

When Students Design Learning Landscapes: Designing for Experiential Learning through Experiential Learning¹



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Abstract

Learning landscapes such as teaching arboretums and demonstration gardens are effective learning sites for teaching and extension activities. Landscape design students in environmental horticulture recently participated in the planning and design of a demonstration landscape on the University of Florida campus. The class assignment, which is grounded in experiential learning theory, helped students understand the basics of experiential learning and the application of it to the design of learning landscapes. This article presents the framework for developing and designing learning landscapes by linking the experiential learning process to the landscape design process and to key design features of learning landscapes. Key questions are also provided for instructors and program directors that are considering designing and implementing a learning landscape as a class project or for their program. In this case study students worked with campus administration, faculty committees, facilities and planning and campus extension programs to gather information and ideas to create a design that reflected the university needs and the educational goals of extension. The students demonstrated their understanding of experiential learning and the experiential learning/design process link by applying the concept and creating a practical, effective and visually pleasing demonstration landscape.

Introduction

Landscape design students in Environmental horticulture participated in the planning and design of a learning landscape for the new Institute of Food and Agricultural Sciences (IFAS) Center on the University of Florida campus. The project presented a unique opportunity for students in landscape design to learn about the link between experiential learning

principles and the landscape design process and to apply those principles in the planning and design of a demonstration landscape for their campus. IFAS administrators expressed the desire for a landscape that reflected the mission, values and educational goals of the IFAS program. To support the IFAS message the landscape around the center was envisioned as a demonstration garden for the principles of Florida-Friendly Landscaping™ (FFL), a trademarked joint venture between the University of Florida, IFAS and Florida Department of Environmental Protection. The goal of the FFL program is to educate Floridians about the protection and conservation of water resources through sustainable landscape design and maintenance practices.

Experiential Learning and Landscape Design

Experts in learning and attitude and behavior change advocate experiential (hands-on) learning as the most durable and effective strategy for producing citizens dedicated to environmental protection through design (Calkins, 2012). Experiential learning theory defines learning as the process where knowledge is created through concrete experience and abstract conceptualization, and transformed through reflective observation and active experimentation in a cyclical manner that continues until the conclusion of the project (Kolb, 1984). Experiential learning theory also correlates with andragogy, an adult learning theory, which proposes that adults are concerned with material that is directly relevant to them and they prefer a problem-solving learning environment that challenges them to find solutions (Knowles, 1984; Myers and Roberts, 2004). Both theories connect with the problem-based learning environment that is the underpinning of landscape design courses. The

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Table 1. The connection between experiential learning and landscape design

Experiential Learning and Landscape Design	
Experiential Learning Process	Landscape Design Process
<p>Concrete Experience: students experience a direct encounter which gives them a common frame of reference</p>	<p>Planning Phase Site inventory: direct experience on the site Client interview: direct interaction with the client to learn client needs and wants</p>
<p>Reflective Observation: students reflect on their experience and internalize their concrete experience</p>	<p>Site analysis: discussion and written description of the opportunities and constraints presented by the site and the client</p>
<p>Abstract Conceptualization: students create rules and strategies related to their experience. The instructor adds additional information to guide the framing of the experience within the rules</p>	<p>Design Phase Program development: design strategies and concepts are developed and features proposed for the site</p>
<p>Active Experimentation: students apply the strategies and rules to the activity and project</p>	<p>Design Development: Strategies and concepts are used to guide spatial organization of design features</p>

problem-solving design process begins with a site visit to experience the concrete and tangible qualities of a site and identify the opportunities and constraints for site design. The knowledge gained is transformed through a process of site analysis (reflection), program development (conceptualization) and design development (experimentation), into a design that can be created in the built environment. Table 1 outlines the relationship between the experiential learning process model developed by Kolb (1984) and the landscape design process.

In this case study the theoretical framework of experiential learning applied to the in-class design process and to the project the students were designing. In other words, the students used their experiential learning experience to design a space for experiential learning.

