The Development of Ecological Literacy Among Novice Outdoor Leaders

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ABSTRACT

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The purpose of this study was to examine the development of ecological literacy among novice outdoor leaders. Professional outdoor leaders play a central role in educating the public to use outdoor recreation areas in an environmentally responsible manner. Yet little research exists regarding the preparation of outdoor leaders to fulfill this role. To help fill this void in the literature, this study examined the development of several elements of ecological literacy among novice outdoor leaders, specifically, knowledge of environmental impacts resulting from outdoor recreation activities, a sense of self-efficacy in mitigating these impacts through education, and intended continued involvement in the field of outdoor leadership. The sample consisted of participants in courses offered by the Wilderness Education Association (WEA) May through October 2007. Results showed statistically significant increases in knowledge of Leave No Trace (LNT) principles and self-efficacy in teaching environmental ethics. However, results showed a decrease in intention to pursue further development in outdoor leadership. Recommendations for future research are included.

Approved: _____

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We have a mental map, an organization system in our minds of where we are, how we got here, and where we are going. These mental maps exist for every point we've ever been and include handrails, landmarks, and signs. They are active at every moment of every day, ensuring that we end up where we want to be. I embrace that image as I acknowledge contributors to this project, because in many ways, this thesis has been about forming a mental map. This project represents an organization system of thoughts, values, and research, all geared toward addressing sustainability; not only in how we recreate, but also in how we live.

First and foremost I'd like to thank my family, who gave me my sense of direction. Thanks, to my advisor Dr. Bruce Martin, who provided handrails aplenty: in ideas, in suggestions, in encouragement, and in pulling together surveys in the final hour. I never thought a person's research perspective could be so endearing, but that is certainly the case with Dr. Robin Mittelstaedt. I am grateful to Dr. Mittelstaedt not only for her insight on this project, but also for her genuine kindness and help in my admission to OU. Dr. David Bower should be acknowledged for bringing solid focus to my research. My good friend Jesse Jones marked the trails on this map; I appreciate his cheer and example. Erik Dahlstrom and Mike Ackerman both should be credited for sharing in the challenge. I also recognize Kelly Streeter as a calm voice guiding much of my work. A final thanks goes to the Ohio University Recreation Program, especially Ron Dingle, Jennifer Hinton, and Danny Twilley. Finally, kind regards go to Mathew Austin, Levi Dixel, and Tara Allman as you work on your own mental map.

I would like to dedicate this project to my parents, Ray and Linda.

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CHAPTER 1: INTRODUCTION

Background of the Study

“Thousands of tired, nerve shaken, over-civilized people are beginning to find out that going to the mountains is going home: that wilderness is a necessity” (Hampton & Cole, 2003, p. 205). As these thousands have increased to millions, the potential for the long lasting or permanent degradation of wilderness also increases (Cole, 1987, 1989, 1992, 1993, 1995; Cole & Dalle-Molle, 1982; Hammitt & Cole, 1998; Hendee, Stankey, & Lucas, 1978; Knight & Temple, 1995; Leung & Marion, 2000; Manning, 1999; Marion & Cole, 1996; Marion & Merriam, 1985; Marino & Reid, 2007). Numbers are a factor, but anyone who has witnessed the aftermath of a campfire turned wildfire can attest to the destructive power of one person on wilderness. From this awareness, individuals, agencies, and organizations have developed ways to protect the wilderness from humans. Awareness of the need to protect natural resources in the United States began to emerge in the 1800s, especially after Frederick Jackson Turner’s 1893 thesis declaring the western frontier closed (Martin, Cashel, Wagstaff, & Breunig, 2006). The closure illustrated a changing perception of the West, from boundless frontier with an endless supply of resources, to a finite resource (Martin et al., 2006). This fundamental awareness of a carrying capacity for natural areas set the groundwork for future legislation aimed at preserving and protecting pristine natural places.

While protecting natural areas in general was never a simple task, protecting them became very challenging in the 1950s. Economic development, greater accessibility through improved transportation, advancements in technology, access to information, and

a desire to escape the crowds all contributed to a post-war bulge in Americans' use of the backcountry (Turner, 2002). Outdoor recreationists began to ask, perhaps for the first time, if there was a need to protect backcountry areas from recreation impacts (Sierra Club Bulletin, 1946). However, outdoor recreationists were not the only ones noticing the impact of wilderness visitors on natural places. A 1960 *Saturday Evening Post* article reported on the threat to a New Mexico wilderness by hordes of hikers, motorized recreationists, and Boy Scouts trying to live off the Land (as cited in Turner, 2002). Recognizing not only the much larger threat of resource extraction, but also their own impact on the wilderness, the wilderness advocacy community (including the Sierra Club, Outward Bound, and other outdoor recreationists) worked to pass the Wilderness Act, which was signed into law by Lyndon B. Johnson (Harvey, 2005). The Wilderness Act of 1964 "institutionalized an idea" (The Wilderness Society, n.d.) as it set aside 9.1 million acres of land as federal protected wilderness "devoted to public purposes of recreational, scenic, scientific, educational, conservation, and historical use" (Wilderness Act of 1964, Section 4a, b). The Act described wilderness as "an area where the earth and its community of life are untrammeled by man, where man himself is a visitor who does not remain" (Wilderness Act of 1964, Section 2c). A fundamental paradox exists at the heart of Wilderness Act, as it is meant to both be "untrammeled by man" and "devoted to public purpose of recreational uses..." (Wilderness Act of 1964, Section 4a, b; Section 2c). Just one year after the passage of the Wilderness Act, Paul Petzoldt, first chief mountaineering instructor for Outward Bound USA, founded the National Outdoor Leadership School (NOLS). Petzoldt, who had long been guiding users into wilderness,

knew first-hand the impact caused by wilderness trips, especially by those less experienced in backcountry travel (Absolon, 1995). In an interview, Petzoldt stated:

I wasn't a way out person, I didn't think we shouldn't cut a tree...but I was in favor of the wilderness bill (later the Wilderness Act). I testified before Congress on the wilderness bill. At the same time, here we were at Outward Bound taking people out and devastating the wilderness. Bad camping, crapping all over...I was dismayed at the ideas kids were getting about how to treat the wilderness. (Absolon, 1995, ¶40)

NOLS represented a concerted effort to train “wilderness skills and leadership that serve people and the environment” (NOLS About Us, n.d., ¶1). The efforts of NOLS and Petzoldt were perhaps ahead of their time, as the Wilderness Act did not solve the preservation issue, the Act merely set aside the land providing little instruction on how to manage or protect it. Management and protection of the Wilderness became the center of debate leading into the late 1960s.

The late 1960s marked a two-sided debate on how to run the new Wilderness areas. One side advocating stringent visitation limits aimed at pristine wilderness preservation and the other side arguing for wilderness protection use prioritized by human recreation (Turner, 2002). In 1972, Brock Evans, Sierra Club Pacific Northwest Representative, as well as other outdoor recreationists pointed out that “recreation is a named purpose of the Wilderness Act, in fact, it is the first named purpose, which is out of alphabetical order” (as cited in Turner, 2002, p. 472). The debate was largely settled in the early 1970s with the adoption of a balance between use and preservation (Turner,

2002). This solution, pioneered in many ways by Petzoldt (Absolon, 1995), represented a “new wilderness recreation ethic—minimal-impact camping, which promised to open wilderness for a better-educated wilderness visitor” (Hart, 1972, p. 5). The pragmatic balance between use and preservation depended on educating the public to minimize environmental impacts resulting from use of natural areas for recreational purposes. Attempts to educate the public came in the form of books such as Harvey Manning’s *Backpacking, One Step at a Time* (1972), Paul Petzoldt’s *The Wilderness Handbook* (1974), and John Hart’s *Walking Softly in the Wilderness* (1977). In addition, the U.S. Forest Service (USFS) introduced educational programs in the mid-1970s that provided “no-trace” travel and camping tips (Marion and Reid, 2001, p. 3). This later evolved into the Leave No Trace principles and practices commonly used today. In 1977, another important development in promoting the balance between use and preservation was the creation of the Wilderness Use Education Association (WUEA), which later became the Wilderness Education Association (WEA; Drury, Bonney, Bereman, & Wagstaff, 2005). The motive of Petzoldt and co-founders Frank Lupton, Bob Christie, and Chuck Gregory for establishing the WEA was to promote the professionalism of outdoor leadership and thereby advance safe and environmentally responsible use of the natural environment (WEA, About Us, n.d., ¶1). The importance of education continues in maintaining the balance between use and preservation as revealed by Max Peterson, former Chief of the USFS, who stated: “wilderness management is 80-90 percent education and information and 10 percent regulation” (Marion & Reid, 2001, p. 1).

Significance of the Study

The World Commission on the Environment Development (1987) stated: “The world’s teachers... [are said to] have a crucial role to play in bringing about the extensive social changes needed to address an environmental crisis” (p. xiv). Certainly, outdoor leaders are teachers, as teaching and facilitation is the fourth of eight core competencies identified by Martin et al. (2006). In no small way outdoor recreation leaders facilitate the connection between their participants and the natural environment, which can contribute to the necessary environmental consciousness shift needed to address the environmental crisis (Grimwood, 2005; Hanna, 1995; Jordan, 1996). One question might be: How do outdoor leaders facilitate that connection? Ibrahim and Cordes (1993) make the point clear: “The more time we spend outside, the more we seem to learn about our environment and the need to live in harmony with it” (p. 385). Russell (1999) also contributed to the concept by showing that nature experiences lead to concern for nature, followed by a commitment to nature, and finally action for nature. Based on this, one might be tempted to believe that simple exposure to nature will lead to a greater regard for the natural environment. However, some outdoor recreation activities have been shown to further disconnect humans from the natural environment (Haluza-Delay, 1999b, 2001). Therefore, developing ecological literacy among outdoor participants requires specific techniques. Outdoor leaders and organizations have a unique responsibility in structuring how and what to teach their participants because their actions will impact their participants’ future behavior and feelings for the environment (Hanna, 1995).

The WEA is one program working toward the goal of a more ecologically literate citizenry. As such, the WEA provides a good setting for examining educational techniques and the success of those techniques in preparing future outdoor leaders to promote environmental concern among their program participants. The WEA was founded with the mission of “promoting the professionalism of outdoor leadership and to thereby improve the safety of outdoor trips and to enhance the conservation of the wild outdoors” (WEA About Us, n.d.). “Preservation through education” is the WEA’s tagline (WEA About Us, n.d.). The importance of this particular population is based on the premise that participants in the WEA courses are future outdoor leaders themselves, aspiring to gain the knowledge and expertise needed to take others into the wilderness.

Little research has been conducted that focuses specifically on the development of competency in the realm of environmental stewardship (or ecological literacy) among potential outdoor leaders (see Duenkle, 1994; Hanna, 1995; Paisley et al., 2008). Nonetheless, many outdoor organizations like the WEA, Outward Bound, NOLS, and the Boy Scouts of America consider themselves sources of such developments through their leadership development programs and courses. Such research is valuable, because it can help determine best practices for programs and courses such as these. It can help improve these programs in their attempts to promote positive environmental change. If participants in such courses experience a positive ecological shift, the influence of wilderness education programs in addressing larger environmental concerns might be more fully recognized. Further, identifying best practices for such programs would establish models that could be adopted by other educational programs working to develop

ecological literacy in their participants. Such studies are essential for achieving the goal of utilizing education as a means of protecting the environment.

Statement of the Problem

The purpose of this study was to examine the development of ecological literacy among novice outdoor leaders. Specifically, it examined the effectiveness of the WEA in preparing its course participants to become more ecologically literate citizens vis-à-vis their roles as outdoor leaders. The development of ecological literacy among novice outdoor leaders presents a potential for addressing both wilderness and more general environmental issues.

Summary

Chapter 1 introduces the reader to the background, key literature, and significance of this study. Further, it is designed to provide the framework for the rest of the paper and prepare the reader for the concepts that follow.

Chapter 2 presents a review of literature and highlights pertinent research on which the study builds. Chapter 2 underscores the current state of research in this area and the theoretical concepts of the study, including: ecological literacy, self-efficacy, Leave No Trace (LNT), leadership development, and the WEA. These concepts are drawn from a variety of disciplines and not confined to the field of recreation and leisure.

Chapter 3 outlines the methodology used in the study. It provides a description of the research design, sample, delimitations, data collection, and data analysis used for the study.

The findings of the study are presented in Chapter 4. Significant results of the study are presented. Chapter 4 concludes by revisiting the study's research questions and responds to each using key findings of the study.

The results are discussed in Chapter 5. Implications for both practice and future research are considered. Further, Chapter 5 underscores limitations of the study and provides recommendations for future research.

