RELATIONSHIPS AMONG PEDAGOGICAL DIMENSIONS AND ENVIRONMENTAL ATTITUDES IN AN UNDERGRADUATE OUTDOOR RECREATION COURSE

by

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ABSTRACT

This study examined the relationship between learner involvement, outdoor recreation, grades and environmental attitudes. Specifically the study was of a collegiate level course entitled "Outdoor Recreation and Environmental Awareness."

The specific research questions addressed in this study were:

1. What are the interrelationships among college student perceptions of the pedagogical dimensions of a course, their grades and their environmental attitudes?
2. How do the aforementioned relationships vary with respect to students' self-reported participation in outdoor recreation?
3. How do the aforementioned relationships vary with respect to selected demographic variables (e.g., age, gender, academic classification and academic major)?

This study used an exploratory correlational design to examine the relationships between student perceptions of course design variables (pedagogical dimensions) and cognitive outcomes, as indicated by course grades, and affective outcomes, as measured by environmental attitudes. In addition to exploring relationships among college student perceptions of the pedagogical

dimensions of a course, their grades, and their environmental attitudes, the nature of relationships found was examined in light of several other variables, including self-reported participation in outdoor recreation, and several demographic variables (e.g. gender, academic classification, and academic major).

Overall, students perceived the course to be less constructivist and more instructivist, but only slightly so. (In other words, students were slightly less likely to see the course as one in which they were more actively engaged in how they learned).

Correlational data suggested a modest positive relationship between scores on the Pedagogical Dimensions of Interactive Learning (PDIL) and New Ecological Paradigm (NEP) measures, but the relationship was not statistically significant and subsequent regression analyses, controlling for the influence of pretest NEP scores, resulted in little additional variance in NEP post scores attributable to the PDIL or other variables. Further research should attempt to incorporate a larger number of participants, refine the measure further, and perhaps compare students from a variety of disciplines in order to examine a more heterogeneous population.

INDEX WORDS: Outdoor Recreation, Environmental Awareness, Environmental Attitude

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Introduction

Statement of the Problem

Most Americans now participate in some form of outdoor recreation, ranging from simple walks in their neighborhood to participation in increasingly popular adventure tourism. In fact, in the most recent National Survey on Recreation and the Environment (NSRE, 2000) a nationwide survey of about 5000 individuals, researchers at the Forest Service Research group at the University of Georgia and the Human Dimensions Research Laboratory at the University of Tennessee indicated that for people 16 years and older, 97.5 percent (202 million U.S. residents) participated in some type of outdoor recreation (Cordell, 2004).

At the same time, most Americans are very concerned about the environment and support environmental literacy strongly. The following quote from a public opinion survey illustrates American support for environmental literacy:

> NEETF/Roper research reveals that this need is so keenly felt that 95% of American adults (96% of parents) think environmental education should be taught in the schools and 90% believe that people in the workplace and in other places in adult society should receive environmental education too. The persistence and strength of America's belief in environmental

> education seems to come from the ease by which visions of a cleaner, greener and more balanced future occur to so many (NEETF/Roper, p. 4).

Participation in outdoor recreation and positive attitudes toward the environment would seem to go hand-in-hand, but this cannot be assumed. Studies by Dunlap and Heffernan (1975) and others (Leopold, 1967; Teisl & O'Brien, 2003) have investigated the relationship between two phenomena: outdoor recreation and environmental attitudes. Results have been mixed. For example, Dunlap and Heffernan (1975) found that greater outdoor recreation participation was associated with stronger environmental concern when that recreation was in non-consumptive forms of outdoor recreation such as hiking and catch-and-release fishing. Moreover, Tarrant and Green (1999) found that "involvement with appreciative outdoor recreation activities (day hiking, backpacking and nature viewing) …are clearly more important in generating responsible environmental behaviors (such as recycling) than more passive and nonpersonal experiences" (p.28). However, Bright and Barro (2000) reported that the Dunlap and Heffernan hypotheses has been tested "and found only moderate or weak correlation between outdoor activity and environmental concern (Van Liere & Noe, 1981; Geisler, Martinson, & Wilkening, 1977; Jackson, 1987; Pinhey & Grimes, 1979; Theodori, Luloff, & Willits, 1998)" (p. 40).

Additionally, Teisl and O'Brien (2003) noted, "A positive association between the two ultimately implies that those individuals who participate in outdoor recreation activities are more likely than their counterparts to be environmentally concerned" (p. 521). Despite the mixed findings, some support for a positive association between these two variables has been found. Nonetheless, further research is needed.

Encouraging participation in outdoor recreation and positive attitudes toward the environment should begin in our elementary schools and continue into higher education. These kinds of important outcomes (recreation and environmental education) are not as susceptible to direct instruction as traditional curricular outcomes such as learning how to add fractions or the names of the planets. Fortunately, research on pedagogy has been evolving, and as result, enhanced pedagogical theories and principles now provide higher education instructors with better strategies for helping students accomplish affective as well as cognitive outcomes (Bransford, Brown, & Cocking, 2000).

Although not evident in every college or university classroom, the theoretical foundations for pedagogy in higher education have gradually changed from a strictly behaviorist basis to principles that include cognitive and social factors. (Laurillard, 2001). More specifically, constructivism, a learning theory that has greatly influenced the field of instructional technology, is touted by such researchers as Lambert and Walker (1995). They suggest that learning is constructed through building upon prior knowledge and experience. This view is common, although not always applied, in higher education. Constructivism holds that: "(1) learning is an active process of constructing rather than acquiring knowledge, and (2) instruction is a process of supporting that construction rather than communicating knowledge" (Duffy & Cunningham, 1996). However, research focusing on the specific kinds of pedagogy effective in outdoor recreation higher educational programs has been limited. It is this gap in the pedagogical foundations of outdoor recreation education that has led to the investigation of the topic.

The current study examined a course entitled *Outdoor Recreation and Environmental Awareness*, which had 5 objectives that were tied to external standards of the National Recreation and Park Association.

1. Understand the conceptual foundation of outdoor recreation
2. Describe the development of the conservation and preservation movements in the U.S.
3. Understand outdoor recreation user's environmental attitudes and behaviors from a sociological and psychological perspective.
4. Understand the role of planning and selected management concepts in the provision of outdoor recreation opportunities.
5. Describe the concept of environmental ethics and implications for the stewardship of outdoor recreation resources.

The design of the outdoor recreation course investigated in this study was influenced by a constructivist perspective that students need to construct their own knowledge concerning outdoor recreation and the environment and develop their own environmental attitudes. It cannot, however, be assumed that just because students are given the opportunity to construct their own knowledge and attitudes they actually do so. In addition, understanding the relationship between pedagogical perceptions and environmental attitudes was seen as an important undertaking. (For example, do students with a conception of the course as more instructivist also have a more critical environmental attitude?) In order to increase the knowledge base about the ability to construct knowledge and develop attitudes related to the environment, two important subjects were explored in this study:

1. the attitudes toward the environment of undergraduate students enrolled in an outdoor recreation course; and
2. the relationships between the students' perceptions of how they are being taught and their environmental attitudes.

The students participating in this study were enrolled in an undergraduate course that was fairly unique in that it used both traditional classroom methods (e.g., lecture and discussion) and technology-based methods (e.g., an interactive multimedia CD-ROM). The course was designed and implemented at a large research university located in the southeastern United States of America. The course, "Outdoor Recreation and Environmental Awareness," was cross-listed in two colleges/schools within the university, the School of Forestry and the College of Education. A description of the course can be found in Chapter 3 and the syllabus for the course appears in Appendix A.

Purpose

Higher education courses are expected to have a range of outcomes including increased knowledge in the cognitive domain and informed attitudes in the affective domain. Ideally, there should be an alignment between the pedagogical dimensions of a course and the desired outcomes, both cognitive and affective. The pedagogical dimensions of a course are defined by the instructional design of the course. These dimensions include a number of variables, e.g., the degree to which the instructor in the course assumes a role that is primarily didactic or facilitative and the degree to which goals of the course are primarily concrete and relatively easy to assess versus abstract and much more difficult to assess. This study explored the nature of this critical alignment within the aforementioned "Outdoor Recreation and Environmental Awareness" course.

The purpose of this study was to examine the relationships among a set of variables thought to be related to the research issues posed above. These variables included the following:

1. selected student demographic variables
2. student perceptions of pedagogical dimensions within a college course focused on "Outdoor Recreation and Environmental Awareness"
3. their self-reported participation in outdoor recreation
4. course grades
5. student environmental attitudes

Research Questions

The following research questions were addressed in this study:

1. What are the interrelationships among college student perceptions of the pedagogical dimensions of a course, their grades, and their environmental attitudes?
2. How do the aforementioned relationships vary with respect to their self-reported participation in outdoor recreation?
3. How do the aforementioned relationships vary with respect to selected demographic variables (e.g., age, gender, academic classification and academic major)?