The Use of Demonstration Landscapes as Learning Experiences

Research supports the use of demonstration landscapes for learning. Several studies provide evidence that learning in natural environments improves creative problem solving and the recall of information (White and Stoecklin, 1998). Research suggests that adults retain more information and are more likely to adopt certain behaviors if they learn in experiential settings that are relevant to them (Myers and Roberts, 2004). Agencies and educational institutions that are associated with environmental protection and conservation often use demonstration landscapes in their social marketing campaigns aimed at changing homeowner’s perceptions and encouraging adoption of new behaviors (Miller et. al., 2004). Based on these and other studies on environmental behavior and attitude, a demonstration landscape was chosen as the appropriate experiential setting to encourage

behavior change and modification of landscaping practices for the Florida-Friendly Landscaping™ program. The use of a demonstration garden was also encouraged by studies suggesting that the experiential setting of public demonstration gardens is one of the primary means by which adults learn about environmental concepts and transform their perspective of the environment (Bush-Gibson and Rinfret, 2010). Attitudes about the environment are also linked to ecological knowledge and attitudes that are formed through direct experience with nature are believed to be better predictors of behavior

(Pooley and O’Conner, 2000). The demonstration landscape setting is also appropriate for discovery learning, an experiential style of learning that is personal and self-paced and allows learners to create meaning and construct knowledge through discovery (Wake, 2007). This concept was important to the use of a demonstration landscape for the FFL program because visits to the landscape will be primarily self-paced and discovery oriented with the proposed use of smart phone technology to access information while in the landscape.

The FFL demonstration landscape is designed to provide an opportunity to experience the first two phases of the experiential learning process. Knowledge is created through the concrete experience (phase 1) of a visit to the landscape to view the displays and reflection (phase 2) on the experience, is self-directed and depends on the visitors initiative to think about the experience. However, phase three (abstract conceptualization- creating rules and strategies) is not guided by an instructor and the visitor/learner must form their own rules or strategies for incorporating the FFL principles in their home landscape and follow through by actively incorporating (phase 4), the ideas from the displays in their yards.

Methods

Designing the Demonstration Landscape

This case study describes an assignment that was completed as part of a standard landscape design course and is therefore deemed exempt from IRB approval under federal regulation 45 CFR §46.101(b). Designing the demonstration landscape began with the planning phase that included a site inventory and

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client interview and concluded with an analysis of the information learned. The client for this project included IFAS university administrators, IFAS facilities staff, and UF Senate committees associated with design and planning for the university.

The Planning Phase- Concrete Experience and Reflective Observation

Students first met with IFAS Facilities Planning and Operations to visit the site and learn about the project scope. The planning staff discussed the vision of IFAS administration, the site constraints and the functional and spatial requirements of the project. Students then participated in the university approval process for new construction projects by attending faculty committee meetings, including the Lakes, Vegetation and Landscaping Committee and the Land Use and Facilities Planning Committee. In the committee meetings they learned about campus policies for environmental protection and sustainable design standards for new construction. They were also introduced to the campus sustainable sites initiative for landscaping and grounds that promotes the development of an environmentally healthy campus. After site approval in the committees the students met with the Florida-Friendly program staff to learn about the public education mission for Florida-Friendly Landscaping™. The educational message of the FFL program recommends the use of nine landscaping principles to protect and conserve Florida water bodies, including: 1) use the right plant, in the right place, 2) water efficiently, 3) fertilize appropriately, 4) use mulch, 5) attract wildlife, 6) manage yard pests responsibly, 7) recycle yard waste, 8) prevent stormwater runoff, and 9) protect the waterfront. The FFL staff expressed a desire to demonstrate these principles through a variety of displays and signage in the landscape.

Pre-design planning included writing a purpose statement with program goals and objectives, determining the educational message and creating a program based on the visitor needs, site resources and the proposed displays. The students developed the following purpose statement: *“The purpose of the demonstration landscape is to teach homeowners about Florida-Friendly landscape principles and demonstrate how the principles can be used in their home landscapes. The goal is to encourage homeowners to use the nine landscaping principles by creating a visually pleasing and ecologically healthy landscape that will inspire visitors to replicate the design features in their own yard.”* The objectives included:

1. Create a visually pleasing design with informative displays to attract visitors.
2. Design the landscape for all visitors with an accessible pathway.
3. Create simple yet appealing displays that can be replicated by homeowners.
4. Explain the FFL principles with attractive signage and user-friendly technology.

Students analyzed the site and visitor needs to determine the specific learning displays and other site features needed to convey the educational message and accommodate the visitor. They determined that FFL principles #1) right plant, right place, #4) use mulch and #5) attract wildlife, could be demonstrated in plant bed displays with signs. They also decided principles #2) water efficiently, #7) recycle yard waste and #8) prevent stormwater runoff, could be demonstrated with site feature displays. The remaining principles, #3) fertilize appropriately, #6) manage yard pests and #9) protect the waterfront, would be described with educational signage. The focus of each principle provided direction for the type of displays and signs that would best convey the information.

