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Identifying Criteria for Designing Inherently Educational Landscapes

(Under the direction of MARGUERITE KOEPKE)

The connections between people and the natural world are seemingly growing weaker, and this only feeds existing cycles of environmental degradation. Designed landscapes provide an opportunity to strengthen these connections; they have potential to serve as a forum for environmental education, thereby advancing public environmental awareness and understanding. Because landscape architects influence the meanings and messages revealed through landscapes, they can send messages of positive ecological understanding in order to educate people who interact with particular landscapes. This thesis aims to discover how everyday landscapes can be designed as tools for learning about the environment. Research for this thesis generated a set of design criteria for incorporating learning into landscapes. The criteria include both design features and design qualities, and is derived from an overlap of several different layers: learning environments, an analysis of three ecological landscapes, interviews with these landscapes' designers and users, and information from environmental psychologists Rachel and Stephen Kaplan on relationships between people and their environments.

INDEX WORDS: Educational landscapes, Non-formal education, Public environmental education, Ecological design, Learning environments, Preferred environments

IDENTIFYING CRITERIA FOR DESIGNING
INHERENTLY EDUCATIONAL LANDSCAPES

by

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FOREWORD

I arrived at this topic for a number of reasons, but primarily through my interest in environmental education. My interest in environmental education has been around for some time, but only recently did I realize just how few people seek out knowledge about their surroundings. The extraordinary variety in human interests is certainly one of life's jewels. While it is difficult for me to understand how someone would not love to learn about plant communities, for example, I can certainly appreciate and learn from other people's interest and knowledge, and would hope they feel the same. When it comes to learning about our earth, however, it seems important enough a subject that increasing public knowledge is a necessary endeavor for our continued sustenance. This is what led me to this thesis, to discover ways that more people can learn about their surroundings through non-formal education.

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CHAPTER ONE

INTRODUCTION

The medium is the message.

-Marshall McLuhan

A fairly logical relationship exists between knowledge and observation or awareness; when one increases, the other does also. Conversely, when people cease to notice and observe, their knowledge diminishes. Subsequently, there is more potential for problems to arise due to lack of awareness.

Clearly our society is faced with an environmental crisis of its own working. Global warming due to greenhouse gas emissions is a threat now recognized by almost all countries. Power blackouts from overtaxed energy sources are becoming a regular occurrence in California, and yet conserving energy is not widely viewed as a potential remedy. Droughts and groundwater shortages threaten various urban and agricultural regions of our country, but common sense water use restrictions are not routine practice. These and countless other examples suggest that an awareness of natural systems, how they work, and an understanding of their interconnectedness with human populations is not widespread knowledge. Though most people would acknowledge these problems, they feel no affiliation with them; the connections between people and the natural world are seemingly growing weaker, and this is dangerous as it only feeds the cycle of environmental degradation.

Though causes are difficult to pinpoint, one might be the result of lifestyle changes over the last half-century, with most of our population now living in cities where connections to the land are not readily apparent. They do not have to grow their own food or obtain water from nearby springs. Faucets are turned on and water appears; trash is taken out and it disappears. One response to the overriding issue is expressed by Gregory Smith:

Among the most daunting challenges of our era is the task of bringing about the transformation of consciousness that will be required if we are to move away from a culture predicated on consumption and the values of the market toward one that strives to balance human activities with the requirements of the natural world. . .It therefore seems imperative that people concerned with these issues consider ways that nonformal educational experiences directed toward adults might contribute to the shift in thinking required to engender the new values and understandings needed to live more in harmony with the earth.¹

In this statement he calls for public environmental education as a necessary undertaking for the balance and survival of our land and the people who live on it. Landscape architects have an opportunity to embrace this challenge: designed landscapes possess a great deal of potential to serve as a forum for environmental education. While environmental education is gradually creeping into school curricula, landscapes could be the teachers of adult populations and the general public.

As landscape designers, we influence the meanings and messages revealed through landscapes, thus the opportunity exists to send messages of positive ecological understanding. People who do not choose to learn about the environment still pass through and see many designed landscapes. These places, be they commercial office plazas, malls, theme parks, or residential designs, all send messages of place: plants and

¹ Gregory A. Smith, "Creating a Public of Environmentalists," *Ecological Education in Action*, Eds. Gregory A. Smith and Dilafruz R. Williams. (Albany: State University of New York Press, 1999), 207

soil and rocks and earth and people. Unfortunately, many of today's landscape designs are incongruent with the environment, conveying messages of placelessness, such as the strip malls and suburban developments that have no regionally characteristic qualities distinguishing one landscape in Georgia from another in New Jersey. Often, people learn by example.

Landscape architects undoubtedly have potential to address some of today's problems with long term sustainable design solutions. Jory Johnson and Douglas Johnston write that "...the ecological crisis confronting our planet not only renders the pleasures of the garden far less innocent and isolated, but challenges landscape architects and artists again to represent and define our relationship to the natural world."² Even if and when the design and planning relationship to the natural world is defined through ecologically sound landscape architecture, another obstacle still exists. They go on to echo Smith's sentiments about a lack of public environmental awareness. "There is still a great gulf between many ecological design proposals and the public's understanding, comprehension, and recognition of ecological processes, a gulf made all the wider by ecology's inherent conceptual and linguistic complexity."³ In addition to the many functions of a designed landscape, one of the primary purposes should be to educate people who interact with that landscape.

Here is the summons for this thesis: How can designed landscapes assume the role of not only healing the earth, but also educating visitors about the earth's natural processes and systems? How can everyday landscapes be designed as tools for learning about the environment?

² Jory Johnson & Douglas Johnston, "Nature Constructed," *Orion* Winter (1993): 16.

³ *Ibid.*, 17.

To answer this question, exploring designed landscapes as the language which communicates ecological principles by example is important. Conveying messages to an audience is not always an easy task, even when the audience listens consciously and actively. In landscape architecture the audience is often a passive one, unanticipating of any messages. Every designed landscape has meaning, but how effectively is this meaning communicated? Even if landscapes are designed in an ecologically sound manner, do visitors to the space notice, understand, or learn from the sensitive design execution and meaning manifested in the land around them? The primary goal of these visitors is most likely not the pursuit of environmental knowledge and understanding, so another question arises: how can people be educated about a subject which they do not actively choose to learn? Perhaps what media and communication theorist Marshall McLuhan states also applies to landscape architecture -- 'The medium is the message.'⁴

Designed landscapes reach a wide audience, traversed by diverse populations on a daily basis. Therefore, these landscapes present a prime forum for learning; specifically, for advancing public environmental awareness and understanding. This thesis sets out to answer the questions presented thus far by exploring ways landscapes intrinsically communicate ecological values or understanding, in order that we as designers can do this better. To accomplish this, chapter two addresses the history of ecological design and human relationships with the landscape. Chapter three examines the idea of learning. Chapter four evaluates three case studies in terms of human potential to learn from the landscape. The final chapter synthesizes findings from chapters two, three, and four into a set of criteria that will enhance design of inherently educational landscapes.

⁴ McLuhan, Marshall, *Understanding Media* (New York: Signet Books, 1966).

Chapter Overview

Chapter two of this thesis will provide a discussion of research and writings concerning landscape, focusing first on ecological landscape design and then on behavioral aspects and human relationships with nature. Ecological landscape design is something difficult to define in few words, as it may embrace a wide range of examples. It is not a rigid, prescribable method, but rather a concept and attitude of respect for both nature and culture. The definition of ecological design provided here is based on influences from books, articles, and professors under whom I have studied in the last three years. So for the purpose of this thesis, ecological design is defined as design guided by principles and procedures that foster respect for nature and culture, before, during, and after development. Ecological landscape design has developed into a distinct discipline within the design field in recent years, and so an overview of its evolution is presented. The purpose is to provide background to current practices of this nature, a sample of which will be examined in chapter four.

The second section in the chapter discusses Kaplan and Kaplan's leading research on preferred environments. The results of their work have revealed qualities in both people and landscapes that combine to make preferred landscapes -- preferred on a subconscious level because they satisfy basic human needs. They have identified four primary elements of a preferred landscape: complexity, coherence, legibility, and mystery.⁵ The discussion will include the Kaplan's current published documentation containing implications for landscape design application.

⁵ Rachel Kaplan, Stephen Kaplan, & Robert Ryan, *With People in Mind* (Washington D.C.: Island Press, 1998), 13.

Chapter three focuses on learning within the discipline of education. What is pertinent here is to examine research regarding optimal learning environments -- where and how learning occurs. A broad overview of the psychology and theory in learning is presented, followed by information taken from literature dealing specifically with school facilities and classroom design and how these impact learning. The goal in reviewing this research is to discover guiding principles that foster learning so that they may be compared with ecological design to reveal effective ways of incorporating education into designed landscapes.

Chapter four explores the potential for learning in the landscape, through an examination of three case studies, categorized along a spectrum of educational purpose. These case studies, the Southern Progress Headquarters, Oconee Forest Park Trails, and the Lady Bird Johnson Wildflower Center, all have strong guiding ecological principles, and thus may be (and probably are) intrinsically educational. However, each site varies in the degree of educational objectives and intent. Included as part of this analysis are informal interviews, conducted with each site's designer and a sample of its users. These were used to reveal any overlap in design intent and user response, as well as to gain general input regarding learning in these landscapes. The result of these case study analyses should be a more refined inventory of potential criteria that may be significant for designing inherently educational landscapes.

Chapter five concludes with an analysis and synthesis of the information from previous chapters. Findings from the landscape case studies are compared with information from chapter three on current thinking in education about what constitutes a successful learning environment. Ultimately, this should determine consistencies or

overlaps that can translate into useful criteria for guiding the design of landscapes that can also inherently serve as tools for public environmental education.

CHAPTER TWO

PEOPLE & ECOLOGICAL DESIGN: BACKGROUND & RESEARCH

Historically, landscape architects have worked to solve cultural and environmental problems through design. But the degree to which the environment, as an entity, is addressed varies greatly, even within the concentration of designers who claim an ecological emphasis. Some designers focus more on restoring or maintaining ecological processes, while others focus on the ecologic aesthetic that is conveyed in a design. “Both approaches are problematic -- especially the representation of ecological processes in our built environment -- because of the public’s limited scientific knowledge and aesthetic preferences.”¹ Public understanding and perception is a key factor in the success of environmentally sensitive designs. While a design may serve the land and its systems well, it does not realize its full potential if the public remains unaware of the sensitive design execution and its ecological messages, because people are an integral part of the larger natural system.

This chapter addresses these issues, presenting a portion of the existing literature concerning the evolution of ecological landscape design and human behavioral aspects relevant to landscape design. The intent here is that by embracing a better understanding of both the land and the human components of landscapes, design can take on a more educational role.

¹ Jory Johnson & Douglas Johnston, “Nature Constructed,” *Orion* Winter (1993): 16.

Ecological Landscape Design

This section looks at the evolution of the role of ecology in landscape architecture, in order to assess where we stand today on this issue, and how or why landscape designs take an ecologically sensitive approach. If better designs can be produced through the recognition of an ecological base, they can be furthered by incorporating means through which people can learn from such practices.

A brief overview of the history of ecological design, as a construct in landscape architecture, reveals a trend that arguably began in the late 1800s. Ecological designs have been manifested in the landscape for over a century, but often with very different interpretations of the design's ecological role. An ongoing theme in design is evident in terms of ecology as either an aesthetic or as a function, often fused with in-profession debates over landscape architecture as an art or interdisciplinary reflection of other more scientific fields. On one hand, landscape architects have created places that look natural or have an environmental basis, grounded in curvilinear forms with native or 'wild-looking' plants; such places do not necessarily function as natural systems. Their value is judged on aesthetics. Conversely, other landscape architects have created designs to serve the land and people, recognizing more holistic landscape systems and working within those systems. This ecological dichotomy between aesthetics and function is often defined by various levels of human intervention in nature. "The conception of a designed landscape as purely a work of art -- as a visual object arrayed 'out there' in space to be admired as beautiful by a distanced human observer -- obviously works against

awareness of the landscape as a dynamic, changing, and exchanging force field of ecological process in which humans are actively immersed and engaged.”²

Perhaps the earliest roots of environmental landscape design are found in eighteenth century English landscape gardens. These landscapes strayed from the common geometrical formalities, creating the impression of a natural landscape.³

English practice of the nineteenth century provided the precedent, too, for applying this imagery borrowed from the rural countryside to urban parks, as a strategy for improving the physical and psychological well-being of city populations coping with urban congestion and what social reformers looked upon as a dangerous loss of contact with the natural world. The design strategy was primarily scenographic: to create, in Olmsted’s terms, ‘broad ranges of space’ replicating meadows edged by woodland and complemented by picturesque passages of ‘wild’ nature.⁴

Practitioners such as Capability Brown employed this method of design, sometimes using native plants, but without a true regard or understanding for the natural systems within a landscape. Yet, such practice did contribute to evolving aesthetic values in the landscape.

Andrew Jackson Downing and Frederick Law Olmsted, who practiced in the mid to late 1800s in the Northeast, helped to further the perception and practice of natural landscape design. However, they frequently used exotic plant species to create ‘natural’ landscapes. At a time when horticulture was thriving as a popular cultural interest, Olmsted utilized the exotic plant species “to secure greater variety and richness of effect.”⁵ Though he did not necessarily subscribe to today’s ideas of environmental responsibility through the use of native plants, Olmsted did look more closely at natural

² Catherine Howett, “Ecological Values in Twentieth Century Landscape Design,” *Landscape Journal* Special Issue (1998): 84.

³ Ervin Zube, “The Advance of Ecology,” *Landscape Architecture* 76, no. 2 (1986): 59.

⁴ Catherine Howett, “Ecological Values in Twentieth Century Landscape Design,” *Landscape Journal* Special Issue (1998): 83.

⁵ Ervin Zube, “The Advance of Ecology,” *Landscape Architecture* 76, no. 2 (1986): 59.

systems in his work, as well as social and aesthetic issues. “Olmsted was also concerned with reestablishing the integrity of a natural ecosystem (the Back Bay Fens and Muddy River in Boston) that had been badly exploited and polluted.”⁶ In response, he established and constructed the Emerald Necklace, a continuous, park and open space system within Boston, which also addressed drainage and flooding problems that were the result of prior unregulated growth. Olmsted sought to make his designs reflect his “personal vision of landscape architecture as an entirely unique form of art in which the aim was to bring about the delicate balance, a synthesis of aesthetic, environmental, and social goods.”⁷

Another step in acknowledging ecology in landscape architecture occurred in the 1880s with a stronger recognition and use of native plants in design. This movement was perhaps strongest in the Midwest with the prairie landscape, as it was difficult for exotic species to survive in that climate.⁸ O.C. Simonds was one of the first to promote the use of native plants in design. He explained his approach years later in a 1922 lecture to the University of Illinois Landscape Architecture Department: “Nature teaches what to plant. By going to the neighboring woods and seeing the trees and plants and shrubs they contain, one can tell pretty accurately what trees will do well in any given locality. . . In making a planting design for any given territory, one should seek to retain the local character, and this he can do largely by retaining indigenous plants.”⁹ His philosophy toward landscape design certainly was closer to ecological sensitivity than some other practitioners’, yet it primarily addressed planting design, not whole landscape systems.

