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There is a strong need to increase the amount of environmental education training for formal and non-formal educators (Knapp, 2000; NEETF, 2005). To meet this need, the National Environmental Education and Training Foundation calls for the field to "Become more serious about the deployment of quality training and web-based education" (2005, p.30). Offering training opportunities through online learning holds great potential for increasing the amount and types of environmental education training available. With a grant from National Project Learning Tree (PLT), Florida PLT explored the potential to reach 4-H leaders with online training to empower and prepare them to use PLT.

The online training goals include building participants’ self-efficacy to use PLT materials with youth and increase familiarity of PLT materials. To ensure these goals were reached careful program development evaluation strategy was implemented. The following evaluation questions were addressed during the pilot test and implementation of the training:

1) What encourages and discourages participants to completing the training?
2) Were participants able to navigate the training web site successfully?
3) Was the training relevant to 4-H leaders’ needs?
4) Did participants feel motivated to use PLT activities?
5) Which components of the training were most helpful? Which were least helpful?

Albert Bandura defines self-efficacy as “a conviction that one can successfully execute the behavior required to produce outcomes” (Bandura, 1997, p.193). According to the theory, for a 4-H leader to use PLT, he or she must have the requisite level of self-efficacy. Furthermore, the lack of self-efficacy may be one reason educators may not use PLT. The training was designed to include the four self-efficacy building experiences: social persuasion, vicarious learning, mastery experiences and stress reduction. A combination of qualitative and quantitative methods were conducted to investigate the use of these experiences and to explore the following research questions:

1) Can an online training influence self-efficacy and outcome expectancy to lead PLT activities?

2) Which components of the training do participants believe most influence their efficacy?

3) What relationship, if any, exists between participants’ personal goals, previous experience with leading environmental activities, leading and teaching youth, and taking online training and with their self-efficacy?

During the spring of 2010, thirty-four Florida 4-H volunteer leaders registered for the training program. Ten completed the entire program and became certified Project Learning Tree educators. Results of the study suggest the self-efficacy of these participants’ to lead PLT activities with youth increased significantly during the training. The success of these participants is promising for the potential of online training to support the goals of environmental education. However, technology problems and lack of time kept the large majority of leaders who registered for the training from attaining similar benefits.
CHAPTER 1
INTRODUCTION

According to the National Assessment of Education Progress (NEAP) 2005 Report Card, only eighteen percent of twelfth graders performed at or above the "proficient" science level in the United States (Griggs, Lauko, & Brockway, 2006). The National 4-H Council, a leader in non-formal youth development programs, has identified this lack of proficiency as a major threat to the future of America's competitiveness in the fields of science, engineering and technology. In response they have implemented an initiative to educate "one million new scientists" by re-focusing their 4-H programs on science (National 4-H Council, 2010). Deficient understanding of science also has dire implications for the future ability of citizens to handle increasingly complex and critical environmental issues. Future generations will need a stronger understanding of socio-scientific issues like these to effectively face these challenges.

When it comes to the environmental components of these socio-scientific issues, environmental education (EE) has, since the late 1960s, aimed to increase awareness and knowledge of environmental issues and the science behind them. More importantly, it also fosters positive attitudes toward the environment and encourages development of skills to participate in finding environmental solutions (Stapp et al., 1969). Studies have reported that environmental education can increase interest and achievement in science (Lieberman & Hoody, 1998; NEETF, 2000) as well as skills in citizenship behavior (Ramsey, Hungerford and Volk, 1989).

The National Environmental Education Training Foundation (NEETF) has kept a finger on the pulse of EE in the U. S. According to a NEETF report, over 95% of American adults support inclusion of environmental education in schools (2006). However, the amount of organized environmental education being taught in schools has declined in recent years due emphasis on
standardized tests and the exposure students have received has been generally insufficient at building adequate knowledge and skills to address environmental issues (NEETF, 2005).

While it is essential to devise effective strategies to overcome challenges to including environmental education in schools, it is also important to consider the potential contributions non-formal environmental education has to reach the goals of environmental education. Formal education typically refers to learning in a traditional classroom and includes institutions that graduate learners with a set of skills and achievements while non-formal education opportunities are leader-guided programs that a learner chooses to participate in, often afterschool, on weekends, or during summers (Jacobson, McDuff & Monroe, 2006). 4-H is one such example; it is the youth development component of the Cooperative Extension Service and has been working to improve the lives of youth and teach them practical skills through afterschool programs, project clubs, and camps since the early 1900’s.

Because of inadequate science understanding and the magnitude of environmental challenges, there is a critical need to increase the amount of environmental education training for formal and non-formal educators (Knapp, 2000; NEETF, 2005). NEETF calls for the field to "become more serious about the deployment of quality training and web-based education" (2005, p.30 ). This thesis describes efforts to develop and assess an online professional development program to prepare and empower Florida 4-H leaders to use popular environmental education materials created by Project Learning Tree.

Project Learning Tree (PLT) is an environmental education program that produces educator resources and materials. PLT disseminates their materials through in-person professional development workshops. In Florida, the PLT leadership observed that increasing workshops for non-formal program leaders could help replace the declining interest among
formal educators to attend workshops. Because barriers to 4-H leaders’ attendance at workshops include time and costs, Florida PLT designed an online equivalent of a typical PLT workshop. The goals of the online training were to increase 4-H leaders’ understanding of how PLT materials can be used in their programs and build their confidence to do so, also known as their self-efficacy. Therefore the PLT online training was designed to address 4-H leaders’ needs and aimed to include several efficacy building opportunities. These goals were assessed through program evaluation and research investigating the training’s influence on self-efficacy to use PLT activities.

Production of distance education experiences can require a great deal of time and monetary capital. Gaining insight into which strategies are most effective and beneficial to the learner will help designers create more effective online training programs. Understanding how efficacy-building experiences can be included in an online training is vital to the successful conversion to a new training format and makes evaluation and research essential. An evaluation of the training program determined how well the training objectives were reached and is reported in Chapter 2. Of critical interest is the degree to which online training can be an effective tool to build efficacy, and the answer to this question is presented in Chapter 3. Chapter 4 concludes with the implications and suggestions based on findings from both processes.
CHAPTER 2
DEVELOPING AND EVALUATING AN ONLINE PROJECT LEARNING TREE TRAINING
FOR FLORIDA 4-H LEADERS

Introduction

Environmental education helps to create an environmentally literate citizenry that can identify and minimize the direct and indirect impacts their actions have on the environment (Stapp et al., 1969). Inclusion of environmental education in schools and non-formal youth programs is one key to reaching this goal.

Thousands of environmental curricula, lesson plans, and activity guides have been developed to help educators incorporate environmental education objectives in their curricula and programs. Pre-packaged curricula are designed to be easy to use, often by providing background information, instructions, and student pages for duplication. Project Learning Tree’s PreK-8 Activity Guide is one example of a supplemental educational resource designed to be used by formal and non-formal educators who want to engage youth in environmental activities without becoming experts in environmental science. Although proven valuable, many educators use environmental education materials and strategies infrequently because of a lack of skills, ability, and confidence to use environmental education materials, and because of insufficient training (Smith-Sebesto & Smith, 1997).

To overcome this barrier, many curriculum developers offer their materials through professional development workshops designed to prepare and motivate educators to use them. In 2009 alone, over 28,000 educators attended Project Learning Tree (PLT) workshops across the country to receive materials and learn how they can use them with the youth (Project Learning Tree, 2009).

Such numbers, however, are not the only measure of success. Success depends on how each program developer defines it and usually includes implementation and learning goals. There
are a variety of dissemination and professional development strategies and numerous criteria for how to determine their effectiveness. Program evaluation is a commonly included in criteria for effective professional development (Guskey, 2003). Programs can be evaluated to help developers identify which goals are being reached and where improvement is necessary (Ernst, Monroe, & Simmons, 2009). Evaluation is not just a final step in program development and is more beneficial if it is embedded throughout the entire program development process, from identifying needs of the audience to testing strategies and revising materials. This chapter describes the program development process that was applied to create and evaluate an online professional development program created to disseminate PLT materials.

**Identifying the Need**

Project Learning Tree is a program sponsored by the American Forest Foundation. The program has been revised and advanced for over 30 years to include activity guides and secondary modules that are widely used in the U.S. and abroad. Their most popular resource is a PreK-8 Activity Guide with 96 hands-on activities that use trees to engage youth in environmental explorations. PLT coordinators in each state traditionally require educators to attend a six-hour in-person workshop to receive the Activity Guide. At the workshop educators are oriented to PLT program and materials, given an opportunity to experience some of the activities, and engaged in discussions about how the materials can be used. In Florida, PLT is sponsored by School of Forest Resources and Conservation at the University of Florida and the state Cooperative Extension Service. The Florida PLT coordinator works with volunteer facilitators to train between 600 and 1000 educators every year.

The majority of workshop attendees in Florida are formal and pre-service teachers but PLT materials were also designed to be used by non-formal educators in camps, zoos, nature centers, and youth clubs. Reaching non-formal audiences has been more challenging because
they are more diverse. Attempts to increase the use of PLT activities among non-formal educators have included working with 4-H agents throughout the state. 4-H is the youth development component of the Cooperative Extension Service and there is a 4-H agent in every Florida county who coordinates volunteer leaders to run community clubs, after-school and home school groups; prepares youth for contests; visits classrooms; and organizes summer residential and day camps. Agents and leaders were responsible for reaching over 240,000 youth in 2009 with programs of over six hours in duration (Florida 4-H, 2010).

4-H programs are well matched to PLT materials. Existing 4-H project books about trees and forests in Florida have been correlated to PLT activities so leaders can extend lessons and thoroughly cover topics. An annual state 4-H contest allows youth to compete in tree identification skills and ecosystem knowledge. Coaches are always looking for more materials to help students enjoy learning about forests. The need to reach 4-H leaders is well established but finding effective avenues is more difficult.

