Student Learning in Outdoor Education: A Case Study From the National Outdoor Leadership School

Article from:
The Journal of Experiential Education
Article date:
January 1, 2008
Author:
Paisley, Karen ; Furman, Nathan ; Sibthorp, Jim ; Gookin, John

While much attention has been paid to what students learn in outdoor education settings, little has been paid to the process through which that learning occurs. The purpose of this study was to identify the mechanisms through which students report learning one of six targeted objectives on courses offered by the National Outdoor Leadership School. Results suggested five broad domains through which learning occurs: structure-oriented mechanisms; instructor-oriented mechanisms; student-oriented mechanisms; student- and instructor-oriented mechanisms; and mechanisms that are a result of environmental qualities. The relative importance of each of these domains is discussed, as are recommendations for practice.

Keywords: Adventure Education, Instructional Techniques, Wilderness Education, NOLS

How do students actually learn in outdoor education settings? While this question has been the focus of much discussion (e.g., Hattie, Marsh, Neill, & Richards, 1997; Henderson & Fox, 1994), we still have not moved very far from "describing the product to understanding the process" (Klint, 1999, p. 163). Only when we understand the mechanisms through which learning and development occur in outdoor education can we move beyond "black box" programming-where there is no specific accounting for what happens-to real intentionality. It is with this intentionality that we may begin to see and document even more potent outcomes.

In an attempt to better understand how to intentionally structure programs to achieve outcomes, we began to investigate the process of participant development at the National Outdoor Leadership School (NOLS) by focusing on both what students learn and how they learn it. With respect to content, regardless of course type or length, NOLS targets six learning objectives for its students: communication skills, leadership skills, smallgroup behavior, judgment in the outdoors, outdoor skills, and environmental awareness (Gookin, 2006). Communication skills are defined as communicating effectively in a small-group setting and include discussion leading, feedback provision, and expressing ideas. Leadership involves taking initiative, responsibility, and decision-making roles. Smallgroup behavior is defined as being a positive and productive group member. Judgment in the outdoors is the ability to recognize potential hazards and make good decisions in the backcountry. Outdoor skills are competencies for backcountry travel and living. Environmental awareness is defined as a combination of perceived knowledge of environmental stewardship practices and regulations and an appreciation for the environment. With respect to what students learn, when data from a recent study were analyzed (Sibthorp, Paisley, & Gookin, 2007), it revealed that students showed significant perceived gains in all six of these areas as a result of participation in NOLS courses. This is consistent with the multitude of studies on adventure and outdoor education program outcomes (e.g., Hattie et al., 1997; Propst & Koessler, 1998). However, more recent studies have been interested in the processes and mechanisms that help experiential educators to understand how students learn during these programs. For example, McKenzie (2003) posited that course activities, physical environment, instructors, and the group

are all critical to development on adventure courses, and Martin & Leberman (2005) found that the group, the instructors, the physical activities, reviews, and the solo were all critical to learning.

In a more general sense, learning theories, widely articulated and used in classroom settings, can also provide a guide to how participants might learn on adventure programs. Some of the more common learning theories and models include social learning theory, schema theory, information processing, and constructivism (Slavin, 1997). Many of these models include aspects that are highly relevant to outdoor and adventure programs. For example, social learning theory (Bandura, 1977) places a premium on learning through modeling and observation of role models-a common theme in outdoor leadership. Other approaches, like constructivism, embrace the idea of mentoring and participant construction of meaning (e.g., Vygotsky, 1978). However, some of the mechanisms embedded in these models, for example mnemonic devices, are not commonly discussed in outdoor education, but might be relevant to specific program goals.