A contemporary of Simonds and Olmsted, Jens Jensen also utilized native plants

⁶ Ervin Zube, “The Advance of Ecology,” *Landscape Architecture* 76, no. 2 (1986): 59.

⁷ Catherine Howett, “Ecological Values in Twentieth Century Landscape Design,” *Landscape Journal* Special Issue (1998): 84.

⁸ Ervin Zube, “The Advance of Ecology,” *Landscape Architecture* 76, no. 2 (1986): 59.

⁹ *Ibid.*, 60.

in his work, with comprehensive, practical reasoning. “To try to force plants to grow in soil or climate unfitted for them and against nature’s methods will sooner or later spell ruin. Besides, such a method tends to make the world commonplace and to destroy the ability to unfold an interesting and beautiful landscape out of home environments.”¹⁰ Yet he went beyond just using native plants, to engaging more holistic ecological considerations in his designs.

Jensen’s genius drew upon a more profound ecological awareness than his contemporaries seemed to possess... [He] pondered the difficulties not of controlling or subverting these dynamic forces [of time and change], but of finding ways to give them poetic and imagistic presence in his designs.¹¹

Much of his practice resulted in designs where the hand of the designer was almost undetectable. Jensen sought “to move American landscape architecture away from its identification with eclectic high-style design traditions and toward a more original style based on appreciation of the figurative power and beauty of naturally occurring landscape forms and flora.”¹² Though his work was not in the mainstream of his profession, Jensen’s designs and ideas have had significant impacts in the evolution of ecological influences in landscape architecture, as the school he established in Wisconsin, The Clearing, continues to attract many students and admirers of his work.

Also in the late 1800s and early 1900s, Charles Eliot and Warren Manning both began to employ more systematic approaches for analyzing, classifying, and categorizing landscapes. Manning produced maps with information on natural components such as topography and soils, cultural attributes, and aesthetic qualities in order to employ more

¹⁰ Jens Jensen, *Siftings* (Baltimore: Johns Hopkins University Press, 1990), 42.

¹¹ Catherine Howett, “Ecological Values in Twentieth Century Landscape Design,” *Landscape Journal* Special Issue (1998): 85.

¹² *Ibid.*

responsible planning.¹³ These techniques had direct relations to the natural systems mapping methods developed by Ian McHarg years later. Their work was likely influenced by new discoveries in the nascent field of ecology, which was emerging around the turn of the century. In the early 1900s Frank Waugh, who established the Department of Landscape Gardening at Massachusetts Agricultural College, conducted research on ecological relationships and human effects on plant communities. Examples of his work included studies on roadside ecology, freshwater ecology, and natural plant communities.¹⁴ By 1924, the popular home and garden magazine *House Beautiful* published an article on “Plant Ecology”¹⁵ -- an outward sign that landscape architecture was evolving in response to pioneering information and a more widespread understanding of natural systems.

Ian McHarg’s influence and *Design With Nature* appeared in the 1960s, furthering the systematic, environmental approaches to design begun a half century earlier. He incorporated professionals from other disciplines, such as ecologists and biologists, into design teams that “anticipated, even helped to direct, a sea change in the practice of environmental design.”¹⁶ Since then, more and more examples of ecological landscape designs have begun dotting the practice of landscape architecture, each utilizing different tactics to accomplish environmental and artistic goals. In addition, many are beginning to create them with education in mind. One such example is Joan Nassauer’s “Urban Ecological Retrofit: An ecological system for stormwater infiltration along two blocks of an existing urban neighborhood” which was highlighted in *Landscape Journal*’s

¹³ Ervin Zube, “The Advance of Ecology,” *Landscape Architecture* 76, no. 2 (1986): 66.

¹⁴ *Ibid.*, 61.

¹⁵ *Ibid.*

¹⁶ Catherine Howett, “Ecological Values in Twentieth Century Landscape Design,” *Landscape Journal* Special Issue (1998): 92.

Ecorevelatory Design 1998 Special Issue.¹⁷ The success of this project, which took the form of front yard stormwater gardens, was due largely to fostering community education and participation, including both homeowners and city officials. It served to change traditional aesthetic perceptions for the benefit of improving water quality. The project also moved to “a visionary edge of community planning to show us what might be possible if the political, economic, and social powers that shape urban neighborhoods were more willing to embrace alternative models.”¹⁸

Ideas about ecological landscape practices and aesthetics have certainly evolved in the last 150 years, yet designs guided by their influence are still considered an alternative to typical development patterns. It is only one perspective on the profession, and a landscape that is viewed as pretty, natural, or ecological has different meanings for different people. The general public, both children and adults alike, needs to gain a more inclusive understanding of natural landscape systems and functions to ensure ecological health for future generations. As so clearly stated by George Thompson and Frederick Steiner in the introduction to their book, *Ecological Design and Planning*,

It is high time that we citizens of the world begin to understand that our situation on Earth is not one in which nature must rule over culture, or culture over nature, as if one can separate the two in the first place. . . [We must bring forward] the concept that only by designing and planning with nature and culture can we begin to heal and improve the landscapes and places of everyday existence - - urban, rural, and wild -- in environmental *and* aesthetic terms.¹⁹

Designs which are built on this understanding work toward that end, but need to be more

¹⁷ Joan Nassauer, “Urban Ecological Retrofit,” *Landscape Journal* Special Issue (1998): 15.

¹⁸ Catherine Howett, “Ecological Values in Twentieth Century Landscape Design,” *Landscape Journal* Special Issue (1998): 97.

¹⁹ George Thompson & Frederick Steiner, *Ecological Design and Planning* (New York: John Wiley & Sons, Inc., 1997), 2.

readily accepted and publicly desired if they are to have the educational impact that is possible. Until this broad shift in thinking occurs, current ecological design work will continue to have to be vociferously justified to a general public or policy makers.

Behavioral Aspects of Landscape Design

The following is a look at human behavioral aspects related to landscape design, for the purpose of identifying information about how people interact with different environments, and what types of environments people prefer. This information is relevant here for two reasons. In order to design inherently educational landscapes, first, one must have some understanding of human-landscape interactions; second, the landscapes must be ones which people will want to visit and explore, or the opportunity to educate is lost from the beginning.

Much of the information in this section is taken from extensive research conducted by Rachel and Stephen Kaplan (environmental psychologists) on the relationships between people and nature. Understanding these relationships is fundamental in providing good design solutions for our built environment. After all, landscape architecture is not just about the land, nor just about people. As Howett defines landscape architecture, it is “to improve the quality of human environments through design that responds sensitively to the requirements of natural systems.”²⁰

Herein lies the argument for public environmental education, put forth by Smith.²¹ If balancing the needs of both culture and nature is central to good development, then it

²⁰ Catherine Howett, “Ecological Values in Twentieth Century Landscape Design,” *Landscape Journal* Special Issue (1998): 80.

²¹ Gregory A. Smith, “Creating a Public of Environmentalists,” *Ecological Education in Action*, Eds. Gregory A. Smith and Dilafruz R. Williams. (Albany: State University of New York Press, 1999), 207.

logically follows that one should strive to better understand both people and the natural world. The Kaplan's work strengthens this aim, asserting a further reason for education: knowledge is basic to human survival. "Many human motives are in fact very closely tied to knowing and to finding out. People crave new information and at the same time are repelled by information too far from what they can comprehend..."²² Therefore, understanding our surroundings is important in the long term so that people can make more informed decisions that will simultaneously benefit society and the land. Without this understanding and respect, short-sighted solutions are adopted, often having to be corrected or reversed after long-lasting negative impacts have already occurred. Opportunities to learn from designed landscapes about the natural processes in our surroundings need to become an important component of nonformal, public education.

Also important to understand are the kinds of environments people prefer. While this undoubtedly varies among individuals, the Kaplans have identified some regularities and consistencies related to *preferred* environments, both man-made and natural. The term 'preferred' conveys something rather inconsequential; yet its definition here is explained in an evolutionary context as something actually needed.

Preferred environments will in general be ones which human abilities are more likely to be effective and needs are more likely to be met. This does not mean that people are necessarily aware of their needs, nor that preferences do not include idiosyncratic elements, as well as distortions caused by social influences, unrepresentative experiences, and the like. But it does imply that preferences cannot be taken lightly, that they are important indicators of environments in which humans can be constructive and effective.²³

Preferred environments include attributes of both content and process. *Content* refers to

²² Rachel Kaplan & Stephen Kaplan, *Humanscape* (Ann Arbor, Michigan: Ulrich's Books, Inc, 1982), 82.

²³ *Ibid.*, 148.

the more tangible, particular elements of an environment, while *process* pertains to the “informational properties that make any environment involving and sensible.”²⁴ For example, take a landscape that contains a shallow stream with small boulders inviting a person to cross; the primary content in this landscape is water, while the process embodies adventure or relaxation. Preferred environments also involve four fundamental properties that the Kaplan’s have identified and subsequently explained in terms of design implications. These four properties are: coherence, complexity, legibility, and mystery.²⁵

Coherence refers to settings that are organized, where people “can readily discern the presence of a few distinct regions or areas, and those make it easier to make sense of, or understand, a place.”²⁶ One example of coherence in design might be the use of repetition or themes. *Complexity* addresses the human need for exploration, and incorporates variety and richness into a setting. For example, complexity in a landscape might be increased by including many different species of plants or a variety of paving materials. *Legibility* is explained in terms of distinctiveness; however, distinctiveness is also related to one’s experience in a place. “To increase legibility, a scene has to have some memorable components that help with orientation... [But] without experience of a place, its unique aspects are difficult to recognize.”²⁷ In an unfamiliar place, elements may at first seem memorable, but then begin to all look the same. The corollary is also true, that familiarity with a place can lead to seeing and understanding features that at first may not have been noticed. Thus, legibility certainly merits attention when designing

²⁴ Rachel Kaplan & Stephen Kaplan, *Humanscape* (Ann Arbor, Michigan: Ulrich’s Books, Inc, 1982),150.

²⁵ Rachel Kaplan, Stephen Kaplan, & Robert Ryan, *With People In Mind* (Washington D.C.: Island Press, 1998), 14.

²⁶ Ibid.

²⁷ Ibid., 15.

a landscape through which people can comfortably navigate. The last property of preferred landscapes is mystery. *Mystery* is the property identified as sparking people's interest and increasing intrigue, an element found to be a "particularly effective factor in making a scene highly favored."²⁸ It is expressed in the landscape by hinting that there is more to see and discover, perhaps by partially obscuring something, but not by entirely blocking one's view.²⁹ An example of mystery in design is found in Douglass Reed's Therapeutic Garden for Children. A main component of the landscape is a steel water rill that meanders throughout the site, mimicking a natural watercourse, and flowing in and around several different types of spaces. A sense of mystery is invoked through an urge to follow the water rill, not knowing where one might end up.³⁰

Incorporating even small amounts of these four components into a landscape affects how comfortable people are in a setting. The implications here are that in order to design a landscape in which people have the opportunity to learn about nature, one must first provide a landscape that people will want to voluntarily experience.

How information is exchanged within a landscape is also important. Information exchange in the landscape, whether done in an overt or subtle manner, involves including the right amount and type of information, as well as relating what a visitor sees and experiences to what he or she already knows and understands. Since individual needs vary greatly, more general guidelines are helpful. Permitting visitors to experience a setting at their own pace results in information being more readily and easily understood. Also, using "visual and spatial information in combination with words is far more

²⁸ Rachel Kaplan, Stephen Kaplan, & Robert Ryan, *With People In Mind* (Washington D.C.: Island Press, 1998), 16.

²⁹ Ibid.

³⁰ J. William Thompson, "1997 ASLA Awards," *Landscape Architecture* 87, no. 11 (1997): 44.

effective than words alone.”³¹ This is particularly important in trying to communicate concepts of environmental understanding, using the landscape as a teaching tool. A hypothetical example of this might be a park landscape design based on regional plant succession as the concept. Minimal signage throughout the site would explain the process and concept of plant succession, as paths would lead the visitor through the changing vegetation -- experiencing the successional sequence and ‘time.’ The visitor would construct a new mental map of this cross-section of the relationship between time and vegetation.

Summary

Understanding our past and current environmental conditions can only lead to better, more explicit and contextual design in the future. Ecological landscape design is a work in progress, gaining ground as additional and more accurate ecological information is uncovered. Though the time line for ecological landscape design that was furnished here begins in the early 1800s, there are certainly landscapes dating back centuries before that would be considered ecologically sound by today’s standards. As landscape architecture evolves with more and more scientific understanding, the next step in the process is to interject more effective environmental learning opportunities within these landscapes.

Also significant are the potential user groups whom the landscape is trying to educate. The Kaplans have recognized the importance of studying and understanding the relationships between people and nature. Through their research, they have worked to

³¹ Rachel Kaplan, Stephen Kaplan, & Robert Ryan, *With People In Mind* (Washington D.C.: Island Press, 1998), 25.

encourage better planning and design of the built environment, by paying more attention to the ways in which people interact with their surroundings. Building on the Kaplan's research can yield landscape designs which better communicate with people who use them.

CHAPTER THREE

LEARNING: HOW AND WHERE DOES IT OCCUR?

*The path of learning is more like
a butterfly than that of a bullet.*

-Phillip Jackson

This chapter furnishes an overview of where and how learning occurs. In order to identify key elements of a good learning environment, the idea of learning is explored from an educational perspective. What should emerge from this exploration is how particular aspects of a good learning environment might translate into landscape design principles.

Part one addresses an extensive body of literature regarding the philosophical and psychological aspects of learning. Literature concerning methods and principles of school facilities and classroom design for fostering better learning environments will be discussed in part two.

PART I: Educational Psychology and Theory of Learning

The following is a general discussion of basic teaching / learning theories. At the advice and direction of Dr. Kenneth Tanner, professor and specialist in school design in the College of Education at the University of Georgia, this investigation has been focused by selecting the ideas of progressive education as the framework for addressing learning within this thesis.¹ Progressivism is used here as the context for analyzing how general concepts of learning can be translated into learning in or from the landscape.

¹ Dr. Kenneth Tanner, personal interview. 1 March 2001

Many theories of learning exist; these range from Essentialism to Progressivism. Essentialism, on one end of the spectrum, is explained in detail in *Modern Philosophies of Education*.² It may be summarized as “an educational theory that ideas and skills basic to a culture should be taught to all alike by time-tested methods.”³ This theory coincides more with the idea that education should be focused on teaching facts and memorization, and that students should be evaluated and qualified by performance on standardized tests.

Progressivism, on the other end of the spectrum, is based loosely on principles of a democratic society, including two essential elements. The first is “respect for diversity, meaning that each individual should be recognized for his or her own abilities, interests, ideas, needs, and cultural identity. [The second is] the development of critical, socially engaged intelligence, which enables individuals to understand and participate effectively in the affairs of their community in a collaborative effort to achieve a common good.”⁴ This theory, in application, is well-suited to serve as the basis for the Montessori method of teaching. The progressive theory of education, which came to prominence in the 1920’s, emphasizes conceptual and rational thinking, and the “importance of the emotional, artistic, and creative aspects of human development -- ‘the most living and essential parts of our natures.’”⁵ It is these elements of Progressivism -- conceptual thinking, emotional awareness, critical and socially engaged intelligence -- that are necessary in environmental education, and make this an appropriate framework for assessing learning in this thesis.