Although some 4-H agents and leaders already use and enjoy PLT materials and others have expressed interest in PLT programs, efforts to help them facilitate workshops for their own volunteers have largely failed. Funding and time for travel to centralized workshops are barriers, as well as the perception that specialized background in natural resources is needed. Furthermore, typical PLT workshops are not designed to focus on the needs of 4-H leaders, such as using experiential learning to teach 4-H Life Skills. Instead PLT workshops usually follow the conventional emphasis on standards and academic achievement in workshops for school educators.

In 2007, 4-H agent Jean Roglasky created a prototype of a Project Learning Tree online training to address the needs she identified of volunteer 4-H leaders in her own county.
Simultaneously, Florida PLT began development of an online training to disseminate a secondary PLT module, “Places We Live.” Both endeavors experienced initial success and FL PLT decided to further explore the potential to expand on Roglasky’s work.

Online training could potentially meet the need to train 4-H leaders and agents with a 4-H-specific workshop at a time and location convenient for them. Online training is becoming a more popular way to reach educators. The perceived flexibility and convenience of online professional development is a main reason its popularity continues to increase (Brown & Green, 2006; Dede et al., 2009). Extension educators in particular indicate the content being covered is the most important factor when choosing professional development, with convenience and time commitment following close behind, suggesting they are likely candidates for online programs (Senyurekli, Dworkin, & Dickinson, 2006). Studies have shown 4-H volunteers are also open to and interested in online training. An action research effort in Nebraska reported 4-H volunteers were "excited" about online training (Kaslon, Lodl & Greve, 2005). Face-to-face and distance education In-Service Training formats for extension agents were found to be comparable to terms of participant performance. A variety of other online opportunities already exist in Florida for 4-H leaders.

**Program Development**

With funding from the National PLT program at the American Forestry Foundation, Florida PLT began the process of creating an online training program for 4-H leaders and agents in Florida. A successful online training should achieve the same goals as an in-person workshop. According to the Florida PLT Facilitator handbook, goals of workshops include:

- To teach educators how to use the activity guide and become familiar with material in the guide.
- To encourage educators to approach learning and teaching from an environmental and multidisciplinary perspective.
• To prepare educators to use PLT materials by providing a sampling of teaching strategies and activities that will help educator and students become more aware of the environment, their impact upon it, and their responsibilities for it.

• To create a setting in which educators, resource personnel, and others can share information and to encourage ongoing communication and support for environment education.

• To prepare educators and students to make informed and educated decisions.

• To provide a fun and motivating forum that encourages educators to enjoy learning.

• To demonstrate how to address Sunshine State Standards using activities from the guide.

Although some of these goals are a perfect match for 4-H audiences (e.g., preparing learners to make informed decisions is a 4-H life skill), other goals present some potential challenges for a 4-H online training. Rather than demonstrate how to address Sunshine State Standards, which are necessary for formal educators, for example, the online training should focus on the needs of 4-H leaders by addressing how PLT activities can support the development of 4-H Life Skills.

In addition, goals of a PLT workshop include preparing educators to use PLT materials. The social cognitive theory of self-efficacy explains in order to increase 4-H leaders’ use of PLT materials, they must not only be familiar with the materials and know how to use the materials, but also believe they can use the materials successfully to attain beneficial outcomes for their youth. Albert Bandura’s theory of self-efficacy explains that perceptions of their confidence and ability to take an action effectively will also play a large role in determining if they attempt the action (Bandura, 1977). Therefore, the online training aims not only to find creative ways to keep learners engaged and to emphasize the relevance of PLT materials to 4-H, but also to increase participants’ self-efficacy to use PLT materials. A logic model was developed to organize efforts and ensure the online training achieves these goals. (Israel, 2001). Table 2-1 shows a logic model created to guide program development efforts.
The online PLT training was developed during spring 2009. An asynchronous format was chosen to be more convenient for volunteer leaders. The training consisted of a series of modules with text to read, links to follow, videos to watch and assignments to complete. To increase confidence to use PLT materials, opportunities to increase self-efficacy were incorporated into the design. Bandura (1982) outlines four main ways efficacy can be influenced or strengthened including vicarious learning, mastery experiences, social persuasion, and stress reduction. Vicarious learning occurs when a learner watches another person model how to perform a task, such as leading a PLT activity. Social persuasion occurs when a learner is encouraged by others to believe they are capable of performing the task well and will receive positive benefits from doing so. Mastery experiences occur when a learner actually tries to perform the task themselves. Stress reduction is the physiological response to performing a task. Table 2-2 explains how these experiences are often included in typical PLT in-person workshops and how they were accomplished in the online training.

Module content was delivered using the software program Articulate® that converts PowerPoint® slide presentations to a flash presentation. Articulate® software enables some additional interactive options that organize information in more attractive way than plain text. Every module contained at least one video. Videos presented demonstrations of activities and interviews with 4-H leaders who already use PLT activities. Opportunities to reflect and consider how PLT activities can be used were included after each module. Assignments were designed to progress in difficulty, from first trying out a PLT activity individually, to choosing an activity that participants would like to lead and developing a plan to do so, to finally implementing their plan by leading the activity and reflecting on their performance with a self-assessment rubric. Table 2-3 outlines the content of the training program.
Formative Evaluation

The training was pilot tested with 4-H agents in the spring of 2009. Modules were posted on the Florida PLT web site with instructions. Six agents agreed to participate and provide feedback following their completion of the program. Only one agent completed the training and became a certified PLT educator. However, all six participants participated in an online conference call to discuss their experiences in the training, provide feedback, and make suggestions to enhance the program. Their input and suggestions were critical for making improvements to both the online program and its implementation strategy.

Participants felt the training was an appropriate length and had adequate requirements, but suggested that we not offer the training program in the summer, when the 4-H program is at its busiest. They pointed to places where instructions needed improvement and clarification. Most importantly, agents described the 4-H programs in their counties, the types of programs their volunteers lead, and how they thought an online training could support their goals for youth development. The diversity among county programs included size, number and experience of volunteers, interests and focus. Some counties use afterschool programs, while others organize summer camps, offer traditional clubs, make school visits and work with home school groups. The training needs to convey the flexibility of PLT materials and suggest ways activities can be adapted and used in a variety of settings. Agents suggested that additional demonstration videos would be especially helpful to achieve this goal. Agents work with volunteers with a variety of experiences, strengths and weakness. They explained some leaders would be ready to lead PLT activities after completing the online training, while other leaders need more support and information about environmental education. Therefore, in addition to videos, more background and links for additional information were added to the modules. They thought an online discussion forum may be a good way to engage participants and provide that support.
While addressing suggestions provided by pilot testers, the online training outgrew its space on the Project Learning Tree web site. Navigating the page to locate resources was cumbersome and the level of instruction necessary to help learners use the site was overwhelming. Furthermore, there was no way to offer a private discussion space on the existing PLT web site. Viewing modules, accessing extra links and resources, submitting assignments and participating in a discussion could be better facilitated if the training content were organized with a more user-friendly interface. Switching to a free course management web site, Dokeos Free Campus, which hosts small online courses and trainings, allowed the training to be password-protected so only registered participants could access the site and enabled us to track user information such as how long participants spent in the training.

Finally, plans were made to offer this training to all volunteer 4-H leaders in Florida. To investigate how well the goals of the training program were being reached, a summative evaluation plan was created (see Table 2-4). Evaluation surveys were an important tool to collect information necessary to answer evaluation questions. Based on the pilot test results, it was anticipated that not all participants who registered for the training would complete the program. Therefore, two surveys were developed, one to collect information from those who completed the training, and one to collect information from those who did not. Surveys were administered online using Survey Monkey®. An additional evaluation question was created to discover if the online training increased participants self efficacy to use PLT materials. This question was addressed through an associated research study which is described in Chapter 3. In-depth phone interviews were conducted with three participants served a dual purpose by asking some questions that explores several evaluation and efficacy questions.
Implementing the Program

The training was advertised to 4-H leaders throughout the state and offered in the spring of 2010. Thirty-four volunteer leaders registered for the training to become certified PLT educators. Thirty-three of the training participants were women. The participants had a range of experience working with 4-H but the majority had been leading 4-H programs between one and four years. Most (74%) had taken other online courses through school or work. Half of the participants were asked to respond to reflection questions following each module individually and half were asked to post their responses in a discussion forum.

Participants were originally given ten weeks to complete the training. They could complete the training requirements at any pace although those in the discussion group were encouraged to complete one module a week so they could make timely and relevant posts to the forum. After eight weeks, more than half of the participants needed more time to complete the requirements. An extension was granted to participants who were able to at least submit the first assignment before the original deadline but still required more than two additional weeks to complete the program. Table 2-5 shows participants’ progress in the training.

Twenty participants were unable to complete the program in the time provided. They were told they would be notified when the online training would be offered again and were asked to complete an evaluation survey designed specifically for those who did not finish. Of the twenty, three had never accessed the site and two accessed the site but not the modules. Fifteen others completed various amounts of the first three modules. Fourteen participants meet this first deadline and ten of these completed the training. They were asked to complete an evaluation survey for those who finished. The remaining four participants experienced personal extenuating circumstances that have prevented them from completing the training at this time and were also asked to complete the evaluation survey for those who did not complete the program.
Summative Evaluation Results

Twenty seven participants were asked to complete one of the evaluation surveys; eighteen completed surveys were received. Of those, nine finished the training and nine did not. Multiple attempts, including three follow up emails and one phone call when a phone number was available, were made to contact the nine participants who did not complete the survey. Although these results only reflect two-thirds of the participants, they do include the full range of completion, from never accessing the site to completing the entire program. The following information is gleaned from several sources: the evaluation surveys, the tracking data, and interviews with three participants who completed the program. It is organized by evaluation question (see Table 2-4).

**Evaluation Question 1. What Encourages and Discourages Participants to Complete the Training?**

The rather low completion rate (29%) was explained by eleven participants who did not complete the program to be due to a lack of time (7), technical problems (3) or both (1). Technical problems included personal computer malfunction as well as technical issues with the web site. Three of the participants who completed the training also experienced some technical problems with the web site. These problems include trouble logging in, navigating, and submitting assignments. All three of the finishers contacted the facilitator for help with their issues. Only one of the participants who did not complete the training contacted the facilitator for help. Information on who to contact was provided on all correspondence with participants, including periodic update messages, as well as on numerous pages within the site, including the side bar of every module.