Instrumentation

Demographic characteristics were assessed using a Demographic Information Sheet. Questions on this instrument required the respondents to indicate their gender, age, academic classification and academic major (see Appendix B). Perceptions of the

pedagogical dimensions of the "Outdoor Recreation and Environmental Awareness" course were measured using a new instrument called the "Pedagogical Dimensions of Interactive Learning" (PDIL) inventory (see Appendix C). The PDIL was primarily designed to reveal the degree to which students actually perceived the course design as constructivist. Reeves' (1994) work on evaluating computer-based education was integral for the creation of this instrument. In developing this instrument, a pilot test was performed. Students in an undergraduate recreation course at a large midwestern university were asked to comment on the content of the survey, to see if the meanings of the survey questions were clear to them. This resulted in only slight modification to the survey. Grades were obtained from the course instructor. Participation in outdoor recreation was measured using the "Outdoor Recreation Participation Survey" (ORP) (see Appendix D). Finally, the students' environmental attitudes were measured using the "New Ecological Paradigm" (NEP) instrument (see Appendix E). More details regarding this instrumentation can be found in Chapter 3 which focused on the methodology employed in this study.

Delimitations

This study does not seek to find causality among the variables described above, only relationships. Nonetheless, with the ultimate intent of improving upon the nature of outdoor recreation pedagogy in mind, exploring the nature of relationships of these variables is an important first step in the kind of research needed in this field.

Importance of the Study

Despite the delimitations noted above, this study has sufficient merit in the sense that because little is currently known about how changes in pedagogy used in outdoor recreation education relate to cognitive and affective outcomes even an exploratory study such as this may be valuable if it provides greater understanding of the issues involved and stimulates further research.

Definitions of Terms

Outdoor Recreation: Leisure activities involving the enjoyment and use of nature. (Ibrahim & Cordes, 1993, p. 13).

Pedagogy: (1) the art, science, or profession of teaching; (2) an approach to teaching including what is taught, how teaching occurs, and how what is taught is learned. (Merriam-Webster, 2006).

Environmental Attitude: a learned predisposition to respond in a consistently favorable or unfavorable manner with respect to the environment. (Pelstring, 1997).

Summary

This chapter has presented the rationale for this study in terms of attaining a better understanding of the relationships between the pedagogical dimensions of an outdoor recreation course and the cognitive and affective outcomes of the course. The chapter also presented the research questions and a preliminary overview of the instrumentation employed in the research. The chapter provided a frank assessment of the obvious

limitations of the study while also presenting an argument for its importance. The chapter concluded with definitions of terms used in this study.

Chapter 2
Review of the Literature

Overview

This review of the literature provides a critical analysis of the existing research related to this study. The following topics are included: (a) three major learning theories used in higher education (behaviorism, cognitivism, and constructivism) that have been major influences on the field of instructional technology, (b) the relationships between these three learning theories and the field of instructional technology, and (c) research studies that have examined the effects of learning theories and instructional technology within the field of recreation and leisure studies education.

Guiding Questions

1) What are roots of and differences among the three most widely used learning theories in higher education today?
2) How have these three learning theories influenced the field of instructional technology?
3) What are the implications of the research concerning different learning theories and instructional technology for educational research related to the field of recreation and leisure studies?

4) What does the literature regarding gender and environmental attitudes suggest for examining the relationship between pedagogical dimensions of a course and environmental attitudes?

The goal of this literature review is to provide an accurate representation of the use and value of different learning theories in higher education and more specifically in the field of recreation and leisure studies. The critical analysis in this chapter has informed the design of this study as well as the interpretation of the results.

Theoretical Framework

The major theoretical foundation for this study is constructivism, a theory that is grounded in the principle that students differ in their construction of knowledge or the process by which they interpret the world or build meaning. Constructivism as a philosophy is:

> based on the notion that each individual, including siblings from the same family and even twins, constructs his or her perceptual world differently from anyone else based upon his or her unique experiences, personality and subcultural values, among many other variables. As a consequence, we each have a divergent, highly individualized, constructivistically built world (Shapiro, 2003, p. 125).

There are differences in the way constructivist learning theory has been presented by various theorists over the past fifty years. For example, some theorists view it as more of an individual cognitive process (cognitive constructivism) whereas others view it as a social group or community process (social constructivism) (Derry, 1996). Integral to

social constructivist theory is that while learners construct their own knowledge, they do so in communities of other learners. According to social constructivists, the community establishes agreement about the nature of a subject of interest and the warranted assertions that can be drawn from it. The more agreement there is, the stronger the viability of the knowledge that is constructed within that community (Duffy & Cunningham, 1996).

The roots of constructivist learning theory are wandering in directions that can be followed back to diverse thinkers and researchers, such as Vygotsky, Piaget, Bruner, and Papert. Indeed, constructivism is still evolving as a philosophy and a learning theory. Some people regard constructivism as the strongest of the current perspectives on learning available today; whereas others view it as detrimental to educational practice. Constructivism was preceded by earlier learning theories such as behaviorism and cognitive learning theory, both of which also have current adherents and detractors. In the next section, the history of these learning theories is briefly described.

Learning Theories

Higher education has been influenced by many different learning theories since its beginnings in the 19th century and development into its current status. Three basic learning theories—*Behaviorism, Cognitivism,* and *Constructivism*—seem to be the basic foundations for all other variants.

Behaviorism is based upon observations of behavioral change. Behaviorists intentionally dismiss unobservable processes such as cognition. Behaviorism focuses on "the measurable behavioral outcomes of learning, rather than on knowledge, attitudes, values, beliefs, and so forth." (Jarvis, Holford, & Griffin, 1998, p. 22). Although some

authors would argue that this is an oversimplification, behavioral theorists view learners' minds as 'blank slates' or empty vessels to be filled with information and knowledge. The learner, according to the behaviorist theory, does not engage in complex thinking other than in the form of responses to outside stimuli. Notable behaviorists include Ivan Pavlov (1849-1936, Russia) and B. F. Skinner (1904-1990, US). Pavlov experimented with dogs and theorized that if a bell is rung each time dogs are fed over time the dogs would begin to salivate upon hearing the bell. Pavlov called these behaviors a "conditioned response" as opposed to an "innate response" of the kind one might exhibit when touching a finger to a flame. Pavlov's research influenced behaviorists such as John Watson and B. F. Skinner, but ironically Pavlov was not interested in learning or psychology per se. He was actually awarded a Nobel Prize in medicine.

B. F. Skinner later studied behavior in a different manner employing what is known as *operant conditioning*. Operant conditioning is used to reinforce and shape behavior (Jarvis, Holford and Griffing, 1998). Testing his theory on mice and other animals, Skinner found that by giving positive reinforcements for small changes in behavior and ignoring undesirable changes, he could cause the subject to string together a chain of behaviors that would not be part of its normal behavior (such as pushing a lever to obtain a food reward).

Although pure operant conditioning is rarely used outside of special education contexts, it was once regarded as widely applicable across all levels of schools through the use of programmed instruction and teaching machines (Skinner, 1968). Some argue that Skinner's theory is still being applied to human learning in the form of testing and

grades. Others have criticized most applications of instructional technology as being primarily influenced by behaviorism as a learning theory.

Practitioners as well as researchers continue to find behavioral theories applicable in higher education. For example, the use of frequent multiple-choice or short-answer quizzes in university courses can be viewed as a strategy derived from behavioral learning theory, in that this type of question doesn't allow for interpretation. Instructional strategies derived from behaviorist theories have strong, clear, quantifiable goals, making educational research in this area attractive and explicable. However, because of the sole concern of behaviorists for observable behavior and its dismissal of internal mental states, it is seen by many as "a very limited approach to learning" (Jarvis, et al, 1998, p. 22).

As Eric Bredo explains, cognitivism took the external rules of behaviorism and "placed them inside the head as the rules of a symbolic problem representation" (as cited in Phye, 1997, p. 23). Cognitivism is an attempt to explain the thought processes behind a behavior. College instructors influenced by cognitive learning theory have attempted to tap into the mental structures of their students by using a number of alternatives assessment strategies such as the use of concept maps (Novak, 1990). Concept mapping is a way to represent knowledge in the form of a graph. These knowledge graphs are networks of concepts. The networks consist of nodes (which represent concepts) and links (which represent relationship between nodes). Cognitive theorists of critical acclaim include David Ausubel and Sir Frederick Charles Bartlett.

Ausubel theorized that what individuals learn in school is based upon the kinds of "superordinate, representational, and combinatorial processes that occur during the

reception of information." (Kearsley, 1994). This theory, known as *Subsumption Theory*, maintains that new material is related to relevant ideas in the existing cognitive structure on a substantive, non-verbatim basis. Ausubel indicated that his theory applied only to reception learning in school settings. The two basic principles of subsumption are that:

1. The most general ideas of a subject should be presented first and then progressively differentiated in terms of detail and specificity.
2. Instructional materials should attempt to integrate new material with previously presented information through comparisons and cross-referencing of new and old ideas.

Barlett's contribution to cognitivism has to do with memory and what he termed "schema" or "schemata." Barlett believed that "memory takes the form of schema which provide a mental framework for understanding and remembering information." (Kearsley, 1994). Bartlett found that people will remember details by subconsciously putting information into schemes in order recall information. Through a review of Bartlett's work, William F. Brewer (2000) found that there are several categories of how people change information when remembering it. Brewer found that the way people change information can be put into several categories. For example, c*hanges in recall* is inaccurate recollection of information, *summarization processes* is simplifying the information, *transformations to the familiar* is translating unfamiliar information into terms a person can more readily understand and *inferences in recall* is when a person's memory is of what he or she inferred from the information presented.