CHAPTER 2: REVIEW OF THE LITERATURE

The aim of Chapter 2 is to provide a foundation for this study through a discussion of key concepts related to the development of ecological literacy among WEA course participants. This chapter addresses the following points: ecological literacy, self-efficacy, LNT, WEA, and leadership.

Ecological Literacy

To understand ecological literacy, the first step is to provide context for the development of the term. Tozer, Violas, and Senese (1998) pointed out that there are varying degrees of literacy: conventional literacy, functional literacy, cultural literacy, and critical literacy. At the most basic level, conventional literacy is the ability to read and write in one language (Tozer et. al., 1998). Functional literacy provides the ability to use language to accomplish certain goals and to function in society (Tozer et. al., 1998). A more advanced form is cultural literacy, which allows an individual to communicate within and across particular cultures and cultural frameworks (Tozer et. al., 1998). The most advanced form of literacy is critical literacy, which allows for critical analysis of the written word as well as cultural frameworks and discourses (Tozer et. al., 1998). This type of literacy “refers not only to the ability to read, but the ability to read between the lines about what is going on in a society for the sake of becoming a critical, conscientious participant in that society” (Martin, et al., 2006, p. 213).

While Tozer’s et al. (1998) framework is structured to deal with human-to-human interaction, it has been adapted to represent human interactions with the natural world. Applied within the context of human interactions with the natural world, the concept of

critical literacy is thought of in terms of ecological literacy (Cutter-Mackenzie & Smith, 2003; Martin et al., 2006; Orr, 1992). According to Orr (1992), ecological literacy involves “knowing,” “caring,” and “practical competence” (p. 10). In other words, ecological literacy combines both our understanding of the natural world and our proper position as members in it (Orr, 1992). Orr (1992) pointed out that ecological literacy involves becoming a citizen of the environment, to learn about its issues and take appropriate action to address them. Hence, outdoor leadership programs must go beyond promoting simple conventional and functional literacy, which one might interpret as knowing LNT as vague wilderness rules, to ecological literacy, which equates to developing individuals who understand the rationale for LNT, and who are willing to promote and teaching LNT principles and practices to others. The WEA positions itself in this context to create leaders who will take positive action not only in their personal behavior, but also in their willingness to teach LNT principles and practices to their future clients and students.

Volk (1993) identified five levels of learning for ecological literacy: environmental sensitivity, in-depth knowledge of issues, issue investigation skills, citizenship skills, and internal locus of control. Volk (1993) went on to identify four curriculum levels for establishing and forming these five levels of learning for ecological literacy. The first curriculum level is the ecological foundation level, which involves “developing sufficient ecological knowledge to make sound decisions with respect to ecological issues” (Volk, 1993, p. 54). The second curriculum level is the conceptual awareness level (issues and values), which refers to “how individual and collective

actions influence quality of life and quality of the environment” (Volk, 1993, p. 54). The third curriculum level is the investigation and evaluation level, which refers to the “knowledge and skills necessary to investigate and evaluate problems and solutions” (Volk, 1993, p. 55). The fourth level involves “training in and applying skills necessary to take positive environmental action” (Volk, 1993, p. 56), indicating a willingness to act on the part of the student.

This study examined two of the four curriculum levels. First the researcher evaluated general knowledge, pertaining to the ecological foundation level, measuring the overall growth in knowledge using the Leave No Trace Practices Inventory (LNTPI) scale (Martin, Norling, & Sassani, 2006). The fourth level, taking positive action, is examined through an analysis of students’ intended future involvement and sense of self-efficacy in making positive change through promoting LNT principles and practices.

Self-Efficacy

Considerable literature and research has been invested in Bandura’s (1977) concept of self-efficacy. Its value in predicting continued involvement and successful outcomes makes the concept of primary significance in this study (Bell, 2005; Ewert, 1989; Gass, Garvey & Sugerman; 2003; Hinton, Twilley, & Mittelstaedt, 2007; Jones, 2007; McAuley, et al., 2006, Propst & Koesler, 1998; Sibthorp, 2003; Sylvia-Bobiak & Caldwell, 2006; Walsh & Golins, 1976). Self-efficacy represents individuals’ judgment of their capability to deal with possibly new and unknown challenges based on prior experience (Bandura, 1977). Put another way, self-efficacy is a self concept, generated from outcomes in other life situations, providing individuals with a sense of their

probability of success in dealing with new situations or activities. As an example, consider the self-efficacy of a seasoned 50-year-old Paul Petzoldt climbing an unexplored mountain range versus the same man, 34 years younger. The seasoned Petzoldt writes of summiting the Grand Teton at the age of 16 with a friend both of whom were true novice climbers: “we succeeded through sheer guts and luck, we were improperly dressed, had insufficient food and inadequate equipment, knew nothing of snow and ice techniques and very little about rock climbing (Petzoldt & Ringholz, 1984, p. 23). Clearly, the older Petzoldt has greater self-efficacy, having numerous successful experiences in climbing and years of field experiences dealing with the elements and dangers of mountain travel, as compared to an inexperienced younger, self.

Bandura (1977) identified four hierarchical sources for individual self-efficacy: performance accomplishments, vicarious experiences, verbal persuasion, and emotional arousal. Performance accomplishments involve successful attempts at a desired outcome or continued attempts until the desired outcome is reached (Bandura, 1977). The second level for individual self-efficacy, vicarious experiences, involves breaking perceived limitations by observing a friend or coach complete the desired outcome (Bandura, 1977). The third source for self-efficacy development is verbal persuasion, wherein a coach or teacher provides feedback to the individual with verbal cues or suggestions (Bandura, 1977). Verbal persuasion is weaker than both vicarious experience and performance accomplishment for developing self-efficacy (Bandura, 1977). While verbal feedback is helpful, it does not provide the real experience for the individual to build upon their self-efficacy. The final and weakest form of self efficacy development is emotional arousal,

wherein the arousal state is at a tolerable level to allow the individual emotional safety in attempting the activity (Bandura, 1977).

As mentioned, the concept of self-efficacy has been used by numerous disciplines to predict continued participation in a variety of activities. Propst and Koesler (1998) explored the role of self-efficacy in continued participation in outdoor leadership development. The path model that they developed in their study served as part of the conceptual basis for this study (see Figure 1).

Figure 1. Path model of continued participation in outdoor leadership development activities. From “Self-Efficacy and Outdoor Leadership Outcomes” by D. Propst & R. Koesler. 1998, *Leisure Sciences*, 20, p. 323. Copyright 1998 Leisure Sciences. Reprinted with permission (see Appendix F).

In the study, Propst and Koesler (1998) found significant gains among National Outdoor Leadership School (NOLS) participants in both short and long term self-efficacy, yet the full path model was not significant. Propst and Koesler (1998) argued that the lack of significance related to the differing ways males and females respond to immediate feedback, task performance, and mentoring. An important recommendation from Propst and Koesler (1998) was the need to “examining populations of outdoor leaders, not just students who are currently taking courses” (p. 341). Since the participants in Wilderness Education Courses are potential outdoor leaders, this recommendation was somewhat addressed, particularly regarding the National Standards Program participants. Regardless of the limitations of Propst and Koesler’s study, the researcher felt the best indicator of leadership competency is the intention to develop leadership abilities through continued participation in outdoor recreation (1998). Studies such as this one continue to validate the usefulness of Bandura’s concept and illustrate the value of self-efficacy in predicting continued involvement and successful outcomes.

The Wilderness Education Association

The WEA was created in 1977 having as “...its sole purpose the development and promotion of an educational curriculum to create knowledgeable users of the wild outdoors and to train and certify leaders who could instruct others” (Petzoldt & Ringholz, 1984, p. 14). This initial vision still resonates in the current mission of the WEA. The mission of the WEA is to “promote the professionalism of outdoor leadership and thereby improve the safety of outdoor trips and enhance the conservation of the wild outdoors (WEA About Us, n.d., ¶ 1). At present, the WEA is the only organization offering

outdoor leadership certification. This certification process came about because Petzoldt and the co-founders of the WEA saw a need for professional outdoor leaders (Drury et al., 2005). By creating professionalism within the industry, outdoor leaders in the WEA could provide safer, more enjoyable outdoor experiences that would also preserve the natural environment (Drury et al., 2005). Clearly, the need for professional outdoor leaders served as one solution for the growing numbers of novice outdoor enthusiasts who threaten themselves and the environment.

Although the WEA stands as a unique organization, it is historically connected to both Outward Bound USA and the NOLS through its co-founder Paul Petzoldt. Petzoldt served as the first chief instructor of Outward Bound USA and in 1965 founded NOLS. He is noted for a variety of accomplishments regarding the outdoors, and for developing professionalism in the outdoor industry. Highlights of these accomplishments include: summiting the Grand Teton at the age of 16; directing the Petzoldt-Exum School of American Mountaineering; participating in the first American expedition to K2 in the Himalayas; teaching evacuation and cold-weather dress to U.S. ski troops in 1938; testifying before Congress to help bring about the 1964 Wilderness Act; writing *The New Wilderness Handbook*; founding NOLS and developing some of the first Leave No Trace techniques; and co-founding the WEA with Frank Lupton, Bob Christie, and Chuck Gregory (Drury et al., 2005, p. 313).

Currently, the organization is a “decentralized non-profit, offering three distinct courses through its roughly 50 affiliates to approximately 200 students per year” (Drury et al., 2005, p. 310). Courses may be offered anywhere in the U.S. or abroad as long as

they are sponsored by a WEA affiliate and run by a WEA certified instructor. The three courses available are the Professional Short Course (PSC), the Wilderness Steward Program (WSP), and the National Standards Program (NSP). For a more complete explanation of the WEA course types, please refer to Appendix E. In 2005, the WEA partnered with The Leave No Trace Center for Outdoor Ethics to be an official provider of the Leave No Trace (LNT) Master Educator course (Goldenberg, 2007). At present, the WEA is second only to NOLS in the number of Master Educator courses taught (Williams, personal communication, February 15, 2008).

The Leave No Trace Center for Outdoor Ethics

The Leave No Trace Center for Outdoor Ethics is an international nonprofit organization dedicated to promoting and inspiring responsible outdoor recreation through education, research and partnerships. In the words of the center: “[we are] dedicated to the responsible enjoyment and active stewardship of the outdoors by all people, worldwide” (LNT About Us, n.d., ¶ 1). LNT is both a curriculum and an ethic for interacting with nature that seeks to minimize human impact on the natural environment. The origins of the “leave no trace” program date back to the 1970s when the USFS wilderness managers developed a minimum impact camping message/brochure to reduce degradation of their management areas (Marion & Reid, 2001). These types of messages (although not using the actual terminology “leave no trace”) developed as early as the late 1960s by the Bureau of Land Management and the National Park Service under names such as “Wilderness Manners,” “Wilderness Ethics,” “Minimum Impact Camping,” and “No-Trace Camping” (Marion & Reid, 2001, p. 3). Among land management agencies,

early preservation efforts targeted visitor impact problems themselves, not uninformed users who either did not realize, or underestimated, the damage they were causing. The failure of these early regulations in preserving wilderness led to creation of educational efforts to inform wilderness users (Marion & Reid, 2001, p. 4). Formal recognition of this need for educational outreach came in 1979 when Jim Bradley, a USFS wilderness specialist outlined flaws in the regulatory approach (Marion & Reid, 2001, p. 4). The problems in a strictly regulatory approach, Bradley (1979) pointed out, included the difficulty in enforcing regulations in such vast territories, the alienation of patrons versus winning their support, and the realization that most destructive acts in the wilderness are the result of a lack of knowledge. Bradley was not the only person writing about the need for education of wildland users. According to Marion and Reid (2001), other outdoor leaders were also writing about wilderness ethics and practices during this time: Paul Petzoldt (*The Wilderness Handbook*, 1974); Hart (*Walking Softly in the Wilderness*, 1977), Waterman and Waterman (*Backwoods Ethics: Environmental Concerns for Hikers and Campers*, 1979). Clearly, the momentum was forming for a strong educational program to address visitor impact to wild places. However, without adequate funding or leadership, the initial leave no trace concept remained a part of the USFS educational program, but was not formally developed until 1990 (Marion & Reid, 2001).

In 1990, the USFS commissioned the NOLS to create an educational program to promote the leave no trace wilderness ethic (Marino & Reid 2007). NOLS was founded in 1965 by Paul Petzoldt “to be the leading source and teacher of wilderness skills and leadership that serve people and the environment” (Marion & Reid, 2001, p. 5). In 1991,

a Memorandum of Understanding (MOU) between NOLS and USFS was signed, formally recognizing the partnership (Marion & Reid, 2001, p. 5). Using the experiential model and data from Hampton and Cole's 1988 book, *Soft Paths*, NOLS created curricula for teaching LNT (Marion & Reid, 2001, p. 5). The curriculum was designed to cover all aspects of wilderness travel as well as unique environments like alpine tundra, deserts, coastal waterways, and caves.