Dokeos user data provides records of which modules each participant accessed. User data was logged on the same day every week of the training to record participants’ pace. This record
reveals there is no pattern in how frequently participants accessed the training or trend in the pace of those who completed the training program versus those that did not. Some participants made regular progress for the first few weeks and then stopped accessing the site while some participants did not access the site for at least two weeks and still completed the program.

However, this record does reveal points in the training of large drops in participation. Table 2-5 shows the number of participants who completed each step. A majority of participants from the discussion group who did not complete the program stopped participating between Module 1 and Module 2. A majority of participants from the individual reflection group who did not complete the program stopped participating between Module 3 and completing Assignment 1.

One hypothesis that explains this observation is these are both points when participants were asked to take what may have been perceived to be a more time consuming, a more public, or a more technologically challenging step. For example, group discussion participants were asked to post to a discussion forum for the first time after completing Module 1. To do this, participants in the discussion group needed to navigate to the discussion area of the web site and locate the correct forum to post their response. Although participants were given instructions on how to do this, they may have found this task challenging, felt hesitant about being public with their commitment to participate, or realized how much time and effort completing the training would take. Participants in the individual reflection group responded to the same reflection questions but could do so in the same area of the training interface where modules are accessed. It was not the questions that stymied participation. Participants in individual reflection group first reached a more technologically challenging, time consuming, or public point when they were asked to navigate to a new area of the training interface after Module 3 and complete
Assignment 1. Again, although instructions were provided this step may have been challenging, especially for those not familiar with downloading, saving and uploading files.

Issues with lack of time were largely due to participants experiencing unexpected events (7) and/or being too busy (6). Four participants reported the training had too many requirements or was going to take too long. However, eight of the nine participants who completed the training agreed or strongly agreed that the training took an appropriate amount of time.

Follow-up interviews with three participants who completed the training provided a closer look at factors that contributed to their persistence in the program. One participant explained that although she appreciated the convenience of the online training, she struggled to complete the program before the final deadline and would have liked more time. It is clear that those who completed the training found the time to do so even though they were busy. Interviewed participants all demonstrated a certain level of self-motivation to learn and find ways to become better 4-H leaders. They saw the PLT training as a way to accomplish these goals.

Evaluation Question 2: Did the Participants’ Find the Site User-Friendly?

Multiple questions assessed the user-friendliness of the site. Of all respondents to the survey who accessed the site and modules (18), only one person believed that the instructions were not easy to follow. However, a large minority found some aspect of the site difficult to use, had trouble submitting assignments and/or were challenged to log in. While the instructions might have been clearer, the site was not intuitive for these participants. Only eight of the thirteen participants who responded to this question found the site easy to navigate.

Evaluation Question 3: Was the Training Relevant to 4-H Leaders’ Needs?

Twelve of the fifteen participants who accessed enough of the modules to see video content felt they could relate to the leaders shown in the videos. Of these participants, all but one
participant that did not complete the training either agreed or strongly agreed that the training would have provided them with the skills needed to use PLT activities. One person who disagreed explained they were expecting to learn about group leadership skills.

All nine participants who completed the training agreed or strongly agreed that PLT materials are appropriate for their needs. They also agreed or strongly agreed that the instructional messages were helpful to them and could describe ways they will change their instructional practices based on what they learned.

**Evaluation Question 4: Did Participants Feel Motivated to Use PLT Activities?**

Ten of eleven participants who did not complete the training were still interested in becoming a certified PLT educator at another time. A number of participants explained they look forward to having another opportunity to complete the training. For example, one participant said:

I got really excited about it, and wanted to complete it. I think some of the lessons were very good. I just got really busy with work, and the end of the school year, as I home-school my daughter.¹

Of those who finished the training, five plan to use PLT activities at least once a month, three will use them several times a year. Only one person is unsure how often he or she will use PLT activities in a year. Although unsure, she did explain:

Before this training, talking about trees would have been boring to me. With the guide, that topic as well as others has now given me some fun information to pass on to my children.²

**Evaluation Question 5: Which Components of the Training Were Most Helpful? Which Were Least Helpful?**

This question is largely answered with information collected from those who completed the training. When asked to rate the helpfulness of each of the nine major components of the

rating (six modules and three assignments), eight of the nine respondents indicated all but module one and assignment one were very helpful. These two components were rated as little or fairly helpful by two respondents. Follow-up interviews with three participants who completed the training suggests that different components of the training were most helpful depending on the skills and interests of the participants. Interviewees thought the engaging parts of the training, such as the demonstration videos, videos with other leaders and agents, and the assignments, were most helpful to the training program. Links to additional resources were often provided within the modules, and links organized by module were also available from the home page of the training interface. All nine participants who completed the program accessed at least one link. This indicates participants found a something in the module interesting or relevant enough to seek more information. Six participants accessed one to three links and two participants accessed five or more.

**Evaluation Question 6: Is the Discussion Forum an Effective Way to Engage Participants?**

Nine of the seventeen people who were asked to answer reflection questions in the discussion forum actually posted something. Participation in the forum decreased as the training continued despite efforts from the organizer to prompt discussion, ask questions, and respond with encouraging comments. Participants did not comment on others’ postings. Six survey respondents were in the discussion version of the training, and four of them participated in the discussion. Two agreed that the discussion added to the training, and three felt it was easy to communicate with their peers. One participant who did not participate explained he or she did not have time and the other was unsure of what to say in the discussion forum.

Ten participants who were asked to complete the reflection questions individually responded to the evaluation survey. They were asked if they would have rather discussed the reflection questions with others in a discussion forum, three said yes, two were neutral, and five
said no. They all agreed or strongly agreed that the reflection questions were worth their time to think about and respond to.

**Conclusions**

Those that completed the training found the experience helpful and feel prepared to use PLT activities with youth. However the high drop-out rate indicates room for improvement implementing the online training. Although participants reported the instructions were easy to follow, many participants still experienced some challenges navigating the site. Furthermore, participants who did not complete the training indicate they are still interested in becoming certified PLT educators; they were unable to devote the time and effort necessary to overcome minor technology issues and complete the training requirements. Those who completed the training may have had a stronger personal motivation to complete training. The point in the training when participants dropped out may indicate participants stopped working to complete the training when their perception of the commitment required exceeded their available time and energy.

Technical problems may be inherent in online training. There are countless course management design systems and internet tools to deliver online content; regardless of participants’ computer literacy, basic instruction will always be needed. Having someone who is available and ready to help with technical problems was important to those who completed the training. However, some participants were stumped by their computer issues and did not appear to take any steps to get help. These participants might have lacked motivation to complete the training or felt their challenges were insurmountable. This problem might be resolved in the future by sending messages and reminders to all participants about how to deal with the problems others are facing.
It is not surprising participants indicated that engaging experiences were the most helpful, because in-person evaluations of PLT trainings typically indicate they are valued for the opportunity to experience the activities. However, this does imply that the text of the modules was not as important to providing participants with what they need to actually use PLT materials with youth as the opportunity to do or watch an activity. Typically, a predominant portion of online training is based on text. Opportunities to process and apply new information also make it more meaningful and useful. While not requiring active participation, videos are engaging, and content may be presented through video instead of text.

Discussion forums are another common way to engage learners. In this program, however, the discussion forum was not effective. The discussion prompts and questions could have been improved to foster interaction, and may be more effective when all participants work at the same pace or if one discussion forum is maintained for the entire program, rather than separate forums for each module. Nevertheless, participants were not anxious to share their thoughts with others and putting requirements on the pace of completion may have diminished the convenience and flexibility that attracts learners to online training. Learners who appreciated the opportunity to reflect may have found the questions helped them feel the training was relevant to their needs.

**Recommendations**

Based on the experience and evaluation of this online environmental education professional development program for non-formal educators, the following recommendations may be helpful as other programs seek to develop asynchronous programs:

1. Anticipating participants’ technical questions is critical. Online training programs must be easy to navigate and intuitive. Adding instructional reminders or arrows at every point in the training where a participant may not know what to do or where to click “next” is important. Pilot testing can reveal where instructions are lacking.
2. Since participants may expect online training to be convenient and painless, it is essential that marketing materials for the program accurately explain the requirements so participants develop reasonable expectations. While online training is flexible, the amount of effort and energy needed to complete an online training program can be significant. An estimate of the number of hours online and offline and a description of the required tasks may be useful.

3. Videos are useful and helpful strategies to incorporate engaging opportunities to learn content. After evaluating dissemination methods of an environmental education curriculum, Ernst (2009) suggests educators benefit from hearing others provide examples of how the materials can be used, as well as tips and success stories. Videos of agents and leaders were used to describe and demonstrate how to incorporate PLT activities with 4-H programs. Videos can be short and filmed on a low budget. Only two of eight videos included in this training were filmed and edited by a professional. None of the participants commented on variations in quality.

4. Choices help participants create a professional development program that suits their needs. Participants can choose to follow links, which activity to test for an assignment, and which reflection questions to answer. Giving learners a choice to reflect individually or in a discussion may be another useful option. Certain topics or questions may be more appropriate than others. Providing participants tips on how to customize their experience will help them realize the benefits of a flexible design.