The term ‘learning’ can be defined in many different ways. ‘Learn’ is defined by Webster as “1. to gain knowledge or understanding of or a skill in by study, instruction, or experience; 3. to acquire knowledge or skill or a behavioral tendency.”⁶ These

² John Paul Strain, *Modern Philosophies of Education* (New York: Random House, 1971).

³ *Webster’s New Collegiate Dictionary*.

⁴ University of Vermont, College of Education and Social Sciences, John Dewey Project on Progressive Education, “A Brief Overview of Progressive Education”; available from <http://www.uvm.edu/~dewey/articles/proged.html>; Internet; accessed 21 March 2001.

⁵ *Ibid.*

⁶ *Webster’s New Collegiate Dictionary*.

definitions provide a basis for understanding what learning is. The goal of this paper, however, is to assess the elements of where and how learning occurs. Thus, a further discussion of learning from an educational standpoint is required.

There is no single absolute way of learning. Learning is certainly situational, -- often occurring in 'the teachable moment' -- and thus establishing the most effective means differ according to circumstances as well as individual learning styles. As explained in *Educational Psychology*, forms of learning fall into several categories, including classical conditioning, trial and error, imitation, insightful learning, and reasoning.⁷ However, a broader explanation encompasses these particular learning methods. Learning can refer "to all of the relatively permanent modifications of one's reaction tendencies (or potentialities for response) that result from experience, [including] all the informal and incidental acquisitions as well as the formally directed learning usually thought of as 'education'."⁸ This explanation describes the application end of the principle of stimulus-response psychological studies of learning. In short, experience is the source of learning; learning is the source of changing or of strengthening one's behaviors. Further, "defining learning as a *potential* change in behavior covers those situations in which learning occurs at some particular point in time but does not become manifest in behavior - that is, observable - until some time later."⁹ Such an explanation becomes relevant when attempting to convey principles and concepts, in addition to mere facts, as would be the case in learning or teaching environmental education.

Learning is also considered by John Dewey to be a combination of objective, external knowledge and subjective, internal knowing. "There is, on one side, a body of truth, ready-made, and, on the other, a ready-made mind equipped with a faculty of

⁷ James M. Sawrey and Charles W. Telford, *Educational Psychology* (Boston: Allyn & Bacon, Inc., 1958), 66.

⁸ *Ibid.*, 61.

⁹ James T. Walker, *The Psychology of Learning* (New Jersey: Prentice-Hall, Inc., 1996), 4.

knowing -- if it only wills to exercise it, which it is often strangely loath to do.”¹⁰ This suggests that physical knowledge, or truths, are only one aspect of learning; rational knowledge, or thinking, is another. Ideally one learns in both manners, taking in knowledge and then associating, processing, and building on that knowledge.

Expanding on Dewey’s thought is the discussion of learning that occurs in terms of relational and conceptual thinking. This more in depth look at how learning occurs is important in this thesis because it relates to one’s potential to learn concepts, and learning concepts is an inherent and fundamental part of environmental education. One mechanism for this type of learning is using simulation. “In general, simulation consists of devising a model that imitates essential features of some other object or process that we wish to understand... A symbolic model is a set of logical relationships expressed in words, images, or other symbols representing events...”¹¹ The simulation described here refers to the benefits in educational psychology that result from making predictions from models. Utilizing this concept of the symbolic model could show great potential for learning environmental concepts, with landscapes designed as models of larger ecosystems. One example of such a model is the Water Pollution Control Laboratory in Portland, Oregon. It is designed with bioswales and a pollution-filtering pond in order to treat stormwater in a manner similar to the way rainwater cycles through a more natural or undeveloped area. This landscape is designed to model natural processes, serving to educate the public by ‘daylighting’ rainwater as opposed to the traditional methods of sending it to the storm drains and hiding it in the sewers.¹²

PART II: Learning Environments: School Facilities and Classroom Design

The more tangible aspects of effective learning environments presented here focus

¹⁰ John Dewey, *Democracy and Education: An Introduction to the Philosophy of Education* (New York: The Macmillan Company, 1964), 335.

¹¹ James Walker, *The Psychology of Learning* (New Jersey: Prentice-Hall, Inc., 1996), 298.

¹² J. William Thompson, “The Poetics of Stormwater,” *Landscape Architecture* 89, no.1 (1999): 58.

on school facilities and classroom design as a means of enhancing student learning.

While this thesis is more focused on an adult population, the elements and principles used to enhance school-age learning have merit and significance in promoting learning for all visitors to a designed landscape. This section explores several elements and patterns of optimal learning environments.

Dr. Jeffrey Lackney, architect and professor at the University of Wisconsin, has produced a list of design principles based on brain-based learning, presented in relation to the physical design of schools. Included in this list for promoting learning are movement, reducing threat, changing and interacting with the environment, and active and passive places, with the conclusion that utilizing a combination of these principles accommodates many individual ways of learning.¹³ Each of these principles shows possible benefit to school design; but what is more important here is to understand the origins of this list so that these principles for learning can be incorporated into landscape design.

One foundation of these learning tenets is that the brain grows continuously, and that learning occurs throughout one's lifespan. Understanding that learning is ceaseless is significant as a premise to another realm of learning research: that of the relationship between emotion and learning. "When we get emotional about a task we are involved in learning. . . Emotions are linked to learning by assisting us in recall of memories that are stored in our central nervous system. . . Emotions aid in memory retention (learning) of this situation as being good or bad."¹⁴ For example, an adult learning a new skill may find it to be frustrating, and the emotion of frustration is actually the learning taking place. This life-long learning applies directly to the basis for this thesis -- how to design to educate adults.

¹³ Jeffrey Lackney, "12 Design Principles Based on Brain-Based Learning Research," 1998; available from <http://www.designshare.com/research/BrainBasedLearn98.htm>; Internet; accessed 13 February 2001.

¹⁴ Ibid.

Another aspect of learning is the need to provide a situational balance between stress and comfort. “The brain needs some challenge, or environmental press that generates stress...to activate emotions and learning. . .Too much anxiety shuts down opportunities for learning. Too little and the brain becomes too relaxed and comfortable to become actively engaged.”¹⁵ This reinforces the need for the opportunity to order information and form meaningful patterns. Thus, designing a more challenging and thought-provoking environment may be a way to better instill environmental education in visitors to a landscape.

Dr. Lackney’s concluding remarks on the understanding of brain research on learning emphasize the concept of place.

“When designing for optimal learning environments, design must be approached in a holistic, systemic way, comprising not only the physical setting, but also the social, organizational, pedagogical, and emotional environments that are integral to the experience of place.”¹⁶

To promote learning, there lies a direct correlation between more literal school design and architecture, and principles for designing landscapes with more inherently educational qualities.

An even more observable approach to learning environments is outlined by Dr. Kenneth Tanner of the UGA School Design and Planning Laboratory. The list comprises twenty-nine design patterns, both tangible and intangible, found to be successful in relating to student achievement.¹⁷ There are elements in this list that are also in landscape architecture design terminology, and due particularly to this overlap with school design, have potential for creating more inherent learning opportunities in designed landscapes.

¹⁵ Jeffrey Lackney, “12 Design Principles Based on Brain-Based Learning Research,” 1998, 4; available from <http://www.designshare.com/research/BrainBasedLearn98.htm>; Internet; accessed 13 February 2001.

¹⁶ Ibid.

¹⁷ C. Kenneth Tanner, “Essential Aspects of Designing a School,” School Design and Planning Laboratory, April 2000.

Following are seven of these design patterns, included here for their potential relevance to landscape design. They are context, pathways, circulation patterns, public areas, activity pockets, living views, and egress. *Context* heads the list as an important overriding school design principle, relating to “personality of place and ‘in harmony’ with nature and the surroundings.”¹⁸ *Pathways* and *circulation patterns* should be clearly defined and broad, allowing freedom of movement among structures and between rooms. These two elements relate to how one interacts with buildings and structures, as well as comfort zones in terms of crowding and legibility. *Public areas* that foster a sense of community - of unity and belonging - should be inviting, comfortable, and well-lit. *Activity pockets* should be included in a school’s design, in order to allow small group work to occur. The inclusion of public areas and activity pockets in a designed landscape encourage visitors to interact with others as well as with their surroundings. Improving levels of comfort and security allows one to focus on other things, thus creating more potential for learning to occur. *Living views* of “indoor and outdoor spaces (gardens, animals, fountains, mountains, people, etc.)... allow minds and eyes to take a break.”¹⁹ *Egress* is explained as having easy access to the outside environment and learning areas. Having views and easy access into a landscape is critical if the landscape is to educate its visitors, for it must be used and protected in the long run. What is consistent among these design elements, is that whether they are used for designing a school for children or a public landscape for all ages of visitors, designers are defining experiences, and the opportunities for learning experiences are enhanced when these principles are followed.

¹⁸ C. Kenneth Tanner, “Essential Aspects of Designing a School,” School Design and Planning Laboratory, April 2000.

¹⁹ Ibid.

Other factors that affect learning are elements of one's ambient environment. These include sound, temperature, lighting, color, and odor, and tend to influence mood, emotions, behavior, and learning capabilities of individuals.²⁰ The ways that people respond to these elements vary greatly among individuals, yet as discussed earlier, engaging emotions tends to increase learning. Thus there is no prescription for how the ambient environment should be used; instead, it must be addressed and considered on a situational basis according to a designer's intentions.

Summary

The primary goal of this chapter was to explore learning within the discipline of education-- where and how it occurs. Important elements that emerged from the research include:

- experience is vital to learning
- learning involves both factual information and rational processing of that information
- we learn from symbolic simulation; utilizing a model can be a particularly effective means for learning larger concepts.

Further implications found to be critical for enhancing learning, as examined by Lackney, are that:

- learning is triggered by activating emotions
- learning is driven by meaning, which is often derived by understanding and creating patterns from unordered or chaotic information

²⁰ Francis T. McAndrew, *Environmental Psychology* (Belmont, California: Brooks/Cole Publishing Co., 1993), chapter 3.

- conditions presenting high challenge/curiosity with low threat engages learning.

According to research by Tanner, tangible elements in school facilities design for optimal learning environments include:

- good design of pathways and circulation patterns discourage feelings of crowdedness and enhance legibility, which improves visitors' comfort level and potential to focus on other aspects of the surroundings
- public areas, activity pockets, living views, and egress all allow for interaction with others and with one's environment.

All of these elements factor into the Progressive framework for learning, each contributing to the type of learning necessary in environmental education -- conceptual thinking, emotional awareness, and a critically and socially engaged intelligence. It is this understanding of learning that can lead to designing better landscapes in which people can learn more about the natural world that surrounds them.

CHAPTER FOUR

CASE STUDIES

Relationships and interactions between people and landscape are at the heart of this chapter. Three case studies are utilized as a way to connect real sites with real people to the previous text on learning and on the Kaplan's research of preferred environments. This examination focuses on three built landscapes where people and the land come together: Southern Progress Headquarters in Birmingham, Alabama, Oconee Forest Park Trails in Athens, Georgia, and the Lady Bird Johnson Wildflower Center in Austin, Texas. These landscapes were chosen as case studies for two reasons. First, these landscapes span a spectrum of educational purpose, ranging from one landscape that was designed for the explicit purpose of education to one that implicitly conveys sound ecological principles in its design, yet exists as a non-educational entity. Second, each was designed with environmental sensitivity as a guiding principle. The intent of this case study analysis is to reveal what aspects of each design makes them successful in terms of ecological education in the landscape.

To discover if and how people learn from the landscapes they are in, it is necessary to include people in this thesis research. The following inquiry explores each landscape in terms of designer intent and user response through informal interviews, in an attempt to discover where, when, or how learning occurs in ecologically sensitive landscape designs. Personal observations and information about these selected built

landscapes are a valuable part of these case study analyses; however, exploring educational aspects of a landscape cannot be accomplished without input from the people who design and use these landscapes.

Methods

Informal interviews were employed as a tool for gaining input from both designers and users to see if design intent and outcomes were consistent, and to see if education does, in fact, occur in the selected landscapes. These interviews were intended to provide some information about the potential to learn from the landscape, as perceived by the people who designed and who use these landscapes. They were not intended to be scientific devices yielding statistically correct data.

In order to accomplish this, two sets of questions were generated: one set was for the designer of each landscape, the other for users of each landscape. The questions for both the designer and the users were designed in a parallel manner so that responses could be compared. The purpose of conducting these interviews was to assess the potential for education to occur in these landscapes, and to classify each design in terms of its educational intent. (See Appendix A: Interview Questions). Correlations derived from these case studies could suggest attributes common to landscapes that are both ecological and educational, thus providing potential criteria for designing an intrinsically educational landscape.

First, interviews with each of the three landscape designers were conducted either in person or by phone. Second, a total of twenty-five user interviews were conducted by randomly approaching visitors on site at the Southern Progress Headquarters and at

Oconee Forest Park Trails. Due to distance and lack of time, user interviews for the Lady Bird Johnson Wildflower Center were conducted by phone.

Each of the following case study discussions complies with a consistent overall format. First, a general description of the site is given, with an emphasis on the educational aspects of the design. Next is a summary of the interview with the designer, followed by a summary of the landscape user interviews. Finally, correlations and sub-conclusions are drawn from this information for each site. Overall conclusions about the potential for passive environmental education to occur in designed landscapes, derived from comparison of the three sites, is presented at the end of the chapter.

Site One: Southern Progress Corporation, Birmingham, Alabama

This site was selected for two primary reasons: the respect for nature in its sensitive siting and design, and its existence as a non-educational entity. Southern Progress is a large business falling closer to one end of the educational spectrum, because while the building and landscape have some educational aspects, the site is not an educational center. People generally do not go there with the primary intention of learning about nature or the environment. Thus, it was chosen here as a means of assessing the potential to learn from one's surroundings when there is no explicit or formal educational aspect. Regarding ecology, this development addresses both the visual and functional aspects. It is designed to have an ecological, natural aesthetic, and also to function in a more ecologically sound manner than typical development. Trees and vegetation are saved on site for habitat and erosion control, and the drainage patterns are fairly undisturbed.

Southern Progress Corporation, which is based in Birmingham, Alabama, publishes many magazines, including *People*, *Southern Living*, and *Progressive Farmer*. After outgrowing its previous site, Southern Progress hired landscape architect Robert Marvin and Associates to design a masterplan and general landscape plan for their new 27-acre woodland site (See Fig. 1: Plan).

A brief description of the site reveals the environmental sensitivity that guided the development. The property lies on a steep slope that averages about 25%, with two deep ravines running through it. One of the key features of this development is that the main building is located on the ‘worst’ part of the site, where it spans one of the ravines. This ravine has been adapted with a recirculating water feature to provide the effect of a stream (See Fig. 2: Building Siting). A pond at the lower end of the site is part of this system, providing wildlife habitat as well as physical and psychological benefits to employees (See Fig. 3: Pond). The result is that the land was not excavated for leveling a foundation, and the site’s drainage patterns and most of the existing hardwood trees were saved.