The seven core principles and practices of LNT are:

1. Plan Ahead and Prepare: Consider your location and have items necessary for safety and comfort;
2. Travel and Camp on Durable Surfaces: Erosion and soil impaction permanently damage the landscape, use surfaces that provide maximum resiliency;
3. Dispose of Waste Properly: Human wastes of all types can damage the natural ecology of an area; know the appropriate ways of protecting areas from human visits;
4. Leave What you Find: A variety of natural, historical, and cultural artifacts make wilderness exciting, leave those items others to enjoy;
5. Minimize Campfire Impacts: Fires scar the landscape and can change the ecology of an area;
6. Respect Wildlife: Wildlife needs to be kept wild, keeping them so requires that humans do not disrupt their normal and natural routines and habits;

7. Be Considerate of Other Visitors: Most wilderness is a shared resource; therefore individuals must act in ways that respect the rights of other users (LNT Programs, n.d., ¶1)

In 1991, the first LNT Masters Educator course was conducted for agency staff in the Wind River Mountains of Wyoming (Marion & Reid, 2001, p. 5). The initial course, Master Educator was designed as a four-day experiential program to take place in backcountry setting for educators who would train others to train the public (Marion & Reid, 2001, p. 5). Three additional courses were added, including the Trainer course, Workshops, and Public contacts (Marion & Reid, 2001, p. 5). As other agencies began partnering with this new national program, the need for a non-profit organization became evident. In 1994, LNT, Inc. came into existence as a 501(c)(3) non-profit educational organization, with the backing of 24 agency, commercial, and non-profit partners (Marion & Reid, 2001, p. 5). At present, LNT represents the de facto environmental ethic of many organizations in the United States and the organization boasts thousands of courses and millions of participants in a variety of curricula each year (LNT Programs, n.d., ¶2). As Paisley et al. (2008) noted, LNT is not just a curriculum, it is an environmental ethic, and blends the lines of “how students learn” and “what students learn” (p. 216).

Leadership

The WEA mission underscores the importance of outdoor leadership. According to Petzoldt, “...outdoor leadership is defined as the ability to plan and conduct, safe, enjoyable expeditions while conserving the environment” (1984, p. 42). This concise

definition seems to only hint at the complexity of outdoor leadership, nonetheless it provides an excellent starting point. Considerable literature has accumulated regarding the issue of outdoor leadership (Drury, Bonney, Bereman, & Wagstaff, 2005; Ford, 1987; Graham, 1997; Green, 1981; Martin et al., 2006; Priest, 1986; Priest & Gass, 1997; Swiderski, 1981). Yet at the very basic level, leadership is “a special case of interpersonal influence that gets an individual or group to do what the leader wants done” (Schermerhorn, Hunt, & Osborn, 2005, p. 270). Priest called leadership the process of influence (as cited in Ajango, 2000). The outdoor component simply gives context to the leadership concept. However, due to the inherent risks of wilderness travel and the potential for accidents in the outdoors, there is a need for competent leadership, as errors in leadership or inability to inspire followership can lead to deadly consequences. In the business model of leadership, the ineffective leader’s outcomes are low profits and downsizing. In outdoor leadership, ineffective leader’s outcomes could possibly include death or serious injury of participants and/or permanent damage to the natural environment.

While the concept of outdoor leadership development is complex and debatable, this text will focus on outdoor leadership development as it pertains to the last point of Petzoldt’s definition: conserving the environment. According to the *The Backcountry Classroom*, outdoor leadership can be divided into the following categories: “the four cornerstones of leadership, essential leadership qualities, leadership traits, and personal qualities” (Drury et al, 2005 p. 349). Others in the field have identified core competencies necessary for outdoor leadership (Buell, 1981; Martin et. al.; 2006, Priest,

1986; Priest & Gass, 1997; Raiola, 1995; Swiderski, 1981). Martin et al. (2006) categorized the core competencies in terms of “foundational knowledge, self-awareness and professional conduct, decision making and judgment, teaching and facilitation, environmental stewardship, program management, safety and risk management, and technical ability” (p. xv). While all of these areas are imperative for the development of outdoor leadership, for the purpose of this study, the researcher is primarily concerned with environmental stewardship.

While the answer may seem self-evident, one must ask why is environmental stewardship considered a core competency? As popularity of outdoor adventure recreation participation increases (Luckner, 1994; Peart, 1995; Raiola & Sugerman, 1999; Ranney, 1991) protecting recreation areas from participants has become more and more of a priority, as discussed in Chapter 1. Therefore, as Searle and Brayley (1993) pointed out, wilderness recreation leaders have an obligation to influence their participants toward a stronger regard for the natural environment. Since outdoor leaders are often providing the first or sometimes the only interaction individuals have with a pristine environment, they strongly influence the ethic and mentality their clients formulate (Hanna, 1995).

The ethic participants embrace seems to be set upon a continuum. On one end of the continuum, participants may develop a greater regard for the natural environment (Russell, 1996). Ibrahim and Cordes (1993) noted that as our time outside increases, so too does our concern to live in harmony with the environment. Martin (1999) echoed this sentiment, writing: “The direct connection between lived experience and environmental

concern is to be expected” (p. 463). On the opposing end of the continuum, an ethic of “conquering” nature or a mentality of nature as out-there or separate may develop (Haluza-Delay, 1999a, 1999b). Wilderness experiences that increase the rift between humans and the environment are in direct contradiction to the mission espoused by many wilderness programs (Van Matre, 1990). Henderson (1999) illustrated this point well, stating that outdoor recreation and education leaders “have the opportunity to provide a framework for thinking and acting that can help individuals to understand their value and responsibility in the world” (p. 80). Therefore, not only are outdoor leaders preserving the area for others to enjoy, but also they are helping to formulate the environmental ethics of their participants. If they fail to instill the necessary values or ethics, the potential for lasting damage to the environment is tremendous. The issue is compounded when considering training organizations, like university programs, NOLS, and the WEA. These institutions in many ways represent an introduction to appropriate environmental ethics, a core competency among developing for outdoor leaders. The ethic these institutions impart affects leaders, and by proxy, the multitudes of potential participants under the leaders’ influence in the future.

Outdoor leadership organizations might consider a two-pronged approach toward developing future outdoor leaders in ecological literacy. The first approach must address the would-be leaders’ values, because ecological literacy begins at the value level. Hill (2005) provided one example of this, claiming that most modern people lack the humility to realize their appropriate place in the world. The second approach must focus on

developing leadership qualities that will allow potential leaders to exert influence over their future participants; specifically, values of the natural environment.

In addressing the first issue, one strategy outdoor organizations might assume to address participant values is transformational learning. Cranton (2002), coming from education as a discipline, stated: “In teaching for transformation, teachers set the stage and provide the environment in which students can articulate and critically reflect on their assumptions and perspectives” (p. 63). What better environment could be available for students to grapple with issues of preservation than the very places that need to be preserved? The challenge for instructors then is to set the stage. Fortunately, the core of transformative learning theory is “elegantly simple” (Cranton, 2002, p. 64). Cranton (2002) described it as such:

Through some event, which could be as traumatic as losing a job or as ordinary as an unexpected question, an individual becomes aware of holding a limiting or distorted view. If the individual critically examines this view, opens herself to alternatives, and consequently changes the way she sees things, she has transformed some part of how she makes meaning out of the world. (p. 64)

Therefore, organizations providing outdoor leadership training must engage in challenging participant assumptions and facilitating the critical examination of those assumptions as they relate to the natural environment. Conducting this examination in the wilderness provides the optimal sense of place. Asking students to minimize campfire impact, a LNT principle, is a prime example. If students hold to the long standing notion that campfires are an indispensable aspect of camping, asking them to

assess that assumption when confronted with an overused campsite devoid of sticks or low branches may be the ideal situation in which to create transformative learning.

Once student leaders have assessed and critically reflected on their own assumptions regarding the natural environment, outdoor leadership organizations may engage the learner in leadership strategies that will influence would-be leaders' future participants. Jordan (1996) referred to this as transformational leadership potential, in which wilderness recreation leaders promote values of environmental stewardship.

According to Bass (1990), writing from the management field:

Transformational leadership occurs when leaders broaden and elevate the interests of their employees, when they generate awareness and acceptance of the purposes and mission of the group, and when they stir their employees to look beyond their own self-interest for the good of the group. (p. 21)

Outdoor leadership organizations need leaders who will accept the mission of the group, in this case, the mission of preserving the natural environment and promoting that mission to their participants. In line with Burns (1978) concept of transformational leadership, outdoor leaders must change the framework by which participants value the natural environment. As Martin et al. (2006) underscored, transformational leadership is the "prototype of leadership that most people have in mind when they describe their ideal leader" (p. 47). Developing this ideal leader who inspires a value for ecological literacy through transformative learning is a key for outdoor organizations to truly preserve the natural environment.

Statement of the Problem

This study aims to assess the development of ecological literacy among WEA course participants. The researcher found prior research dealing directly with the leadership development among outdoor leaders (Drury et al., 2005; Ford and Blanchard, 1993; Green, 1981; Martin et al., 2006; Priest, 1986; Priest & Gass, 1997; Swiderski, 1981), but significant research has not addressed the development ecological literacy among outdoor leaders. By blending self-efficacy and continued involvement as proposed by Propst and Koesler (1998) and including knowledge development, the researcher has attempted to identify how LNT knowledge and self-efficacy contribute to ecological literacy amongst potential outdoor leaders. Hence, this study focuses on (a) WEA course participants' development of personal responsibility for the natural environment; (b) participants' development of ecological literacy as a result of attending a WEA course; and (c) tools useful in analyzing and documenting personal responsibility for the natural environment, self efficacy, continued participation, and ecological literacy.

Summary

Chapter 2 illustrates essential prior literature pertaining to this study. A discussion of the areas of ecological literacy, self-efficacy, LNT, WEA, and leadership were addressed to provide context for this study. In Chapter 3, the methodology of the study is addressed.

CHAPTER 3: METHODOLOGY

Introduction

Chapter 3 includes the following subsections: research design and operational definitions, sampling, instrumentation, pilot study and revisions, data collection procedures, and data analysis procedures.

Research Design

Within the scope of the study, a variety of key variables existed. The primary independent variable or treatment was a WEA course. This included any of the three types of courses: National Standards Program (NSP), Wilderness Stewards Program (WSP), and Professional Short Course (PSC). Variables that were controlled for in the study included (a) type of WEA course the participant completed and (b) years of experience the participant had as an outdoor leader. There is one dependent variable in the study--ecological literacy. Participants' development of ecological literacy is measured by (a) increase in knowledge of and intention to follow LNT principles and practices (measured by their LNTPI score), (b) increased self-efficacy in teaching environmental ethics (measured by ecological self-efficacy score), and (c) intended continued participation score (measured by continued participation score).

Instructors of the WEA courses were surveyed for a variety of reasons. First, the researcher wanted to obtain a baseline of ecological self-efficacy, or in other words, a model of self-efficacy attainable by student participants. Instructors also completed an Intended Educational Strategy Scale to help delineate preferred educational strategies used by instructors. Identifying pedagogy promoting ecological literacy was an initial

goal of this study; however, this goal was set aside because it proved to be beyond the scope of this project.

Sample

The sample is a convenience sample generated from participants who enrolled in various WEA courses during the spring and summer of 2007. Participants who engaged in the study were members of course groups who completed the majority of their training in the following wilderness areas: Weminuche Wilderness, CO; Cape Lookout, NC; Sequoia and Kings Canyon, CA; Chattooga River, SC; Pisgah, NC; Moshannon and Michaux State Forest, PA; Wind River Range, WY; and Glacier Bay, AK. Generally, survey respondents ranged from 19 to 25 years in age and had some form of higher education beyond high school. Further, respondents frequently identified themselves as future outdoor leaders and had more outdoor experience and LNT awareness than might be expected from the a random citizen of the United States. Data were drawn from nine different WEA courses that went into the field over the summer and fall of 2007. Five of these courses surveyed fell under the WEA's category of NSP; two were labeled as a PSC; and two were labeled WSP. These three courses differ in time in the field and pace of material covered, but the general goal to develop environmentally responsible outdoor leaders is the same. These courses were sponsored by WEA affiliates and run by certified WEA instructors, facilitating the WEA's 18-point curriculum for the development of outdoor leaders. Primarily, students in WEA courses are potential outdoor leaders working towards a bachelor's degree in the outdoor education/recreation field or practitioners currently working in the field of outdoor education.

