52	The natural section of the park is a bit messy compared to the artificial ones
53	No shade
54	N/A
55	More resting spots and benches
56	No cafeteria. I want to drink a cup of coffee!!
57	More restriction on the opening hour to keep the ecosystem healthy
58	No restriction on the opening hour. I want to come here whenever i want.
59	The subway station should be near here
60	N/A
61	More water fountains and restrooms
62	Hope many people comes here. I would like to let other people know in the world
63	Beautiful in general
64	More flowers and maybe water features
65	Needs an elevator and cafeteria
66	Cafeteria
67	Needs vending machines and benches
68	Escalator or elevator
69	More trees
70	I like it as it is.
71	I want to roll on the grass field!
72	N/A
73	N/A
74	N/A
75	I want more big trees!
76	N/A

77	I am interested in recycling of garbage
78	N/A
79	N/A
80	N/A
81	Too far from the subway station. The paths are confusing. Needs signs and descriptions
82	More restrooms and water fountains.
83	More restrooms. I heard a guy complaining "there is no restroom here in this park!"
84	N/A
85	More evergreen trees!!
86	More sitting spots and shades
87	N/A
88	More shade and sitting spots
89	N/A
90	More sings and descriptions
91	Garbage! Space for smokers!!
92	N/A
93	More diverse things to see
94	More diverse things to see
95	More sitting space, paths, and restrooms (I don't know where they are) too hot to walk during summer
96	More sitting space and shades
97	N/A
98	The trellis should be more natural looking!
99	More shade
100	N/A

APPENDIX C

IRB APPROVAL

ASU ARIZONA STATE UNIVERSITY
RESEARCH AND ECONOMIC AFFAIRS

Office of Research Integrity and Assurance

To:	David Pijawka ARCH
From:	for Mark Roosa, Chair SM Soc Beh IRB
Date:	04/26/2010
Committee Action:	**Exemption Granted**
IRB Action Date:	04/26/2010
IRB Protocol #:	1004005100
Study Title:	Post-industrial space transformation to public space

The above-referenced protocol is considered exempt after review by the Institutional Review Board pursuant to Federal regulations, 45 CFR Part 46.101(b)(2) .

This part of the federal regulations requires that the information be recorded by investigators in such a manner that subjects cannot be identified, directly or through identifiers linked to the subjects. It is necessary that the information obtained not be such that if disclosed outside the research, it could reasonably place the subjects at risk of criminal or civil liability, or be damaging to the subjects' financial standing, employability, or reputation.

You should retain a copy of this letter for your records.