While each of these approaches is potentially applicable to some of the learning that occurs in classrooms and outdoor settings, there remains no universally accepted theory or model of learning. How people learn seems to depend greatly on the complex interactions between participants, leaders, program elements, program goals, educational settings, and contexts. While these factors vary substantially within traditional educational settings, learning in outdoor and adventure settings adds even more factors into the mix, creating a significant gap between the setting in which these theories were developed and the settings in which outdoor and adventure education take place. For example, environmental factors, such as difficult terrain and tempestuous weather conditions, introduce tremendous variability into the outdoor "classroom." Furthermore, outdoor classes are often longer in duration and involve smaller groups than those in traditional classroom settings, creating a new and sometimes intense social milieu. Also contrary to traditional educational settings, which tend to be individualistic in nature, outdoor education goals are commonly accomplished collectively. Motivations for participation in outdoor education are varied and, within the small-group environment, individuals must accommodate the distinct and separate aspirations of others on their expeditions. Given these factors, we believe that traditional theories and models of learning may not be fully applicable in outdoor education settings and that a grounded theory approach would be most useful to discover the mechanisms through which students learn in such contexts. Simply defined, "grounded theory is an iterative process by which the analyst becomes more and more 'grounded' in the data and develops increasingly richer concepts and models of how the phenomenon being studied really works" (Ryan & Bernard, 2003, p. 279). Thus, while utilizing a grounded theory approach, the purpose of this study was to explore the mechanisms through which student learning occurs at the National Outdoor Leadership School.

Methodology

Participants and Procedures

All study participants were enrolled in NOLS courses between May and August of 2005. Students were sampled from six different NOLS branches and represented a wide variety of course types and lengths. Upon course completion and as part of the standard course debrief, students completed a questionnaire that assessed their learning of the NOLS targeted outcomes (communication, leadership, small-group behavior, judgment in the outdoors, outdoor skills, and environmental awareness) and captured demographic information and course characteristics (see Sibthorp, Paisley, Gookin, & Ward, 2005). On the final portion of the questionnaires, students were asked to indicate which of the six NOLS outcomes they learned the most about. Following

this was an open-ended question asking students, "Out of all the ways you learned about this objective, which was the most effective and why?" The qualitative data generated through this final question were the focus of this study. During May through August, 508 students responded to the open-ended question and, of these, 441 were usable answers. Approximately 1,200 students did not respond to the question, perhaps partly due to paperwork fatigue as there are multiple evaluations completed at the end of each course. The sample was 59% male and 38% female (3% chose not to identify their sex), with an average age of 24.9 years (ranging from 14 to 56 years). All responses were anonymous, were collected at NOLS branches, and were sent back to NOLS headquarters.

Data Analysis

Data were transcribed verbatim and were analyzed manually. Because this study is a case study approach of NOLS, specifically, ethnomethodologies advocated by Spradley (1979) were considered appropriate. After reading through the data, two researchers independently identified mechanisms of student learning (similar to McKenzie's [2003] "course components" that emerged through constant comparison), meaning that, as previously unidentified, emic (expressed in the students' words) modes of learning were discovered in the data, and new etic (expressed or summarized in researchers' words) mechanisms were labeled. The researchers then discussed the classification of student responses and determined the best fit for the few cases of disagreement. These mechanisms of learning were then grouped with other like mechanisms in what Spradley calls a taxonomic analysis. The broad headings for the related groups of mechanisms, called domains or themes, were also labeled, for the sake of consistency, in etic terms.

These domains represented general sets of "ways of learning." Inclusion of specific mechanisms in each domain was verified through the use of structural questions (Spradley, 1979, p. 116). The specific semantic relationship used to verify placement of mechanisms into domain was strict inclusion (X is a type of Y). Spradley's componential analysis revealed that the value of contrast between domains was the source of the learning (e.g., instructor, environment, peers).

Next, using each student's entire response as the unit of analysis, data were then enumerated into learning mechanisms by the researchers. Thus, if a student mentioned more than one mechanism in his or her response, it was coded only once into the mechanisms of best fit. Coding each student's response in only one category allows for the presentation of percentages included in Tables 1 through 6 which, in turn, allows for comparison of relative magnitude.

Results

The purpose of this study was to identify the means through which NOLS students learned on their courses. First, students were asked to select the one of NOLS' a priori six learning objectives about which they learned the most, with the results as follows: outdoor skills (n = 160); leadership (n = 114); judgment in the outdoors (n = 59); small-group behavior (n = 52); communication (n = 39); and environmental awareness (n = 17). Students were then asked, "Out of all the ways you learned about this objective, which was the most effective and why?" Results are described in two parts: a description of five domains that emerged from the data representing methods of student learning and then a description of learning within each of NOLS' six objectives.