The Design Phase - Abstract Conceptualization and Active Experimentation

Each student created a landscape design that incorporated the Florida-Friendly principles with various plant displays and features. The project requirements included 1) a front entry plaza that would accommodate approximately 100 people, 2) an accessible pathway through the garden, 3) plant buffers around an open outdoor pavilion, 4) trees to decrease the scale of the two-story building and provide shade, 5) a large cistern and micro-irrigation demonstration area, 6) a rain garden and butterfly garden, 7) plant beds to demonstrate right plant-right place and 8) locations for educational signs at each demonstration area. The project also included the design of educational sign prototypes. The purpose of the sign project was to encourage students to think about the most important points to convey to the visitors and to learn how to develop and write educational messages. They also learned about the importance of good quality graphics and effective text to attract and hold the attention of visitors.

Student Designs - What Worked, What Didn't

Although the student projects were similar in layout based on site restrictions they varied widely in details and materials. Some students opted for curvilinear

pathways and more organic designs, while others designed straight pathways with a geometric layout of right angles. Pathway materials included concrete, pavers, brick and stone. The most common mistake beginning design students make is to overdesign—using too many features and costly materials—which also leads to budget over-runs. Revisions to their conceptual designs typically included reducing the size of the entry plaza and number of walkways and choosing a more inexpensive paving material. Plant choices, planting plans and spatial organization of the displays were generally well done and the designs exhibited a good understanding of how visitors would move through the space and the learning sequence for the displays.

IFAS planning staff, the project architect and FFL staff reviewed the completed projects and noted the best features of each. The final plan was produced by an FFL staff member who incorporated different features from all the student projects into a master plan. The final plan included a meandering looped pathway that circled a butterfly garden, several plant beds, a rain garden and a rectangular plaza at the front of the building. Although the original proposal was for the students to help with the installation, liability issues and timing prevented students from participating and the plan was installed by a professional landscape contractor.

After installation, plant identification signs with QR codes (quick response codes) were developed by the IFAS Center for Landscape Conservation and Ecology. Visitors who scan the QR codes on the plant identification tags can view additional plant information, including growing requirements and a photo of the mature plant. The FFL staff also used ideas from the prototype signs designed by the students to create large graphic signs describing each of the nine FFL principles.

Making Connections—Learning, Design, and Landscapes

The class project was carefully structured and implemented to teach students about experiential learning by using the experiential learning process and connecting it

to the design process to create an experiential learning site. Table 2 illustrates the connection between the phases of experiential learning, the design process activities, and the key site concepts and features.

The class began each stage in the design process with a discussion about how the activities they were engaged in to design the landscape fit the experiential learning process. For example, in the planning phase the students were asked to describe why the site inventory and the stakeholder meetings were considered a concrete experience. They were also asked to explain why the site analysis was an exercise in reflective observation. In the design phase the students included a list of the site features they intended to use and in the individual desk critiques they were required to explain the strategies, or concepts, they were proposing. For example, each student had to justify the location of each feature, such as a birdbath in the butterfly garden and why they were including it in the plan. Their justification had to include how it promoted FFL principles and what the visitor to the garden would learn from the display. At the beginning of the project students were told that future classes would be using the garden for learning so they should consider their own experience in learning about FFL principles and think about what was helpful to them. In this project

Table 2. The link between experiential learning phases, the design process and site design for learning landscapes