Finally, online program developers should keep in mind that program development with evaluation is an on-going process. As technology changes, new and better tools are constantly being introduced. It is not critical to have the latest bells and whistles, but to choose the tools that work best for each programs’ purposes. As new ways to engage learners are explore, new evaluation questions will need to be addressed. Being creative about how technology can also be matched to provide the most appropriate tools will help identify these questions.
<table>
<thead>
<tr>
<th>Inputs</th>
<th>Activities</th>
<th>Outputs</th>
<th>Short</th>
<th>Long</th>
<th>Medium</th>
</tr>
</thead>
<tbody>
<tr>
<td>Funding from American Forest Foundation, National Project Learning Tree, and University of Florida, College of Agriculture and Life Sciences</td>
<td>Develop online training program with Florida 4-H agents and volunteer leaders who want to become certified PLT educators.</td>
<td>Florida 4-H agents and volunteer leaders who want to become certified PLT educators.</td>
<td>Increase number of 4-H leaders who are certified PLT educators.</td>
<td>Increase use of PLT activities in 4-H programs</td>
<td>Increased skills and participation in community environmental initiatives</td>
</tr>
<tr>
<td>Time and knowledge to develop the training program</td>
<td>Assignments that provide opportunities to explore PLT activities and demonstrate understanding of the material</td>
<td>4-H leaders become aware of the benefits of PLT and environmental education activities for youth</td>
<td>4-H youth develop Life Skills through participation in PLT activities</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Knowledge of effective workshops and 4-H leaders needs</td>
<td>Video demonstrations of PLT activities being conducted</td>
<td>4-H leaders feel confident to use PLT activities with youth and take youth outdoors</td>
<td>4-H youth increase awareness and knowledge of environmental issues.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Software</td>
<td>Engaging content emphasizing relevance of PLT to 4-H</td>
<td>4-H youth are motivated to apply Life skills to environmental issues.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 2-2. Sources of Efficacy from in-person and online Project Learning Tree Training

<table>
<thead>
<tr>
<th>Source of Efficacy</th>
<th>In-person workshop</th>
<th>On-line format</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social Persuasion</td>
<td>Facilitators share tips and positive experiences</td>
<td>Video of experienced 4-H leaders sharing tips and positive experiences</td>
</tr>
<tr>
<td></td>
<td>Real-time feedback</td>
<td>Email responses with constructive feedback on assignments</td>
</tr>
<tr>
<td>Vicarious Learning</td>
<td>Live demonstrations</td>
<td>Step by step videos of activities led with youth</td>
</tr>
<tr>
<td></td>
<td>Strategies and skills modeled by instructor</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Discussions with colleagues</td>
<td></td>
</tr>
<tr>
<td>Mastery Experience</td>
<td>Practice after the training</td>
<td>Progression of tasks to prepare for practice using self assessment and peer review rubric</td>
</tr>
<tr>
<td></td>
<td>Welcoming atmosphere</td>
<td>Answers to anticipated needs and questions provided early on</td>
</tr>
<tr>
<td>Stress Reduction</td>
<td>Community building group interaction</td>
<td>Clear instructions</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Link to email for support visible on every screen</td>
</tr>
</tbody>
</table>

Table 2-3. The Online 4-H PLT Training module organization

1. Explore
2. Take a Closer Look
3. Reconnecting Youth with Nature
   - Assignment 1, *PLT Guide Mailed*
4. Safety
5. Planning
   - Assignment 2 Create a Plan
6. Experiential Learning
   - Assignment 3 Try it Out
   - Evaluation Survey
   - Follow-up Interviews
<table>
<thead>
<tr>
<th>Evaluation Questions</th>
<th>Indicators</th>
<th>Information sources</th>
<th>Tools</th>
<th>Design and sampling</th>
</tr>
</thead>
<tbody>
<tr>
<td>What encourages and discourages participants to completing the training?</td>
<td>Completion data</td>
<td>Participants</td>
<td>Dokeos user statistics</td>
<td>All participants, during and after the training</td>
</tr>
<tr>
<td></td>
<td>Email correspondence</td>
<td></td>
<td>Email records</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Participants responses</td>
<td></td>
<td>Evaluation survey</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Interviews</td>
<td></td>
</tr>
<tr>
<td>Were participants able to navigate the training website successfully?</td>
<td>Participants can access all parts of the training and submit assignments.</td>
<td>Dokeos user data training facilitator</td>
<td>Dokeos user statistics Email records Evaluation survey</td>
<td>All participants, during the training Immediately after the training</td>
</tr>
<tr>
<td></td>
<td>Few emails are received concerning technology issues</td>
<td></td>
<td>Email records</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Evaluation survey</td>
<td></td>
</tr>
<tr>
<td>Was the training relevant to 4-H leaders’ needs?</td>
<td>Participants describe ways they can apply information from the modules</td>
<td>Participants</td>
<td>Submitted Assignments Follow up interviews</td>
<td>All participants, during and after the training 3 participants, purposive, 3 months after the training</td>
</tr>
<tr>
<td>Did participants feel motivated to use PLT activities?</td>
<td>Participants responses</td>
<td>Participants</td>
<td>Evaluation survey Follow up interviews</td>
<td>All participants, immediately after the training 3 participants, purposive sampling 3 months after the training</td>
</tr>
<tr>
<td>Which components of the training were most helpful? Which were least helpful?</td>
<td>Participant responses</td>
<td>Participants</td>
<td>Evaluation Survey Follow up interviews</td>
<td>All participants, immediately after the training 3 participants, purposive sampling 3 months after the training</td>
</tr>
<tr>
<td>Is the discussion forum an effective way to engage participants?</td>
<td>Active discussion forum with participants responding to each other’s posts</td>
<td>Participants</td>
<td>Posts Evaluation survey</td>
<td>Half participants in the discussion group, during and after the training</td>
</tr>
</tbody>
</table>
Table 2-5. Active participation in the training program. The number of people at each point who agreed to participate in the study is shown in parentheses.

<table>
<thead>
<tr>
<th></th>
<th>Group Discussion</th>
<th>Individual Reflection</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Registered</td>
<td>17 (15)</td>
<td>17 (12)</td>
<td>34 (27)</td>
</tr>
<tr>
<td>Accessed the site</td>
<td>15 (14)</td>
<td>16 (12)</td>
<td>31 (16)</td>
</tr>
<tr>
<td>Module 1 Explore</td>
<td>14 (13)</td>
<td>15 (11)</td>
<td>25 (24)</td>
</tr>
<tr>
<td>Module 2 Take a Closer Look</td>
<td>8 (7)</td>
<td>13 (9)</td>
<td>21 (16)</td>
</tr>
<tr>
<td>Module 3 Reconnecting Youth with Nature</td>
<td>8 (7)</td>
<td>13 (9)</td>
<td>21 (16)</td>
</tr>
<tr>
<td>Assignment 1 by Deadline</td>
<td>8 (7)</td>
<td>6 (6)</td>
<td>15 (13)</td>
</tr>
<tr>
<td>Module 4 Safety</td>
<td>8 (7)</td>
<td>6 (6)</td>
<td>15 (13)</td>
</tr>
<tr>
<td>Module 5 Planning</td>
<td>6 (5)</td>
<td>6 (6)</td>
<td>12 (10)</td>
</tr>
<tr>
<td>Assignment 2 Create a Plan</td>
<td>4 (3)</td>
<td>6 (6)</td>
<td>10 (9)</td>
</tr>
<tr>
<td>Module 6 Experiential Learning</td>
<td>4 (3)</td>
<td>6 (6)</td>
<td>10</td>
</tr>
<tr>
<td>Assignment 3 Try it Out</td>
<td>4 (3)</td>
<td>6 (6)</td>
<td>10</td>
</tr>
<tr>
<td>Completed the Training Program</td>
<td>4 (3)</td>
<td>6 (6)</td>
<td>10 (9)</td>
</tr>
</tbody>
</table>

Table 2-6. Participants in the evaluation surveys.

<table>
<thead>
<tr>
<th></th>
<th>Group Discussion</th>
<th>Individual Reflection</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Completers</td>
<td>3</td>
<td>6</td>
<td>9</td>
</tr>
<tr>
<td>Non completers</td>
<td>6</td>
<td>6</td>
<td>12</td>
</tr>
<tr>
<td>Total</td>
<td>9</td>
<td>12</td>
<td>21</td>
</tr>
</tbody>
</table>
CHAPTER 3
EXPLORING THE INFLUENCE OF ONLINE PROFESSIONAL DEVELOPMENT ON 4-H LEADERS’ SELF-EFFICACY TO USE PROJECT LEARNING TREE ACTIVITIES

Online opportunities hold great potential for increasing the amount and types of environmental education professional development available. The National Environmental Education and Training Foundation calls for the field to "become more serious about the deployment of quality training and web-based education" (2005, p.30). Online formats appeal to educators who may not have time or support to attend in-person trainings (Brown & Green, 2003; Boling, 2005; Mandinach, 2005; Dede et al, 2009). With the advancement of the Internet and recent explosion of social networking, communication, and information-sharing opportunities, distance education of today barely resembles the mail correspondence courses of twenty years ago. Both interest in and the availability of online professional development have increased dramatically (Brown & Green, 2003). The National Science Foundation offers hundreds of science educator training and courses and environmental educators can now earn their masters online from a number of reputable programs. However, research is needed to examine the impacts of online learning (Dede et al., 2009) and what makes it effective.

In Florida, an online training program was recently developed to prepare and empower non-formal educators to conduct environmental education activities with youth. The training was designed to increase educators’ perceived self-efficacy to use an environmental education activity guide. This paper reports our efforts to measure change in perceived self-efficacy and understand the elements of the training program most responsible for those perceptions.

Background

Project Learning Tree (PLT) is a popular program for educators available in all states and 11 other nations (Bullwinkle & Tarnapol-Whitacre, 2006). The materials include activity guides and secondary modules designed to help educators engage youth in environmental explorations
to develop awareness and skills to address environmental issues. Their most popular resource is a preK-8 activity guide with 96 engaging lesson plans that use trees and forests to motivate learners to explore their environment. PLT offers their resources to educators only through professional development workshops. In Florida, the sporadic availability of facilitators, school-based accountability, and fewer resources to support travel to in-person workshops have led to a decline in teacher workshops. An online training could overcome accessibility and facilitation barriers. Help transition

Non-formal educators are typically not bound by education reform standards and achievement tests and therefore represent a potential area of growth for environmental education programs. The 4-H program, a youth program of the Cooperative Extension Service, offers after-school, project club, and summer camp programs. These programs reach over 240,000 youth in every county in Florida (2008-2009 Florida 4-H Annual Statistical Snapshot, 2010). The PLT Activity Guide could provide 4-H leaders with excellent resources to achieve 4-H goals in life skills training (e.g., cooperation, leadership, problem solving) and build environmental knowledge. An online PLT training program could adapt the PLT workshop specifically to 4-H leaders’ needs.