Cognitive learning theories have changed continuously and various threads are strengthened or unraveled as additional research is done. For example, 20 years ago there was much more confidence among researchers that artificial intelligence, a branch of cognitive learning theory, would evolve to allow the development of powerful intelligent tutoring systems; however that confidence has waned in the face of the technical difficulties encountered by developers (Shute & Psotka, 1996). Nonetheless, cognitive learning theory continues to be in used in higher education. For example, university lecturers are cautioned not to exceed a certain number of major concepts per lecture because cognitive load theory maintains that short-term memory can only process seven plus or minus two at one time (Miller, 1956). Another example of cognitivist learning concepts is that some faculty members, especially in the sciences, seek to help their students develop robust mental models of complex phenomena rather than to simply absorb discrete factual information (Norman, 1983).

Constructivism is a controversial learning theory that some regard as an offshoot of cognitivism. Constructivism has both passionate adherents and fierce critics. It is both criticized for being too subjective (Duffy & Cunningham, 1996), and touted for recognizing the mind as an active rather than a passive vessel. Further, "constructivism has suddenly exploded onto our present educational and academic stage with a potency that hardly could be imagined, let alone predicted." (Shapiro, 2003, p. 327).

As noted previously, constructivist theorists hold that there are two subtypes of constructivism: cognitive constructivism and social constructivism. While both of these sub-theories view the learner as a knowledge constructor, cognitive constructivists regard the learner primarily as an individual, and social constructivists view the learner as part

of a learning community. Cognitive constructivist theorists look to Jean Piaget as having influenced early theory while social constructivist theorists regard Lev Vygotsky as the founder of early theory. (Maschke, n.d.).

Piaget theorized that there are several stages of human development: *sensorimotor, preoperational, concrete operational,* and *formal operational.* Piaget theorized that these developmental processes could explain how a person develops into a thinking, rationale human. He believed that learning was based on human experience and the maturation process (Maschke, n.d.).

Vygotsky, on the other hand, theorized that social and cultural aspects of human life influence learning. He conceived of the learner as a discoverer of knowledge. Vygotsky's theory consisted of three major points: making meaning, tools for cognitive development, and the zone of proximal development. The central tenets of making meaning are that the community plays a central role in learning and that the people around the learner strongly influence his/her perception of the world. Tools for cognitive development consist of the student's significant other people, culture, and language. The learner's development depends on how well he/she develops and uses these tools. Finally, the zone of proximal development has three "zones." These zones are tasks that (a) the learner can do alone, (b) the learner cannot do, and (c) the learner can do with the help of a teacher. (Leont'ev, 1997, p. 29). Ideally, according to this theory, students should be "scaffolded" by a knowledgeable other (e.g., a teacher, older student, or some form of technology) so that they can do things that they would otherwise not be able to do and thus learn in the process. The principle of the zone of proximal development has had a major influence on the design of instructional technologies that are supposed to provide

the help (or scaffolding in Vygotsky's terms) that learners need to improve their capabilities (Duffy & Cunningham, 1996).

As is evident, integral to social constructivist theory is that while learners construct their own knowledge, they do so in communities of other learners. Therefore, the community establishes agreement about the nature of whatever the subject of interest is. The more agreement there is, the stronger the certainty of the community view (Duffy & Cunningham, 1996). According to this theory, learning is facilitated when learners work in teams to solve complex problems or make new meaning out of real-world data.

Learning Theories and Instructional Technology

The three main theories briefly described above—behaviorism, cognitivism, and constructivism—have all influenced the field of instructional technology during the past fifty years. For example, behaviorism was used as the theoretical foundation for the development of programmed instruction, a major initiative of instructional technologists during the 1950s and 60s (Cuban, 1986). Cognitivism formed the theoretical foundation for intelligent tutoring systems, a focus of much attention within instructional technology in the 1970s and 80s (Shute & Psotka, 1996). Today, many instructional technologists are engaged in creating web-based constructivist learning environments, an endeavor influenced by constructivism in both its individual and social forms (Wilson, 1996). This section of this literature review is intended to assess how the field of instructional technology has been influenced by (and in turn, influenced) the development of behaviorism, cognitivism, and constructivism.

Behaviorist instructional technology has been regarded by many researchers as having made positive impacts on learning. Delivery systems such as the *Personalized*

System of Instruction (Keller, 1968) and *Learning from Mastery* (Bloom, 1976) focused on self-pacing of the learner and completion of predetermined tasks. *Precision Teaching* (Lindsley, 1990) was designed with time in mind. The time spent doing a particular behavior was mathematically graphed according to the amount of learning that took place. Finally, *Direct Instruction* (Engelmann, Becker, Carnine, and Gersten, 1988) suggested the environment influences the learner. For example, the number of students involved (10 to 15 as the optimum) would be seen as an environmental influence on learning. These types of instructional tools are still being used and with much success (Burton, Moore, & Magliaro, 1996).

One major criticism of these types of behaviorally influenced systems is that they only seem to work well at providing instruction for gaining basic knowledge. In other words, they are limited to the learning that takes within simple skills acquisition. Learners also need systems by which they can learn more abstract knowledge as well as critical-thinking skills.

Cognitive learning theorists seek to reach further into developing learners. Cognitivists see the environment in which learning takes place and the various functions of memory as having significant effects on what is learned. The environment has infinite variables; however, controlling all of these is probably impossible and certainly impractical. Similarly, the question of how memory works is still a matter of much debate. In the eyes of some critics of this perspective, the relationships between short-term, long-term, and working memory are still more a matter of speculative theory than definitive scientific principles.

Cognitivist researchers have focused on three main areas. First, how learners memorize certain schema has been one of the most significant areas of research for cognitivist educational technologists. Second, research on how learners group thoughts for rapid recall has been significant. Some people remember concepts and ideas in a linear fashion, while others remember them more graphically, as in the concept of *information mapping.* Finally, cognitive scientists have targeted their research efforts on discovering ways to make computers operate similar to how humans think (Winn & Snyder, 1996).

Compared to behaviorists, cognitivist researchers seem to be looking deeper into how learners learn. However, cognitivists still seem to be conceiving of learners as passive (albeit less so than behaviorists) entities who absorb information. Rather than conceiving of learners as passive, constructivists have reconsidered learners as active participants in creating and acquiring new knowledge.

Constructivists have developed several areas of research in educational technology, including research on problem-based learning and the use of the World Wide Web. The Strategic Teaching Framework (STF) is an example of a problem-based learning environment for teachers (Duffy, 1997). The STF is designed to help teachers solve problems by exposing them to several video-taped classroom scenarios that they can explore and interpret. STF is intended to help teachers reflect upon how they would act in similar scenarios. Teachers are encouraged to form communities with other teachers using the STF in order to increase learning and support. One of the guiding principles of this system is that it is entirely learner centered, meaning that there are no

right or wrong answers to the problems independent of the community of learners (Duffy & Cunningham, 1996).

Constructivists in educational technology have invested much of their research efforts on collaborative learning (Bostock, 1998) within the context of both traditional classroom-based and web-based environments (Duffy & Cunningham, 1996). Researchers have found that learners generally claim that they like the idea of collaborative learning. However, when not forced, some learners, especially in higher education, are less likely to practice it. Some learners, often those who are most successful in traditional non-collaborative assignments, resent having to work with other students whom they may view as not as talented, conscientious, or motivated to achieve as they are.

Because the idea of forcing students to learn collaboratively is antithetical to constructivism, a problem arises. To solve this problem, researchers and educators must find ways to reward collaboration in order to foster it. One approach that instructional technology researchers have recommended is making the problems so authentic and complex that no single learner can complete them, thus compelling learners to collaborate (Herrington, Reeves, Oliver, & Woo, 2004).

The constructivist line of educational technology research, as any research paradigm, faces many problems. However, the fact that constructivism focuses on the learner rather than the teacher makes it very progressive. Constructivism embraces the notion that learners are not only active in the learning process, but necessarily conductors of the orchestra of knowledge. Constructivists avow that without learners as the conductors, education is disconnected and out-of-sync. Needless to say, this notion of

learner-centeredness is not accepted by all faculty members in higher education who may prefer to view themselves as the "sage of the stage" rather than the "guide on the side."

Recreation Education Research

Until recently, and even with the many research studies in the field of recreation and leisure studies, very few have been on recreation education in general or specifically on outdoor recreation education. However, a few scholars in the field have attempted to improve recreation education through research.

Of the relatively limited number of journal papers published related to recreation education, a few have described the potential of specific learning strategies such as cooperative learning (Tholkes & Phipps, 1997), or applications of educational technology, such as web-based instruction (WBI) (Brayley, 1999). However, neither Tholkes & Phipps (1997) paper on cooperative learning nor Brayley's on technology in the recreation classroom constitute research studies per se in the sense that data were collected and reported. In the context of recreation education there is a paucity of educational research.

Research is needed to examine the most appropriate outcomes for recreation education. In his work discussing past, present, and future trends in recreation, Godbey (2000) called for increased debate regarding necessary competencies in recreation and leisure studies curricula. Godbey (2000) stated that there is currently almost no debate and that this lack of debate has caused a knowledge gap (p. 40).