Domains

Data analysis revealed five domains that foster student learning of NOLS learning objectives. These etically labeled domains include structureoriented mechanisms; instructor-oriented mechanisms; student-oriented mechanisms; student- and instructor-oriented mechanisms; and mechanisms that are a result of environmental qualities (both physical and social). Consistent with grounded theory, though named by the researchers, these domains were based on the students' responses.

Structure-oriented mechanisms are built into the course design by program supervisors or curriculum managers. They are relatively consistent components of a NOLS course. Examples include Independent Student Group Travel (ISGT), where students travel without instructors, and Leader of the Day (LOD) responsibilities, where students take turns leading peers throughout a day. These two components provide opportunities for students to practice leadership roles on courses.

Instructor-oriented mechanisms are techniques, skills, and practices implemented by the instructors to specifically teach learning objectives. These mechanisms are characterized by instructors directing how course content is delivered and reinforced. Examples of instructor-oriented mechanisms include: (a) coaching, where instructors work with students oneon- one or in small groups; (b) debriefing, where instructors lead the group in an exercise to reflect on events; and (c) formal classes, where instructors teach a topic to a larger group of students for a time period ranging from 15 minutes to two hours.

Student-oriented mechanisms are created by autonomous student acts that are largely independent of instructors. These may be achieved through skill rehearsal, interaction with other group members, or interaction with the physical environment. Learning from student-oriented mechanisms may be the result of a specific, powerful instance or may be due to a sum of experiences common to outdoor education courses. Furthermore, this learning may occur when the student is alone or when participating in a group activity. In either case, the learning is highly individualized and free from direct instructor control.

Student- and instructor-oriented mechanisms are those that can occur as a result of actions of both parties, rather than being specific to one set of actors, such as role modeling and the feedback process. Data suggested that these interactions, and their resulting influence, occur in a one-on-one interpersonal manner rather than as a result of any grouporiented setting. This domain includes instances where the source or model could be either a peer or an instructor, suggesting that the actor was not as critical as the action itself.

The final mechanism, qualities of the environment, describes the learning that students achieve directly from immersion in and interaction with the natural and social environments on their courses. For instance, dealing with inclement weather conditions or difficult terrain led to learning for some students. For others, participation with or observation of the group was reported as the principal means through which they learned an objective.

Results by Learning Objective

These five thematic mechanisms, derived from students' responses, describe modes of student learning within each of the six a priori NOLS learning objectives. Some of them, such as instructor-oriented and student-oriented mechanisms, occur within each learning objective. Others, such as qualities of the environment, explain student learning in fewer categories. A description of the relationship between learning mechanisms and each learning objective follows.

These results are presented based on the results of the enumeration (number of students who cited the outcome as the one about which they learned the most): outdoor skills (n = 160); leadership (n = 114); judgment in the outdoors (n = 59); small-group behavior (n = 52); communication (n = 39); and environmental awareness (n = 17). As the unit of analysis was the entire response, it becomes possible to report the percentage of respondents who mentioned each objective for ease of comparison of magnitude.

Overall, students identified outdoor skills as the NOLS learning objective about which they gained the most knowledge during their NOLS courses (36.3% of responses). Examples of outdoor skills included how to navigate using a map and compass, belay a rock climber correctly, or perform an Eskimo roll in a kayak. For this objective, learning was accomplished primarily through instructor-oriented and student-oriented mechanisms. (Table 1 summarizes methods through which students learned outdoor skills.)

Learning leadership, another NOLS objective, mainly was accomplished by structure-oriented mechanisms like Independent Student Group Travel and Leader of the Day. Student-oriented mechanisms, such as day-to-day course experience, and instructor-oriented mechanisms, such as formal classes, played a lesser role. Leadership curriculum at NOLS may include theoretical and historical foundations of leadership theory, hands-on activities and seminars, and experience leading small groups of peers. (Refer to Table 2 for further detail.)