Delimitations of the Study

Delimitations for this study include:

1. Only students and instructors involved in a WEA course during the summer of 2007 could participate.
2. Only individuals who were part of a WEA course and whose course sponsor and lead instructor agreed to administer the instrument were included.
3. Researchers were not present at the time of pre/post testing and could not provide consistent instructions or exact instrument completion guidelines.
4. Because of the length of the instrument, survey fatigue may have contributing to responses, especially in the qualitative sections of the survey.

Instrumentation

Data were collected using a paper-and-pencil survey. Participants completed a pretest at the beginning of their WEA course and a posttest at the conclusion of their course. The participant survey is divided into three sections. Section one is based on a scale called the Leave No Trace Practices Inventory (LNTPI) developed by Martin, Norling, and Sassani (2006, unpublished manuscript) to assess the LNT practices of Philmont program participants. The original version of the LNTPI included 30 items assessing Leave No Trace practices along five domains representing five of the LNT principles, including *travel and camp on durable surfaces*, *dispose of waste properly*, *minimize campfire impacts*, *respect wildlife*, and *courtesy to others*. The scale was modified for this study to include two additional domains, *plan ahead and prepare* and *leave what you find*. Items for the instrument were derived directly from the LNT *Master*

Educator Handbook (Tilton, 2003). Students responded to statements using a 5-point Likert-type scale (0 = strongly disagree to 5 = strongly agree). In addition to the Likert-type scale to assess the students' LNT practices, the researchers also requested a qualitative explanation of "why" the student acted in a particular way. The purpose of this open-ended question was to identify whether students understood the underlying reasoning for the LNT principles and practices. It was hypothesized that students might know the LNT practice, but not the logic behind the rule, making them simple followers and less likely to promote the LNT principles and practices to others. For the purposes of the study, this qualitative explanation was not examined.

Both sections two and three of the survey were influenced by Propst and Koesler's (1998) work on the development of self-efficacy as a path toward continued participation in outdoor leadership. Propst and Koesler developed a hypothesis that mentoring, feedback, and goal attainment led to self-efficacy, which in turn created continued participation in outdoor leadership development opportunities. Clearly, the concepts of self-efficacy and continued participation weighed heavily on this study, as it had in Propst and Koesler. Through their work, Propst and Koesler found significant improvements in both short and long-term self-efficacy, but noted that continued participation did not increase. Further, their work revealed that men and women differed in how they responded to mentoring and feedback (Propst & Koesler, 1998).

Section two of the survey evaluates participants' intended continued involvement in ecological literacy development. Questions relate to respondents "intended" behavior regarding continued education, such as *subscribing to a magazine, attending a workshop,*

or attaining a position. Respondents could rate their intention as either “yes,” “no,” or “unsure.”

Section three of the survey, the Ecological Self-Efficacy Scale (ELSS), evaluates the development of self-efficacy in teaching and promoting environmental ethics to others. Items in the instrument assess respondents’ feelings when teaching or leading others in environmental stewardship. Students responded to statements using a 5-point Likert-type scale (where 0 = “strongly disagree” and 5 = “strongly agree”). Section three is based in part on the Outdoor Recreation Self-Efficacy (ORSE) scale (Mittelstaedt & Jones, 2008), whose instrument proved to be highly reliable ($\alpha = .950$). Therefore, the ELSS was developed with some previous experience and expertise in scale development.

In the Posttest version of the survey, sections 1-3 were identical to the Pretest; however three additional sections were added. Section four of the survey is the Actual Educational Strategies section. It was designed to gather information about the participants’ perceptions of teaching strategies used by the course instructors during the course. Results of this section of the survey were not analyzed and therefore were not included in this paper. Section four was beyond the scope of this project. This section also gathered detail about what teaching style was most helpful to the participant, which was also not interpreted for this project.

Section five is a qualitative survey instrument giving the respondent two blank pages to respond to the following statement: “Now that you have finished your WEA course, please take a moment to describe how you will use any new knowledge and skills that you gained during this course to teach and encourage others to engage in

environmentally responsible behavior during the coming year.” Responses to this open-ended question, while helpful, were not interpreted for this study.

Section six of the posttest was used to collect demographic data. Demographic variables included the following: age, gender, city and state, years of experience hiking and backpacking, days per year engaging in outdoor pursuits, years of experience as an outdoor leader, level of education, prior leave no trace education, and the participants’ desire to be part of a follow-up study or receive a summary of findings from the project (see Appendix B).

Data Collection Procedures

Materials were mailed to course sponsors and/or course instructors to administer and were returned to the researchers at the completion of the course. Lead instructors and/or course sponsors were contacted by phone or email to solicit their help in administering the survey. These individuals were provided copies of all three surveys (Pre/Post/Instructor) for review during the initial request. The researcher sent survey packets via the US postal service to instructors and course sponsors who agreed to participate. The packets included instructions for the field instructors who would be administering the surveys. For great detail on the instructions, please see Appendix C.

Some participants completed pretests but not posttests. Possible reasons include a decision not to continue in the study or because they were unable to complete the course. After the course was finished, completed surveys were returned to the researcher at Ohio University.

Data Analysis Procedures

As data from WEA courses were received by the researcher, surveys were identified as complete, meaning participants finished both pretest and posttest, or incomplete, meaning the participant did not complete the pretest, or the posttest, or both. Upon receipt, the researcher entered all quantitative responses into a SPSS 14.0 for Windows data file. For all statistical analyses, significance was set at .05. The following analyses were conducted:

1. Descriptive statistics were used to assess variables such as age, sex, course type, education, prior LNT experience, and years of outdoor experience.
2. Frequencies were calculated to provide a summary and comparison of responses to items on ecological literacy self-efficacy scale.
3. Means were calculated for comparison, especially between differing course types.
4. Reliability coefficients were analyzed for the 30-item LNTPI, the 10-item self efficacy scale, and the 7-item intended ecological development scale.
5. Participant pretests and posttests scores were assessed using paired sample *t*-tests (using significance level of .05) to assess differences on LNTPI from pretest to posttest, ELSS scores, and intended continued involvement changes.
6. Pearson's product moment correlation statistic (*r*) was produced to examine the relationship between LNTPI indices pretest to posttest.
7. Effect size using Cohen's *d* (1992) was calculated on LNTPI indices scores and ELSS scores.

Summary

Chapter 3 describes the methods and procedures employed to explore the formation of ecological literacy among WEA course participants. First, the research design was discussed including operational definitions. Delimitations were also noted. Sample information was articulated to provide background on the study group. Finally, Chapter 3 outlined the instrument used, data collection procedures, and analysis.

CHAPTER 4: RESULTS

Introduction

Chapter 4 presents the results of this study. The following data is presented: population variables, survey response rate, descriptive statistics for demographics, scale reliabilities, results for the research questions, and finally, a summary of the findings involving the research questions.

Survey Response Rate and Population Identification

Participants in this study were students who completed a WEA courses during the summer of 2007. Of the 78 participants eligible to complete the survey, only 60 completed both pretests and posttests, for a survey response rate of 76.92%. Of the sample, 6 (23.08%) either chose not to complete either the pretest or posttest or did not complete the course. During all of 2007, a total of 308 students enrolled in WEA course (Williams, personal communication, February 17th, 2008); therefore this study sample represents 20% of WEA course participants for 2007 season. Although participants were selected from a convenience sample of nine WEA courses representing the three types of WEA courses offered, NSP (41), PSC (8), and WSP (11) as shown in Table 1, they did appear to represent the target population, i.e. WEA participants in general.

Table 1

Respondent Course Location and Type

Course Sponsor	Course Location	No. of respondents	Course Type	Response rate (%)
Oklahoma State University	Weminuche Wilderness, CO	5	PSC	8.33
Wright State University	Cape Lookout	3	PSC	5.00
Wright State University	Cape Lookout	3	WSP	5.00
San Diego State University (SDSU)/California Poly State University	Sequoia and Kings Canyon	8	WSP	13.33
Radford University, VA	Chattooga River, SC Pisgah NF, NC	12	NSP	20.00
Messiah College, PA	Moshannon/Michaux State Forest, PA	10	NSP	16.67
International Wilderness Leadership School, (IWLS)	Glacier Bay, AK	3	NSP	5.00
Mount Hood CC and SDSU	Sequoia and Kings Canyon	8	NSP	13.33
Gordon College, MA	Wind River	8	NSP	13.33
Total		60		100

Participant Demographics

Age. Participants on the WEA courses were typically enrolled in college and were in their early 20s ($M = 22.95$, $SD = 4.699$). The youngest participant was 19 and the oldest was 45. The mode for course participants was 20 years of age. For greater detail on age, see Table 2.

Table 2

Respondent Age

Category	Participants	Age Range	No.	% of sample
Mean	22.95	18-22	41	68.2
Median	21.00	23-27	11	16.7
Mode	20	28-32	5	8.4
Youngest	19	33-37	2	2.8
Oldest	45	38-42	0	0
<i>SD</i>	<i>4.699</i>	43-47	1	1.7
		Total	60	100

As expected, PSC participants were the oldest group, with an average age of 27.13 ($SD = 4.12$). The average ages for participants by course type can be seen in figure 2.

Figure 2. Average age of participants based on course types. PSC, $SD = 4.12$ ($n = 8$) WSP, $SD = 7.20$ ($n = 11$); NSP, $SD = 3.44$ ($n = 41$). For more information on the differences between course types, see Appendix F.

Gender. During the posttest, participants identified themselves as male or female. Of the 60 respondents, 33 were male (55%) and 27 female (45%).

Years of experience hiking and backpacking. As might be expected, participants were typically novices, as most claimed to have less than 4 years experience; 20 participants (34.5%) indicated they had 1-2 years experience hiking or backpacking.

Days per year engaged in outdoor adventure pursuits. On average, participants had only a few years experience hiking, but the majority (27.6%) spent 51 or more days per year in outdoor pursuits, the highest option available for days per year engaged in outdoor adventure pursuits. One participant (1.7%) spent 1-10 days in the field, 7 (12.1%) spent 11-20 days in the field, 14 (24.1%) participants spent 21-30 days in the field, 7 (12.1%) spent 31-40 days in the field, 13 (22.4%) spent 41-50 days in the field, 16 (27.6%) participants spent 51 days or longer in the field, and 2 respondents did not answer the question.

Years of experience as an outdoor leader. Participants indicated the number of years they had spent as an outdoor leaders. Most participants (74.6%) had 0-2 years experience. The years of experience of WEA participants are as follows: 23 (39%) participants had 0 years experience; 21 (35.6%) participants had 1-2 years experience; 11 (18.6%) participants had 3-4 years experience; 2 (3.4%) participants had 5-6 years experience; and 2 (3.4%) participants had 9+ years experience. Mean scores were generated to compare years of experience between different course types (see Figure 3).

Figure 3. Mean Years of Experience as an Outdoor Leader by course type. PSC; $SD = 1.03$. WSP; $SD = 1.20$. NSP; $SD = .90$.

Education Level. As previously noted, participants were typically in college, working on a bachelor's degree (58.3%). Other education levels included high school degree (1 participant or 1.7%), a bachelor's degree (15 participants or 25.0%), some graduate school (7 participants or 11.7%), a master's degree (1 participant or 1.7%), and a doctorate degree (1 participant or 1.7%).

LNT prior training. Participants indicated their background experience with the LNT curriculum. Participant identified their prior LNT exposure as follows: 16 (27.1%) had no prior instruction, 24 (40.7%) had "formal instruction" in LNT, 6 (10.2%) were

LNT workshop participants, 12 (20.3%) were LNT trainer course participants, and 1 (1.7%) had completed an LNT Master Educator Course.

Scales

Leave No Trace Practices Inventory (LNTPI). The LNTPI was designed to examine student's behavior in wilderness settings as they relate to the seven principles and practices of LNT. In this 30-item inventory, students were asked to rate their intended behavior while in the backcountry on a 5-point Likert scale. The inventory includes questions representing the seven indices aligned with the seven principles of LNT. Each index or LNT principle contained 5-7 items. Nearly all of the indices proved to be reliable at an alpha (α) of .65 or higher, with the exception of *Minimize Campfire Impacts*, which had a Cronbach's Alpha of .54 (see Table 3). Cortina (1993) and Nunnally and Bernstein (1994) have noted that scales with a small number of items (i.e., 6 or less) and an alpha of about .60 may be acceptable in exploratory studies (Cottrell, Vaske, Shen, & Ritter, 2007). Those indices on the LNTPI with 7 items had a Cronbach's Alpha of .74 or greater (see Table 3).