Foot trails meander through the site from the building to magazine feature gardens, the stream and pond, and to the terraced parking along the east end of the site, serving functional and recreational purposes. Each terrace supports an area of parking on grade with an additional level built above it, and oak trees are planted between the parking terraces. From the parking area one has the option of taking trails through the landscape or using the covered walk which runs through the parking areas to the building entrance. This solution eschews the overwhelming feeling a parking garage would have left in the same place, and allows the vegetation to disguise the view of parking from the

building (See Fig. 4: Parking Areas). All of the exterior retaining is achieved with dry stack walls with vines planted in the gaps for additional support and a greening effect (See Fig. 5: Dry Stack Retaining Walls). Closer to the buildings the landscape is more formalized, yet it still blends the indoors with the outdoors by incorporating water, plazas, and rooftop gardens (See Fig. 6: Blending Indoors/Outdoors). Overall, the siting and landscape design of this development leaves the area fairly natural, with many of the design materials the same as those found existing on site, and only appropriate native plants used to enhance the natural areas.

On March 6, 2001, a phone interview regarding the design and educational aspects of the Southern Progress Corporation was conducted with Mr. Howell Beach, the landscape architect who worked closely with Mr. Robert Marvin, the principle designer on this project (See Appendix B: Designer Interviews). The primary intent of this design was to save the site, both the natural features and vegetation. The secondary goal was to site and build the buildings so that they are not seen from the road. According to Mr. Beach, the ecological influence of this development serves several purposes. The client sought this design in order to draw a certain type and quality of employees and top executives to their company. As part of its community education program, Southern Progress also seeks to influence the larger community by demonstrating that a five-story building can be developed without destroying the land. Mr. Beach asserts that the landscape is intended to be environmentally educational, not through formalized methods, but through the demonstrative qualities of the overall siting and exposure to the

outdoors. He believes the learning opportunities primarily occur as “education through osmosis.”¹

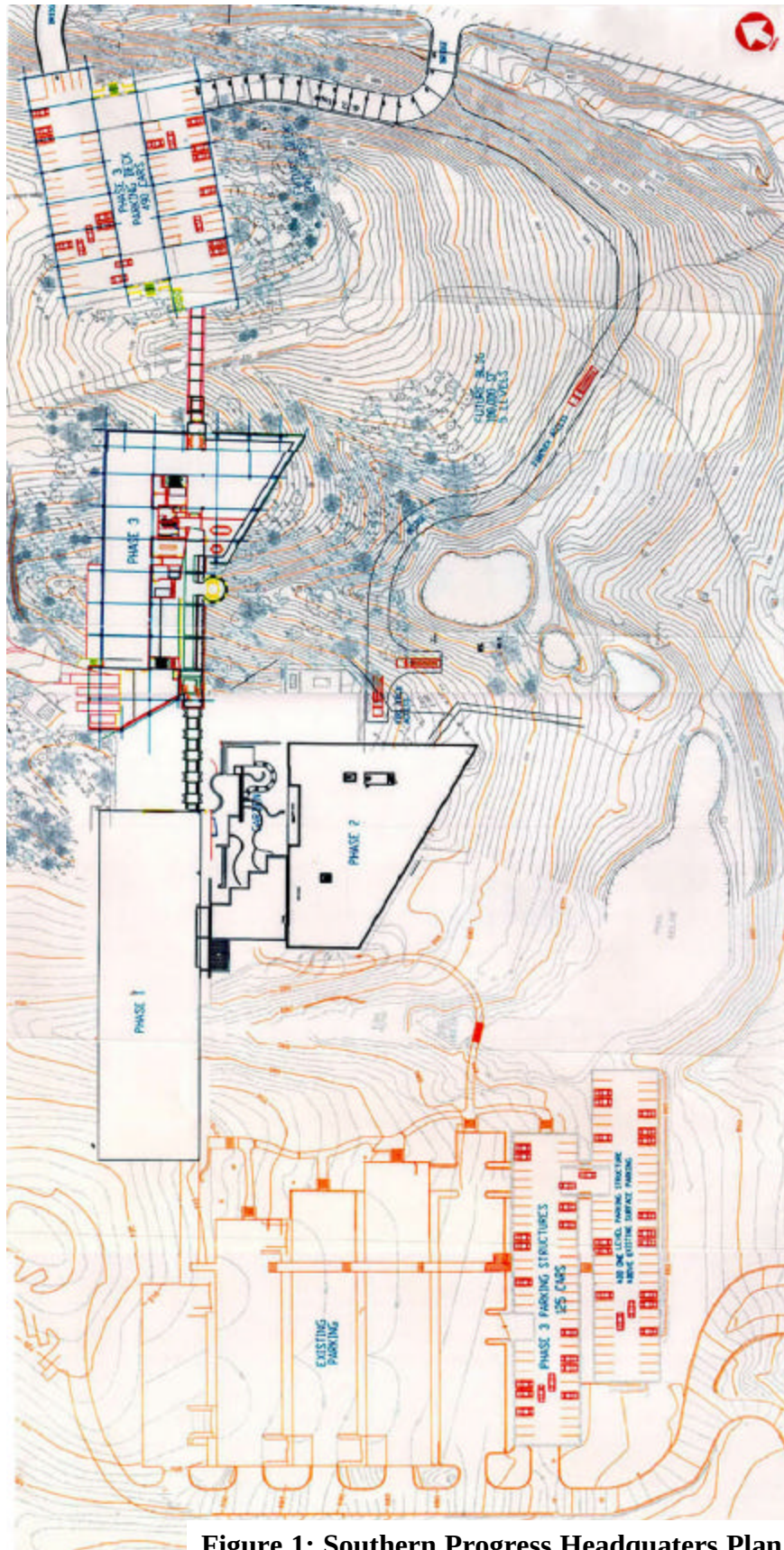
Ten user interviews were conducted on March 30, 2001 on site at the Southern Progress Corporation (See Appendix C: Compiled User Interview Responses). Participants included six males and four females, ranging in age from twenty to fifty. All those interviewed were employees, ranging from a test kitchen chef to grounds maintenance to magazine editors. Responses from these interviews are summarized in the following text, and a visual tabulation of the responses is also included (See Fig. 7: User Interview Response Table). Most users acknowledged that by working at Southern Progress, they do observe things happening in nature on a fairly regular or even daily basis, particularly seasonal changes in vegetation and wildlife. Many of the people questioned also make an extra effort to go out into the landscape more often than would be required by their daily arrival at the parking lot. There was general consensus (with two dissenters) that the landscape was intended to have educational qualities, with answers citing deliberate integration of architecture and nature, the outright exposure to vegetation and wildlife, labels on plants, and the design and construction to preserve nature. (One person did not think the development was educational -- “the building is just hidden”). Most of those questioned said they had experienced environmental education due to the landscape design, including awareness of water patterns, life cycles of the vegetation, wildlife habitat, and again the demonstration of a successful ecological development. Answers varied in reference to the potential to learn in a landscape with or without text (signage, brochures, etc.). Some believed they learned more by simply being in a space, observing and having to figure things out, while others thought having some

¹ Howell Beach, Landscape Architect. Personal phone interview, 6 March 2001.

text to guide the learning experience was necessary. While most attributed their environmental education, at whatever their current level, to news, reading, and experiences growing up (walks in the woods, on farms, etc.), three people attributed some education to their employment at Southern Progress. This points to the real possibility that unstructured, public environmental education can occur.

Conclusion - Case #1

Concluding from the interviews with Mr. Howell Beach and with a sample of the site's users, the potential does, in fact, exist to learn from this ecologically sensitive design. Some of the most important educational elements in this landscape are not explicit (a prime example of where the 'medium is the message'); they are opportunities that exist if individuals wish to take advantage of them -- Specifically, the design is focused on the outdoors, exposing people to nature. The design encourages people to view outside or to actually go outside, where they can then observe what happens in the surrounding land, such as seasonal changes in vegetation or wildlife patterns and habitat. The key aspects for learning from the Southern Progress Corporation landscape are exposure to nature, observation opportunities, and demonstration of environmentally sound development.



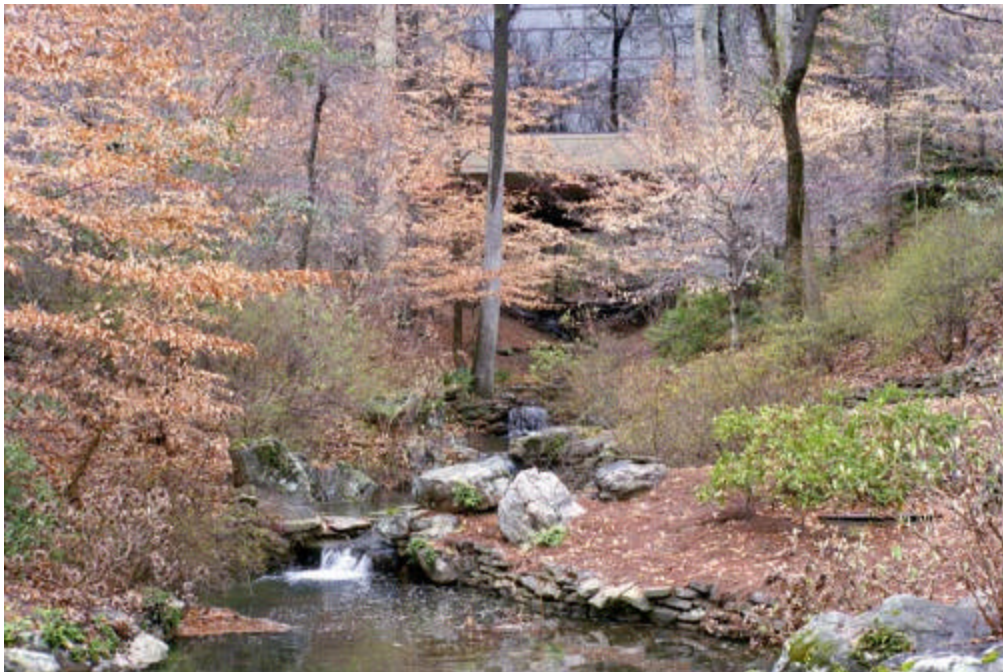
Plan shows the siting of the buildings and parking on steep topography.

Phases 1 & 2 Complete.

Figure 1: Southern Progress Headquarters Plan



View from the north end of the site shows the ravine is kept intact, though enhanced with a recirculating 'stream.'



The main building spans the existing ravine, resulting in minimal impact on the site's existing drainage patterns.

Figure 2: Building Siting



Part of the development's water system is this pond, benefiting both people and wildlife.

Figure 3: Pond



left: Parking terraces are separated with native vegetation.
right: The trail linking the building and parking is used more than the covered walk through the parking deck.



The terraced parking is hidden from the buildings and the road, even in winter.

Figure 4: Parking Areas



One of a visitor's first views is of the mortarless retaining walls that line the drive from the main road.



Dry stack walls throughout the site are planted, providing stronger support with the root system through the walls, as well as softening the stone with leaves and seasonal color.

Figure 5: Dry Stack Retaining Walls



This view from the fifth story shows one of several plazas where employees can easily access an outdoor place to eat lunch or relax outside to the sounds of water.



left: This constructed stream passes through the interior atrium area.
right: Rooftop gardens reduce runoff, enhance views, and further blend the buildings into the wooded background.

Figure 6: Blending Indoors and Outdoors

Interview Participant No.	1. The main purpose of my visit here was:	2. I came here seeking knowledge or expecting to observe something about nature / environment.	3. I have been to this landscape, or similar places, more than once.	4. I believe this landscape was intended to have educational aspects.	5. I believe I learned or observed something about nature while visiting in this landscape.	6. How would you compare learning by reading written text in a landscape and learning through simply experiencing a landscape?	7. To what do you attribute your environmental education and awareness?
1	work	●	●	●	●	experience	growing up
2	work	●	●	●	●	experience	growing up
3	work	●	○	●	○	experience	reading
4	work	●	○	●	●	varies - situational	pop culture
5	work	○	●	○	●	both text and experience	walks, outdoors
6	work	●	●	●	●	experience	growing up, school, work (SP)
7	work	●	●	●	●	both text and experience	school, growing up
8	work	●	●	●	●	experience	work (SP)
9	work	○	●	○	○	both text and experience	walks outdoors
10	work	●	●	●	●	both text and experience	growing up, work (SP)

● = Strongly Agree or Agree

○ = Strongly Disagree or Disagree

**Fig. 7: Southern Progress Headquarters
User Interview Response Table**

Site Two: Oconee Forest Park Trails, Athens, Georgia

Oconee Forest Park is a 60-acre natural area at the University of Georgia, managed by the Warnell School of Forest Resources who once used the area for forest research. The trail system in Oconee Forest Park is the second site selected as a case study in this thesis. This site was chosen for analysis due to its framework as a designed and natural site, undeveloped except for a few pavilions and associated recreational amenities. According to Dr. Walter Cook, who was instrumental in the proposal and design of the park and trails, the primary function of the area is to provide the university community with a place to relax, recreate, and enjoy nature. Educational components are said to be a strong secondary function of the area.² Thus, this site falls somewhere near the middle of a spectrum of educational purpose. It is a place visited for a variety of reasons but almost always of a recreational nature. Yet, its design, affiliation with the University of Georgia and the School of Forestry, and proximity to campus lend Oconee Forest Park to having educational qualities and serving educational purposes.

Officially established in 1982, Oconee Forest Park is the surviving part of an old-growth forest -- “the vision of a few far-sighted professors who began in the late 60’s to look for a way to set aside the remaining old forest for future generations.”³ The park includes hiking and biking trails, a 15 acre lake, and a 15 acre off-leash dog area. It is the 1.5 miles of hiking trails which are the focus of this case study (See Fig. 8: Oconee Forest Trail Map). Visitors to these trails use the area primarily for walking, jogging, or walking dogs. None of the trails are paved; they are composed of natural forest floor, dirt, and boardwalks over streams and wet areas. Visitors are offered a variety of outdoor

² Walter L. Cook, Jr. Personal Interview, 28 February 2001.

experiences, as trails meander through lake, field, forest, and stream habitats (See Figs. 9-12: Habitats). These ecological niches provide homes for such wildlife as the Canadian goose, great blue heron, red-tailed hawk, and red-bellied woodpecker. Many spring wildflowers appear in this oak-hickory forest, where the vegetation consists mostly of native species, although Chinese privet and Japanese honeysuckle are prevalent exotic invasive species in the park. Some of the non-native plants are present because the area was once used by the University to store shrubs for planting on campus; several grew too large to transplant and thus remain in the park. Some plants are labeled, with either or both their common name and botanical name, and are maintained by student interns and park manager, Dan Williams.⁴ However, the labels do not distinguish native plants typical of this region from the non-native, invasive species.