Although web-based programs have become creative and engaging, by definition an online, asynchronous program cannot use the same strategies or meet the same objectives as an effective in-person workshop. Although workshops meet many goals, such as time for educators to reflect and recharge, the most important goal is to build the competence of participants to use the new materials. The goals of Florida’s new online professional development program are to prepare and encourage volunteer 4-H leaders to use the PLT PreK-8 Activity Guide with self-efficacy building opportunities.
Literature Review

Self-Efficacy

Self-efficacy is the social cognitive theory linking people’s beliefs about their ability to take potential action. Although conceived previously by others, Albert Bandura expanded the theory greatly, beginning with his 1977 “Self-Efficacy: Toward a Unifying Theory of Behavior Change.” He defined self-efficacy as “the conviction that one can successfully execute the behavior required to produce outcomes” (p. 193). He explained self-efficacy is not the only contributor to action, but when a person has skills and incentives to act, efficacy plays an important role in what people choose to do. A person who has a high sense of efficacy to perform a task will try harder and persist longer (Bandura, 1977, 1997). Efficacy is a predictive theory of behavior. A person is less likely to perform a task they do not think they can perform well (Pajares, 1996; Bandura, 1997; Tschannen-Moran, Woolfolk, & Hoy, 1998).

The importance of teacher efficacy in education has been a topic of considerable research since the 1960s. Teacher efficacy has been positively correlated to student achievement, implementation of innovations, reduced teacher stress, and willingness to persist in the face of challenges. Originally, researchers explored the extent to which teachers felt their actions controlled of student achievement (Tschannen-Moran, Woolfolk, & Hoy, 1998). However, Bandura defines self-efficacy to be a personal prediction of how well a future task will be performed and the consequence of performing the task at the expected level is defined as one’s outcome expectancy (Bandura, 1982). According to this definition, the original measures were not measuring efficacy, possibly looking at a teacher’s locus of control. Bandura explains that outcome expectancy is a function of efficacy, suggesting if a person has low efficacy for a task, he or she may expect negative consequences would result from performing it (Bandura, 1977).
Measuring Efficacy

In the early 1980s, researchers Gibson and Dembo (1984) aimed to more closely measure Bandura’s concept of self-efficacy with a thirty-item Teaching Efficacy Scale (TES). Factor analysis of the TES revealed that the items load on two factors which Gibson and Dembo called Personal Teaching Efficacy (PTE) and General Teaching Efficacy (GTE), and believed they reflected Bandura’s concepts of self-efficacy and outcome expectancy, respectively. They found teachers with higher PTE, or self-efficacy, are more likely to try new materials, experiment with teaching strategies, and work to find better ways to teach as well as be more organized and enthusiastic. Meanwhile, students of teachers with high GTE, or outcome expectancy, are more likely to be interested in and have positive attitudes toward school.

Gibson and Dembo’s scale has undergone a number of subject-specific modifications including math, chemistry, and statistics (Tschannen-Moran, Woolfolk, & Hoy, 1998). In 1990, Enochs and Riggs modified Gibson and Dembo’s scale to focus on science teaching efficacy. The STEBI (Science Teaching Efficacy Belief Instrument) also measures two factors, which Enochs and Riggs deemed Personal Science Teaching Efficacy (PSTE) and Science Teaching Outcome Expectancy (STOE) (Enochs & Riggs 1990). A pre-service teacher version was created, the STEBI-B (Enochs & Riggs 1990). Sia modified this scale in 1992 to examine environmental education efficacy beliefs, and named it the EEEBI (Sia, 1992).

Work on science teaching efficacy suggests that instructional programs that enhance efficacy might increase educator’s likeliness to use new teaching material. To explore the role of professional development in increasing efficacy, Moseley, Reinke, & Bookout (2002) investigated the effect of a three-day outdoor environmental education program on pre-service teachers’ environmental education self-efficacy using the EEEBI. They found participation in the program did not significantly influence efficacy. However, the researchers point out, the
program’s goal was to provide a learning experience and introduction to environmental education, not to increase efficacy. In fact, though few studies have been done to investigate the role of efficacy in environmental education, but its potential is promising (Sia, 1992; Mosely, 2002). Clearly, there is room for more work in this interesting and important aspect of professional development.

**Enhancing Efficacy**

Self-efficacy can be influenced through vicarious experiences, mastery experiences, social persuasion, and physiological state (Bandura, 1977). Bandura originally outlined these sources of efficacy as the foundation for cognitive psychological therapy to help patients overcome fearful, avoidant behavior. However, the scope of their application since has been vast, from improving athletic training to HIV-AIDS education. Sources of efficacy are essentially opportunities to receive and process information about how to perform a task and the potential consequences of doing so. Self-efficacy beliefs are influenced by how this information is processed and interpreted (Bandura, 1977). Mastery experiences are opportunities to authentically attempt the task. While learning a new task, early and successful practice is the most influential source of efficacy. Efficacy can also be influenced by observing others. Vicarious learning is most effective at increasing efficacy when the observer relates to the person modeling the task and the benefits of the performance are witnessed (Bandura, 1982). Social persuasion is often a weaker source of efficacy compared to actually trying or witnessing a new task. Persuasive information is typically provided through verbal cues from others that the task is achievable and the consequences will be beneficial. The remaining source of efficacy is the emotional and physiological reaction to performing a task, often experienced in combination with other sources. For example, before performing the task for the first time a person may feel
anxious and stressed. Too much stress can diminish performance and lead to an unsuccessful mastery experience.

The in-person PLT workshop typically provides these sources of efficacy through the enthusiasm of facilitators and educators appreciating useful, well-designed resources and experiencing a handful of engaging activities. An online training will not have the atmosphere of a workshop or the collective learning that comes from experiencing an activity with other educators. But online training can still include efficacy building experiences. Posnanski (2002) found that online professional development experiences such as creating action plans, watching video examples of teaching, and developing reflective journals contributed to an increase in science teaching efficacy of elementary teachers. Florida PLT’s online training includes similar components and was designed to include opportunities to gain information from each of the four efficacy sources. Table 3-1 describes the strategies used to build self-efficacy in both training formats. A series of evaluation instruments were designed for the first implementation of the online program to explore whether it enhanced efficacy. This paper will describe the results of the following research questions:

1. Can an online training influence self-efficacy and outcome expectancy to lead PLT activities?
2. Which components of the training do participants believe most influence their efficacy?
3. What relationship, if any, exists between participants’ personal goals, previous experience with leading environmental activities, leading and teaching youth, and taking online training and with participants’ self-efficacy?

Methods

Population

The opportunity to become certified Project Learning Tree educators by completing the on-line training was marketed to 4-H leaders through their volunteer listserv in early 2010.
Thirty-four Florida 4-H volunteer leaders registered for training. They spanned a range of experience with 4-H; nine were active 4-H leaders for over five years, half had been leaders between one and four years, and eight had less than one year of experience at the time they registered. All but two of the participants had other teaching experience (e.g., school, church group, and home school). Ten of the participants indicated they had some experience leading environmental education activities, such as gardening, forestry and nature camps. Twenty-five, or 74% had participated in other online training. The University of Florida Institutional Review Board approved the consent protocol and 27 participants allowed their data to be used in this study.

**Treatment**

This 4-H PLT online training is a series of six modules and three assignments. The training is asynchronous; there is no time when participants need to be online simultaneously. The modules are presented with a program that converts PowerPoint® presentations into flash, called Articulate®, containing text, links for more information, some on-screen interactions and videos. Modules present an introduction to environmental education and PLT, explain how PLT activities have been used in 4-H, and discuss why re-connecting youth with nature is important. Practical considerations for using PLT activities with youth include safety considerations, how to choose and prepare for an activity, and how to cover all five steps of the 4-H experiential learning cycle with PLT activities. Following each module, participants were asked to answer reflection questions, either individually or in a discussion forum, to guide their own thinking and to apply the information to their own program.

The required three assignments gradually increased in difficulty and application. After completing the first three modules, the first assignment asked participants to choose one of three provided PLT activities to explore on their own. Modified instructions were provided so the
activity could be completed by one person, without youth. After submitting their assignment, participants were mailed a PLT PreK-8 Activity Guide which was needed to complete the remaining assignments. The second assignment asked participants to choose one activity from the ninety-six activities in the Guide and develop a plan to use it with youth. The final assignment asked participants to implement their plan by leading the activity they chose with youth and to reflect on their performance by completing a self-assessment rubric. On receipt of the third assignment, participants were sent a certificate of completion.

The online training was piloted tested with six 4-H extension agents during the summer of 2009. The training was well received and the agents looked forward to using it with volunteers in their counties. Improvements and adjustments were made to the program based on their feedback.

**Design**

Quantitative and qualitative methods were used to investigate the research questions. They include a pre and post self-efficacy scale, responses to reflection questions, in-depth interviews, and an evaluation survey. Participants completed the pre-test immediately after completing the first module, which provided a brief introduction to PLT program and materials. The post-test and evaluation survey were completed after submitting their final assignment. Participants who did not complete the training were also asked to respond an evaluation survey once the completion deadline had passed. Interviews were conducted three months after completing the program.

Participants begin a training program with experiences and expectations that could affect their existing efficacy or their likelihood to increase efficacy. Four independent variables were identified as indicators of these pre-existing experiences and expectations: 1) experience
teaching environmental education related activities, 2) experience teaching and leading youth, 3) goals for the training, and 4) previous experience with online training.

Experience was considered because mastery experience is the most influential to efficacy (Bandura, 1982). People with high self-efficacy also tend to set higher, more specific goals (Bandura, 1977; 1997). Finally, past experience with online training was considered predictive of how comfortable and therefore less emotionally aroused a participant may become while taking the training. It was assumed if participants had not taken an online training, they may have a more difficult time navigating the training website which may limit what they are able to take away from the experience.