Table 3

Reliability Analyses of LNTPI Instrument

LNT Indices	Item Total Correlation	Alpha if item Deleted	Cronbach Alpha
Travel on Durable surfaces			.66
When hiking in a heavily used area, I walk on established trails.	.36	.63	
I take shortcuts along trail switchbacks.	.53	.55	
Hiking off-trail in a pristine area with a group, I ensure the group spreads out...	.48	.57	
When camping in a pristine area, I move my camp every night.	.42	.60	
I avoid walking in streams and puddles in areas where water is scarce.	.32	.65	
Minimize Campfire Impact			.54
I check to see if there are restrictions on building fires in areas...	.15	.56	
When building a campfire, I use existing campfire rings when they are present.	.27	.52	
I avoid building fires when I go camping, except in case of emergency.	.33	.49	
I scatter the ashes from a fire ring when I am finished using it.	.33	.47	
I use camp stoves instead of campfires to cook when I go camping.	.58	.35	
Avoid Wildlife			.74
I avoid approaching wildlife.	.37	.72	
I give food to wildlife.	.27	.76	
I hang food, trash, and other items in a "bear bag" at night when camping.	.45	.71	
I camp at least 200 feet from water sources to avoid blocking access of wildlife...	.57	.67	
I avoid hiking in sensitive wildlife habitats.	.65	.66	
When hiking with a dog, I ensure that the dog is kept on a leash.	.51	.69	
I pack leftover food out of the backcountry	.52	.71	

Courtesy toward others			.77
When hiking with a dog, I ensure that the dog is kept on a leash.	.46	.76	
I am careful to leave an area the same as or better than I found it.	.43	.76	
When hiking, I yield to livestock (horses and mules) that I encounter on the trail.	.60	.72	
When backpacking, I always choose a campsite that is out of sight of the trail.	.46	.75	
I minimize the amount of noise that I make when camping...	.38	.77	
I collect historical objects that I find when traveling in the backcountry.	.61	.72	
I collect interesting natural objects that I find when traveling in the backcountry.	.60	.72	
Waste Disposal			.70
I am careful to leave an area the same as or better than I found it.	.38	.68	
When digging a cat-hole, I always dig it approximately 6-8 inches deep.	.46	.64	
In arid desert environments, I put my toilet paper in a plastic bag and pack it out.	.58	.60	
I avoid urinating on trees and plants.	.40	.71	
I repack food in preparing for my outdoor trips.	.45	.66	
I pack leftover food out of the backcountry.	.53	.65	
Leave what you find			.69
I collect historical objects that I find when traveling in the backcountry.	.51	.61	
I collect interesting natural objects that I find when traveling in the backcountry.	.51	.60	
I empty and clean my backpack, tent, boat and other gear after every trip.	.36	.67	
I clean the dirt from my boots after hiking trips.	.44	.63	
I alert landowners and land management agencies of areas infested...	.41	.65	
Plan ahead and prepare			.70
When hiking in a heavily used area, I walk on established trails.	.42	.67	
I check to see if there are restrictions on building fires...	.44	.66	
I avoid hiking in sensitive wildlife habitats	.47	.64	
In arid desert environments, I put my toilet paper in a plastic bag and pack it out...	.61	.57	
I repack food in preparing for my outdoor trips.	.36	.68	

From pretest to posttest, using paired sample t-tests, students showed statistically significant improvement in their practices in backcountry settings based on all seven indices: *travel on durable surfaces* ($t = -3.92$; $df = 58$; $p = .000$); *minimize campfire impact* ($t = -3.58$; $df = 59$; $p = .001$); *avoid wildlife* ($t = -3.75$; $df = 59$; $p = .000$); *courtesy toward other users* ($t = -2.70$; $df = 59$; $p = .009$); *waste disposal* ($t = -3.02$; $df = 59$; $p = .004$); *leave what you find* ($t = -2.95$; $df = 59$; $p = .005$); and *plan ahead and prepare* ($t = -3.14$; $df = 59$; $p = .003$) (see Table 4). Effect sizes ranged from small to moderate.

Table 4

Pre- to Posttest LNT Scores of WEA Students as Shown by the LNTPI

LNT Indices	<i>M Pretest*</i>	<i>M Posttest</i>	<i>t-value</i>	<i>p-value</i>	<i>r**</i>	<i>Effect size***</i>
Travel on durable surfaces	4.13	4.43	-3.92	.000	.284	.51
Minimize campfire impact	4.01	4.29	-3.58	.001	.411	.46
Avoid wildlife	4.27	4.52	-3.75	.000	.545	.48
Courtesy toward other others	4.21	4.39	-2.70	.009	.577	.35
Waste disposal	4.36	4.53	-3.02	.004	.640	.39
Leave what you find	3.95	4.22	-2.95	.005	.416	.38
Plan ahead and prepare	4.37	4.56	-3.14	.003	.560	.40
Total LNTPI	124.13	131.95	-4.39	.000	.563	.60

*Scores compute on scale of 1 to 5. 1 Represents poor LNT practice, 5 represents ideal LNT practice.

** Pearson's *r* representing the correlation between pretest and posttest scores. *M* = Mean.

***Cohen (1992) posed that effect sizes of .2 are small, .5 are medium, and .8 are large.

When examining the mean values, it is important to remember that participants chose a number that best represented their actions in the backcountry where, 1 = “strongly disagree” and 5 = “represented strongly agree.” All items were coded such that

a 5 (strongly agree) represented the correct action based on LNT principles and practices. Further, totaling all 30-items from the LNTPI revealed an average increase of 7.72 points ($M_{pretest} = 124.13$, $SD = 14.69$; $M_{posttest} = 131.85$, $SD = 12.69$) per participant. Analysis of LNTPI scores by course type revealed that WSP participants had the greatest growth with an LNTPI score improvement of 9.33 ($M_{pretest} = 129.57$, $SD = 11.87$; $M_{posttest} = 138.9$, $SD = 7.99$). NSP participants also showed growth pretest to posttest, while PSC course participants actually exhibited a slight decrease (see Figure 4).

Figure 4. Mean LNTPI Score based on course type. PSCpre, $SD = 6.46$ ($n = 8$); PSCpost, $SD = 13.15$ ($n = 8$); WSPpre, $SD = 11.88$ ($n = 11$); WSPpost, $SD = 7.99$ ($n = 11$); NSPpre, $SD = 16.36$ ($n = 41$); NSPpost, $SD = 13.03$ ($n = 41$); Totalpre, $SD = 14.82$ ($n = 60$); Totalpost, $SD = 12.80$ ($n = 60$).

*Mean scores calculated using all 30-items of the LNTPI, a perfect score equals 150, indicting best LNT practices.

Ecological self-efficacy scale (ELSS)

A reliability analysis was run on the self-efficacy scale for the pretest and posttest, and the instructor scale. The pretest, the ELSS was highly reliable ($\alpha = .909$) and the posttest as well ($\alpha = .928$) (see Table 5). The instructor ELSS was also reliable ($\alpha = .846$).

Table 5

Reliability Analyses of Ecological Self-Efficacy Scale (ELSS)

Scale	Item Total Correlation	Alpha if Item Deleted	Cronbach Alpha
Posttest Self-Efficacy			.93
I teach environmental responsibility when leading...	.688	.92	
I can empower others to care for the natural envir...	.708	.92	
I am capable of teaching appro. environmental skills...	.717	.92	
The part that I play makes a difference in preserving...	.675	.92	
I can educate others to be better stewards...	.830	.92	
I feel a sense of accomplishment in delivering LNT...	.726	.93	
I have a sense of achievement when I see others...	.696	.92	
I feel successful in furthering LNT principles...	.837	.92	
I consider myself an effective role model...	.787	.92	
I have confidence in my ability to teach others LNT...	.663	.92	

A paired sample t-test of pretest and posttest scores revealed significant increases on average from pretest to posttest ($t = -6.84$, $df = 59$, $p = .000$). In the pretest, participants perceived their ability to teach environmental ethics as satisfactory ($M = 40.43$; $SD = 6.04$). After the course, participants had a higher level of self-efficacy and perceived themselves to be excellent at teaching environmental ethics ($M = 45.08$; $SD = 4.61$). This held true regardless of course type, as shown in Figure 5.

Figure 5. Mean Ecological Self-Efficacy score by course type including instructors. PSCpre, $SD = 5.74$ ($n = 8$); PSCpost, $SD = 4.71$ ($n = 8$); WSPpre, $SD = 5.84$ ($n = 11$); WSPpost, $SD = 5.63$ ($n = 11$); NSPpre, $SD = 6.22$ ($n = 41$); NSPpost, $SD = 4.39$ ($n = 41$); Totalpre, $SD = 6.04$ ($n = 60$); Totalpost, $SD = 4.611$ ($n = 60$), Instructor, $SD = 3.95$ ($n = 14$). A score of 50 represents a perfect ecological self-efficacy score.

As expected, PSC participants had higher initial scores on the ELSS, likely due to their greater experience in the field. Instructor scores were assessed for comparison to participant score.

Continued Ecological Literacy Development Scale (CELD). This scale was administered as pretest and posttest to examine participant's intentions to maintain involvement in or continue their educational experience as it pertains to ecological literacy or promoting an environmental ethic. Propst and Koesler (1998) claimed that high self-efficacy would lead to continued participation in outdoor leadership development activities. Hence, the researcher hypothesized that students would show growth in their intention to continue to develop their knowledge base and activism regarding the environment after the WEA course. Propst and Koesler (1998) found a positive, but nonsignificant relationship ($B = .134$; $p = .141$) between short term self-efficacy and continued participation in their study, but did find a positive and significant relationship ($B = .272$; $p = .027$) one year later. Propst and Koesler (1998) further claimed that there may be a reciprocal relationship between self-efficacy and continued participation. As a result, they recommended further study in the area, specifically examining populations of outdoor leaders. Propst and Koesler (1998) suggested that a NOLS experience "influenced participants continued participation in wilderness education activities, but not necessarily as leaders" (p. 341). While WEA participants are not yet outdoor leaders, they represent a population of potential outdoor leaders.

The 14 question pretest was found to be reliable ($\alpha = .708$). This included a subscale called the prior involvement scale, which included eight questions pertaining to

prior engagement in environmental ethic development. The continued ecological literacy development scale, although promising, showed flaws because of conflicts between questions on personal enrichment versus intended career choice. To address this issue, the researcher subdivided the Continued Ecological Literacy Development (CELD) scale into two separate domains: “intention to engage in ecological literacy development” (personal enrichment, three questions) and “intention to pursue a career or job related to environmental stewardship” (career choice, three questions). The two subscales proved to be unreliable (intention to engage in ecological literacy development, $\alpha = .27$ and intention to pursue a career related to environmental stewardship, $\alpha = .54$). Nonetheless, the posttest of the 6-item CELD scale was reliable ($\alpha = .60$) and was significant ($t = -6.84$, $df = 59$, $p = .000$). Use of a paired-sample t test showed a slight decrease ($M = -.08$, $SD = 1.64$) in intended continued ecological literacy development.

CHAPTER 5: SUMMARY, DISCUSSION, LIMITATIONS AND RECOMMENDATIONS

Summary

Much literature in the field of recreation focused on the development of leadership in outdoor settings. However, the literature has not focused on the development of environmental ethics. This lack of emphasis underscores the need to examine environmental ethic development, since a major focus of many outdoor recreation programs is on conservation and preservation (i.e., NOLS, WEA, and Outward Bound). As greater importance is placed on global environmental concerns, outdoor programs are poised to help contribute to the development of ecological literacy, a form of environmental awareness and activism.

The WEA is one such organization that is strongly oriented toward “preservation through education” (WEA About Us, n.d.). Participants on WEA courses showed significant growth in intended behaviors regarding principles and practices of LNT. The growth stemmed from an awareness of proper behavior in a wilderness setting. The growth that occurred during their wilderness experience represents an increased awareness of how their actions affect the environment. This intrapersonal development might be called transformative learning.

In order for ecological literacy to develop, students must embrace a sense of environmental activism. A tendency toward activism was documented in this study with regard to students’ self-efficacy scores concerning the teaching of environmental ethics to others. Based on results from the Ecological Self-Efficacy Scale (ELSS), students rated

their ecological self-efficacy, on average, as only satisfactory prior to the course and excellent after the course. This positive gain in self-efficacy suggests that students are developing a proclivity toward teaching LNT principles and practices to other wilderness participants.

However, this study did not see any growth, and, in fact, saw a slight decrease with regard to continued ecological literacy development among WEA participants. Post hoc, the continued ecological development scale was divided into two categories: personal ecological literacy development and intended career goals. Despite the lack of reliability relating to continued involvement in intended career goals, anecdotal data indicated that the field experience was a defining moment as to whether students planned to pursue careers involving outdoor leadership and may have contributed to the decrease in the continued ecological development score.

An insufficient sample size limits discussions about differences among course types; however, data indicated that all courses developed at least short term ecological self-efficacy, and PSC participants typically enter the course with higher levels of self-efficacy than WSP or NSP participants. Unexpectedly, PSC participants showed a slight decrease in their intended behavior regarding LNT at the end of the course, while NSP and WSP course types showed a moderate increase.