An interview with Dr. Walter Cook revealed much about the design and layout of the trails at Oconee Forest Park (See Appendix B: Designer Interviews).⁵ It was not designed with children in mind, because the University community generally consists of an adult population. This is particularly relevant in assessing the potential for adult environmental education. As previously mentioned, the primary intent of the area was to provide the University community with a place to relax, play, and enjoy the natural world. Yet an educational component of the park was not overlooked. The trails were laid out to pass through the main ecological niches: lake, field, stream, and both new forest (~50-60 years old) and old forest (~100-150 years old). Cook explained that the trails would be different if the goal was to provide a completely tranquil experience, for

³ Warnell School of Forest Resources, "Oconee Forest Park"; available from <http://www.forestry.uga.edu/warnell/ofp/history.htm>; ^{Internet}; accessed 14 March 2001.

⁴ Warnell School of Forest Resources, "Oconee Forest Park"; available from <http://www.forestry.uga.edu/warnell/ofp/history.htm>; Internet; accessed 14 March 2001.

example. The deliberate layout through various habitats was one method of providing an educational and enjoyable experience. He commented that:

What is enjoyable or aesthetic and what is educational is hard to separate. If you put a trail where people can learn something, but it's not enjoyable, it's not going to happen. On the other hand, if you put the trail where people will enjoy it, they're likely to learn something.⁶

Dr. Cook also explained that he designed these trails to be easy and enjoyable, allowing one to focus on things other than exertion. He maintains that by not focusing all one's energy on having to "balance on the edge of a cliff or wade through a swamp,"⁷ opportunities to learn from nature are more available. Other than one interpretive kiosk in the forest near the lake's edge, the only other signage is the occasional plant identification tags. Cook notes that although these are not interpretive trails, a small amount of text can be beneficial in encouraging learning to take place in the landscape. His view is that without any text, visitors may get an experience and perhaps learn subliminally, but by providing some information one is able to guide and direct learning.

Ten interviews were conducted with visitors to the Oconee Forest Park Trails. Their responses are included (See Appendix C: Compiled User Interview Responses), as well as a visual reference (See Fig. 13: User Interview Response Table). The visitors, randomly approached, included five females and five males ranging in age from twenty to forty-five. While there are many people over forty-five who use the trail system, none happened to be interviewed. The number of visitors under college-age appeared to be quite few, except for smaller children visiting with their parents. The significance of these demographics is that this public, natural area attracts and serves a primarily adult

⁵ Walter L. Cook, Jr. Personal Interview, 28 February 2001.

⁶ Walter L. Cook, Jr. Personal Interview, 28 February 2001..

⁷ Ibid.

population, and thus any potential education occurring in the landscape is occurring with adults. Only one of the respondents visited the trails specifically for educational purposes (during a plant identification course), while all others said they used the trails for recreation, relaxation, and exercise, and visited on a fairly regular basis. This is consistent with the intent of the park, where education was said to hold a secondary purpose. So the remainder of the questions were particularly important in discovering if learning takes place when one is not visiting for the purpose of education.

Most of those interviewed agreed that while at Oconee Forest Park they did expect to observe things in nature, they expressed that they did not necessarily expect to learn about the environment. Most believed the trails were intended to have educational aspects, primarily due to observation of plant labels. When asked if they had learned or observed things in nature while on the trails, those who mentioned the plant labels had not actually read the information provided. Yet overall, the responses suggested a diverse array of accumulated environmental observations. In addition to observing both terrestrial and aquatic wildlife and noticing seasonal changes in vegetation, visitors also noticed water drainage patterns and the different habitat areas traversed along the trails. What is interesting is that observing and learning were often viewed as very different from one another, but it was observations that were recounted when the visitors were asked about learning in this landscape.

There was general consensus from the people interviewed on the trails that the potential to learn in the landscape is enhanced if some text is provided. They believe it guides the visitor and actually makes one pay attention to things he or she might not otherwise notice. Several people in this interview group attributed their environmental

education more to experiences in parks and woods. When questioned, people believe they do learn simply by being outdoors, which shows that the possibility for education to occur in the landscape exists, whether it occurs in a conspicuous or indirect manner.

Conclusions - Case #2

The main purpose of the Oconee Forest Park Trails is to give people a place to relax and enjoy nature, and judging from the interviews with the trails' users, that is precisely the reason for visiting. While most agreed that the landscape did have some educational aspects and that they had gained some environmental awareness while there, the responses were fairly broad in terms of just what ecological knowledge was acquired. Overall input from the trail users indicates that because the landscape is not interpreted, it is unlikely that people will learn a great deal in this particular setting. Signage, particularly the plant labels, have potential to inform passers-by, as many have noticed the existing tags. However, based on the user interview responses and on the lack of origin (native/exotic) information, current plant ID application appears to be somewhat ineffective. What is effective in terms of learning from this landscape, results from a deeper look at the site, input from Dr. Cook and from those interviewed. What is revealed is that the key components likely to educate visitors in this landscape are the variety of natural systems through which the trails traverse and the overall opportunity to connect with nature.

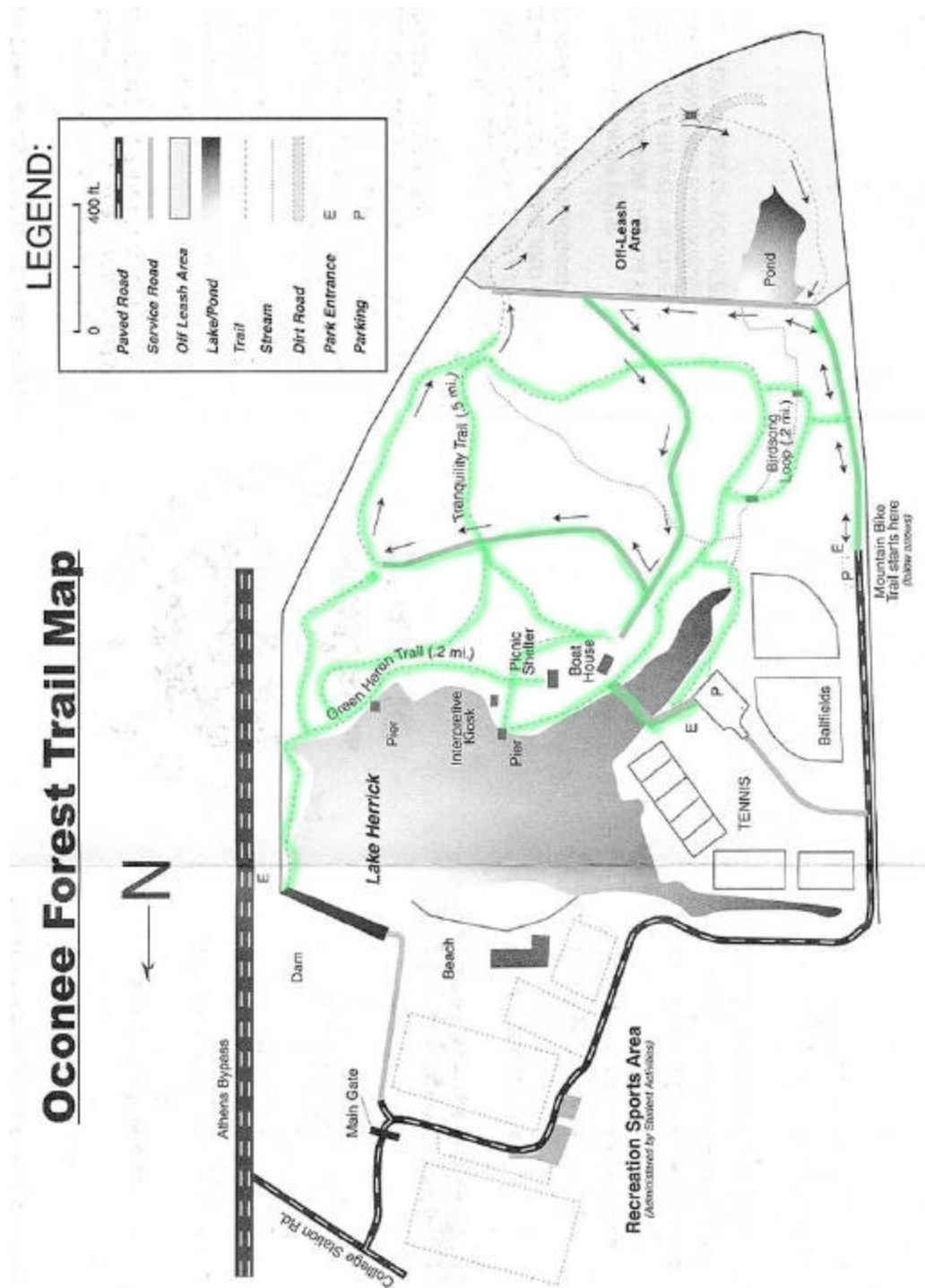


Figure 8: Oconee Forest Park Trail Map
Trails in case studies are highlighted.



Trail passes through a fallen tree in close proximity to native piedmont azaleas.



View of oak-hickory forest along forest portion of the trail.

Figure 9: Forest Habitat



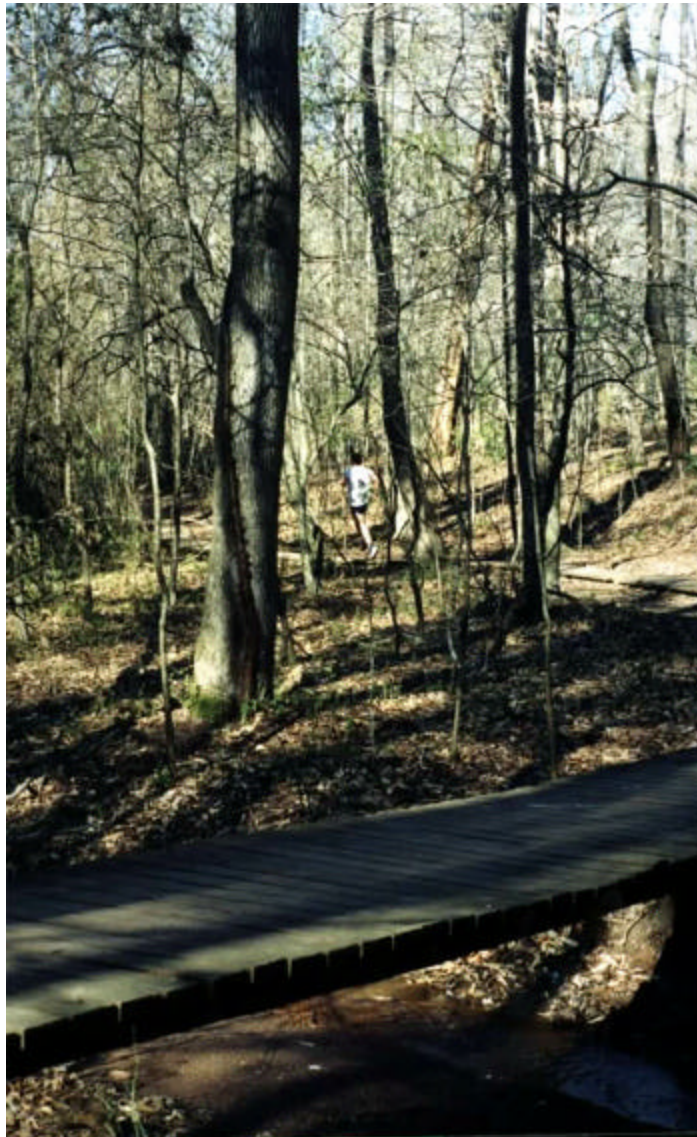
Visitors are allowed access to lake edge.

Figure 10: Lake Habitat



One of two types of field habitat that trails pass through (other is tall grass field) where birds are prevalent

Figure 11: Field Habitat



The trails include bridges over streams, allowing visitors a closer connection to the riparian habitat.

Figure 12: Stream Habitat

Interview Participant No.	1. The main purpose of my visit here was:	2. I came here seeking knowledge or expecting to observe something about nature / environment.	3. I have been to this landscape, or similar places, more than once.	4. I believe this landscape was intended to have educational aspects.	5. I believe I learned or observed something about nature while visiting in this landscape.	6. How would you compare learning by reading written text in a landscape and learning through simply experiencing a landscape?	7. To what do you attribute your environmental education and awareness?
1	recreation/exercise	●	●	●	●	both text and experience	school, reading books, walks in woods
2	walk dog; recreation/exercise	●	●	●	●	both text and experience	camp counselor
3	recreation/exercise	○	●	●	●	both text and experience	school
4	walk dog; recreation/exercise	●	●	●	●	both text and experience	walks in woods, parks
5	relaxation	●	●	●	●	both text and experience	work in landscaping
6	recreation/exercise	●	○	●	●	both text and experience	growing up; ed. at Callaway Gardens
7	relaxation	○	●	●	○	both text and experience	walks in woods, parks
8	environmental education	●	●	○	●	both text and experience	school
9	relaxation; walk dog	●	●	●	●	both text and experience	walks in woods, parks
10	recreation/exercise	●	●	●	●	depends on visitor's purpose	news, books, newspapers

● = Strongly Agree or Agree

○ = Strongly Disagree or Disagree

**Fig. 13: Oconee Forest Park
User Interview Response Table**

Site Three: Lady Bird Johnson Wildflower Center, Austin, Texas

The Lady Bird Johnson Wildflower Center is a nonprofit educational organization located on forty-two acres bordering the Texas Hill Country region, which was founded in 1982 as the National Wildflower Research Center (See Fig. 14: Wildflower Center Plan). The center recently acquired 136 more acres, saving them from subdivision development, which is a visible sign of its philosophy to demonstrate and promote ecologically sound planning, design, and land preservation. This site (the original forty-two acres), designed by landscape architect Darrel Morrison, was chosen as the third case study because of its environmentally responsible development, construction, and emphasis on sustainability, and for its existence as an educational center. The stated goal of the Wildflower Center is “to educate people about the environmental necessity, economic value, and natural beauty of native plants.”⁸ When people visit, they are probably intending to see and experience a beautiful place while gaining an appreciation of and learning about the use of native plants in the region. The Wildflower Center also maintains a research agenda that varies along the subject of plant and land restoration, with the primary research goal “to propagate natives for introduction into the commercial seed and nursery trade...”⁹

The Wildflower Center, which won the ASLA Design Merit award in 1996, possesses great potential for advancing public environmental education and awareness, since the center reaches a large audience. It receives approximately 100,000 visitors a year and produces several publications, including a wildflower handbook and the

⁸ Lady Bird Johnson Wildflower Center “Wildflower Center Headquarters.”; available from <http://www.wildflower.org/hq.html>; Internet; accessed 26 April 2001.

⁹ Michael Leccese, “Texas Tour-de-Force,” *Landscape Architecture* 85, no. 9 (1995): 68.

quarterly magazine, *Native Plants*. Ecological care was taken not only in the design of the site, but also in its construction. Native sandstone and limestone excavated on site were used for the center's ten buildings and paved areas (See Fig. 15: Native Construction Materials). Very few trees were felled during construction and those that were, were ground for use as mulch on the trails.

Demonstration gardens are another of the major design elements. Each plot has different, rotating theme displays, such as deer-resistant planting, or a butterfly or color garden. This area also includes a display for the 'front yard' landscape. It is exhibited in a comparison format showing the difference in aesthetics and in water and fertilization needs when using native plants as opposed to the traditional exotic species used in residential plantings (See Fig. 16: Demonstration Gardens). Cisterns are another prominent feature of the Wildflower Center, showcasing the treatment of rainwater that falls on site (See Fig. 17: Cisterns). Collecting water that runs off the tin roofs via an aqueduct system, the cisterns have a combined capacity of 70,000 gallons which supplies drip irrigation on site.