A matched pairs design was used to randomly place participants into two treatment groups—individual reflection and group discussion. Each participant was given a rating on these variables using from information gleaned from registration forms. Responses were rated on a one to three scale. For example, participants with very specific goals for the training that were relevant to the environment and PLT were rated a three. Participants with less specific goals that could have been relevant to any training were given a two, and participants who did not write any goals were scored a one. Inter-rater reliability was achieved with two independent coders and found 85% agreement. When coders disagreed, ratings were averaged. After the coding process, each participant had a four digit code (one score for each variable). Participants were matched based on their codes and participant pairs were randomly placed into each treatment group.

**Quantitative Instrument**

To measure a change in efficacy, participants were asked to rate their level of agreement with 25 statements on a 5-point Likert scale. The majority of questions were modified from the EEEBI to better reflect tasks association with leading 4-H, outdoor, and PLT activities. It was
modified for this study because the online training focuses specifically on leading PLT activities rather than environmental education in general.

Although participants were already leaders of 4-H clubs and programs, only one third indicated previous experience with environmental activities. Therefore it was appropriate to use questions modified from a scale for pre-service teachers. If the item refers to a behavior that is not typically practiced, participants would be unable to report their efficacy. Table 3-2 provides an example of how questions underwent this series of modifications and the entire scale can be found in Appendix C and D.

**Qualitative Instruments**

Qualitative tools were also chosen to better understand quantitative results, overcome barriers to small sample size, and look more closely at participants’ experience in the training. Reflection questions and assignments collected throughout the training were used to gain an initial understanding of how participants felt during the training. This information was also used to inform the development of an interview guide. Incorporating responses to reflections and specific examples from assignments into interview questions facilitated respondents’ recall of particular experiences in the training and greatly enhanced the quality of the interview data. Questions focused on participants’ experience during the training, as well as experiences with and future plans to use PLT activities with youth. Purposive sampling was used to select three participants for in-depth interviews three months after the training. Participants were chosen based on change in their efficacy score to maximize understanding of a diversity of experiences.

**Analysis**

A confirmatory factor analysis was attempted using statistical software SPSS 18. However, factor analysis typically requires at least a 20:1 subject to item ratio and the results were unusable because they produced a determent value of 0.00 (Costello & Osborne, 2005).
Several studies using the STEBI rely on the factors found by Enochs and Riggs during development (Mosley, 2010; Bliecher, 2006). In 2004, Bleicher re-confirmed Enochs and Riggs’ original factor analysis and reliability findings. The responses were organized into these two sub-scales and Cronbach’s alpha was used to test internal reliability. The sub-scale measuring self-efficacy was composed of 14 questions and had a Cronbach’s alpha of .761. However, reliability of the outcome expectancy sub-scale was low at 0.29. Removing items with low item-total correlation did not improve reliability.

A closer look at the literature reveals criticisms of this troublesome outcome expectancy sub-scale and the validity of two factors (Kerr, 2006; Tschannen-Moran, Woolfolk, & Hoy, 1998). These two factors only account for a total of 36% of the variance. Analysis with this scale also typically shows the two factors are at most, weakly correlated with each other, which allowed Enochs and Riggs (1990) to suggest self-efficacy and outcome expectancy are two distinct factors. However, Bandura (1997) explains outcome expectancy is based on self-efficacy and the two concepts have a close, often reinforcing relationship. Interestingly, all questions loading on the self-efficacy sub-scale use the identifier ‘I’ while none of the outcome expectancy sub-scale questions contain “I” and instead refer to “teachers” in general (Guskey & Passaro, 1994). Because outcome expectancies are anticipated consequences based on predictions of personal performance, the STEBI-B’s STOE sub-scale may actually be measuring Rotter’s locus of control (Tschannen-Moran, Woolfolk, & Hoy, 1998).

Enochs and Riggs recognized these challenges and accepted a lower Cronbach’s alpha and item-to-total correlation standard for this sub-scale. Bleicher’s 2004 re-analysis of the STEBI-B uncovers some of the same weaknesses. However, many researchers rely on Enochs and Riggs’ original reliability findings to analyze their data and confirmatory factor analysis are not
conducted or reported. When investigating effect of length of professional development opportunities on self-efficacy, Roberts et al. (2001) also experienced difficulty with the outcome expectancy sub-scale and only used the PSTE scale. Given the questions regarding the item wording and the low reliability, we also focused our analysis only on the self-efficacy factor. Paired sample, two-tailed t-tests were used to compare means of participants who provided both pre and post-tests. Correlations between individuals’ change in mean score and the four variables used to match participants into pairs for grouping were calculated using Spearman’s rho.

The semi-structured phone interviews lasted between thirty and forty minutes and were recorded and transcribed. Two researchers first coded the transcriptions for themes independently; next the codes were compared and discussed to develop a common list of codes. Finally the interviews were then re-coded and checked for consistency.

Results

Of the 27 participants who agreed to be a part of the study, nine completed the online training program and became certified Project Learning Tree Educators. Four of the eighteen who did not finish, completed 75% of the program before dropping out due to extenuating personal circumstances. Eleven completed varying amounts of the first three modules and the remaining three did not appear to have accessed the modules. This analysis will focus on the perceived self-efficacy and outcome expectancy of the nine participants who completed the training.

Six of the nine were in the treatment group that reflected individually; the remaining three reflected in the group discussion treatment. Because the four participants who nearly finished the training were in the discussion group, the different treatments were probably not the cause of the uneven distribution. Due to the small sample size, and because few participants
actually participated in the discussion, very little interaction occurred in the discussion group. In the end, there was very little difference between the two groups and they were combined for the quantitative analysis. The different experiences are addressed during the interviews and are also investigated further in the evaluation of the online training program.

Quantitative

The results of a paired t-test indicate the mean scores of the post-test on the self-efficacy sub-scale were significantly greater than the mean score of the pre-test at p < .05 (Table 3-3). The training was successful at increasing the participants’ self-efficacy to use Project Learning Tree activities with youth. Seven of the nine participants’ mean scores for the fourteen self-efficacy items increased, one stayed the same and one decreased (Table 3-4). Correlations between participants’ efficacy levels and the four variables used to match participants into pairs for grouping, as determined by Spearman’s rho, can be seen in Table 3-5. Significant correlations were found between the environmental education experience and pre-test efficacy score (r = .716, p < .01). A significant correlation was also found between initial goals for the training and change in self-efficacy (r = .683, p < .030). No relationship was found between pre-efficacy scores or changes in efficacy and experience leading and teaching youth nor previous experience with online training.

Qualitative

Interviews were conducted with the participant whose efficacy decreased, the one whose score did not change, as well as the one whose score increased the most (participants 1, 2 and 9 as seen in Table 3.3). Out of nine participants, their pre-scores were fourth highest, eighth highest, and lowest, respectively. Participant 9 had the lowest starting efficacy but largest increase was in the discussion group, the other two participants reflected individually.
A number of salient themes appeared while analyzing the interviews. Learning goals for youth was a strong motivator for all three participants. This supports quantitative findings regarding the importance of participants initial goals and increase in efficacy. Goals for youth included long-term hopes for their future, including becoming healthy, confident adults leading productive lives in some kind of intact environment. In addition, all participants spoke of the short-term benefit that having fun plays in their 4-H program. They rely heavily on feedback from their group, the group’s parents, and co-leaders to evaluate what is working, what is most fun, and therefore what types of activities to offer. All three also commented on the importance of the PLT Guide; it provides a type of support since it contains so many easy, wonderful ideas with sufficient explanation and background. The respondents also all rely on support and guidance from their 4-H agent and mentioned his or her influence when deciding what projects to do with their clubs. Finally, each participant discussed his or her own motivation to learn and become a good leader.

Beyond the themes that were common across all three interviews, each participant described experiences with the training and consequently their outlook on using PLT activities in the future. Each participant highlighted different components of the training as most memorable and influential to them. Therefore each participant’s change in efficacy appears to have come from a different source.

Participant 2’s self-efficacy to lead PLT activities did not change. She had slightly more experience leading outdoor and environmental activities than the other two interviewees. She has been leading 4-H between one and four years and also has experience working at her church nursery. She did not have prior experience with online courses or trainings. Her pre-test score indicated she began the training with a high sense of efficacy and this is confirmed by interview
Participant 1’s efficacy decreased from the pre-test to the post-test. She has been leading 4-H activities between one and four years, had relatively unspecific goals for the training, and no experience leading environmental activities. She had taken online training courses before and felt comfortable with computers. She chose to participate in the online training because it was an enticing opportunity to learn from home since travelling to seminars and trainings has become difficult for her. Participant 2 typically leads a dog obedience club and explained she had, “never led a child on a nature walk before.” In general she enjoyed the experience and sees PLT activities as positive for youth she works with.

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1 Personal phone interview, August 20, 2010. Participant’s identity kept confidential.
I liked about this experience. I never thought about a tree other than tie the dog to it occasionally. Yes it provides shade and yes it needs nutrients to grow… my eyes were opened as far as different things you can do for trees and going through this activity book and looking at the different activities that were there and I went, you know, this is wonderful this is what kids needs to be exposed to.²

Vicarious experiences seemed to be the most important source of efficacy information for this participant. When asked what part of the training she remembered the most, she enthusiastically described the demonstration videos and could even recall a direct quote from one. She was the only participant to mention past experiences as important to her approach and reasons for working with youth. Specifically she described one of her own teachers, saying “I modeled myself after her for years.” She expressed a general sense of efficacy to lead 4-H activities and told many stories of having fun with youth and being able to keep them engaged. However, as the training continued she realized that leading PLT activities will be different from anything she has done before and that doing it successfully will be a challenge. Two opportunities for mastery experience were not extremely rewarding. While trying out the activity on her own, she reflected she wished she had more guidance and wasn’t sure what to observe. When leading an activity with youth on her final assignment, she visited a classroom and admitted having to ask the teacher to help her implement her plans. Although the teacher said the students enjoyed it, this was not “quite as she had envisioned.” Her misgivings about these two early experiences either contributes to or explains her decrease in self-efficacy.