At NOLS, judgment in the outdoors is often taught by examining case studies, incident/accident analysis, teaching decision-making tactics, and by making use of teachable moments. Consistent with these teaching efforts, students' learning was most often reported as a function of instructor-oriented mechanisms, such as classes or coaching. Studentoriented mechanisms, such as day-to-day course experience and acting autonomously, were reported frequently as well. (Table 3 summarizes student learning of this objective.)

As would be expected, students most frequently learned about smallgroup behavior, what NOLS calls "expedition behavior," through studentoriented means such as learning from social dynamics. Tolerance and consideration for others, a sense of selflessness, and humility are characteristics of "good" small-group behavior. A greater degree of variation in learning mechanisms was found in regards to this objective than with other objectives. (Table 4 provides an account of student learning in this area.)

Learning the NOLS objective of communication was accomplished primarily through instructor-oriented mechanisms. Coaching, receiving feedback from instructors, debriefing, and formal classes were all methods through which students learned communication. Conflict resolution, stages of group development, and the relevance of communication on an expedition are examples of communication curriculum often covered on NOLS courses. (Student learning of communication on NOLS courses is summarized in Table 5.)

Finally, environmental awareness was learned via a combination of instructor-oriented and student-oriented mechanisms. Practice, classes, encounters with impacts, and Leave No Trace were all ways students reported learning this objective. Developing an understanding of land management issues, Leave No Trace traveling and camping techniques, and understanding how to serve as a steward of the wilderness are curricula often covered on many NOLS courses. Table 6 discusses how students learned environmental ethics.

Discussion and Integration With the Literature

In general, our findings are consistent with existing literature of outdoor education pedagogy. When fit is difficult to establish, however, perhaps it is due to the focus of existing literature on how information is taught rather than how it is learned (Drury, Bonney, Berman, & Wagstaff, 2005; Gookin, 2003). Our field is rich with curricula to teach students, yet there is a lack of understanding about how students actually learn the material. The skills that outdoor educators seek to teach are often divided into technical skills ("hard" skills; specifically outdoor skills, risk management, and environmental ethics in this study) and interpersonal skills ("soft" skills; also called conceptual skills [Swiderski, 1987]; leadership, expedition behavior, and communication in this study).

McKenzie (2003) identified specific techniques reported by Outward Bound students with respect to course outcomes of motivation and interpersonal skills. She suggested a reconceptualization of Walsh and Golins' (1976) Outward Bound process that included the following interactive course components: physical environment, social environment, course activities, service, and instructors. Despite her specific focus on interpersonal skills, these course components closely parallel the domains identified in this study. A major difference in this study, however, lies in the distinction between students' reported methods of learning technical vs. interpersonal skills.

Acknowledging, though not accounting for, the likely impact of individual learning styles, there are patterns of differences in the way students learned technical skills and interpersonal skills, which supports the existence of these as separate sets of skills. Most often, students reported learning technical skills by means of student-oriented or instructor-oriented techniques. Interpersonal skills, however, were typically learned through a wider range of means. (Figure 1 contains a graphic representation of the types of mechanisms through which students learned these two sets of skills.)

Learning of Technical Skills

Outdoor Skills

Our findings suggest that practice and experience will both teach and hone outdoor skills. Recalling that the unit of analysis for the enumeration of the data was the entire response, 58% of the students who responded attributed learning outdoor skills to one of these processes. For instance, one student said she learned by "actively practicing my outdoor skills, therefore gaining familiarity with them." Another said, "The most effective way I learn is by doing, and the NOLS way of teaching works well with my learning style." Literature supports the concept that outdoor skills are learned by practice and experience (Curtis, 1998; Hutchinson, 1999; Long, 2003; Luebben, 2004; Wells, 2005). For instance, Martin, Cashel, Wagstaff, and Breunig (2006) claim that "technical proficiency in outdoor activities can only be gained through experience. The more experience individuals gain, the more competent they generally become" (p. xix).