Some researchers have examined learning styles and their interaction with other factors related to recreation education. Using Kolb's Learning Style Inventory (LSI),

Szucs, Hawdon, and McGuire (2001), studied learning style differences between leisure science majors and students majoring in management, psychology, and sociology. They found that leisure science majors are "comparatively weak in abstract conceptualization" (p. 28) compared to students of the other compared majors, with leisure science majors generally preferring more of an empirical learning approach. Lukow and Ross (2003) also using Kolb's LSI to examine how learning styles affect attitudes toward technology, and found that "students' attitudes toward the use of technology in the classroom have no significant relationship with their preferred learning style" (p. 76).

A few researchers have examined pedagogical issues related to recreation education. Myllykangas (2004) reviewed the literature regarding recreation pedagogy from 1986-2001 and found that "recreation students largely showed" a learning style characterized by concrete experiences and active experimentation (p. 117). Myllykangas also suggested that recreation professors can increase their teaching effectiveness by using a variety of teaching methods (p. 122). In another research study regarding attitudes toward pedagogy, Collins and Wilhite (2004) analyzed recreation and leisure studies students' attitudes toward computer technology in the classroom and found that "students who have more computer experience generally express more positive attitudes toward computers" at course end (p. 105). However, "student attitudes toward computers do not always improve with computer experience and may actually become less positive (p. 105). According to Collins and Wilhite (2004), possible reasons for this decline included "1) outside pressures, 2) perceptions of workload, 3) increased individual responsibility for learning, 4) problems with computer access, and 5) interface with the teacher-student and student-student relationship" (p. 105).

Given the paucity of research studies examining educational issues in the field of recreation and leisure studies, it is clear that a research study about educational methods and outdoor recreation experiences and attitudes is both timely and needed.

Environmental Attitudes and Gender

Limited research on the effects of gender as it relates to environmental attitudes has been conducted. A key finding of a review of the research from 1988 to 1998 in this area is that "women report stronger environmental attitudes and behaviors than men" (Zelenzy, Chua & Aldrich, 2000, p. 1). The authors continue, "As a single variable, the effect of gender on pro-environmental behavior was consistently stronger than on environmental attitudes" (Zelenzy et al., 2000, p. 1). Several explanations are offered for this finding. One is that women across cultures are generally more expressive, nurturing, and compassionate (Zelenzy et al., 2000), and thus they extend their caring for others to the environment. Another explanation offered for this is that there is a greater likelihood that women "make connections between environmental conditions and their values, rather than because they have different value structures than men" (Stern, Deitz, & Kalof, 1993, p. 339).

Borden and Francis (1978) support the notion of gendered differences by noting the parallel development of the Women's Movement with the environmental movement. The empowerment of women did not stop at the issue of gender, but extended to other issues such as environmentalism (Borden & Francis, 1978). Given these research findings, it seemed essential to include gender as a major variable in this study of the relationship between pedagogical dimensions and environmental attitudes.

Implications of the Literature for this Study

While outdoor recreation and environmental awareness have become ever more important considerations for the quality of life for individuals as well as for society as a whole, research on ways to improve education related to these subjects has been sparse. Research focusing on ways to improve environmental education at all levels is sorely needed. As a fledgling step in this direction, this study examined relationships between student perceptions of the pedagogical dimensions of a learning environment (an undergraduate course about outdoor recreation) and their environmental attitudes.

Many educational researchers have assessed the comparative effectiveness of instructional media on student learning (Lohse, 2000), but none has done so in the context of recreation and leisure studies at the undergraduate level. This study was originally designed to examine the impact of an outdoor recreation course delivered via different instructional media (classroom instruction and online learning). A lack of students enrolled in an online version of the course eliminated opportunity for any meaningful comparison between the two media types. When it became clear that the originally designed media comparison study was not going to be feasible, I changed my focus to an investigation of the relationships between the pedagogical dimensions of a unique course and the environmental attitudes of the students enrolled in that course.

Although I was initially disappointed that I could not pursue the media comparison research, the adjustment to the new focus was eased when further literature review revealed that media comparison studies have been highly variable in quality (Hannafin, Hannafin, Hooper, Reiber & Kini, 1996; Reeves, 1993), and even flawed because “there is no way to determine that one class is better than another without first

agreeing on the criteria" (Diaz, 2000, p. 1). Indeed, after nearly fifty years of media comparison studies, some experts have concluded that media have no influence on learning and that any outcome differences found can be explained by differences in instructional methods (Clark, 1994).

Thus, instead of focusing on media per se, this study explored student perceptions of critical pedagogical dimensions inherent in the design of a course of instruction and how these perceptions relate to their environmental attitudes. One tentative hypothesis implicit in this exploratory study is that students who perceive the course as constructivist (i.e., one that allows them to construct their own knowledge) will be more likely to "construct" positive attitudes toward the environment. The reason for this position is that I think those who perceive a more engaging environment in the course, which is implicit in having a constructivist point of view, will likely be more engaged in environmental issues and therefore have a higher level of environmental concern.

Summary

This literature review primarily focused on the three major learning theories influencing the design of courses in higher education today. The research indicates that all three theories are still evident in educational practices in higher education with the most cutting-edge work being influenced by contemporary constructivist perspectives. Each of the learning theories has adherents and detractors, and the question of whether one is more effective than another remains open.

This literature review also reported that there is very little significant research on the efficacy of various approaches to education in the field of recreation and leisure studies. Thus the need for the current study was clearly justified.

Chapter 3
Methodology

Introduction

As detailed in Chapter 1, this study was designed to explore the alignment between the pedagogical dimensions of a higher education course called "Outdoor Recreation and Environmental Awareness" and cognitive and affective outcomes of the course. The specific research questions that were addressed in this study were:

1. What are the interrelationships among college student perceptions of the pedagogical dimensions of a course, their grades, and their environmental attitudes?
2. How do the aforementioned relationships vary with respect to their self-reported participation in outdoor recreation?
3. How do the aforementioned relationships vary with respect to selected demographic variables (e.g., age, gender, academic classification, and academic major)?

Environmental Attitudes were viewed as the primary dependent variable in the study. However, given the exploratory nature of the study, calling course grades and environmental attitudes true dependent variables is unwarranted. No specific hypotheses were explored in the study, although my judgment was that students who viewed the

Outdoor Recreation and Environmental Awareness course from a constructivist viewpoint and who also achieved higher grades would be the students with more positive attitudes toward the environment. The reason for this supposition was that a constructivist point of view seems to this researcher as a more thoughtful approach to learning, just as more positive attitudes toward the environment seems a more thoughtful approach.

Design

This study used an exploratory correlational design to examine the relationships between student perceptions of course design variables (pedagogical dimensions) and cognitive outcomes as indicated by course grades and affective outcomes as measured by environmental attitudes. Correlation methods are weaker than experimental designs for educational research, but given the exploratory nature of this research study, they were justified as an initial step. In addition to exploring relationships among college student perceptions of the pedagogical dimensions of a course, their grades, and their environmental attitudes, the nature of relationships found was examined in light of several other variables, including self-reported participation in outdoor recreation and several demographic variables (e.g. gender, academic classification, and academic major). The examination of outdoor recreation participation was of particular importance because for several decades researchers (e.g. Dunlap & Heffernam, 1978) have hypothesized that outdoor recreation participation would be related to environmental values. Thus, it seemed reasonable to take into account the possibility that participating in outdoor activity might have some influence on the relationship between environmental values and other variables.

Instrumentation

Demographic data were collected using the Demographic Information sheet. Questions on this instrument asked the learner his/her gender, age, academic classification and academic major (see Appendix B).

The Pedagogical Dimensions of Interactive Learning (PDIL) instrument was used to assess *student perceptions of the pedagogy* used in the course (see Appendix C). Higher education students have had many years of previous instruction in elementary, middle, and high school as well as in earlier college-level courses. The pedagogical dimensions of these courses can range on the low end of the scale from being decidedly "instructivist," wherein the teacher is the central authority in the learning environment and students are relatively passive, to the high end of the scale and an environment that is much more "constructivist" wherein students are expected to take charge of their own learning and thus be much more active. The PDIL is a 20-item Likert-type scale instrument, which the learners completed during the middle of the course after having had an opportunity to form their perceptions about the course design, especially with respect to instructivist versus constructivist dimensions. Some items were reverse coded to avoid response direction bias For example, in asking respondents about their thoughts on how they acquired knowledge in the course, two separate questions were used; one was coded as a "1" being a low score, while the other was coded as a "1" being a high score as follows:

1. In this course, I absorbed specific knowledge as clearly presented in the content of this course.

Strongly Agree	*Agree*	*Neither*	*Disagree*	*Strongly Disagree*	*Not applicable*
1	2	3	4	5	0

2. In this course, I constructed my own interpretations of the knowledge embedded in the content of the course.

Strongly Agree	*Agree*	*Neither*	*Disagree*	*Strongly Disagree*	*Not applicable*
1	2	3	4	5	0

The PDIL variable score was calculated then as the total of the 20 item scores once the responses to the reverse scored items were recoded.

The learners' *outdoor recreation participation* levels were measured using the Outdoor Recreation Participation Survey (ORP) (see Appendix D). This 45-item survey, asked learners about their *current* involvement in several outdoor recreation activities. The survey listed numerous outdoor recreation activities, both consumptive and non-consumptive forms, and asked the learner to list the number of days in which he/she participated in those activities during the course. A "day" of participation in this context was any part of a day in which the learner took part in the activity. This survey was administered near the end of the course in order to achieve a more accurate account of the learner's entire outdoor recreation participation for the entire course.