Discussion

The discussion begins by revisiting the research questions and interprets results as they relate to each research question.

Do WEA course participants have a stronger sense of personal responsibility to the natural environment after completing a WEA course than when they began the course?

A comparison of the total scores from the LNTPI instrument revealed that students did develop a stronger sense of personal responsibility for the natural environment, scoring an increase of 7.72 at the end of the WEA course on the LNTPI. This increase was significantly higher and had a medium effect size ($d = .60$). Participants showed development in each of the seven LNT principles and practices indices, indicating a growth in knowledge and intention to act at the end of the course. This awareness of LNT and intention to act appropriately in wilderness places suggests that the WEA is effective in teaching and promoting an accepted environmental ethic (i.e., LNT). One 20-year old student stated: “I feel like during this course I developed my own sense of responsibility and ownership toward the LNT ethic, instead of seeing them just as guidelines.” Another student commented “[I have] more confidence in the ‘whys’ of LNT.” Sentiments such as these and the results of the LNTPI indicate students *know* more about environmental ethics after their WEA course.

Do participants develop higher levels of leadership competency in the realm of ecological literacy as a result of participation in a WEA course?

Leadership competency is a complex mixture of traits and core competencies (Buell, 1981; Martin, et. al., 2006; Priest, 1986; Priest & Gass, 1997; Raiola, 1995; Swiderski, 1981). One of the eight core competencies identified by Martin et al. (2006) is environmental stewardship, a component of which is ecological literacy. Participants

in the study exhibited growth in their ecological literacy via their knowledge of and intention to follow LNT principles and practices. Further, the Ecological Self-Efficacy Scale (ELSS) revealed that participants showed a significant gain in their self-efficacy toward teaching LNT and environmental ethics. This combination of gains in knowledge, intended behavior, and self-efficacy toward teaching LNT indicates that WEA participants are more competent leaders relating to ecological literacy after their course. In terms of leadership, these gains might translate into such leadership traits as competent teaching, role modeling, acting ethically, and being ecologically literate. For example, Jack (names changed for confidentiality) stated, “this WEA course has taught me many new skills for effective camping and LNT practices and it would be awesome to pass this on to others.” Jenny, a 22-year old student said, “I am planning on pursuing a career in the outdoor field and would like to continue educating people about the environment, even if it’s just my friends.”

How can greater levels of leadership competency in the realm of environmental stewardship be assessed?

In the paper and pencil survey used, the researcher was able to develop a reliable method to assess aspects of leadership competency, specifically through the LNTPI ($\alpha = .906$) and the ELSS scale ($\alpha = .909$) indicating both have a high degree of internal consistency. Further, both scales proved to be valuable instruments and have promise for future use. The continued ecological literacy development scale, similar to Propst and Koesler (1998), examined the role of continued involvement as a sign of leadership development and competency. Because of conflicts within the instruments, namely the

lack of distinction between personal enrichment and career aspirations, the instrument needs significant development for future use. In spite of this shortcoming, “ecological self-efficacy” shows potential as a tool to measure transformative learning that occurs on wilderness courses. Transformative learning shows promise as a means of changing students’ behavior or mindset so they become more ecologically literate. Such literacy is clearly a desired outcome for developing outdoor leaders.

Numerous studies have shown that uneducated or misinformed users can cause lasting or irreversible damage to wilderness areas. As user visits to wilderness areas have steadily grown, many agencies, like the U.S. Forestry Service, the U.S. Bureau of Land Management, and the U.S. National Parks have realized that education is the key to wilderness preservation. Outdoor leadership organizations have made it their mission to develop environmentally responsible leaders who will guide others in the appropriate uses of the natural environment. This study identified growth in ecological literacy development among WEA participants, and documented that the WEA curriculum is effective in promoting ecological literacy (see Figure 6).

Figure 6. The development of ecological literacy as a component of outdoor leadership and environmental activism through a WEA course.

*Volk's (1993) five levels of learning for ecological literacy.

As a result, this study provides feedback to encourage the use of methods and techniques utilized by the WEA when ecological literacy is a desired outcome.

Looking to the future, as environmental issues continue to arise, other agencies such as public schools, scouting organizations, camping associations, and clubs may consider using WEA courses or WEA content in their programs to develop leadership competency in ecological literacy.

Limitations of the Study

Koepke (1973) noted that just before the start of a wilderness course, participants exhibited high levels of anxiety, which may have impacted pretest measurements. This prefield experience anxiety was not controlled for as participants were typically surveyed at the start of the course. A better approach might have been to solicit participants via email several weeks prior to the start of their course.

Another limitation occurred in section two of the posttest. The instrument attempted to assess future *intended* behavior toward developing knowledge and skills pertaining to environmental stewardship. Post course euphoria could impact responses in this section; therefore a longitudinal study would be valuable to assess actual behavior following the course.

The problem of *intended* behavior is also suspect in the LNTPI, as students self-reported their behavior; validation of these changes or views were not confirmed. With regard to some LNT practices, the researcher or course instructor might notice *actual*

behavior changes made during the course. A follow-up study might address whether participants actually changed their behavior.

Another limitation of the LNTPI is that the scale does not include a response category for “does not apply.” As a result, some participants noted having difficulty circling an answer that “characterized them or their actions,” which is the key phrase in the instrument instructions. A future advancement of the scale might allow for a “does not apply” column, or for the instructions to read “what *would* you do in the given situation.”

Fear of the instructor or the desire to please may have affected student responses since course instructors disseminated the survey. Although instructors were not to see survey responses, students may not have known this and did not want to offend or upset their instructors. A specific statement informing participants that instructors would not see the survey might address this issue.

The Continued Ecological Literacy Development (CELD) Scale did not distinguish between personal enrichment and intended career goals. For example, a participant might want to continue developing their knowledge and skills in ecological literacy, but not be interested in pursuing a career in outdoor leadership. This is an important distinction and should be addressed in any future study.

Although WEA participants were from a wide variety of locations, they were typically college-aged students who signed up for the course as a component of their college degree. To improve external validity, the sample could be extended to other outdoor recreation programs and organizations. A control group could also be considered.

Burdening instructors with another form to complete in the field may create time constraints that make a person completing the instrument feel rushed. Surveys mailed to participants or completed online prior to and after the field experience may allow for more thought and discernment by the respondent.

Finally, students' actual experiences in the field were influenced by a myriad of factors, including instructor expertise, group dynamics, weather, bugs, perceived risks, and accidents. These confounding variables could have impacted the students, leaving them especially satisfied or disenchanted with the course, leading them to misreport knowledge and skills gained. Asking students to relate personal satisfaction with the trip may address this.

Recommendations for Future Research

A key aspect of ecological literacy is noting that the “pedagogy of ecological literacy is based on local, direct and intense participation” by the students (Duailibi, 2006, p. 66). This study set out to examine the pedagogy at the heart of ecological literacy development on extended wilderness trips. However, understanding what exactly happens in the field that stimulates the ecological literacy development was beyond the scope of this project. While this study revealed some types of teaching strategies used to develop ecological literacy, more research is needed in this area. If environmental crises are to be diverted or even for wilderness to be preserved, understanding the foundation of ecological literacy is critical.

Further studies might address the anecdotal data from this study that suggest that WEA courses are a defining moment in whether participants would pursue a career in

outdoor leadership. While the researcher assumed that participants were novice outdoor leaders, it seems likely that many enrolled in courses simply for the extend experience in nature, not to develop outdoor leadership skills. This is a significant distinction in studying outdoor leaders and programs working to develop outdoor leaders.

Directly tied to the need to understand pedagogy for ecological literacy development is a need to understand the impact of extended nature experiences on participants and future outdoor leaders. New data are necessary regarding the impact of participants simply being in wilderness settings. These data may show if any “emotional” bonding occurs between participant and nature, and whether this bond drives ecological literacy. Anecdotally, outdoor leaders know this place attachment exists, but more research is needed in a time when public awareness of “nature deficit” is at an all-time high. Orr states education needs to prepare individuals to be “inhabitants” in the natural world; living and connected as a functional part of the whole as opposed to “residents:” transients that simply occupy a space and eventually move (1990, p. 50). Wilderness settings and outdoor leaders provide a powerful combination for educating students to distinguish themselves inhabitants of the earth rather than just short-term residents.

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APPENDIX A: WEA PARTICIPANT PREFIELD EXPERIENCE SURVEY

Assessing Outdoor Leadership Development among WEA Course Participants

The goal of this study is to assess the effectiveness of the WEA curriculum in promoting outdoor leadership development, specifically in the area of environmental stewardship. This information will be valuable to the WEA in determining the effectiveness of its curriculum. It will also be helpful to other outdoor programs that promote leadership training and development. By participating in this study, you will be helping to promote evidence-based practice in the field of outdoor leadership.

If you decide to participate in this study, you will be asked to complete two surveys, one at the beginning of your WEA course and one at the end of your course. Each survey should take about 30 minutes to complete.

Participation in this study is completely voluntary. You do not have to participate if you do not want to, and you can withdraw from the study at any time. There are no foreseeable risks to you for participating in this study. Your identity will be kept confidential by coding your name when recording data and reporting the findings of the research. The names of participants will not appear in any professional report.

If you have any questions regarding this study, please contact Matt Hartman at mh169406@ohio.edu or 740-593-0595. If you have any questions regarding your rights as a research participant, please contact Jo Ellen Sherow, Director of Research Compliance, Ohio University, (740)593-0664.

I certify that I have read and understand this consent form and agree to participate in the research as described. I agree that known risks to me have been explained to my satisfaction and I understand that no compensation is available from Ohio University and its employees for any injury resulting from my participation in this research. I certify that I am 18 years of age or older. My participation in this research is given voluntarily. I understand that I may discontinue participation at any time.

Name: _____ Signature: _____

Date: _____ Course Sponsor: _____

Pretest

Section 1. Please indicate the extent to which the following statements **characterize you and your actions** when you are in the backcountry. Circle only one response. Under each statement, briefly explain the reason for your response.

	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
1. When hiking in a heavily used area, I walk on established trails.	1	2	3	4	5
Explain why:					
2. I take shortcuts along trail switchbacks.	1	2	3	4	5
Explain why:					
3. When hiking off-trail in a pristine area with a group, I ensure that the group spreads out as it walks through the area.	1	2	3	4	5
Explain why:					
4. When camping in a pristine area, I move my camp every night.	1	2	3	4	5
Explain why:					
5. I avoid walking in streams and puddles in areas where water is scarce.	1	2	3	4	5
Explain why:					
6. I check to see if there are restrictions on building fires in areas that I plan to go camping.	1	2	3	4	5
Explain why:					

	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
7. When building a campfire, I use existing campfire rings when they are present.	1	2	3	4	5
Explain why:					
8. I avoid building fires when I go camping, except in case of emergency.	1	2	3	4	5
Explain why:					
9. I scatter the ashes from a fire ring when I am finished using it.	1	2	3	4	5
Explain why:					
10. I use camp stoves instead of campfires to cook when I go camping.	1	2	3	4	5
Explain why:					
11. I avoid approaching wildlife.	1	2	3	4	5
Explain why:					
12. I give food to wildlife.	1	2	3	4	5
Explain why:					
13. I hang food, trash, and other items in a "bear bag" at night when camping.	1	2	3	4	5
Explain why:					

	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
14. I camp at least 200 feet from water sources to avoid blocking access of wildlife to the water, especially when camping in areas where water is scarce.	1	2	3	4	5
Explain why:					
15. I avoid hiking in sensitive wildlife habitats.	1	2	3	4	5
Explain why:					
16. When hiking with a dog, I ensure that the dog is kept on a leash.	1	2	3	4	5
Explain why:					
17. I am careful to leave an area the same as or better than I found it.	1	2	3	4	5
Explain why:					
18. When hiking, I yield to livestock (horses and mules) that I encounter on the trail.	1	2	3	4	5
Explain why:					
19. When backpacking, I always choose a campsite that is out of sight of the trail.	1	2	3	4	5
Explain why:					

	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
20. I minimize the amount of noise that I make when camping to avoid disturbing other campers and hikers.	1	2	3	4	5
Explain why:					
21. When digging a cat-hole, I always dig it approximately 6-8 inches deep.	1	2	3	4	5
Explain why:					
22. When camping in arid desert environments, I put my toilet paper in a plastic bag and pack it out.	1	2	3	4	5
Explain why:					
23. I avoid urinating on trees and plants.	1	2	3	4	5
Explain why:					
24. I repackage food in preparing for my outdoor trips.	1	2	3	4	5
Explain why:					
25. I pack leftover food out of the backcountry.	1	2	3	4	5
Explain why:					

	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
26. I collect historical objects that I find when traveling in the backcountry.	1	2	3	4	5
Explain why:					
27. I collect interesting natural objects that I find when traveling in the backcountry.	1	2	3	4	5
Explain why:					
28. I empty and clean my backpack, tent, boat and other gear after every trip.	1	2	3	4	5
Explain why:					
29. I clean the dirt from my boots after hiking trips.	1	2	3	4	5
Explain why:					
30. I alert landowners and land management agencies of areas infested with invasive or nonnative plants.	1	2	3	4	5
Explain why:					

Section 2. Please respond “yes,” “no,” or “unsure” to the following statements.