In contrast, mastery experiences were an important positive influence on Participant 9’s self-efficacy to lead PLT activities. Her mean score increased more than any other participant who completed the training. She was also new to environmental education. She’d been teaching at a public school for years but had only been involved with 4-H during the past year. She had

less experience with online training than Participant 1 but had much stronger, more specific goals for the training that emphasized the environment. Of the three participants interviewed, she also had the most specific plans to use PLT activities with youth. Although looking forward to using PLT activities and teaching youth about the environment to “protect the things that we have,” she expressed uncertainties about her lack of knowledge about environmental concepts. She overcame her concerns, however, while completing assignments and these successful mastery experiences seemed to have contributed to her increased self-efficacy. When asked what she remembers most about the training she excitedly spoke about going outside to explore the diversity in her yard for the first assignment.

I’ll always remember the lesson Planet Diversity, I think that is what it was called. That was my very first lesson when I went out to my backyard; I hadn’t been out there in a very long time. Well, I’d been out there but I hadn’t really been paying attention to the flora and fauna, you know being as I work so much I don’t really get much opportunity to get out back. So I went out there and it was raining, but I followed that lesson plan to see how things would turn out and I went out there and I started to draw pictures of things that were out in my very own backyard and when I finished the activity you know I really thought, wow, this was great this was a tour of my own backyard.³

For her final assignment, she tried out the activity about different types of soil with youth. During the interview she confessed at first she wasn’t sure how it would go because she had little prior knowledge about soil. However she admitted in the end it went really well; “it was as if I was learning along with them.”

**Discussion**

As measured by the modified EEEBI, self-efficacy significantly increased for the 4-H volunteer leaders who completed the online PLT training. The interviews helped illuminate participants’ experience and explore which components of training were most influential.

Interestingly, each participant emphasized at least one of the self-efficacy building opportunities as memorable and valuable.

Results indicate that each participant’s change in efficacy is the result of different components of the training. Their interests and background appear to help influence which components were most valuable. Online training may have an advantage over in-person workshops in this regard. Learners may be given more control over the sequence and direction of an online program because it can be a self-directed process. They can customize their experience by following extra links to resources and additional information, return to re-read a module they wish to recall, and can re-visit videos of activities being demonstrated or 4-H agents sharing tips.

The importance of self-directed learning is supported by the significant, positive correlation between initial, specific goals for the training and change in self-efficacy to lead PLT activities. Goals are an important source of motivation, and once personal goals are met, a person may feel good about him or herself and then set new, higher goals (Bandura, 1977). All three participants explained their ongoing goals of incorporating PLT activities into their work with youth. They see the PLT Guide as an asset to helping them achieve the goals they have for their youth as well.

Beyond goals, “Lasting efficacy changes achieved through powerful induction to initially develop capabilities, remove external aids to verify personal efficacy, and then finally using self-directed mastery to strengthen and generalize” (Bandura, 1982, p.202). Although self-efficacy’s predictive power is somewhat limited by the inability to measure and report on participants’ outcome expectancy, follow-up interviews suggest that the training impacts were durable at least three months later. Responses on the evaluation surveys suggest all nine participants who completed the training gained skills and the three interviewees explain the influence the online
training had on their efficacy to use PLT activities with youth. Differences between pre and post scores show the initial capabilities have been attained and follow up interviews three months after the training revealed participants are looking forward to continue using the PLT Guide. As long as they are satisfied with their endeavors, their own continued practice and effort to use PLT activities will provide additional mastery experiences and maintain or increase their self-efficacy to lead PLT activities with youth.

Conclusion

These results of this research are encouraging for the potential of online training to increase self-efficacy to lead PLT activities. Although results are limited by sample size, they do indicate that opportunities can be incorporated into online training that successfully enhance self-efficacy. These findings also suggest that efficacy research is a valuable potential avenue for environmental education research. However, challenges measuring changes in self-efficacy and outcome expectancy are evident and must be addressed before future work can continue. The use of general scales without regular confirmation of reliability has amplified these challenges. In particular, outcome expectancy should be measured with items that focus specifically on a person’s beliefs about the likely consequences of their own actions rather than what generally occurs or is possible. Such a scale may then correlate with self-efficacy as measured by statements such as “I know how to lead Project Learning Tree activities successfully” and “The environmental awareness of the youth I lead increases when I lead Project Learning Tree activities.” In 2006 Bandura addressed challenges and attempts to measuring efficacy by making recommendations for developing efficacy scales including using interviews and pilot studies to identify challenging aspects of a task and then constructing homogeneous items based on different difficulty levels, using a 100 point scale. In addition, this study also highlights the need
to tailor items to appropriate context to attain adequate specificity and relevancy to the context of population in question.

A 4-H program is significantly different from formal education, and this difference is reflected in the design of the training program. This difference may have an important bearing on the reported increase in 4-H leaders’ self-efficacy which has not been evident in the literature on pre-service environmental education. In 4-H, the emphasis is on participating and learning skills such as cooperation, respect, and communication. There is less focus on content and knowledge than a typical school program. Because the training emphasized 4-H leaders do not need to know content since the Guide provides adequate background information, and, 4-H leaders merely need to gather the courage to explore and learn alongside youth.
### Table 3-1. Strategies for Enhancing Efficacy in Project Learning Tree Workshops

<table>
<thead>
<tr>
<th>Source of Efficacy</th>
<th>A typical in person workshop</th>
<th>Our on-line format</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social Persuasion</td>
<td>Facilitators share tips and positive experiences</td>
<td>Video of experienced 4-H leaders sharing tips and positive experiences</td>
</tr>
<tr>
<td></td>
<td>Real-time feedback</td>
<td>Email responses with constructive feedback on assignments</td>
</tr>
<tr>
<td>Vicarious Learning</td>
<td>Live demonstrations</td>
<td>Step by step videos of activities led with youth</td>
</tr>
<tr>
<td></td>
<td>Strategies and skills modeled by instructor</td>
<td>Progression of tasks to prepare for practice using self assessment and peer review rubric</td>
</tr>
<tr>
<td>Mastery Experience</td>
<td>Practice after the training</td>
<td>Answers to anticipated needs and questions provided early on</td>
</tr>
<tr>
<td>Stress Reduction</td>
<td>Welcoming atmosphere</td>
<td>Clear instructions</td>
</tr>
<tr>
<td></td>
<td>Community building group</td>
<td>Link to email for support visible on every screen</td>
</tr>
</tbody>
</table>

### Table 3-2. Example of item modification between STEBI, STEBI-B, EEEBI, and this instrument

<table>
<thead>
<tr>
<th>STEBI</th>
<th>Even if I try very hard, I do not teach science as well as I do most subjects.</th>
</tr>
</thead>
<tbody>
<tr>
<td>STEBI-B</td>
<td>Even if I try very hard, I will not teach science as well as I will most subjects.</td>
</tr>
<tr>
<td>EEEBI</td>
<td>Even if I try very hard, I will not teach environmental education as well as I will most subjects.</td>
</tr>
<tr>
<td>Modification</td>
<td>Even if I try very hard, I will not lead Project Learning Tree activities as well as I will most other topics.</td>
</tr>
</tbody>
</table>

### Table 3-3. Efficacy Scale Results

<table>
<thead>
<tr>
<th>N</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>Significance</th>
<th>95% Confidence Interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre</td>
<td>9</td>
<td>3.97</td>
<td>0.33</td>
<td>.04</td>
</tr>
<tr>
<td>Post</td>
<td></td>
<td>4.19</td>
<td>0.34</td>
<td></td>
</tr>
</tbody>
</table>

### Table 3-4. Participants Pre and Post Efficacy Scores

<table>
<thead>
<tr>
<th></th>
<th>pre</th>
<th>post</th>
<th>difference</th>
<th>p</th>
<th>Interviewed</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>3.93</td>
<td>3.57</td>
<td>-0.36</td>
<td>0.21</td>
<td>X</td>
</tr>
<tr>
<td>2</td>
<td>4.29</td>
<td>4.29</td>
<td>0.00</td>
<td>1.00</td>
<td>X</td>
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<tr>
<td>3</td>
<td>4.07</td>
<td>4.14</td>
<td>0.07</td>
<td>0.67</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>4.43</td>
<td>4.71</td>
<td>0.29</td>
<td>0.26</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>4.21</td>
<td>4.50</td>
<td>0.29</td>
<td>0.26</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>4.14</td>
<td>4.50</td>
<td>0.36</td>
<td>0.17</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>3.57</td>
<td>4.00</td>
<td>0.43</td>
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<td>0.05</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>3.50</td>
<td>4.00</td>
<td>0.50</td>
<td>0.07</td>
<td>X</td>
</tr>
<tr>
<td>Experience teaching and leading youth</td>
<td>Pre</td>
<td>Change in Pre and Post</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>--------------------------------------</td>
<td>------</td>
<td>------------------------</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Experience with environmental education</td>
<td>.472</td>
<td>.248</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Goals</td>
<td>.841</td>
<td>.042</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Past experience with online training</td>
<td>.738</td>
<td>.478</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
CHAPTER 4
CONCLUSION

During an era when increased screen time is often seen as a threat to connecting with nature, effective online training for non-formal education providers can actually use computer-based technology as a tool to advance the objectives of environmental education. An online training was developed to overcome barriers preventing Florida 4-H leaders from accessing a popular environmental education curriculum, the Project Learning Tree PreK-8 Activity Guide. This online training program successfully encouraged participants who completed the program to go outside and discover new ways to learn and teach about the environment.

The online training program development followed an organized process using continuous evaluation to ensure the goals of the program and needs of the audience were being addressed. Program evaluation was essential to developing a training program that achieves similar goals of an in-person PLT workshop and increasing the self-efficacy of most participants who completed the online program. The results suggest that engaging, online training that provides multiple opportunities for learners to engage in self-efficacy building exercises indeed has the potential to overcome barriers, such as a lack of confidence, that prevent many educators from incorporating environmental education materials into their work.