Course *grades* were obtained from the course instructor and used as an indicator of the cognitive outcomes of the course. Using grades as a reliable and valid measure of student learning outcomes has been widely debated. However, it was the only cognitive outcome indicator available for the course. Performance data tied more closely to the instructional objectives of the course would have provided a better measure of the cognitive outcomes of the course; however, these were not available.

Environmental attitudes were assessed at the beginning and at the end of the course using a 15-item Likert-type survey, the New Ecological Paradigm or NEP (Dunlap, Van Liere, Mertig, & Jones, 2000; see Appendix E). This survey given at the beginning of the course was intended as a measure of the learner's pre-established attitudes toward the sensitivity of the natural world. This survey was administered again near the end of the course to determine if and how those attitudes changed during the semester. Most of the environmental attitude-behavior research has used the NEP as the measurement of choice (Dunlap and Van Liere, 1978), (Dunlap, et al, 2000). Other researchers have performed studies attempting to determine the validity and reliability of the NEP and related environmental attitude-behavior scales, including Tarrant and Cordell (1997), who found that the NEP had a modest internal reliability (alpha factor of .70).

The Course

The purpose of the *Outdoor Recreation and Environmental Awareness* course was to provide students with a broad overview of the human-environment relationship using the context of outdoor recreation. "Topics include a discussion of recreation resource supply and demand; the history of the preservation and conservation movements in the U.S.; social, psychological, and economic aspects of outdoor recreation; tools for outdoor recreation management; an overview to selected recreation resource management issues; and introduction to environmental values and attitudes." (Tarrant, Syllabus 2002).

The course was designed with both traditional (classroom, textbook) and non-traditional (CD-ROM) media. The class met one evening each week throughout the fall semester. The course grades came solely from three in-class multiple choice exams. The

exams were non-comprehensive and covered readings from the textbook (approx. 20-30%), class notes (approx. 40-50%) and material from the CD (approx. 20-30%). The CD had 15 lessons and paralleled the textbook and class notes. There was significant overlap among the three media. The class was taught through traditional lecture format, using primarily *PowerPoint* presentation software rather than a chalkboard or transparencies.

Data Collection

Various survey instruments—specifically the PDIL, the ORP, and the NEP—were the primary data sources in this study. Each of these survey instruments took about ten minutes for students to complete. The survey data were gathered during class time. During the first two weeks, the Demographic Data Sheet and the NEP were given to the learners. This initial two-week period was to allow for students who missed classes or who may have added the class late.

The next phase of survey administration was the PDIL. This second phase of data collection occurred during the seventh and eighth weeks of the course. This allowed for data collection from a majority of learners, as some may have missed a class or two during this time. As stated above, the reason for collecting these data at this point was to allow time for learners to formulate ideas and opinions about the nature of the course.

The final phase of survey administration involved the ORP and again the NEP. Both were administered during the last two weeks of the semester. Again, this two-week period allowed for maximum response rates of students. The reason for administering the ORP at this time was to provide a more accurate account of the learner's entire outdoor recreation participation for the duration of the course. The NEP was administered at the

end of the course to see how or if student environmental attitudes may have been influenced by this course.

Data Analysis

Correlation and regression procedures were used to analyze the data. This study first and foremost involved multiple exploratory variables: student perceptions of the pedagogical dimensions of the course design, their grades, and their environmental attitudes, which served as the primary criterion variable of the regression analyses. To assess the relationship between grades, course dimensions and environmental attitudes, pre-test NEP scores were controlled for in the regression analysis. This analysis was designed to answer the first research question. To expand on the above analysis, the relationships among these variables were re-examined in light of student self-reported participation in outdoor recreation, which served as a criterion variable for this analysis. This analysis was designed to answer the second research question. Finally, the relationships among the primary exploratory variables were re-examined in light of the demographics (age, gender, academic major, academic classification) of the learners. This analysis was designed to answer the third and last research question. Analysis was performed using SPSS, version 11.0 software. Descriptive statistics were calculated, a correlation matrix was constructed, and linear regression analyses were performed.

Delimitations and Limitations

It is virtually impossible to confirm cause and effect relationships with correlational analysis: no proof of causal influence may be drawn from this study. The study was exclusively exploratory, and the small sample size further limited the prospects

for statistical significance and generalization. This assessment of pedagogical dimensions relies on students' perceptions of such rather than some other more "objective" process. The assessment of the impact of the course experience through student perceptions, however is clearly biased toward a more subjective perspective. Further, since the instruments were experimental, their psychometric integrity was not fully established. Finally, no study is without some bias, no matter how much one tries to control for it. In this case, this researcher admits to a bias about the belief in the effectiveness of constructivist methods. So again, readers are encouraged to consider the findings and subsequent interpretations with some caution.

Chapter 4
Results

Introduction

The results of the study are presented in this chapter in two sections: (a) participant profile and (b) exploratory results. This study used survey methodology and correlation and regression analysis to address the following three research questions:

1. What are the interrelationships among college student perceptions of the pedagogical dimensions of a course, their grades, and their environmental attitudes?
2. How do the aforementioned relationships vary with respect to their self-reported participation in outdoor recreation?
3. How do the aforementioned relationships vary with respect to selected demographic variables (e.g., age, gender, academic classification and academic major)?

Descriptive data

Participant Characteristics

Sixty–six students were surveyed, and fifty-five respondents completed and returned the surveys, for a response rate of 83.33%. While the overall response rate was high, not all participants completed all measures or identified their ages in all cases. The

numbers for the continuous variables (see Table 1) reflect the number, 51, with complete data sets. The one exception involved grades, missing for an additional two participants, and thus the smaller n of 49 was used in analyses involving grades.

There were 19 Male students and 32 Female students in the course and one student who did not answer this question. (The tendency to have more females than males in an undergraduate course matches the overall demographics of the university program in which this study was conducted.) The average age of the participants was 22.14 years. Thirty-nine of those (76.5%) were age 20-22. One student was 19 years old (1.9%), and the rest of the respondents ranged from 23-48 years of age and accounted for 21.6% of the total number of participants. Of the survey respondents, there were no freshmen, 2 sophomores (3.9%), 30 juniors (58.8%), 15 seniors (29.4%), 3 graduate students (5.9%) and one (1.9%) who did not indicate academic classification. The average age for the women was 23.02, while the average age for men was 21.72. Academic major was also requested. Forty-five (45) were Recreation and Leisure studies majors, four (4) were Forestry majors, and three (3) were majoring in something other than those.

Pedagogical Dimensions

Student perceptions of the pedagogical dimensions of the course were measured through the use of the PDIL. As previously described, this survey is a 20-item Likert-type scale instrument, which the learners completed near the middle of the academic term. The higher the score, the more constructivist the student perceived the course to be. The possible range was from 0-100. This is a new and as yet unvalidated instrument. Four students did not complete this measure. As evidenced by analysis of the PDIL scores,

student perceptions of the course ($\chi = 49.53$) were less constructivist and more instructivist, but only slightly so.

Outdoor recreation participation

Outdoor recreation participation was measured by asking the students to indicate the number of days (any part of a day equals one day) they participated in 45 different outdoor recreation activities during the semester. There was a wide variation in the number of days of activity, with a mean of 84.9 and a standard deviation of 73.2.

Grades

Grades were obtained for forty-nine students and were measured by documenting the final scores student obtained in the course and were listed as 0-100, with two decimal places. Grades for the course were distributed in a bell curve weighted toward the higher end, with the following results: A's (n=5) accounted for 9.1% of the grades, B's (n=23) accounted for 41.8% of the grades, C's (n=17) accounted for 30.9% of the grades, D's (n=3) accounted for 5.5% of the grades, F's (n=1) accounted for 1.8% of the grades, and two participants did not have grades recorded accounting for the remaining 3.6%.

Environmental Attitudes

Environmental attitudes were measured via the New Ecological Paradigm or NEP (Dunlap, et al, 2000). This survey, given in August of 2002 and again in December of 2002 was used as a pre and post-test measure of the learner's attitudes about the sensitivity of the earth's environment. Possible scores ranged from 15-75. A higher score indicates a more pro-environmental attitude. On the pre-test NEP the mean score was

56.92, with a range from 24-72, and on the post-test NEP, the mean score was 55.21, with a range from 32-68.

Relationship Tests

Because the sample size for this study was low, finding statistically significant relationships would be relatively difficult. Nonetheless, additional analyses of an exploratory nature were pursued. The results from a regression analyses follow a presentation of bivariate relationships.