	Yes	No	Unsure
1. Within the past year, I have subscribed to a magazine that addresses environmental issues.	_____	_____	_____
2. In the coming year, I intend to subscribe to a magazine that addresses environmental issues.	_____	_____	_____
3. Within the past year, I have attended a workshop that promotes environmental responsibility.	_____	_____	_____
4. In the coming year, I intend to attend a workshop promoting environmental responsibility.	_____	_____	_____
5. Within the past year, I have belonged to an organization that promotes environmental responsibility.	_____	_____	_____
6. In the coming year, I intend to join an organization that promotes environmental responsibility.	_____	_____	_____
7. Within the past year, I have held a position, volunteer or paid, where I was expected to teach environmental responsibility to others.	_____	_____	_____
8. In the coming year, I intend to try to obtain a position where I am expected to teach environmental responsibility to others.	_____	_____	_____
9. My current career could be considered outdoor leadership.	_____	_____	_____
10. I intend to pursue a career in outdoor leadership.	_____	_____	_____
11. I currently promote environmental responsibility through my career.	_____	_____	_____
12. I intend to pursue a career that will enable me to promote environmental stewardship.	_____	_____	_____
13. I have a mentor, someone whom I consider a close ally, who guides me in developing my environmental responsibility.	_____	_____	_____
14. This mentor provides me with insights or feedback relating to environmental responsibility.	_____	_____	_____

Section 3. Please indicate the extent to which the following statements characterize you.

	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
1. I teach environmental responsibility when leading activities in the outdoors.	1	2	3	4	5
2. I can empower others to care for the natural environment.	1	2	3	4	5
3. I am capable of teaching appropriate environmental skills.	1	2	3	4	5
4. The part that I play makes a difference in preserving the natural environment.	1	2	3	4	5
5. I can educate others to be better stewards of the natural environment.	1	2	3	4	5
6. I feel a sense of accomplishment in delivering LNT content.	1	2	3	4	5
7. I have a sense of achievement when I see others carry out what I taught them.	1	2	3	4	5
8. I feel successful in furthering LNT principles and practices.	1	2	3	4	5
9. I consider myself an effective role model in promoting environmental stewardship.	1	2	3	4	5
10. I have confidence in my ability to teach others LNT.	1	2	3	4	5

Thank you for completing this survey!

APPENDIX B: PARTICIPANT POSTTEST

**Assessing Outdoor Leadership Development
among WEA Course Participants**

Congratulations on completing your WEA course! At the beginning of your course, you were asked to participate in a study assessing the effectiveness of the WEA curriculum in promoting outdoor leadership development, specifically in the area of environmental stewardship. The first part of your participation in the study involved you completing a survey administered at the beginning of the course. The final part of your participation requires completion of this second survey. Remember, participation in this study is completely voluntary, and you do not have to complete this second survey if you don't want to. However, doing so will help contribute to evidence-based practice in the field of outdoor leadership development.

Thank you for your time and consideration in assisting in this research!

Name: _____ Signature: _____

Date: _____ Course Sponsor: _____

Posttest

Section 1. Please indicate the extent to which the following statements **characterize you and your actions** when you are in the backcountry. Circle only one response. Under each statement, briefly explain the reason for your response.

	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
31. When hiking in a heavily used area, I walk on established trails.	1	2	3	4	5
Explain why:					
32. I take shortcuts along trail switchbacks.	1	2	3	4	5
Explain why:					
33. When hiking off-trail in a pristine area with a group, I ensure that the group spreads out as it walks through the area.	1	2	3	4	5
Explain why:					
34. When camping in a pristine area, I move my camp every night.	1	2	3	4	5
Explain why:					
35. I avoid walking in streams and puddles in areas where water is scarce.	1	2	3	4	5
Explain why:					
36. I check to see if there are restrictions on building fires in areas that I plan to go camping.	1	2	3	4	5
Explain why:					

	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
37. When building a campfire, I use existing campfire rings when they are present.	1	2	3	4	5
Explain why:					
38. I avoid building fires when I go camping, except in case of emergency.	1	2	3	4	5
Explain why:					
39. I scatter the ashes from a fire ring when I am finished using it.	1	2	3	4	5
Explain why:					
40. I use camp stoves instead of campfires to cook when I go camping.	1	2	3	4	5
Explain why:					
41. I avoid approaching wildlife.	1	2	3	4	5
Explain why:					
42. I give food to wildlife.	1	2	3	4	5
Explain why:					
43. I hang food, trash, and other items in a "bear bag" at night when camping.	1	2	3	4	5
Explain why:					

	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
44. I camp at least 200 feet from water sources to avoid blocking access of wildlife to the water, especially when camping in areas where water is scarce.	1	2	3	4	5
Explain why:					
45. I avoid hiking in sensitive wildlife habitats.	1	2	3	4	5
Explain why:					
46. When hiking with a dog, I ensure that the dog is kept on a leash.	1	2	3	4	5
Explain why:					
47. I am careful to leave an area the same as or better than I found it.	1	2	3	4	5
Explain why:					
48. When hiking, I yield to livestock (horses and mules) that I encounter on the trail.	1	2	3	4	5
Explain why:					
49. When backpacking, I always choose a campsite that is out of sight of the trail.	1	2	3	4	5
Explain why:					

	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
50. I minimize the amount of noise that I make when camping to avoid disturbing other campers and hikers.	1	2	3	4	5
Explain why:					
51. When digging a cat-hole, I always dig it approximately 6-8 inches deep.	1	2	3	4	5
Explain why:					
52. When camping in arid desert environments, I put my toilet paper in a plastic bag and pack it out.	1	2	3	4	5
Explain why:					
53. I avoid urinating on trees and plants.	1	2	3	4	5
Explain why:					
54. I repackage food in preparing for my outdoor trips.	1	2	3	4	5
Explain why:					
55. I pack leftover food out of the backcountry.	1	2	3	4	5
Explain why:					

	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
56. I collect historical objects that I find when traveling in the backcountry.	1	2	3	4	5
Explain why:					
57. I collect interesting natural objects that I find when traveling in the backcountry.	1	2	3	4	5
Explain why:					
58. I empty and clean my backpack, tent, boat and other gear after every trip.	1	2	3	4	5
Explain why:					
59. I clean the dirt from my boots after hiking trips.	1	2	3	4	5
Explain why:					
60. I alert landowners and land management agencies of areas infested with invasive or nonnative plants.	1	2	3	4	5
Explain why:					

Section 2. Please respond “yes,” “no,” or “unsure” to the following statements.

	Yes	No	Unsure
15. In the coming year, I intend to subscribe to a magazine that addresses environmental issues.	_____	_____	_____
16. In the coming year, I intend to attend a workshop promoting environmental responsibility.	_____	_____	_____
17. In the coming year, I intend to join an organization that promotes environmental responsibility.	_____	_____	_____
18. In the coming year, I intend to encourage others to interact responsibly with the environment.	_____	_____	_____
19. In the coming year, I intend to lead an outdoor program with an emphasis on environmental responsibility.	_____	_____	_____
20. In the coming year, I intend to try to obtain a position where I am expected to teach environmental responsibility to others.	_____	_____	_____
21. I intend to pursue a career in outdoor leadership.	_____	_____	_____
22. I intend to pursue a career that will enable me to promote environmental stewardship.	_____	_____	_____

Section 3. Please indicate the extent to which the following statements characterize you.

	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
11. I teach environmental responsibility when leading activities in the outdoors.	1	2	3	4	5
12. I can empower others to care for the natural environment.	1	2	3	4	5
13. I am capable of teaching appropriate environmental skills.	1	2	3	4	5
14. The part that I play makes a difference in preserving the natural environment.	1	2	3	4	5
15. I can educate others to be better stewards of the natural environment.	1	2	3	4	5
16. I feel a sense of accomplishment in delivering LNT content.	1	2	3	4	5
17. I have a sense of achievement when I see others carry out what I taught them.	1	2	3	4	5
18. I feel successful in furthering LNT principles and practices.	1	2	3	4	5
19. I consider myself an effective role model in promoting environmental stewardship.	1	2	3	4	5
20. I have confidence in my ability to teach others LNT.	1	2	3	4	5

Section 4. Please indicate the extent to which you agree or disagree with the following statements.

	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
1. Overall, I felt this WEA course improved my level of environmental responsibility.	1	2	3	4	5
2. Overall, I felt this WEA prepared me to lead others toward more environmentally responsible behavior.	1	2	3	4	5
3. The lead instructor of my WEA course was a positive role model in interacting responsibly with the environment.	1	2	3	4	5
4. The co-instructor of my WEA course was a positive role model in interacting responsibly with the environment.	1	2	3	4	5
5. I received periodic feedback on my practice of the Leave No Trace.	1	2	3	4	5
6. This feedback included explanations of the reasons for the Leave No Trace principles and practices.	1	2	3	4	5
7. Serving as Leader of the Day helped my learning	1	2	3	4	5
8. I was encouraged to maintain a journal while on this WEA course	1	2	3	4	5
9. Maintaining a journal helped clarify my responsibility as a steward of the natural environment	1	2	3	4	5
10. I achieved my goals for this WEA course.	1	2	3	4	5

Section 5. Now that you have finished your WEA course, please take a moment to describe how you will use any new knowledge or skills that you gained during this course to teach and encourage others to engage in environmentally responsible behavior during the coming year.

Section 6. Please provide the following information.

1. WEA Course Type (NSP, PSC...):
2. Course Location:
3. Your Age:
4. Gender: _____ Male _____ Female
5. City & State of Residence:
6. How many years of experience do you have hiking and backpacking?
 _____ 0 _____ 1-2 _____ 3 -4 _____ 5-6 _____ 7-8 _____ 9+
7. How many days per year do you engage in outdoor adventure pursuits?
 _____ 0 _____ 1-10 _____ 11-20 _____ 21-30 _____ 31-40 _____ 41-50 _____ 51& up
8. How many years of experience do you have as an outdoor leader?
 _____ 0 _____ 1-2 _____ 3 -4 _____ 5-6 _____ 7-8 _____ 9+
9. What is your highest level of education?
10. Indicate your level of Leave No Trace training prior to taking this WEA course.
 _____ None _____ LNT Trainer Course Participant
 _____ Formal Instruction _____ LNT Master Educator Course Participant
 _____ LNT Workshop Participant
11. Please indicate a preference below and leave your email address if you would like to be contacted:
☐ I would like to be a part of a follow-up to this study.
☐ I would like a summary of findings from this project.

EMAIL:**Thank you for taking the time to complete this survey!**

APPENDIX C: INSTRUCTOR SURVEY

Assessing Outdoor Leadership Development among WEA Course Participants

Instructor Survey

The goal of this study is to assess the effectiveness of the WEA curriculum in promoting outdoor leadership development, specifically in the area of environmental stewardship. This information will be valuable to the WEA in determining the effectiveness of its curriculum. It will also be helpful to other outdoor programs that promote leadership training and development. By participating in this study, you will be helping to promote evidence-based practice in the field of outdoor leadership.

If you decide to participate in this study, you will be asked to complete two surveys, one at the beginning of your WEA course and one at the end of your course. Each survey should take about 45 minutes to complete.

Participation in this study is completely voluntary. You do not have to participate if you do not want to, and you can withdraw from the study at any time. There are no foreseeable risks to you for participating in this study. Your identity will be kept confidential by coding your name when recording data and reporting the findings of the research. The names of participants will not appear in any professional report of this research.

If you have any questions regarding this study, please contact Matt Hartman at mh169406@ohio.edu or 740-593-0595. If you have any questions regarding your rights as a research participant, please contact Jo Ellen Sherow, Director of Research Compliance, Ohio University, (740)593-0664.

I certify that I have read and understand this consent form and agree to participate in the research as described. I agree that known risks to me have been explained to my satisfaction and I understand that no compensation is available from Ohio University and its employees for any injury resulting from my participation in this research. I certify that I am 18 years of age or older. My participation in this research is given voluntarily. I understand that I may discontinue participation at any time.

Name: _____ Signature: _____

Date: _____ Course Sponsor: _____

Section 1. Please indicate the extent to which the following statements characterize you and/or your course.