Parking lots are incorporated in among cedar trees and the lots "are enveloped by five stormwater infiltration ponds that feature sandy bottoms and riprap sides fashioned from rust-colored stone collected on site."¹⁰ Beyond the parking and buildings are trails that meander through a constructed native wildflower meadow and restored Texas prairie, where an overabundance of cedar trees had previously taken over the indigenous, relatively open landscape (See Fig. 18: Meadow and Prairie Landscape).

¹⁰ Michael Leccese, "Texas Tour-de-Force," *Landscape Architecture* 85, no. 9 (1995): 68.

During an interview with the designer of this landscape, Darrel Morrison, the four-part design intent of the Wildflower Center was explained (See Appendix B: Designer Interviews). This was:

1. to celebrate the unique vegetation of the hill country
2. to demonstrate sound landscape / building practices (ie. water harvesting system)
3. to demonstrate the use of native vegetation of a particular region, in a variety of ways from stylized to more natural restoration
4. to keep a 'sense of Texas' as much before as after development¹¹

This makes clear that educating visitors is an important role of the center. According to Morrison, it is the need to expose people to a natural systems approach and to alternative landscape possibilities, such as minimizing lawn and irrigation, that drove much of the design. Yet the Wildflower Center does not necessarily draw a diverse audience. People must choose and make the effort to visit, which is perhaps one limiting factor in the center's mission to educate the public. Once people do visit, however, Morrison hopes the design and buildings lead to a greater appreciation than expected. "Getting 100,000 visitors a year, it's a prime opportunity to educate. They come to see a pretty place, and I think there are deeper messages than the prettiness of it."¹²

The educational aspects of this landscape are both tangible and intangible. Some of the main physical elements are the demonstration plots that educate people about plant species; the entrance walkway, from where the prairie landscape can be viewed; and plantings around the main courtyard which are matched with microhabitats, such as ferns and columbine on the north sides of buildings, and cactus on the south sides. Messages, or guiding principles, are another component of the educational qualities which the

¹¹ Darrel Morrison, Personal Interview, 27 February 2001.

¹² Darrel Morrison, Personal Interview 27 February 2001.

designer hopes visitors carry away with them when they leave the center. These messages are that places have distinct characteristics, and one can draw on these to make beautiful gardens of that place; working from natural associations of plants in a region will usually result in “an aesthetic fitness;” and beautiful landscapes do not need to diminish resources and depend heavily on chemicals.¹³

While the site is fairly well interpreted and has some structured education with docents and tours, the design of the center is such that passive or unstructured education can also occur. According to Morrison, the various spatial experiences that let one walk through different degrees of ‘wildness’, and the different ‘room’s -- something new to discover around every corner -- are what make the subconscious education likely to take place. He believes in the importance of getting people out, and that once people are outside, having some text while experiencing a place is best for learning.¹⁴

Obtaining input from visitors to this site was somewhat more complicated than the same task for the other two case studies. Due to time and distance constraints, these interviews were not conducted on site. Five users were interviewed via phone after a visit to the Wildflower Center (See Appendix C: Compiled User Interview Responses and Fig. 19: Interview Response Table). Being an educational center, it was surprising that one of those questioned went to the Wildflower Center with no intent to learn about nature, though all others did hope to learn about plants, as well as enjoy recreation and relaxation. Those interviewed were all first time visitors, including three females and two males, ranging in age from twenty to eighty. This is important to note when trying to educate an audience. A center such as this (which charges \$7-\$9 admission) is unlikely to

¹³ Ibid.

have regular visitors; people who do visit more frequently may be those wishing to walk the trails or return on an annual basis for peak spring bloom, for example. Yet this is not necessarily detrimental; it simply merits attention when weighing the type of educational opportunity in a landscape, and whether the learning opportunities are derived from one or multiple visits.

When asked if they believed the landscape was intended to be educational, all interviewed agreed, citing the more visible elements such as the demonstration plots, cisterns, and plant labels. Regarding things learned during their visit, only one person felt she did not learn anything (only saw a lot of ‘weedy’ plants), yet even she mentioned two native vines she discovered and wanted to plant at her residence. Others found value in the demonstration gardens which depicted *why* native plants worked well; they noted that these did not require the amount of water and fertilizer needed for exotics, and remarked that “they looked appropriate for this area.” Most interviewed also commented on the cisterns and rainwater harvesting system, with one respondent saying “the cisterns make water collection visible, and that gets your interest piqued to find out more about how it works.” Also, views of and trails through the prairie were cited as enhancing regional awareness. In terms of providing text in a landscape from which people can learn, all interviewed here agreed that including some text is helpful. Ironically, having visited at least this one environmental education center, none attributed his or her environmental education or awareness to this or similar places. This could be due to the manner in which the question was posed, that implied that education must have occurred

¹⁴ Darrel Morrison, Personal Interview 27 February 2001.

further in one's past. On the other hand, it could also indicate that the Wildflower Center attracts people who already are aware.

Conclusions - Case #3

The potential education gained from this decisively educational landscape is appreciable. This is perhaps due to the Wildflower Center being more interpreted through signage and text than the landscapes in the other case studies. However, the alternative means of using and conserving resources, apparent in the site's design and physical elements, does appear to affect a visitor's learning experience. Education can certainly come from observation. The visibility of atypical practices, such as collecting rainwater or using a native plant pallet for landscaping, exposes people to ideas, concepts, and perceptible alternatives that they may not have known existed or known how to implement. Morrison maintains that "often, exposure to the possibilities is what is needed."¹⁵ The key aspects for learning from the landscape identified from this case study are discovery, demonstration and exposure, variety and spatial sequencing, and interpretation.

¹⁵ Darrel Morrison, Personal Interview 27 February 2001.



Plan shows building complex, courtyard, wildflower meadow, and demonstration gardens.

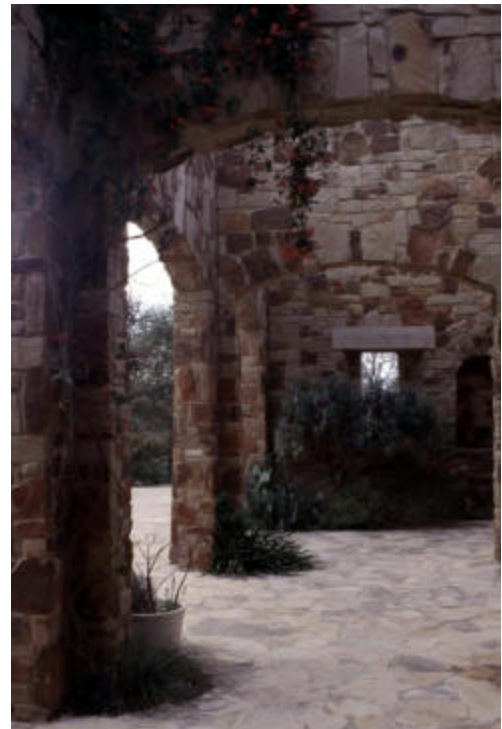
plan courtesy of Darrel Morrison

Figure 14: Wildflower Center Plan



Arbors on site are made from local cedar trees.

Courtesy of Mary Chapman



Buildings and paving are of native limestone and sandstone.

Courtesy of Mary Chapman

Figure 15: Native Construction Materials



View of interpretive theme gardens.

Courtesy of the Wildflower Center Website



One of three plots demonstrating variations in plant species and layout of the traditional residential yard.

Courtesy of Mary Chapman

Figure 16: Demonstration Gardens



A second cistern, located near the main courtyard, doubles as a tower where visitors can view the Texas prairie landscape.

Courtesy of Mary Chapman



The cistern at the entrance to the Wildflower Center extends into the walkway where visitors can closely observe the structure.

Courtesy of the Wildflower Center Website

Figure 17:Cisterns



A walk along the trails affords views of and information on the restored prairie landscape.

Courtesy of Mary Chapman

Courtesy of Wildflower Center Website



A view from the trail shows the wildflower meadow in front of the buildings.

Courtesy of the Wildflower Center Website

Figure 18: Meadow and Prairie Landscapes

Interview Participant No.	1. The main purpose of my visit here was:	2. I came here seeking knowledge or expecting to observe something about nature / environment.	3. I have been to this landscape, or similar places, more than once.	4. I believe this landscape was intended to have educational aspects.	5. I believe I learned or observed something about nature while visiting in this landscape.	6. How would you compare learning by reading written text in a landscape and learning through simply experiencing a landscape?	7. To what do you attribute your environmental education and awareness?
1	env. ed	●	○	●	●	both text and experience	school, news, camping, hiking
2	env. ed	●	○	●	●	both text and experience	school, trips to nat. parks
3	relaxation	●	○	●	●	both text and experience	growing up
4	recreation	○	○	●	○	both text and experience	family
5	recreation; env. Ed.	●	○	●	●	both text and experience	growing up, walks in woods; school

● = Strongly Agree or Agree

○ = Strongly Disagree or Disagree

**Fig. 19: Wildflower Center
User Interview Response Table**

Site Comparisons and Conclusions

Drawing from the three case studies presented, including on-site observation, input from each landscape's designer and a sample of the landscape's users, the potential to educate people from a designed landscape is a viable opportunity. Designers from all three sites had incorporated some educational scope within their designs, with aspects that were both tangible and intangible. In each case, these included paths or trails that exposed visitors to nature by taking them through various habitats and landscapes. Demonstrations of more sustainable, alternative plantings, building techniques, and water conservation serve to introduce visitors to practices that are not evident in typical development. These were some of the elements that visitors seemed to notice and learn from. The details and the larger ecological concepts -- of natural systems and sound ecological design and development -- may not be quite as discernible to the eyes of the general public.

Overall conclusions from these case studies indicate that learning in the landscape depends on a visitor's level of ecological awareness, and that he or she is more likely to learn when visiting with the intention to learn. The user interview responses were informative and insightful, however, they were probably somewhat biased because the demographics of the majority of those interviewed were fairly similar. This was in part due to the three sites chosen for study -- all drawing generally well-educated visitors. Some of the major conclusions consistently revealed through each case study follow.

1. It became evident from information from the user interviews that most people do not equate observation with learning. This is interesting to note because people often referred

to current or past observations as a learning experience when questioned about environmental awareness. Therefore, despite this apparent contradiction, observation is a powerful tool for learning.

2. When a place is designed or developed in a new or innovative manner, as opposed to through typical development practices, some level of interpretation is needed in order for visitors to understand, or even notice the alternative technique. Once explained, visitors are more likely to take and retain that information, ideally recalling and using it when necessary at appropriate times.

3. Education can occur in landscapes that are designed as educational facilities, as well as those not designed explicitly for that purpose. People's perception of learning is undoubtedly greater when visiting an educational site, however, learning can still take place when people are unaware that they are being exposed to an educational opportunity. However, the degree of explicit education in a landscape must be addressed on a site-specific basis. According to Walter Cook, "environmental education in a recreation area must be somewhat subliminal. People do not come to a recreation area to be educated, and most will resist being educated, if they suspect it is an objective of the management. Being educated implies work (effort) and they come to relax – the opposite of work."

4. People tend to grasp the more explicit and tangible educational aspects of a landscape. However, in these case studies there were very few comments regarding natural systems or ecological concepts when questioned about environmental education in the landscape.

Most observations referred to isolated elements of a landscape, such as plants or structures, indicating that large scale systems may not be detectable to the general public. One conclusion that may be drawn from this is that unless one is trained in a particular field, such as ecology or natural resources, he or she may be unlikely to notice subtleties or acknowledge larger concepts of the field. It is also important to note that time becomes a particularly significant factor for learning about the natural world. A person visiting a particular landscape over time is more apt to learn about the larger concepts or systems that function in that landscape. He or she can gain a better understanding of the place by observing seasonal changes and experiencing more than would another who only visits once or on an infrequent basis.

5. While interpretation is characterized in this thesis as an active, rather than passive, means of education, it is fairly evident that incorporating some degree of information into the landscape, through signage, brochures, etc., is perhaps an effective way to focus and guide visitors to learn from sound ecological design. Providing written interpretation in the landscape should be designed in a way that is most appropriate for a given landscape, because a peoples' purposes for visiting varies. Therefore, signage or brochures can be designed unobtrusively to merely satisfy a visitor's curiosity. On the other hand, written interpretation can be presented to function more for visitors with a conscious desire to learn or be educated. Most likely, interpretation will continue to be necessary until public, adult environmental awareness is at a higher level; a level at which one could teach children the necessary concepts and aspects of the natural world that would allow us a more harmonious co-existence within it.

CHAPTER FIVE

EVOLVING THE DESIGN CRITERIA

At the beginning of this investigation, curiosity was piqued by numerous encounters with the call for public environmental education in nonformal settings. Another call comes from David Orr, chair of Environmental Studies at Oberlin College, in an article directly related to this thesis. Here he describes an often overlooked limiting factor in education:

As commonly practiced, education has little to do with its specific setting or locality. The typical campus is regarded mostly as a place where learning occurs, but is, itself, believed to be the source of no useful learning. It is intended, rather, to be convenient, efficient, or aesthetically pleasing, but not instructional.¹

Consequently, he and a group of students recently undertook the research, design, proposal and implementation of a sustainable building that could instruct “as fully and powerfully as any course taught in it.”² Beginning with concept and through post-construction, the building conveys messages of ecological understanding, place, and energy efficiency. Again, the medium becomes the message.

While Orr’s efforts were focused on a building, the same pursuit can be applied to landscape. The landscape itself should be an instructional entity. This is not a simple task, because the public -- those targeted in this endeavor -- has become increasingly disconnected from its role in ecological processes. “Because ecological systems are

¹ David Orr, “Reassembling the Pieces,” *Ecological Education in Action*, Eds. Gregory A. Smith and Dilafruz R. Williams. (Albany: State University of New York Press, 1999), 229.

² Ibid.

complex and difficult to understand, they are often invisible to the untutored eye, and the designs based on them may be accessible sensually but not intellectually.”³ This very statement is the subject addressed by this thesis. The previous chapters explored ecologically sensitive landscape design, learning, and human relationships with the landscape to discover some means for creating landscapes that will teach about the natural world. Why? So that understanding of natural processes will spread to a wider, more diverse population; such enlightenment will most certainly lead to more responsible and sustainable societal growth.

Findings and Discussion

A final look at information from the previous chapters indicates several criteria for use in design of intrinsically educational landscapes. These criteria should be incorporated into a site-specific design response to cultural and natural features, resulting in a more educational landscape. Likewise, the criteria presented here can be used in many different design realms where they will be manifest through distinctive physical forms and expressions. The items in this list are basic criteria that are descriptive rather than prescriptive and guide the character and quality of the outcome.

The process of compiling this list began by ‘overlaying’ the main facets of this research: ecological design, nature-human relationships, and learning. Elements that appeared as significant to learning in the landscape were included, whether they surfaced in just one aspect of the research or appeared time and time again throughout the investigation. The purpose was to find the broadest range of criteria applicable to the design of an intrinsically educational landscape.. The following table lists the eleven design criteria that emerged from this process, and the aspect(s) of research from where each is derived.