Table 1: Descriptive statistics

Continuous variables

Variable	N	Min	Max	M	SD
Age	51	19.00	48.00	22.2157	4.309
NEP -Pretest	51	24.00	72.00	56.9216	9.121
PDIL	51	18.00	69.00	49.5294	8.931
Outdoor Rec. Participation	51	.00	417.00	84.9020	73.259
NEP-Post	51	32.00	68.00	52.2157	8.846
Grade	49	55.2498	95.7276	81.2183	7.989

Categorical variables

Gender (1= Male, 2=Female)
Academic Classification (1=Freshmen, 2=Sophomore, 3=Junior, 4=Senior, 5=Graduate)
Major (1=Recreation & Leisure Studies, 2=Forestry, 3=Other)

Gender	51	1	2	1.63	.488
Academic Classification	51	0	5	3.31	.812
Major	51	1	3	1.16	.464

Research Question 1

Pearson correlation coefficients were calculated to assess the interrelationships among student perceptions of course pedagogy, grades, and pre/post environmental attitude (NEP), as well as gender, age, class, and major A significant relationship (r = .722) was found between pre- and post NEP scores ; as pre-test NEP scores increased, post-test NEP scores increased. The variables of gender, academic classification, major and pedagogical dimensions were weakly but non-significantly correlated with environmental attitudes (-.175, -.049, .148 and .207, respectively). Major was positively related to outdoor recreation participation, with RLS majors doing less, and to class with RLS majors being more likely to be underclassman.

A stepwise regression analysis was conducted using post NEP scores as the criterion variable with pedagogical perception, grade, and pretest NEP scores as predictors. In step 1, NEP pre-test scores were a significant predictor of NEP post-test scores (environmental attitudes) (see Table 3), accounting for 50.2% of the total variance in post environmental attitude. As pre-test environmental attitude scores increased, post-test environmental attitude increased. This model was statistically significant at .05. In step 2, student perceptions of course pedagogy (PDIL scores) and grades were entered into the equation and were not significant predictors of post environmental attitudes. The addition of these variables accounted for only an additional .02% of the variance in post environmental attitude, indicating that changes in NEP scores subsequent to the course could not be attributed to course performance or perceptions of course pedagogy

Table 2: Correlation Matrix

	NEP Post	PDIL	GRADE	ORP	GENDER	AGE	CLASS	MAJOR	NEP Pre
NEP Post	1								
PDIL	.207	1							
GRADE	-.122	-.085	1						
ORP	.143	-.099	.221	1					
GENDER	-.175	-.266	.074	-.235	1				
AGE	.309*	.044	-.121	-.016	-.018	1			
CLASS	-.049	.170	.139	.118	-.052	.020	1		
MAJOR	.148	-.045	.021	.540**	-.090	.003	.345*	1	
NEP Pre	.722**	.076	-.216	.058	-.029	.275	.001	.145	1

Note. *p<.05, **p<.01

CLASS was coded (1=Freshmen, 2=Sophomore, 3=Junior, 4=Senior, 5=Graduate)

MAJOR was coded (1=Recreation & Leisure Studies, 2=Forestry, 3=Other).

Research Question 2

As shown in Table 2, the correlation between outdoor recreation participation and student perception of course pedagogy (PDIL scores) was non-significant. However, a regression analysis was conducted to allow for the influence of other variables. Using outdoor recreation as the criterion, with student pedagogical perception, grade, and pre/post environmental attitudes as predictors, no evidence was found that this combination of variables was predictive of outdoor recreation participation. (See Table 4.)

Table 3: Regression of Student Perceptions of Course Pedagogy on Post-test Environmental attitudes

Step	Predictors	R	R^2	*p*
1	Pre-Environmental Attitude	.709	.502	.000
2	NEP Pre-test, Pedagogical Perceptions, Grade	.726	.527	.324

Table 4: Regression of Student Perceptions of Course Pedagogy, Grades and NEP scores on Outdoor Recreation Participation			
Predictors	R	R^2	*p*
Post-NEP, Grade, PDIL, Pre-NEP	.355	.126	.196

Research Question 3

Five independent sample *t*-tests were conducted to assess gender differences in student perceptions of course pedagogy perception, grades, outdoor recreation, and pre/post environmental attitude. The same five variables were also differentiated by academic classification. There were no statistical differences between males and females (Table 5) or by class (Table 6). However, differences approaching significance (p=.06) suggests that males in the sample were slightly more likely than females to see the course as constructivist in nature. And predictably males were slightly more likely to be involved in outdoor recreation activities (p = .09).

Nevertheless, because of the relatively few additional significant bivariate relationships between the variables of interest (PDIL and NEP scores) and age, gender, grade and classification, as well as the lack of relationship established in the previous regression analyses, no additional regression analyses were undertaken.

Table 5: Independent sample *t*-tests – Student Perceptions of Course Pedagogy , Grades, Outdoor Recreation Participation, and Environmental Attitudes by Gender

Variables	M (Male)	SD (Male)	M (Female)	SD (Female)	*t*	df	*p*
PDIL	53.32	6.15	49.72	8.07	1.92	49	.06
Grade	81.75	8.13	81.02	7.96	-.51	47	.62
NEP-Pre-test	57.26	10.40	56.44	8.11	.20	49	.84
NEP-Post-test	54.21	8.73	51.11	8.82	1.24	49	.22
Outdoor Recreation	123.26	117.90	89.44	58.85	1.70	49	.09

Table 6: Independent sample *t*-tests – Student Perceptions of Course Pedagogy, Grades, Outdoor Recreation Participation, and Environmental Attitudes by Academic Classification

Variables	M (Juniors)	SD (Juniors)	M (Seniors)	SD (Seniors)	*t*	df	p
PDIL	50.90	8.00	50.27	6.52	.03	43	.97
Grade	79.18	8.56	83.19	4.89	-.08	42	.93
NEP- Pre-test.	55.45	7.29	56.50	11.76	-.23	43	.81
NEP Post-test.	52.64	7.87	49.19	10.93	1.13	43	.26
Outdoor Recreation	85.73	11.32	121.15	30.29	-1.40	43	.16

Summary

With respect to the research questions, there was little evidence of a relationship in this study between student perceptions of course pedagogy and course-ending environmental attitudes. Nor was much evidence of any new relationship revealed when taking into account outdoor recreation participation, grades, gender, age, major, or class. However, several other findings were noteworthy. As evidenced by analysis of the PDIL scores, student perceptions of the course ($\chi = 49.52$) were less constructivist and more instructivist, but only slightly so. The male study participants reported a slightly stronger ($\chi = 53.32$) perception of constructivist pedagogy from the course than did their female counterparts ($\chi = 49.72$). Of particular note here is the decline in environmental concern between the pre-test and post-test scores. This is the most interesting finding in the entire study. Possible reasons are discussed in chapter five.

The next chapter reports the conclusions of this researcher, including an interpretation of the findings. Implications of the findings for the area of recreation education are also included in the last chapter.

Chapter 5
Discussion

Overview

This chapter discusses the study's conclusions and implications. An interpretation of the findings reported in the previous chapter is presented below. Implications for recreation education and land management are also included. The first part of this chapter is organized by addressing the three research questions. The limitations of the study are then addressed. Finally, implications for further research are considered.

This research was undertaken with the assumption that a course that encouraged students to construct their own knowledge about outdoor recreation might also encourage the development of positive environmental attitudes where they did not exist before, or that such a course would reaffirm those positive attitudes if they already existed. Unfortunately, the evidence examined here does not provide a compelling case for a relationship between college student perceptions of the pedagogical dimensions of a course, and their environmental attitudes, even when other factors are taken into account. Self-reported participation in outdoor recreation was considered a likely confounding variable, but the strength of the relationship remained unchanged when adding the self-reported participation in outdoor recreation variable. However, because of the methodological limitations of the study and the small sample size there is still a lingering

question as to whether a relationship might exist under more favorable research circumstances.

Statistical significance *was* found in examining some relationships outside of the research questions. One of the most interesting findings is that the average NEP score dropped over 4 points (over 5%) between the Pre-test NEP and the Post-test NEP. This suggests that students might have become actually less rather than more concerned about the environment at the end of the course. One reason for this change may have been that students came to understand more about the nature of the relationship between humans and the environment. Students in this course learned how land managers act to slow environmental degradation. So, it could be that the students generally felt like humans can and will manage their environment as good stewards, thus leaving them with less concern at the end of the course. However, one could also argue that the decreased environmental concern is related to something else.

The modest positive correlation (.207) between pedagogy perceptions and NEP post-test scores only approached significance, but it suggests that those who view the course as more constructively designed may be slightly more concerned about the environment. Further research is needed to more completely determine whether those who see the course as more constructively designed are more concerned about both instructional and environmental issues.

The lack of a relationship between pedagogical perceptions and course grades was counter to what I expected. Perhaps those seeing the course as instructively and cognitively-oriented were at least as successful in taking multiple choice type of exams (the sole method of student performance evaluation) as were those students who

perceived the course as more constructively designed If other methods of evaluation were employed perhaps these results would have been different.

The finding of statistical significance in research question one—What are the interrelationships among college student perceptions of the pedagogical dimensions of a course, their grades, and their environmental attitudes?—is on the surface of great interest. Upon closer examination, however it is apparent that the significant relationship is due almost entirely to the relationship between pre and post environmental attitude. With pretest scores controlled in the regression analyses to examine change in NEP, it was apparent that none of the other variables contributed to change in environmental attitudes.

Globally, what remains in question here is when learners think the learning environment is more constructivist, are they then more likely to engage more, learn more and be more concerned about the topic? The results unfortunately are inconclusive at best.

The finding of no significant relationship between outdoor recreation and student pedagogical perception, showed that outdoor recreation participation (ORP) variable had very little, if any influence on the variables assessed in research question one. What is interesting here is that this relationship or lack thereof is consistent with some of the prior research on the subject (Theodori, Luloff, Willits, & Fern 1998), (Tarrant & Green, 1999), Sometimes it seems that ORP does have an effect on environmental attitudes, sometimes it doesn't.