	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
21. A major focus of this WEA course is the promotion of environmental responsibility.	1	2	3	4	5
22. In my opinion, promoting LNT/ environmental responsibility is a very significant component of this course.	1	2	3	4	5
23. I take advantage of teachable moments in promoting environmental responsibility.	1	2	3	4	5
24. In promoting environmental responsibility, I point to negative examples to illustrate my points.	1	2	3	4	5
25. I rely on specific planned instruction times to teach environmental responsibility.	1	2	3	4	5
26. I explain the underlying reasoning and information of LNT when teaching the LNT principles and practices.	1	2	3	4	5
27. I engage my students in a dialogue about environmental responsibility when instructing WEA courses.	1	2	3	4	5
28. In teaching about environmental responsibility, I allow students to work in groups.	1	2	3	4	5
29. I provide students with opportunities to become actively engaged in environmental stewardship.	1	2	3	4	5
30. I rely on experiential education when teaching about environmental responsibility.	1	2	3	4	5

	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
31. I provided periodic feedback to my students on their proficiency in practicing the principles of LNT.	1	2	3	4	5
32. This feedback was constructive	1	2	3	4	5
33. I provided this feedback daily during my expedition.	1	2	3	4	5
34. I reasoned explanations as a part of my feedback	1	2	3	4	5
35. I use Leader of the Day exercises to promote learning among my students.	1	2	3	4	5
36. I encouraged my students to maintain a journal reflecting on their experiences.	1	2	3	4	5
37. I gave participants opportunities to provide peer feedback.	1	2	3	4	5
38. I encouraged participants to make specific goals to accomplish during the course.	1	2	3	4	5
39. I believe that I am a positive role model in promoting environmental responsibility.	1	2	3	4	5
40. During the course, I encouraged participation in an organization that supports environmental responsibility	1	2	3	4	5
41. During the course, I encouraged subscription to a magazine that addresses environmental issues	1	2	3	4	5

Section 2. In the space below, please describe your approach to developing environmentally responsible leaders while on this WEA course.

Section 3. Please indicate the extent to which the following statements characterize you.

	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
1. I teach environmental responsibility when leading activities in the outdoors.	1	2	3	4	5
2. I can empower others to care for the natural environment.	1	2	3	4	5
3. I am capable of teaching appropriate environmental skills.	1	2	3	4	5
4. The part that I play makes a difference in preserving the natural environment.	1	2	3	4	5
5. I can educate others to be better stewards of the natural environment.	1	2	3	4	5
6. I feel a sense of accomplishment in delivering LNT content.	1	2	3	4	5
7. I have a sense of achievement when I see others carry out what I taught them.	1	2	3	4	5
8. I feel successful in furthering LNT principles and practices.	1	2	3	4	5
9. I consider myself an effective role model in promoting environmental stewardship.	1	2	3	4	5
10. I have confidence in my ability to teach others LNT.	1	2	3	4	5

Section 4. Please provide the following information.

12. WEA Course Type (NSP, PSC...):
13. Did this course provide LNT Master Educator Certification? YES NO
14. Your role on the course:
15. Your Age:
16. Gender: ____ Male ____ Female
17. City & State of Residence:
18. How many years of experience do you have hiking and backpacking?
 ____ 1-3 ____ 4-6 ____ 7-9 ____ 10-12 ____ 13-15 ____ 16-19 ____ 20+
19. How many days per year do you engage in outdoor adventure pursuits?
 ____ 11-20 ____ 21-30 ____ 31-40 ____ 41-50 ____ 51-60 ____ 61-70 ____ 71+
20. How many years of experience do you have as an outdoor leader?
 ____ 1-3 ____ 4-6 ____ 7-9 ____ 10-12 ____ 13-15 ____ 16-19 ____ 20+
21. What is your highest level of education?
22. Indicate your level of Leave No Trace training prior to this WEA course.
 ____ None ____ LNT Trainer Course Participant
 ____ Formal Instruction ____ LNT Master Educator Course Participant
 ____ LNT Workshop Participant
12. Please indicate a preference below and leave your email address if you would like to be contacted:
☐ I would like to be a part of a follow-up to this study.
☐ I would like a summary of findings from this project.

EMAIL:

Thank you for your time in completing this survey.

APPENDIX D: FIELD INSTRUCTIONS FOR SURVEY ADMINISTRATION

The following instructions were included on the Pre-test packet:

Please have your WEA participants complete this 15 minute survey prior to departing for the field.

Please feel free to read the statement below while dispersing the survey.

“Researchers are conducting this study to determine the development of leadership in participants who take part in a WEA course. Specifically, the researchers would like to know how well your leadership capabilities have grown with regard to environmental responsibility. If you decide to participate, you will be asked to complete two surveys, one at the beginning of your WEA course and one at the end of your WEA course. Being a part of the study probably won’t hurt you or help you. You don’t have to participate; it is totally up to you. Also, if you start the survey and decide at any time you don’t want to continue, you can withdraw and no questions will be asked. Your help is greatly appreciated.”

The included posttest reminder instructions stated:

Congratulations. Please Have Your WEA Participants Complete This 20 Minute Survey
At The End Of Your Course.

APPENDIX E: PERMISSION TO DUPLICATE AGREEMENT

Good morning Matt!

Thanks for inquiring about using the Path Model from my dissertation. Of course you can use it, if it better helps explain your thesis. I'm curious how you will use it as it relates to environmental ethic development?!. Please pass on how you are planning to use it and perhaps it might be interesting to pass along in my Environmental Education class. Good luck Matt!

Rená

*Rená Koesler, Ph.D.
Professor
HRK Department
Longwood University
201 High St.
Farmville, VA. 23909
phone: 434-395-2550
FAX: 434-395-2380*

From: Matt Hartman [mailto:mh169406@ohio.edu]

Sent: Saturday, March 22, 2008 3:50 PM

To: Koesler, Rena

Subject: Reprint request

Dear Dr. Koesler,

Greetings from Ohio. My name is Matt Hartman, I'm a 2nd year master's student at Ohio University. The purpose of my email is to request permission to reproduce the "path model of continued participation in outdoor leadership development activities" in my thesis. Please see the attached file for how the model would be used in my document. I believe the model was first printed in the 1998 *Leisure Sciences* journal. My thesis focuses on the development of environmental ethic among WEA course participants and I'm nearing completion of the project. Including the model would be helpful as a means of illustrating where some of my ideas for assessing environmental ethic development were formed.

Thank you for your consideration and for the very insightful research that has contributed to my thesis.

Kind regards,
Matt

Matt Hartman
Graduate Assistant
Department of Recreation Studies
Ohio University
Phone: 740-593-0595
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APPENDIX F: INSTITUTIONAL RESEARCH BOARD (IRB) APPROVAL FORMS

OHIO
UNIVERSITY

Office of the Vice President
for Research

07E082

Office of Research Compliance
Research and Technology
Center 117
Athens OH 45701-2979

T: 740.593.0664
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A determination has been made that the following
research study is exempt from IRB review because it
involves:

Category 2 - research involving the use of educational tests,
survey procedures, interview procedures or
observation of public behavior

Project Title: Assessing the Impact of Variations in Instructional Approaches on the
Formation of Leadership Competency in Environmental Responsibility
Among Wilderness Education Association (WEA) National Standards
Program (NSP) Course Participants

Project Director: Matthew Hartman

Department: Recreation Studies

Advisor: Bruce Martin

Robin Stack

Robin Stack, Human Subjects Research Coordinator
Office of Research Compliance

04/25/07

Date

The approval remains in effect provided the study is conducted exactly as described in your application for review. Any
additions or modifications to the project must be approved by the IRB (as an amendment) prior to implementation.

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The amendment, detailed below, and submitted for the following research study has been approved by the Institutional Review Board at Ohio University. Approval date of this amendment does not affect the expiration date of the original approval.

Amendment: More formal and final version of all 3 parts of survey, pre, post test and instructor's post test survey. Includes deletions from section 1: behavior-knowledge, and an additional section on leadership efficacy.

Project: Assessing the Impact of Variations in Instructional Approaches on the Formation of Leadership Competency in Environmental Responsibility Among Wilderness Education Association (WEA) National Standards Program (NSP) Course Participants

Project Director: Matthew Hartman

Advisor: Bruce Martin
(if applicable)

Department: Recreation Studies

Robin Stack

Robin Stack, C.I.P., Human Subjects Research Coordinator
Office of Research Compliance

05/17/07

Date

APPENDIX G: GLOSSARY OF KEY TERMS

Course Location. This variable was again a hand written name of where the course took place. Examples of course locations include: Cape Lookout, NC; Sequoia and Kings Canyon, CA; and Glacier Bay, AK. For a complete list of course locations, please refer to table 1.

Current ecological literacy development score. Respondents chose “yes,” “no,” or “unsure” by placing a check by the statement that represents their current behavior involving ecological literacy development. The following examples illustrate the type of items in this score: “within the past year, I have subscribed to a magazine that addresses environmental issues;” and “within the past year, I have attended a workshop that promotes environmental responsibility.” For the entire ecological literacy development score, see appendix A.

Days per year engaging in outdoor adventure pursuits. The variable keys in on prior experience, and participant again had to check by the following seven options: 0, 1-10, 11-20, 21-30, 31-40, 41-50, and 51 & up.

Education. For this demographic variable, participants wrote in their current level of education, some high school, rank in college, masters, PhD, etc.

Intended ecological literacy development score. Participants checked “yes,” “no,” or “unsure” regarding their intended ecological literacy development. The category included the same six statements from the *current ecological literacy development score*.

LNTPI score. This scale was based off of the work of Martin, Norling, and Sassani, who developed a precursor to this scale in 2006. This dependent variable was

calculated using a five point Likert scale, wherein a one represented “strongly disagree,” two represented “disagree,” three represented “neither,” four represented “agree,” and five represented “strong agree.” The 30 item scale included multiple items corresponding to the seven principles and practices of LNT derived directly from the LNT *Master Educator Handbook* (Tilton, 2003). Listed below are seven examples items: when hiking in a heavily used area, I walk on established trails; when building a campfire, I use existing campfire rings when they are present; I avoid approaching wildlife; I give food to wildlife; when backpacking, I always choose a campsite that is out of sight of the trail; when digging a cat-hole, I always dig it approximately 6-8 inches deep; I collect historical objects that I find when traveling in the backcountry; I alert landowners and land management agencies of areas infested with invasive or nonnative plants. For the entire LNTPI scale, please refer to appendix A.

Participant and instructor Ecological Self-Efficacy Score (ELSS). This 10 item dependent variable was used for participants and instructors to rate how well a statement characterized their feelings about their ability to teach and promote environmental ethics. Again, participants chose by circling their answer using a five point Likert scale, ranging from strongly disagree (1) to strongly agree (5). The following two statements provided examples of items from the participant self efficacy score, “I teach environmental responsibility when leading activities in the outdoors” and “I can empower others to care for the natural environment.” For the complete ELSS, see appendix A.

Prior LNT training. Participants could checked whether they had no prior LNT training, formal LNT instruction, had been an LNT workshop participant, had been an LNT trainer course participant, or had been an LNT Master Educator course participant.

Promoting of ecological literacy development score. Two items corresponding to the student ecological literacy development score were used in the instructor survey. Using a five point Likert scale, instructors denoted their promotion of ecological literacy. The items included: during the course, I encouraged participation in an organization that supports environmental responsibility; during the course, I encouraged subscription to a magazine that addresses environmental issues (see Appendix C).

WEA participant. An individual who volunteered to take the WEA course, either on his or her own volition or as a component of a college outdoor leadership program. These individuals paid a fee to obtain the instruction received while in the field.

WEA Course Type. Students wrote National Standards Program (NSP), Professional Short Course (PSC), or Wilderness Steward Program (WSP). The NSP requires a minimum of 21 days field experience and is designed for the more novice to intermediate level outdoors person who hopes to gain outdoor leadership certification (WEA Courses, 2008). The PSC is similar to the NSP in that it provides outdoor leadership certification, but differs in that it caters to more experienced leaders who might already be working in the field of outdoor leadership (WEA Courses, 2008). PSC can be shorter in duration than the NSP, but require a minimum of 10 days in the field (WEA Courses, 2008). The WSP is typically 10 days in length and is designed to teach

the basics of the 18-point curriculum (WEA Courses, 2008). WSP participants are not eligible for outdoor leadership certification (WEA Courses, 2008).

Years of experience as an outdoor leader. Yet another antecedent condition, participants checked: 0, 1-2, 3-4, 5-6, 7-8, and 9+.

Years of experience hiking and backpacking. Students chose experience level using a check between six options: 0, 1-2, 3-4, 5-6, 7-8, and 9+.