Judgment in the Outdoors

Students noted that they learned judgment in the outdoors largely through general course experience (34%), a student-oriented mechanism. For instance, one student reported, "Experience is the best teacher. So by continuing to improve through practice, my assessment of risk improved." Similarly, another student noted that "crossing hazardous terrain puts the theory into practice." Literature suggests gaining experience is seen as an important part of risk management (Cain & McAvoy, 1990; Petzoldt, 1984; Swiderski, 1987), as it leads to better hazard evaluation and decision-making.

Formal classes (15%) were another way in which students learned about judgment in the outdoors. One student said, "We had a class on how to make good decisions based on good judgment." This method of teaching risk management policy and procedures has precedence in the literature. "It is important to have a formal learning experience before students go on any small group adventures without staff" (Drury, Bonney, Berman, & Wagstaff, 2005, p. 449).

A small percentage (3%) of students reported learning from scenarios. One student said, "Scenarios were important because I could see how I would act if in a bad situation." Many resources on risk management make use of case studies and scenario analysis to teach field-based risk management (Drury et al., 2005; Kosseff, 2003; Leemon, 2006; Leemon & Schimelpfenig, 2005; Martin et al., 2006). Several publications, including Accidents in North American Mountaineering (an annual put out by the American Alpine Club), exist primarily to report accidents and provide context for learning from them.

Although a good deal of material has been written on the importance of risk management, very little addresses how to teach it to students. Most often, it seems risk management curricula are left for training the staff of outdoor education programs and do not directly result in explicit information offered to students. Perhaps this is due to the idea that risk management is inherently paired with decision-making, and decisionmaking is traditionally coupled with leadership. In addition, increasing good judgment depends largely on increasing experience, which links it to outdoor skills (Cain & McAvoy, 1990). Because of these factors, it is possible that a risk management curriculum often becomes embedded in other learning objectives. As such, students may, in fact, be learning risk management skills, but not necessarily be aware of them as such.

Environmental Awareness

Twenty-four percent of students who reported that they learned the most about environmental ethics said they learned it by practicing Leave No Trace (LNT) techniques. For instance, one student said, "Practicing good LNT practices was important; I learned why they are so important." Another student said, "Leave No Trace, because it is critical in wilderness preservation."

Certainly, LNT has become a dominant theme in outdoor education and backcountry travel. Many outdoor education resources discuss its significance (Drury et al., 2005; Gilbertson, Bates, McLaughlin, & Ewert, 2006; Harvey, 1999; Kosseff, 2003; Martin et al., 2006; Priest & Gass, 1997). Its significance may, in part, explain a departure from the norm established for this research. Except in this instance, findings are reported as how students learn. In this case, LNT is what students learned. Regardless, we chose to include LNT as a "mechanism" because of how often students reported learning environmental ethics by means of LNT. Perhaps the time devoted to it on NOLS courses, the mastery students gain practicing it for weeks at a time, and the immediate relevance of the subject to everyday backcountry living blurs the line of what I learned and how I learned it. This may be reasonable because LNT principles are a form of outdoor ethics; by inference they could be interpreted as environmental ethics.

A recent curriculum for teaching environmental ethics is presented by Drury et al. (2005). Their model includes: (a) helping students observe and recognize conservation behavior; (b) applying and analyzing evidence of environmental behaviors; and (c) using discussions, scenario analysis, and Leave No Trace performances. Here, again, we find congruence with using LNT to either teach or provide context for environmental ethics. We also find similarity with our findings insofar as "encounter with impacts" (the third most commonly reported way in which students

reported learning environmental ethics) is related to Drury et al.'s "analyzing evidence of environmental behaviors."

Learning of Interpersonal Skills

Small-Group Behavior

What NOLS refers to as "expedition behavior" might be more fully described as applied group dynamics in which individuals show as much consideration for their companions as they do for themselves. The term was coined by Paul Petzoldt, the founder of NOLS and the Wilderness Education Association, to describe behaviors that led to positive outcomes on wilderness expeditions (Drury, Bonney, Berman, & Wagstaff, 2005). Twenty-one percent of the students reported learning small-group behavior as a function of participating in social dynamics. One student said he or she learned expedition behavior "through taking care of the entire group-especially hiking groups that would arrive much later. We would give them a hand." Another said that learning occurred by "observing my peers' good and bad expedition behavior. It really made me think about how I act around others." This type of learning was also prominent in the work of Martin and Leberman (2005), whose study suggested that "most of the learning came from being in a group environment" (p. 55).