In the final research question—How do the aforementioned relationships vary with respect to selected demographic variables (e.g., age, gender, academic classification and academic major)?— no regression analyses were undertaken because of the relative absence of other significant bivariate relationships Nevertheless, it appeared that the older a student, the more concerned about the environment he/she was in spite of the relatively age homogenous sample. Educators can make changes in how and what they teach, but they cannot do much about the age of their students.

According to the research of Myllykangas (2004), educators in the field of outdoor recreation should strive to make their courses as engaging as possible. This makes intuitive sense due to the action-oriented and human interaction nature of the recreation profession. One way to do this is use constructivist pedagogy designed to move the students out of a traditionally passive stance to that of a more active learner. Although my exploratory study does not provide direct support for Myllykangas' recommendation, I believe that recreation educators must not only try to use constructivist approaches in the classroom, but also convey the importance of using this approach to graduate students who will be the next generation of recreation educators.

What are the benefits of the constructivist approach? Besides the fact that it is more engaging than other approaches, one could argue that a "buzz" could begin about the way outdoor recreation courses are taught. This could help with recruitment and retention of students into the recreation and leisure studies major or at least into the courses. Many students in Outdoor Recreation have "discovered" Recreation as a major only after having been disappointed by other previous choices of major. If students knew how exciting and engaging the courses in outdoor recreation are, because of the

constructivist methods, they may intentionally consider Recreation as a major rather than accidentally discovering it. The constructivist approach may also alleviate some of the angst experienced by majors. The angst that students feel is sometimes evidenced in their "hurry up and get out of here" attitude toward their degree. Students are so ready to get out of school, once they finally find a major that works for them, that they put in just enough effort to get through. Again, if constructivist approaches were instilled into the outdoor recreation curriculum, then students might become more engaged in the subtle nuances of outdoor recreation education.

While the findings of this study do not lend much support to the efficacy of constructivist methods in higher education, there is still a body of evidence from other researchers that does (e.g., Bransford, et al, 2000). Accordingly, a number of suggestions can be given for college-level educators in the field of recreation education. The following list is designed to help in creating lessons or courses aimed at increasing participant environmental awareness. These ten tips, derived from the PDIL instrument, are for creating constructivist-style lessons.

Ten recommendations for designing constructivist lessons

1. To the extent that the content of the course allows, include a blend of discrete and abstract goals and objectives in the course to allow students to develop more personalization and ownership of the knowledge.
2. Encourage students to construct their own interpretations of the knowledge embedded in the course.
3. Establish an environment where students tackle complex problems that have multiple right answers.

4. Create tasks that are authentic in nature. Plan assignments with real consequences.
5. Try to draw on student intrinsic motivation.
6. Teach by being facilitative. Help students find their own way.
7. Include activities and resources that encourage deep reflection and thinking.
8. Create collaborative learning activities for the course.
9. Plan activities and resources with cultural diversity in mind.
10. Allow learners to choose time and place of instructional activities.

Given the opportunity to design an ideal outdoor recreation course for undergraduates, here are some potential strategies to utilize:

1. Realize that students differ in their learning styles and design differing types of lessons (e.g., some hands on, some field-based, some small group discussion, some more traditional).

2. Implement constructivist projects (see #'s 3, 4, and 7 from "Ten recommendations for designing constructivist lessons").

3. Facilitate feedback sessions for projects.

4. Encourage professional development through conference attendance, professional visits, and other avenues.

5. Update course each semester in order to change with the growth of the profession.

Recommendations for future research

To address the aspect of population size, this researcher recommends a much larger sample. In addition, including various types of courses for examination may prove beneficial. For example, one might choose to compare student scores in the "Outdoor Recreation and Environmental Awareness" course to those students in a Forestry course, and again in an Ecology course. These three course areas may offer the best comparison of students interested in environmental issues. Conversely, one may wish to study students from very different academic areas of study. For example, courses from Business, English, and Math may be chosen in an attempt to draw a more heterogeneous population for the study. Additional research should be conducted to examine how student perceptions of the pedagogical design of an outdoor recreation course relate to faculty perceptions of the design of the course.

A final recommendation for future studies would be to examine the cultural diversity of the participants. This was not measured in this study, but the participants were seen as a fairly homogenous group in this regard. Because one of the tenets of constructivism is that of diverse thought, inclusion of a wide variety of different cultural groups seems important.

Limitations

One of the obvious limitations of this study is the sample size. The small sample size (N=53) makes it difficult to make any broad conclusions. Also, the nature of the sample is a limitation, as it was not randomized but was, rather, a convenience sample. The correlational nature of the analysis is also a shortcoming in the sense that correlation

studies are generally weaker than experimental studies, especially with respect to revealing causal relationships. Admittedly, there may be other inherent limitations of this study, but those mentioned are the most evident.

Again, course grades were obtained from the course instructor after the course was completed and used as the only indicator of the cognitive outcomes of the course. Performance data tied more closely to the instructional objectives of the course would have provided a better measure of the cognitive outcomes of the course.

Summary

Many Americans now participate in some form of outdoor recreation. Most, but certainly not all, Americans are concerned about the environment and support environmental literacy. The persistence of America's belief in positive environmental attitudes continues to fuel the fires for additional research. The pedagogical theory driving this study, constructivism, is growing and is supported at the highest levels. A report from the National Research Council (2002) maintains that pedagogy in higher education is changing:

> The faculty member of the 21st—century university could thus become more of a consultant or a coach than a teacher, less concerned with transmitting intellectual content directly than with inspiring, motivating, and managing an active learning process. That is, faculty may come to interact with undergraduates in ways that resemble how they interact with their doctoral students today. (p. 26)

The constructivist theory is grounded in the principles that learning is an active process and that instruction should actively support that process. The methodological

limitations of this study may have kept it from adding support to this position. Addressing these limitations in further research is highly recommended.

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Appendix A

FORS/ RLST3310 Outdoor Recreation & Environmental Awareness

Fall, 2002

Instructor: Michael Tarrant, Ph.D. Office: 1-309 WSFR
Telephone: 583-0901 E-mail: tarrant@uga.edu
Class hours: 6:30 – 9:00 p.m. Tuesday Classroom: 205 Ramsey Center
Office hours: By appointment

Course textbooks

1. Ibrahim, H. & Cordes, K.A. (2002). Outdoor recreation. Champaign, IL: Sagamore Publishing ISBN: 1-57167-495-0.

2. Leopold, A. (1987). A sand county almanac and sketches here and there. New York: Oxford Univ. Press.

3. Tarrant, M.A. (1999). Outdoor recreation and environmental awareness: User-interactive CD. Athens, GA: University of Georgia.

Course introduction

Increased outdoor recreation use has resulted in considerable demands and pressures upon our natural resources. Managing these impacts requires an awareness of the recreation user's environmental attitudes, values, and behaviors, as well as an understanding of the various policies and management strategies for preserving the nation's natural resources. This course will provide students with a broad overview of the human-environment relationship using the context of outdoor recreation. Topics include a discussion of recreation resource supply and demand; the history of the preservation and conservation movements in the U.S.; social, psychological, and economic aspects of outdoor recreation; tools for outdoor recreation management; an overview to selected recreation resource management issues; and introduction to environmental values and attitudes.

Course objectives

By the end of the course, a student should be able to: (NRPA standards are in parentheses)

1. Understand the conceptual foundation of outdoor recreation (8.01).
2. Describe the development of the conservation and preservation movements in the U.S. (7.04).
3. Understand outdoor recreation user's environmental attitudes and behaviors from a sociological and psychological perspective (8.02; 8.05).
4. Understand the role of planning and selected management concepts in the provision of outdoor recreation opportunities (8.03; 8.05; 8.10).
5. Describe the concept of environmental ethics and implications for the stewardship of outdoor recreation resources (8.05; 8.09).

Course grading and exams

100 points exam #1

100 points exam #2
100 points exam #3
A = Above 270 points B = 269 - 240 points C = 239 - 210 points
D = 209 - 180 points F = Below 180 points

The exams will not be comprehensive and will cover readings (approx. 20-30%), class notes (approx. 40-50%) and CD (approx. 20-30%). It should be noted, however, there is considerable overlap in information among the three sources. Make-up exams will be given on the day of the next exam.

Notes
Any student with a disability who needs an accommodation or other assistance in this course should make an appointment to speak with the instructor ASAP. Unless indicated by the student, final grades for the class will be posted by the last four digits of the student's SSN. Students are directed to review the UGA's policies and procedures on academic honesty, which can be found at http://www.uga.edu/~vpaa All academic work must meet the standards contained in "A Culture of Honesty." Each student is responsible to inform themselves about those standards before performing any academic work.

Appendix B

DEMOGRAPHIC INFORMATION

Directions*: Please indicate your responses below by circling your response.*
Thank you for you time.

What is your gender? Male Female

What is your age? _____

What is your class standing? Freshman Sophomore Junior Senior

What is your major?

Appendix C

PEDAGOGICAL DIMENSIONS OF INTERACTIVE LEARNING (PDIL)

Instructions: Listed below are statements concerning this course. For each statement, please indicate your degree of agreement or disagreement. For example, if you "strongly agree" with the statement, please circle a "1." If you "strongly disagree" with a statement, please circle a "5." If you have no opinion, circle "3". If the statement does not apply, please circle a "0".