Experiential Learning/Design Process and Site Design for FFL Learning Landscape	
Experiential Learning/Design Processes	Site Design Concepts and Features
<p>Phase I: Concrete Experience</p> <p>Design Activities</p> <p>Site inventory:</p> <ol style="list-style-type: none"> 1. Buildings, vegetation, drainage <p>Stakeholder meetings:</p> <ol style="list-style-type: none"> 1. Planning policies 2. Missions and educational goals 3. Committee approvals 4. Budget and costs 	<p>Phase 1: Pre-design Planning</p> <p>Key site concepts:</p> <ol style="list-style-type: none"> 1. Purpose of demonstration landscape 2. Educational message 3. Goals and objectives 4. Visitor/learner needs 5. Desired displays 6. Site resources
<p>Phase 2: Reflective Observation</p> <ol style="list-style-type: none"> 1. IFAS mission 2. FFL mission and educational goals 3. Site opportunities and constraints 4. Stakeholder needs and wants 	<p>Phase 2: Site Analysis</p> <ol style="list-style-type: none"> 1. Review site inventory and meeting notes 2. Group discussion- solutions to site constraints, use of site opportunities 3. Group discussion-stakeholder and project goals
<p>Phase 3: Abstract Conceptualization</p> <p>Site features related to the educational goals</p> <ol style="list-style-type: none"> 1. Display/feature requirements 2. Spatial requirements 3. Visitor needs 	<p>Phase 3: Program Development</p> <ol style="list-style-type: none"> 1. Loop pathway and educational signs 2. Plant displays and rain garden 3. Cistern and micro-irrigation 4. Wildlife/butterfly garden
<p>Phase 4: Active Experimentation Activities</p> <ol style="list-style-type: none"> 1. Conceptual designs 2. Refine concepts (cycle back to Reflective Observation) 3. Final Master plan design 4. Approval of stakeholders 	<p>Phase 4: Design Development</p> <ol style="list-style-type: none"> 1. Spatial organization, display location 2. Pathway layout 3. Display/feature design 4. Sign/educational material design

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the students also took on the role of a teacher; by creating a learning environment that required them to incorporate a learning process and an understanding of how people learn.

Design Features of Learning Landscapes

Learning landscapes include a few important features that distinguish them from a typical landscape design. The intent of the landscape is to teach, so it is important to provide access and displays that clearly illustrate concepts or principles related to the educational mission. The most important learning features are a series of easily accessible educational displays and signs. Basic functional considerations include pathway design, visitor safety and comfort and maintenance access. Aesthetic considerations include creating attractive displays and a visually appealing and interesting site organization.

The FFL demonstration landscape includes an accessible pathway that takes the visitor through a variety of planting displays in different sun and shade conditions. Each bed features Florida-Friendly plants and mulch to demonstrate the importance of locating the right plant in the right place and the proper use of mulch. The path circles a wildlife/butterfly habitat with host and nectar plants and a rain garden with appropriate plants to demonstrate using water efficiently and preventing stormwater runoff. The landscape also includes a large cistern to store rainwater and a micro-irrigation system display to demonstrate another technique for using water efficiently. The original plan included a compost station to demonstrate recycling yard waste, however, the logistics of maintaining a compost pile made it impractical so it was decided to use signage instead. The class project resulted in an attractive landscape that fits with the campus aesthetic and the mission of IFAS extension and also clearly demonstrates the Florida-Friendly Landscaping™ principles.

Results and Discussion

After students completed the design of the demonstration landscape they were asked to summarize their experience and recommend some key questions to ask about the use of demonstration landscapes in an educational program or as a class project. The students felt that connecting the experiential learning process to the design process was very helpful to understand the purpose and theoretical concepts that applied to learning landscapes. After discussion of several issues the students narrowed the list to eight key areas.

Key Questions for Designing and Implementing a Learning Landscape

Key questions that should be addressed when developing the design include pre-design questions about feasibility and usefulness and design related questions about presentation and functionality. If you are considering the use of a learning landscape for your program, ask the following questions to determine if it will suit your education mission and goals:

1. Is the experiential learning/discovery process appropriate for the targeted learner?
2. Can the topic of your educational goals be demonstrated in tangible displays?
3. Is this the best learning method to promote your message and reach your objectives?
4. Does the site have the characteristics needed to develop appropriate displays?

If you are contemplating using the design of a demonstration landscape as a class project there are also some key questions you should ask about the feasibility of the project, including:

1. Are the students learning skills appropriate for an experiential learning format?
2. Will you have the support and cooperation of administration and planning?
3. Do you have an appropriate site and facilities for a demonstration landscape?
4. Do you have a well-defined program that will provide the foundation for the design?

Summary

Students engaged in the experiential learning activities of design can apply their experience and knowledge gained to the design of a learning landscape. Outdoor settings are one of the best examples of an environment that provides opportunities for learning through experience and reflection. Most outdoor learning areas, such as gardens and landscapes, offer many qualities that make them useful for a variety of teaching activities. Pre-design planning should always start with development of a purpose statement that includes the program goals and objectives, determining the educational message and creating a program based on the visitor needs, desired displays and site resources. The features included in the design will be determined by the educational concept and message of the program. University settings provide a variety of opportunities to design and develop experiential learning environments, in the outdoors and in the classroom. Class projects also provide an avenue for students to learn about the policies and procedures that can influence the final design. Both students and campus administration benefited from

the student involvement in the FFL demonstration landscape project.

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