³ Jory Johnson & Douglas Johnston, “Nature Constructed,” *Orion* Winter (1993): 19.

Criteria	Source
1 experience / interaction	learning
2 circulation / pathways	learning, Kaplans
3 demonstration	case #1, case #3
4 discovery / exploration	case #3, Kaplans
5 exposure / observation opportunities	case #1, case #2, case #3
6 interpretation / written information	case #2, case #3, Kaplans
7 meaningful information & thinking/processing	learning, Kaplans
8 models / simulation	learning, Kaplans
9 public spaces, views, access to environment	learning, case #1
10 challenge / emotions and safety/low threat	learning, case #2
11 variety of settings / habitats	case #2, case #3, Kaplans

Upon careful evaluation it became apparent that each criterion fell into one of two categories: Design features or design qualities. The category of design features encompasses physical elements that can actually be designed into a landscape. The second category, design qualities, comprises the characteristics of a landscape that promote learning. The following table shows the grouped criteria based on whether each possessed functional, physical features and attributes, or qualities and characteristics of an experience.

Design Features	Design Qualities
1 models / simulation	1 experience / interaction
2 circulation / pathways	2 meaningful information & thinking/processing
3 public spaces, views, access to environment	3 challenge / emotions and safety/low threat
4 variety of settings / habitats	4 exposure / observation opportunities
5 demonstration	5 discovery / exploration
6 interpretation / written information	

There is no hierarchy identified here in these categories or the elements within them. All of the criteria are significant for incorporating educational opportunities into a landscape design. The aim should be to utilize criteria from both categories, as combined they contribute more to one's experience and potential to learn from a place. Further strengthening the case for the potential effectiveness of these criteria, each correlates with at least one of the four properties of preferred environments, identified by the Kaplans. Any of the four properties -- complexity, coherence, legibility and mystery, -- that are relevant to each criterion are included and briefly discussed in the following explanation. Arguably, the properties of preferred environments cross the board, correlating in some manner to all of these criteria. The broad implications are that these criteria lend a landscape qualities of both education and preference.

Criteria

Design Features

Models and Simulation:⁴ As noted in the prior discussion on learning, simulating larger events or concepts is a useful tool for learning because it supplies logical and spatial relationships. These are particularly important to grasp when learning about the environment. Modeling or simulation relate to the properties of complexity and coherence. Any system will have multiple components, which at once serve to stimulate thinking and help with understanding how the components work together. Using this tool, one could design a landscape as a representative model of a larger system, such as a portion of the water cycle where it interfaces with human use and disposal.

Pathways and Circulation: Most landscapes use some sort of path or circulation system to direct people through a space. If learning from the landscape is a priority, however, then special attention must be paid to the sequence of experiencing information in layout and design. While particular standards such as dimensions or materials undoubtedly vary, careful consideration should be given to path width and legibility of the system, as both contribute to a landscape's coherence. A person's feelings of understanding and comfort in a space affects his or her ability to interact with other elements of the landscape.⁵ Circulation can also function to enhance mystery.

Public Spaces, Views, and Access: Public spaces, views, and access to the environment are all important considerations for incorporating learning into the landscape.⁶ These also relate to one's comfort and comprehension (coherence) of a

⁴ James Walker, *The Psychology of Learning* (New Jersey: Prentice-Hall, Inc., 1996), 298.

⁵ C. Kenneth Tanner, "Essential Aspects of Designing a School," School Design and Planning Laboratory, April 2000.

⁶ Ibid.

space, in addition to providing opportunities for interaction both with other people and with nature. This interaction is important in strengthening any education that occurs in a landscape. Even views incorporate complexity into a landscape, as they provide a scene that varies from immediate surroundings, and can incite feelings to explore. The chance to change perspective, such as going close to a tree and examining its leaves, or discussing an observation with another visitor are both forms of learning that must be planned for during the design of a landscape. For example, a very narrow path does not invite two people to linger in discussion. But if the intent is to foster learning, then a path that widens in places or breaks off to a seating area or council ring, such as those Jens Jensen often incorporated into his designs, encourages people to sit, closely observe, and converse.

Variety of Settings: Providing variety, particularly in settings, proves to be an effective educational strategy. Not only does having variety hold a visitors attention, it also enhances learning about the settings. Simply by proximity or contrast, a visitor's attention can be drawn to notice a landscape or specific habitat. Of course, variety does not have to apply just to larger landscapes, but could engage smaller elements within a landscape, such as in building or paving materials. Providing variety in the landscape correlates to the complexity and legibility properties of preferred environments.⁷ Variety and interest stimulate one's mind to organize and make sense of what is before him or her, perhaps by recognizing elements distinct to different settings. In turn, information a person takes in is linked and associated with existing knowledge, and thus the person better retains the learning experience.

⁷ Rachel Kaplan & Stephen Kaplan, *Humanscape* (Ann Arbor, Michigan: Ulrich's Books, Inc, 1982), 148.

Demonstration: Demonstration is another powerful device for teaching in the landscape, albeit a bit more explicit than some of the other subtle design inclusions. It responds to coherence and complexity, with new information that is simultaneously clarified. Demonstration can take on any form, from garden plots of native vegetation such as those at the Wildflower Center to ecological site design and construction as exhibited with the Southern Progress development. Utilizing demonstration provides a degree of direct knowledge, enlightening people to alternatives or opportunities that they may have been unaware existed.

Interpretation: Interpretation or written information is another more explicit means of education, aiding in legibility and coherence; however, is not necessarily an inherent part of a landscape design. It is particularly necessary when a new approach or technique is used in a landscape because the educational intent may be lost on many visitors who do not have training in a certain area, if their attention is not directed on some level. Interpretation is also sometimes needed even in typical landscapes if education is intended, as it directs and guides a visitor to at least acknowledge the subject and information. An example is on the Oconee Forest Park trails where identification labels appear on certain plants as part of a 'dendrology trail' throughout the site. Someone not walking the dendrology trail and without the accompanying brochure, may indeed discover and remember a plant labeled along the trail. Yet interpretation must be incorporated with care. Too much or the wrong type of information, or poor implementation will prove ineffective and distracting, instead of educational.

Design Qualities

Criteria of the design qualities category are rather intangible. The first three on the list, experience, meaningful information, and challenge and safety are difficult to separate, and feed into one another.

Experience and Interaction: Experience and interaction are both widely acknowledged as key components of learning.⁸ Any landscape provides an experience in and of itself; to enhance learning, a landscape should be designed to foster meaningful experiences and interactions, both with nature and people. This incorporates the property of complexity, where different types of interactions or experiences motivate one's mind to where learning can occur.

Meaningful Information: Providing meaningful information also cultivates the learning process, and is important to recognize in designing landscapes with or without written interpretation. Written information should include more than just facts; it should provide a context for what is being communicated, allowing one's mind to process and understand it by developing links and patterns to other information. An uninterpreted landscape must also be designed to motivate one's mind to absorb, order, and rationalize information. This function of presenting meaningful information also coincides with coherence, the property of preferred environments that makes it possible to "organize the field, to divide it into units for which one already has appropriate representations."⁹

Emotions /Challenge and Safety: Corresponding closely with mystery and legibility, settings where one's mind is stimulated or challenged engage one's emotions, and, as Lackney concluded, learning ensues. Yet this must occur in conjunction with an

⁸ James M. Sawrey and Charles W. Telford, *Educational Psychology* (Boston: Allyn & Bacon, Inc., 1958), 61.

⁹ Rachel Kaplan & Stephen Kaplan, *Humanscape* (Ann Arbor, Michigan: Ulrich's Books, Inc, 1982), 149.

environment that is not threatening to the visitor. Feelings of security allow one to focus his or her attention on other issues, such as other educational features in a landscape. For example, the Mary Kahrs Warnell Garden outside of the UGA Forestry School provides stimulating surroundings in a secure setting. It contains a living pond, shade, and seatwalls with ample room for individual reflection or larger gatherings. The design maintains a balance of enclosure and visibility into and beyond the space, fostering feelings of security. This allows a visitor the opportunity to notice the complexity and associations of native piedmont vegetation in this landscape.

Exposure and Observation Opportunities: Exposure and observation opportunities surfaced several times in this research as positively affecting education in the landscape. It was cited in all three case studies by both designers and users. This is consistent with designing for coherence, as the process of observing is also that of understanding and linking cognitive maps. People learn from observing, and thus a design allowing for observation of natural occurrences or exposure to new possibilities in development will certainly generate education of these issues.

Discovery and Exploration: Finally, when the notion of discovery is built into a landscape, learning more likely occurs. Discovery involves experiencing something new or unexpected, and because it is an experience and triggers emotions, the information discovered is apt to be remembered. This design function corresponds to the Kaplan's preferred landscape quality of mystery -- a quality that a person instinctively desires in order to expand one's knowledge base. A landscape design utilizing the concept of discovery and mystery entices people to explore. This concept tends to ensure that frequent visits allow a person to continue to uncover new sights or spatial experiences.

Capturing attention in this manner provides an individually motivated learning experience.

Conclusions

As keenly expressed by John Dewey, “the belief that all genuine education comes about through experience does not mean that all experiences are genuinely or equally educative... For some experiences are miseducative...”¹⁰ This is certainly the case in many current landscape and development practices, such as strip malls and countless subdivisions, where the messages conveyed are those of extravagance, waste, and disregard for both culture and the earth. Thus the purpose for this investigation.

A look at the evolution of ecological design in landscape architecture showed that an ecological focus in this field has existed for over a century, increasing along with the growth of scientific discovery in ecology. This focus has taken various physical forms in the landscape, from systems of open space connection and drainage restoration to computer aided analysis. With ecological design currently in the spotlight, community participation and education is already becoming integrated into the process, as evidenced in Nassauer’s Urban Retrofit project. The Kaplan’s research on preferred environments further contributes to landscape architecture, offering information to aid in effective, people-oriented designs. The review within the discipline of education presented vast information on learning, including psychological, theoretical, and perceptible features that contribute to optimal learning environments. The case studies in this research make clear that a place does not have to broadcast educational opportunities in order for people to learn; people can indeed learn from designed landscapes. Further, observation is key to learning, and learning in a landscape occurs both when interpretive information is

¹⁰ John Paul Strain, *Modern Philosophies of Education* (New York: Random House, 1971), 69.

provided and when it is not. However, communicating larger ecological concepts is difficult to achieve simply through design; some level of interpretive information may be necessary in order for visitors to notice and learn this information.

Everyday landscapes hold potential to reach a large audience, one undoubtedly more diverse than what a traditional environmental education or nature center might attract. The intent of this research was to determine how these landscapes can be more inherently educational, teaching ecological values and concepts to a diverse, adult population. Results of this work are the set of design criteria for use in creating inherently educational landscapes. These criteria form two categories: Design features that include physical elements, and design qualities, or intangible elements that promote learning in a landscape. They were determined from analyzing three different realms: ecological landscape design, learning / education, and preferred environments.

The resulting list of design criteria for creating inherently educational landscapes is certainly not exhaustive. It is merely one suggestion of ways to design landscapes to serve educational purposes without subverting a visitor's intent for being in a particular landscape. There is no reason why these criteria cannot serve as guidelines in a variety of landscape designs, as flexibility and individual solutions are an integral part of these criteria.

The approach to the methodology used here for interviews and data collection does have limitations. The interviews were only conducted with a small number of users, and there was perhaps a class bias because all three sites tend to attract a more educated population. However, this open-ended methodology is legitimate, based on the success of

Kevin Lynch's work published in *The Image of the City*¹¹. He interviewed a small sample of people with regard to their image of their environment in order to draw some conclusions about cities and how they are perceived. Using this method does allow one to generalize from the results, and in the case of this thesis, to indicate criteria.

Further research could focus the analysis on a select few of the identified criteria to gain insight into their implementation in a landscape design. This closer look might utilize more specific questions directly related to a particular landscape, as opposed to the interview questions in these case studies where the same questions were used for each site. Another approach might be an analysis substituting another discipline for ecological design in order to teach and learn a subject other than ecology.

This thesis does not suppose to make environmental experts out of all who experience landscapes designed according to these criteria. Applied, however, this research does presume to increase ecological awareness. A person cannot be forced to care about a subject such as the environment; but proper landscape design can encourage a person to observe and give attention to certain things, tangible and even conceptual. People who increase their knowledge and awareness tend to observe more about the world around them; and, people who keenly observe more increase their knowledge and awareness. This cycle will only serve to benefit our land and culture.

¹¹ Kevin Lynch, *The Image of the City* (Cambridge, Massachusetts: The MIT Press, 1960; twenty-seventh printing, 2000), 140.

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APPENDIX A
INTERVIEW QUESTIONS

Interview Questions for Landscape Designers

What Makes A Landscape Educational?

1. What is the intent of this design / landscape?
2. What inspired the ecological components of this landscape design?
3. Is this landscape designed ecologically to encourage or draw certain types of visitors?
4. This landscape was designed to have educational qualities.
- 5a. Elements of this landscape were specifically made to be educational.
- 5b. This landscape was designed so that passive (unstructured) education is more likely to occur than organized/ formal education.

if yes: What is it about this design, or particular elements of this design, that makes passive education likely?
6. How would you compare learning by reading written text in a landscape and learning through simply experiencing a landscape?
7. To what do you attribute your environmental education and awareness?

Interview Questions for Landscape Users

What Makes A Landscape Educational?

1. The main purpose of my visit here was ...
 Recreation/exercise relaxation some degree of environmental education
 other:

2. I came here seeking knowledge or expecting to observe something about nature / environment.

Strongly Agree Agree Disagree Strongly Disagree

3. I have been to this landscape, or similar places, more than once.

Agree Disagree

If Agree: what other places/landscapes? how often?

4. I believe this landscape was intended to have educational aspects.

Strongly Agree Agree Disagree Strongly Disagree

What do you consider to be the educational qualities or elements?

5. I believe I learned / observed something about nature while visiting in this landscape.

Strongly Agree Agree Disagree Strongly Disagree

If Agree: What were some of the particular elements of this design or landscape that taught or communicated something to you?

If Disagree: Do you believe there is potential for one to learn something from this design or landscape? Yes No

What are particular elements of this design or landscape that you believe could teach or communicate something to visitors?

6. How would you compare learning by reading written text in a landscape and learning through simply experiencing a landscape?