On the other hand, online training brings new challenges to program developers. Although positive impacts to those who completed the training programs were measured, less than 30% persisted through the training to experience these benefits. Time and convenience are major reasons educators enroll in online training, however lack of time was one of the primary reason participants did not complete the training program. Participants may have had unrealistic expectations for the training program which should be addressed with marketing by providing a clear description of training expectations before participants register for the training. Interviews
also indicated participants were attracted to online training because of the flexibility of an asynchronous course. However, there may be a misconception among learners that online training take less effort or be less time. Once the training begins, participants must be engaged and motivated to direct their own learning. In the long run this may actually take more effort than attending an in-person workshop, but it is likely to have more meaningful results. Interviews with three of those who finished the program suggest they shared a sense of self-direction and commitment to learning.

Participants indicated technological complications are another major reason they did not complete the online training. Technology issues are inherent to online training and may diminish the advantage of increasing accessibility. A majority of participants who did not completing the training stopped working when reaching points when they were asked to navigate through new sections of the training interface to complete tasks such as an assignment or discussion post that required more focused attention and time. While clear instructions that anticipate learner’s questions and issues can prevent some prevent some problems, once the training begins, success is in the hands of the learner. Participants who completed the training program sought out solutions to their technology problems by contacting the training facilitator for help.

Several advantages to online training may be helpful for those who are considering embarking on this type of training program. Criticisms of single exposure workshops to disseminate activity guides suggest this one-shot program may not provide adequate ongoing support educators need to use the materials (Newstrom & Lengnick-Hall, 1990) and only lead to sporadic inclusion of environmental education activities rather than thoughtful integration necessary to build environmental literacy (Knapp, 1997). Furthermore, single exposure
workshops may not be the most effective way to disseminate materials because educators’ needs vary (Ernst, 2010). Online training can address these concerns. For example, although this online program was designed to be the equivalent of a six-hour workshop, participants completed the program over period of weeks or months. These educators had more time to consider how to actually apply and integrate environmental education into their programs. Furthermore, in-person workshops that allow educators to experience activities as students do not typically enable participants to lead an activity themselves, and particularly not with youth. Mastery experiences are the most influential source of efficacy, but, in-person workshops rarely include this opportunity. This online training guided participants through the entire process of choosing an activity, developing a plan, and then leading it with youth. A mastery experience was part of this program. Future research investigating the difference between influences from online training and in-person workshops have on self-efficacy would be valuable.

No matter what format a 4H leader receives PLT training, to use PLT materials often and successfully they need to have enough self-efficacy to do so (Bandura, 1977). While the entire experience increased participants’ efficacy, according to three interviewees, different elements of the program contributed the most to their self-efficacy. Therefore, another advantage of online training is that it can be a self-directed and customized experience. Participants are in control of how much time they spend on a topic, how many supplementary links they follow, how deeply they reflect, and whether they discuss their thoughts with peers. Because online training participants are seeking flexibility, providing an explanation about what will be required to complete the training and how the experience can be customized may decrease the attrition rate. Interviews with participants suggest each had goals and self motivation to reap the benefits of the training by gaining what they needed from the experience. This advantage could be enhanced if
participants were given more options to tailor the online training experience. For example, those who plan to use PLT activities at camp could complete a module about safety while those who plan to use PLT activities in classrooms can explore curriculum standards and expectations of teachers.

Finally, supplementary materials and ongoing support are important and can be conveyed through web sites and email (Newstrom & Lengnick-Hall, 1990). Because online training participants have already interacted with content and additional resources through an online venue, they may be more comfortable seeking additional resources and assistance through the computer and more apt to take advantage of ongoing support than their in-person colleagues.

Self-directed learning may be both an advantage and disadvantage to online professional development. In this experience, 4-H leaders who were motivated to complete the online training program were able to recognize and capitalize on learning opportunities that were relevant to their needs. This led to an increase in their self-efficacy to apply training content. Results support findings by Ernst (2010) that educators’ needs regarding professional development on environmental education curriculum materials differ. Online training has promising potential to be another strategy to provide educators with training opportunities they need to feel confident in their ability to use environmental education materials. Improving these strategies is essential to reaching the objectives of environmental education.
APPENDIX A
ONLINE TRAINING REGISTRATION FORM

Please complete the following form to help us learn a little bit more about you. Thank you.

1. Name ____________________________________________

2. Address __________________________________________

3. What is the best way to contact you?
   □ Phone ____________________________
   □ Email ____________________________

4. What county do you lead 4-H activities in? ________________

5. Are you a Volunteer □ or an Agent □?

6. How would you describe the type of 4-H groups you work with most? For example: a club, school groups, or camps. __________________________________________________________

7. What are the main project areas you usually lead? __________________________________________________________

8. Have you ever used Project Learning Tree, Project Wet, or Project Wild activities with youth before? □ Yes □ No

9. How long have you been involved with 4-H?
   □ 1 to 11 months    □ 1-2 years    □ 3-4 years    □ more than 5 years

10. Do you have other experience teaching or working with youth besides 4-H? □ Yes □ No
    If Yes, please describe briefly: __________________________________________________________

11. Please describe at least two personal goals you have for this workshop.

12. Have you ever taken an online class or training before? □ Yes □ No
    If so, please describe briefly: __________________________________________________________

13. How would you rate your confidence in using computers with 1 being very confident and 5 not at all confident?
    1  2  3  4  5

Finally, National PLT would like to know:

14. How would you describe yourself?
    □ White □ Black or African American □ Hispanic or Latino □ American Indian □ Asian
    □ Other

15. Would you like to receive the bimonthly PLTree Line newsletter via email? □ Yes □ No
Dear Participant,
Thank you for your interest in this PLT training program! As a special bonus, you have an opportunity to be part of a research project that will be part of my Master’s program here at UF. I’m studying the effectiveness of professional development trainings. If you volunteer to participate in this study you will be asked to complete a pre and post survey and allow me to use your assignments and discussions as a part of my project. Those who agree to participate and those who do not will have the exact same experience and complete all the same requirements of this training program. The questions on the training assignments must be completed to earn your PLT Certification and Guide. The only difference is whether I can use that information for my study.
I would also like to learn more about your experience with the training and PLT following your completion. I may contact you for an interview to learn more about your experience with this training program. You do not have to answer all of the interview questions and can stop the interview at any time. I will also send a very brief follow up survey three months after your completion of the training.
Your name will not be associated with your comments in any of the reports on this research that we create. All responses will be kept confidential to the extent provided by law. There are no known risks to you for participation. There is no compensation to you for participating in the study. The feedback you provide will be used to inform the development of professional development in the future.
If you have any questions or concerns, please contact me, Lindsey McConnell at the University of Florida at (352) 846-2374 or my supervisor, Martha Monroe at 846-0878. Questions or concerns about research participants' rights may be directed to the UFIRB Office, University of Florida, PO Box 112250, Gainesville FL, 32611-2250, (352)392-0433.
I have read the procedure described above, and have received a copy of this description.
☐ I voluntarily agree to participate in the following procedure.
☐ I do not agree to participate in the following procedure.

____________________________________         ________________
Participants Signature Date

____________________________________
Participants Name (printed)

Approved by
University of Florida
Institutional Review Board 02
Protocol # 2009-U-1312
For Use Through 12-30-2010
APPENDIX C
MODIFIED EEEBI

Please indicate the degree to which you agree or disagree with each statement below by circling the appropriate number to the right of the statement.

1 2 3 4 5
Strongly Disagree Disagree Uncertain Agree Strongly Agree

1. When a 4-H member becomes more comfortable learning outdoors, it is often because the leader exerted extra effort.
2. I will continually find better ways to lead activities using PLT.
3. Even if I try very hard, I will not lead PLT activities as well as I will most other topics.
4. When the behavior of a 4-H member improves, it is often due to their leaders using a more effective approach.
5. I know how to prepare to lead PLT activities
6. I am not very effective in leading outdoor activities.
7. A 4-H member's lack of engagement in outdoor activities can be overcome by good leading.
8. I generally lead activities with youth ineffectively.
9. I wonder if I have the necessary skills to lead outdoor activities.
10. I can cover all five steps of the experiential learning cycle when leading PLT activities.
11. The lack of development of Life Skills by some 4-H members can not be blamed on their leaders.
12. If 4-H members are uninterested in PLT activities it is most likely due to an ineffective leader.
13. I understand environmental concepts well enough to be effective in leading PLT activities.
14. Increased effort in using PLT will produce little change in some 4-H member's development of Life Skills.
15. I will find it difficult to explain how to prevent youth from experiencing injuries outdoors.
16. The leader is generally responsible for 4-H members developing Life Skills.
17. Given a choice, I will not assess my ability to lead a PLT activity again.
18. I am an effective 4-H leader.
19. When leading PLT activities, I will usually welcome 4-H member's questions.
20. When leading outdoor activities, I will plan safe excursions.
21. 4-H members' engagement in PLT activities is directly related to their leader's effectiveness.
22. If all five steps of the experiential learning cycle are covered, 4-H members will learn new concepts.
23. Participating in outdoor activities has little meaningful benefits for youth.
24. If parents comment their child is showing more interest in 4-H, it is probably due to the child's leader.
25. I do not know what to do to turn 4-H members onto enjoying outdoor activities.
LIST OF REFERENCES


BIOGRAPHICAL SKETCH

Lindsey McConnell is a seventh generation Floridian. She was born in Tampa, and her family moved to Miami and Jacksonville before returning the Tampa area to live in Lutz. Lindsey graduated from Vivian Gaither High School in 2003. She earned a Bachelor of the Arts from the School of Natural Resources and Environment, University of Florida in 2008. Upon completion of her bachelor’s, Lindsey thru-hiked all 2,175 miles of the Appalachian Trail. It was while on this journey she decided she would return to the University of Florida to earn her Master of Science from the School of Forest Resources and Conservation. Lindsey has also earned certificates in tropical conservation and development as well as environmental education and communication. Lindsey looks forward to beginning a career in environmental education.