3. In this course, I absorbed specific knowledge as clearly presented in the content of this course.

Strongly Agree	*Agree*	*Neither*	*Disagree*	*Strongly Disagree*	*Not applicable*
1	2	3	4	5	0

4. In this course, I constructed my own interpretations of the knowledge embedded in the content of the course.

Strongly Agree	*Agree*	*Neither*	*Disagree*	*Strongly Disagree*	*Not applicable*
1	2	3	4	5	0

5. The learning theory used in this course is primarily behavioral in nature, i.e., teaching involves the presentation of content to which students respond in some way followed by feedback from the instructor about whether the students' response is correct.

Strongly Agree	*Agree*	*Neither*	*Disagree*	*Strongly Disagree*	*Not applicable*
1	2	3	4	5	0

6. The learning theory used in this course is primarily cognitive in nature, i.e., teaching involves establishing an environment in which students tackle complex problems that have multiple right answers.

Strongly Agree	*Agree*	*Neither*	*Disagree*	*Strongly Disagree*	*Not applicable*
1	2	3	4	5	0

7. The goals and objectives in this course are primarily focused and concrete.

Strongly Agree	*Agree*	*Neither*	*Disagree*	*Strongly Disagree*	*Not applicable*
1	2	3	4	5	0

8. The goals and objectives in this course are primarily unfocused and abstract.

Strongly Agree	*Agree*	*Neither*	*Disagree*	*Strongly Disagree*	*Not applicable*
1	2	3	4	5	0

7. The assignments in this course primarily involve tasks that are more academic in nature, such as writing a paper about outdoor recreation history.

Strongly Agree	*Agree*	*Neither*	*Disagree*	*Strongly Disagree*	*Not applicable*
1	2	3	4	5	0

8. The assignments in this course primarily involve tasks that are more authentic in nature, such as preparing a management plan for a land management agency.

Strongly Agree	*Agree*	*Neither*	*Disagree*	*Strongly Disagree*	*Not applicable*
1	2	3	4	5	0

9. My motivation in this course is primarily extrinsic, e.g. the desire to get a good grade or the need to complete this course for a degree program.

Strongly Agree	*Agree*	*Neither*	*Disagree*	*Strongly Disagree*	*Not applicable*
1	2	3	4	5	0

10. My motivation in this course is primarily intrinsic, e.g. high interest in the course content or a general love of learning.

Strongly Agree	*Agree*	*Neither*	*Disagree*	*Strongly Disagree*	*Not applicable*
1	2	3	4	5	0

11. The role of the instructor in this course is primarily didactic, i.e., the instructor is clearly a subject matter expert who presents the content to the students.

Strongly Agree	*Agree*	*Neither*	*Disagree*	*Strongly Disagree*	*Not applicable*
1	2	3	4	5	0

12. The role of the instructor in this course is primarily facilitative, i.e., the instructor may or may not have the knowledge him or herself, but he/she helps the students learn in every way possible.

Strongly Agree	*Agree*	*Neither*	*Disagree*	*Strongly Disagree*	*Not applicable*
1	2	3	4	5	0

13. Activities and resources that encourage deep reflection and thinking about what and how one is learning are integral to this course.

Strongly Agree	*Agree*	*Neither*	*Disagree*	*Strongly Disagree*	*Not applicable*
1	2	3	4	5	0

14. Activities and resources that encourage deep reflection and thinking about what and how one is learning are tangential to this course.

Strongly Agree	*Agree*	*Neither*	*Disagree*	*Strongly Disagree*	*Not applicable*
1	2	3	4	5	0

15. Collaborative learning activities (e.g., team projects) are integral to this course.

Strongly Agree	*Agree*	*Neither*	*Disagree*	*Strongly Disagree*	*Not applicable*
1	2	3	4	5	0

16. Collaborative learning activities (e.g., team projects) are tangential to this course.

Strongly Agree	*Agree*	*Neither*	*Disagree*	*Strongly Disagree*	*Not applicable*
1	2	3	4	5	0

17. This course includes activities and resources that are intended to make this course more sensitive to learners from diverse cultures.

Strongly Agree	*Agree*	*Neither*	*Disagree*	*Strongly Disagree*	*Not applicable*
1	2	3	4	5	0

18. This course does not include activities and resources that are intended to make this course more sensitive to learners from diverse cultures.

Strongly Agree	*Agree*	*Neither*	*Disagree*	*Strongly Disagree*	*Not applicable*
1	2	3	4	5	0

19. This course primarily includes instructional activities that are scheduled at a specific time and place.

Strongly Agree	*Agree*	*Neither*	*Disagree*	*Strongly Disagree*	*Not applicable*
1	2	3	4	5	0

20. This course primarily includes instructional activities that can be done at the time and place of the learner's choice.

Strongly Agree	*Agree*	*Neither*	*Disagree*	*Strongly Disagree*	*Not applicable*
1	2	3	4	5	0

Appendix D

OUTDOOR RECREATION PARTICIPATION SURVEY

Derived in part from the NSRE version 2, with permission from G.Green, USFS.
Please indicate (by number of days in the space provided) which of the following activities you have participated in within the past 4 months. A "day" of participation in this context will be any part of a day in which you took part in the activity. For example if you participated in outdoor team sports five times write "5" in the space provided.

1. _____ Outdoor Team sports
2. _____ Gathering of family or friends away from home.
3. _____ Picknicking
4. _____ *Walking for exercise of pleasure (item omitted from analysis)*
5. _____ Day hiking
6. _____ Backpacking (hiking with at least one overnight stay)
7. _____ Gathering mushrooms, berries, firewood, or other natural products
8. _____ Visiting a wilderness area, other primitive or roadless area
9. _____ Visiting an outdoor nature center, nature trail, visitor center, or zoo
10. _____ Visiting prehistoric structures or archaeological sites
11. _____ Visiting any historic sites, buildings, or monuments
12. _____ Bicycling for fun or exercise a._____ road bike b. _____ mountain bike
13. _____ Horseback riding or do other equestrian activities
14. _____ Camping at developed sites with facilities such as tables and toilets
15. _____ Camping at a primitive site without facilities
16. _____ Viewing, identifying, or photographing wildlife
    (for example: birds, fish, bears, deer, snakes, butterflies, turtles)
17. _____ Viewing or photographing natural scenery
18. _____ Hunting a._____small game b. _____large game
19. _____ Downhill skiing a. _____ lift-served b. _____ telemark
20. _____ Snowboarding
21. _____ Cross country skiing or ski touring
22. _____ Snowmobiling

23. _____ Ice climbing
24. _____ Sightseeing
25. _____ Driving for pleasure on country roads or in a park, forest, or other natural setting
26. _____ Driving off-road for recreation using a 4-wheel drive, ATV, or motorcycle
27. _____ Fishing a. ____ catch & release b. _____ kept the fish
28. _____ Sailing
29. _____ Canoeing
30. _____ Kayaking
31. _____ Rowing
32. _____ Motorboating
33. _____ Waterskiing
34. _____ Using personal watercraft such as jet skis, wave runners, etc
35. _____ Rafting, tubing, or any other type of floating
36. _____ Sailboarding or windsurfing
37. _____ Surfing
38. _____ Swimming outside (not in an indoor pool)
39. _____ Snorkeling
40. _____ SCUBA diving
41. _____ Visiting a beach
42. _____ Mountaineering
43. _____ Rock Climbing a. _____ traditional b. ____ bolted c. _____ bouldering
44. _____ Caving/Spelunking
45. _____ Other (please specify) _____

Appendix E

THE NEW ECOLOGICAL PARADIGM SURVEY

The following questions are about your opinions on a variety of ecological issues. Please circle the most appropriate response. The item responses are scaled as follows:

SA = Strongly Agree, MA = Mildly Agree, U = Unsure, MD = Mildly Disagree, SD = Strongly Disagree

1) We are approaching the limit of the number of people the earth can support
   SA MA U MD SD

2) Humans have the right to modify the natural environment to suit their needs.
   SA MA U MD SD

3) When humans interfere with nature it often produces disastrous consequences.
   SA MA U MD SD

4) Human ingenuity will insure that we DO NOT make the earth unlivable.
   SA MA U MD SD

5) Humans are severely abusing the environment.
   SA MA U MD SD

6) The earth has plenty of natural resources if we just learn how to develop them.
   SA MA U MD SD

7) Plants and animals have as much right as humans to exist.
   SA MA U MD SD

8) The balance of nature is strong enough to cope with the impacts of modern industrial nations.
   SA MA U MD SD

9) Despite our special abilities humans are still subject to the laws of nature.
   SA MA U MD SD

10) The so-called “ecological crisis” facing humankind has been greatly exaggerated.
   SA MA U MD SD

11) The earth is like a spaceship with very limited room and resources.
   SA MA U MD SD

12) Humans were meant to rule over the rest of nature.
   SA MA U MD SD

13) The balance of nature is very delicate and easily upset.
   SA MA U MD SD

14) Humans will eventually learn enough about how nature works to be able to control it.
   SA MA U MD SD

15) If things continue on their present course, we will soon experience a major ecological catastrophe.
   SA MA U MD SD