7. To what do you attribute your environmental education and awareness?

School News Walks in woods, parks, gardens, etc. Other

APPENDIX B

DESIGNER INTERVIEWS

Howell Beach, -- Southern Progress Headquarters

1. *What is the intent of this design / landscape?*
save the site, natural features and vegetation
hide view of building from the road
2. *What inspired the ecological components of this landscape design?*
the site: 2 deep ravines, the local materials found on the property, and the steep slope full of hardwood trees
3. *Is this landscape designed ecologically to encourage or draw certain types of visitors?*
designed to draw particular types of employees, as well as top executives
client wanted to have an influence on the community, demonstrating the quality of development possibly without destroying the site
4. *This landscape was designed to have educational qualities.*
Strongly Agree - primarily through demonstration of overall siting and saving the site
 - trails through the site and to the parking area
 - tours available to visitors
- 5a. *Elements of this landscape were specifically made to be educational.*
Agree - "education through osmosis"
- 5b. *This landscape was designed so that passive (unstructured) education is more likely to occur than organized/ formal education.*
Strongly Agree

What is it about this design, or particular elements of this design, that makes passive education likely?
leaving existing site as is
trails and opportunities for being outdoors
indirect education just by being in a place
6. *How would you compare learning by reading written text in a landscape and learning through simply experiencing a landscape?*

you need that third dimension of *feeling* - of being in a space
signage is helpful, depending on the situation and what is to be taught

7. *To what do you attribute your environmental education and awareness?*
working with Mr. Robert Marvin

Dr. Walter L. Cook, Jr., -- Oconee Forest Park Trails

1. What is the intent of this design / landscape?

allow the students and the university community to have a place to go to relax, recreate, and enjoy nature
education is a secondary function

2. What inspired the ecological components of this landscape design?

the four ecological niches on site: for example, the birdsong trail goes through a hollow, an area that attracts different types of birds; trails go through new forest (50-60 yrs. old) and then the old forest (100-150 yrs. old) on the north facing slope

3. Is this landscape designed ecologically to encourage or draw certain types of visitors?

no, it is for anyone wanting to enjoy nature; however, it's not designed specifically for children - was designed with the university community in mind, mainly adults

4. This landscape was designed to have educational qualities.

Agree - not the primary reason for the park, but a strong secondary purpose
- worked to lay out the trail in different environments, through different ecological stands; it would be different if the goal was to completely stress tranquility, for example

5a. Elements of this landscape were specifically made to be educational.

Agree - "what is enjoyable or aesthetic and what is educational is hard to separate"

- "If you put a trail where people can learn something, but it's not enjoyable, it's not going to happen. On the other hand, if you put the trail where people will enjoy it, they're likely to learn something."

5b. This landscape was designed so that passive (unstructured) education is more likely to occur than organized/ formal education.

Strongly Agree

What is it about this design, or particular elements of this design, that makes passive education likely?

designed to be easy and enjoyable, which allows one to focus on other things, not on having to balance on rocks, wade through a swamp, etc.
trails laid out through different habitats, stands -- variety

6. How would you compare learning by reading written text in a landscape and learning through simply experiencing a landscape?

having both directs visitors to learn
without text, visitors get experience and may learn subliminally; text directs one to learn certain things

7. *To what do you attribute your environmental education and awareness?*
- became interested during 4 years of forestry school
 - self-educated
 - increased knowledge through work, looking to improve academic/university
 - environmental education opportunities

Darrel Morrison, -- Lady Bird Johnson Wildflower Center

1. What is the intent of this design / landscape?

1. to celebrate the unique vegetation of the hillcountry
2. to demonstrate sound landscape / building practices (ie. water harvesting system)
3. to demonstrate the use of native vegetation of a particular region, in a variety of ways from stylized to more natural restoration
4. to keep a 'sense of Texas' as much before as after development

2. What inspired the ecological components of this landscape design?

the mission of the Wildflower Center - their stated objective
the need to show possibilities (ie. minimizing lawn and irrigation)

3. Is this landscape designed ecologically to encourage or draw certain types of visitors?

the audience is self-selected - those who want to see native wildflowers; but seeing the design and buildings hopefully leads to a greater appreciation than expected
"they come to see a pretty place, and I think there are deeper messages than the prettiness of it"

4. This landscape was designed to have educational qualities.

Strongly Agree - "getting 100,000 visitors a year, its a prime opportunity to educate"

What do you consider to be the educational elements?

messages, such that every place has distinct characteristics, and one can draw on that (ie. making beautiful gardens that are of that place)
working from natural associations/communities of plants in a region, there will usually be an aesthetic fitness
a beautiful landscape does not need to diminish resources and depend heavily on chemicals
people notice the abundance of butterflies/life that result when one does work with native, diverse vegetation
demonstrates an alternative to the lawn aesthetic - often exposure to the possibilities is what is needed

5a. Elements of this landscape were specifically made to be educational.

Strongly Agree - true in a lot of different ways: demonstration plots (educate people about plant species), the entrance walkway (prairie landscape seen through the arches - demonstrates what can be done with grasses), plantings around the main courtyard are matched with microhabitats (ie. north sides have ferns, columbine; south have cactus,...)

5b. This landscape was designed so that passive (unstructured) education is more likely to occur than organized /formal education.

Agree - site is designed for both structured and unstructured - there are docents and tours

What is it about this design, or particular elements of this design, that makes passive education likely?

different spatial experiences let you walk through different degrees of

'wildness' though one may not talk to staff or take a tour

site is designed for something new to discover around every corner - different 'rooms'

6. *How would you compare learning by reading written text in a landscape and learning through simply experiencing a landscape?*

experiential is more effective than just having text to read, but a combination of experience and text is best for learning

7. *To what do you attribute your environmental education and awareness?*

grew up on a farm and raised gardens

teaching, seeing the potential impact of field experiences on students - realize the importance of getting people out

APPENDIX C

COMPILED USER INTERVIEW RESPONSES

Southern Progress Headquarters

1. The main purpose of my visit here was ...

1. (M, 30-35); work - garden editor
2. (M, 20-25; work - intern in research department
3. (F, 25-30); work
4. (M, 25-30); work
5. (M, 25-30); work - mail room
6. (M 40-45); work
7. (F, 20-25); work - grounds
8. (F, 45-50); work
9. (M, 25-30); work - chef in test kitchens
10. (F, 25-30); work

2. (referring to outside of building) I came here seeking knowledge or expecting to observe something about nature / environment.

1. Strongly Agree - go out regularly every day, observe changes in vegetation; like to take alternate routes
2. Strongly Agree - walk around
3. Agree - observe wildlife when leaving work
4. Strongly Agree - observe seasonal changes, listen to birds, watch hawk
5. Disagree
6. Strongly Agree - observe daily changes outdoors, particularly wildlife - hawk, doves, geese
7. Strongly Agree - observe; ask questions
8. Strongly Agree
9. Disagree
10. Strongly Agree - blending between woods and human use - paths through trees, observe plants in different stages of growth

3. I have been to this landscape, or similar places, more than once.

1. Agree - daily
2. Agree - eat lunch at waterfall, walk around after work
3. Disagree - only outside going to / from work
4. Disagree - only outside going to / from work
5. Agree - to / from work; fish on lake 2 times per month

6. Agree - twice a day or more; meditative
7. Agree - all day - work on grounds maintenance
8. Agree - daily
9. Agree - when it's nice out, will take breaks, eat lunch outside
10. Agree - walk around once a week for pleasure; park daily on lowest lot so as to have longest walk to building

4. I believe this landscape was intended to have educational aspects.

1. Strongly Agree - bringing nature inside
2. Strongly Agree - designed and constructed to preserve nature
3. Strongly Agree - wildlife observation opportunities
4. Strongly Agree - labels on plants; blending architecture into landscape; used materials local in Alabama
5. Disagree - the building is just hidden
6. Strongly Agree - student groups visit; plant labels
7. Strongly Agree - demonstration - it's possible to build and preserve landscape; collection of many native plants
8. Strongly Agree - surroundings are precious, vital to employees' experience; provides wildlife habitat
9. Disagree
10. Strongly Agree - plants in mass, colors; blending siting of building and vegetation, not institutional look

5. I believe I learned / observed something about nature while visiting in this landscape.

1. Strongly Agree - observe water; seasonal changes in plants/trees; changes in light seasonally through windows that incorporate inside/outside
2. Agree - having this sort of development in this town
3. Disagree
4. Strongly Agree - demonstration aspect - don't have to wreck environment with development
5. Agree - observe plants and wildlife, seasonal changes
6. Strongly Agree - trees change - budding and leafing out; no 2 walks are the same; building siting - trees are just as important
7. Strongly Agree - layout/demonstration; observe wildlife such as lizards on the stone walls, plants blooming and smells
8. Strongly Agree - observe different plants/flowers; trails and waterfall - site creates a 'treehouse' feel
9. Disagree
10. Strongly Agree - observe life cycle of plants; demonstration of building siting with stream running through; there's not just one aspect to problem solving; use of materials and attention to integration of outside and inside

6. How would you compare learning by reading written text in a landscape and learning through simply experiencing a landscape?

1. experience is more memorable

2. experience - if relaxed gives opportunity to learn
3. experience and observation is best
4. depends on context, and what is to be learned- plants need ID; architecture/design, don't need signage
5. reading text helps
6. experience - being in a space
7. both - experience/observation necessary, but text makes it easier to learn something
8. experience - discover is important, learn and retain more if figure something out yourself
9. text is necessary
- both - experience with text to guide the learning

7. *To what do you attribute your environmental education and awareness?*

1. growing up - running wild on grandparents' farm and in woods near house
2. growing up on farm
3. news and reading
4. news and growing up
5. walks in woods and parks
6. school; growing up (scouts sparked interest); work at Southern Progress reinforces
7. school and growing up with mom pointing out birds and native wildflowers
8. walks and working at Southern Progress - observe landscape and question people
9. walks in woods and growing up - interests changed from 'looks pretty' to associations and understanding; work at Southern Progress enhances knowledge of what is possible; demonstration

Oconee Forest Park Trails

1. The main purpose of my visit here was ...

1. (M, 25-30); recreation/exercise
2. (F, 20-25; recreation/exercise - walk dog
3. (F, 20-25) recreation/exercise
4. (M, 30-35); recreation/exercise - walk dog
5. (M, 20-25); relaxation
6. (F, 40-45); recreation/exercise
7. (M, 20-25); relaxation
8. (F, 30-35); environmental education
9. (F, 20-25); relaxation; walk dog
10. (M, 25-30); recreation/exercise

2. I came here seeking knowledge or expecting to observe something about nature / environment.

1. Agree - see something different every time in the landscape; notice seasonal changes
2. Agree
3. Disagree
4. Agree - observe trees, foliage, blooms - especially in spring
5. Strongly Agree
6. Agree
7. Disagree
8. Strongly Agree
9. Strongly Agree
10. Agree

3. I have been to this landscape, or similar places, more than once.

1. Agree - 3x/week - also hike and go to botanical garden trails regular basis
2. Agree - 1x/week - also, botanical garden trails
3. Agree - 3x/week - also, botanical garden trails for jogging
4. Agree - 2-3x/week
5. Agree - 1x/week
6. Disagree - first time - go to Callaway Gardens often; also hike
7. Agree - 2x/week
8. Agree - also hike, nature walks, botanical garden
9. Agree - occasionally; also botanical garden
10. Agree - 4x/week; also Sandy Creek

4. I believe this landscape, or the layout of these trails, was intended to have educational aspects.

1. Strongly Agree - ID tags on plants; trails lead through a variety of ecosystems
2. Agree - lots of different plants, and labels

3. Agree - plant labels; classes are sometimes out here
4. Strongly Agree - labels on plants
5. Agree - plant labels, although they lack information
6. Agree - plant labels; landing / steps to water's edge, bird boxes allow for observation
7. Strongly Agree - layout and plant labels
8. Disagree
9. Strongly Agree - plant ID tags
10. Strongly Agree - see how humans and animals interact in same environment; learn plants

5. I believe I learned / observed something about nature while visiting in this landscape.

1. Strongly Agree - plant labels; just being out there, seeing changes such as spring blooms
2. Agree - observed wildlife - a rat, fish and turtles
3. Agree - plants, trees in spring
4. Strongly Agree - amount of greening since winter; bridges over the water - notice the way the water washes when it rains
5. Agree - read the plant signs; notice the different scenery - hills, woods, lake, enclosed areas,...
6. Agree - native plants such as Piedmont azaleas and river birches
7. Disagree
8. Strongly Agree - moving through different slopes / orientation; access to water; different zones of plants; tranquil environment - listen to birds
9. Agree - general connection to nature
10. Agree - observed plant ID tags

6. How would you compare learning by reading written text in a landscape and learning through simply experiencing a landscape?

1. combination - reading first helps enrich the experience
2. text - can appreciate things more
3. text - don't pay attention unless there's text; having both is good
4. text - can learn more
5. reading text helps - can acquire knowledge and then see examples
6. text - if short text, enhances learning potential
7. both - read and experience helps, explains more
8. both, but with a minimum of interpretation; brochures good b/c can keep them with you
9. both - text helps you learn more, is not distracting
10. varies - text helps if one goes to learn; don't really notice if not going for purpose of learning

7. To what do you attribute your environmental education and awareness?

1. school, reading books as a child, walks in woods and parks
2. camp counselor
3. school - wrote a paper on environmental awareness

4. walks in woods and parks
5. work in landscaping
6. growing up - time spent with grandparents; education at Callaway Gardens
7. walks in woods and parks
8. school - undergrad in env. studies
9. walks in woods, hiking
10. news - books, newspaper

Lady Bird Johnson Wildflower Center

1. The main purpose of my visit here was ...

1. (M, 20-25); some environmental education
2. (F, 20-25; some environmental education
3. (F, 75-80); relaxation
4. (F, 45-50); recreation
5. (M, 25-30); recreation, some environmental education

2. I came here seeking knowledge or expecting to observe something about nature / environment.

1. Strongly Agree
2. Agree
3. Agree - see how wild plants are put together in a landscape
4. Strongly Disagree
5. Agree

3. I have been to this landscape, or similar places, more than once.

1. Disagree
2. Disagree
3. Disagree
4. Disagree (all first time visitors)
5. Disagree - also go to botanical gardens

4. I believe this landscape, or the layout of these trails, was intended to have educational aspects.

1. Agree - native plants and info on how they grow; designed to help people understand what works in this region
2. Strongly Agree - variety of plants and text with bloom information; visitor center with books
3. Strongly Agree - cistern / water system demonstration; plants are well labeled, large variety
4. Strongly Agree - labels on plants; info on plant zones; cistern and architecture roof-runoff demonstration
5. Strongly Agree - demonstration plots, cisterns, trails

5. I believe I learned / observed something about nature while visiting in this landscape.

1. Strongly Agree - demonstrative - explains WHY local plants are best; observation and text; site looked appropriate for the area
2. Agree - theme gardens; also they are separated according to appropriate soils
3. Strongly Agree - native plants can grow w/o high maintenance and abundance of water; demonstrative qualities, plants and rocks
4. Disagree
5. Strongly Agree - trails through prairie landscape have interpretive markers; cisterns make water collection visible, peaks interesting;

demonstration plots show different water/fertilizer needs of native v. traditional plants; view of hillcountry

6. How would you compare learning by reading written text in a landscape and learning through simply experiencing a landscape?

1. combination works best - more signage in a place helps educate
2. combination is best
3. combination is best - text helps to direct people to learn
4. combination is best
5. combination is best - important to have text/signs, but shouldn't be the focal point; depends on degree of awareness of visitors

7. To what do you attribute your environmental education and awareness?

1. school, news, camping and hiking
2. school - also trips with family to national parks, observing seasonal changes growing up
3. growing up - life in general
4. family
5. growing up and walks in woods; school