Students reported that by working within a group they were able to see the benefits of "good expedition behavior." For instance, one student reported, "Seeing how my fellow students interacted made it clear why good expedition behavior is important." Another noted he learned by "?seeing how folks learn to trust and care for absolute strangers after only a week in the backcountry; simple things like this make or break an expedition." This finds support in the literature; Dowd and Tierney (2005) state that an effective way to teach social skills is by utilizing group settings.

Within the small body of literature that specifically addresses expedition behavior, most sources (Drury et al., 2005; Harvey, 1999; Kosseff, 2003; Petzoldt, 1984) contend that learning expedition behavior is a function of instructor-oriented mechanisms. Our findings, however, suggest that student-oriented mechanisms are responsible for 58% of the learning. "I learned good expedition behavior by watching those around me," reported one student. Another added, "When I was able to see how little annoyances added up in the group, I was able to see why expedition behavior was important."

The degree to which students saw expedition behavior as having relevance played a role in the learning. For instance, one student noted:

Being in an environment that often presented adverse situations forced me to work harder towards reaching group goals rather than personal goals to increase efficiency, productivity, and my comfort level. Through this process, I became much more focused on group-oriented goals, becoming more selfless and increasing my expedition behavior.

Hattie et al. (1997) might agree. They described the acquisition of interpersonal skills as being acquired through "forming small groups and making the groups face a set of increasingly more challenging tasks that necessitate group interactions to achieve goals with real consequences" (p. 69), such as ascending a cliff face or landing a sea kayak in rough water. This suggests that the more students perceived that small-group behavior was relevant, the more they learned about it.

Communication

Communication curriculum at NOLS includes instruction on conflict management, stages of group development, and increasing awareness of communication issues and strategies. Fifty-nine percent of the time, students reported learning communication primarily through either course experience or formal classes. For instance, one student noted she learned communication by "? working as a group every day. We were coached by instructors in basic methods to improve communication, but it was seeing the group put the lessons into action that was convincing." Another added, "My communication skills increased because I was able to learn from the classes and then apply what I learned."

There is little support in the literature for our findings about the way students learn communication on outdoor education courses. Explanation for this is perhaps twofold. First, there is an abundance of valuable literature on the role of communication in outdoor education and what should be taught to students (Kosseff, 2003; Martin et al., 2006; Phipps & Swiderski, 1990; Raiola, 2003), yet little to support how students learn communication skills. Second, it is possible that exercising good communication is most often considered a competency of being a good outdoor leader and less commonly an objective to teach students.

Implications

There is a clear distinction between the way students learned technical skills and interpersonal skills. Technical skills (outdoor skills, judgment in the outdoors, and environmental ethics) were learned largely through instructor-oriented and student-oriented mechanisms. Interpersonal skills, in contrast, were learned through a larger variety of ways. More often, students reported learning interpersonal skills from their interactions with the environment, from other students, or from the structure of the course. It has been reported by research (Green, 1990; Phipps & Swiderski, 1990; Priest & Gass, 1997; Swiderski, 1987) that interpersonal skills are more difficult to teach. Considering both this literature and our findings, it may be that it takes a wider range of instructor techniques or group experiences for interpersonal skill learning to occur.

Leadership learning was primarily accomplished through course structures such as Independent Student Group Travel and Leader of the Day. Outdoor education programs can benefit from implementing course structures that facilitate leadership development. Although it could be argued that, within each of these course structures, learning is a function of autonomous student action, the course structure is established a priori and directly functions to allow for these opportunities.

Formal classes are responsible for a portion of the learning in all of the six objectives. In outdoor education, formal classes are not necessarily delivered in a lecture-based, didactic fashion. It is common for these classes to incorporate discussions, role-playing, debates, activities, and more. Many outdoor education programs hold the "act of doing" in the highest regard, which is, perhaps, counter to the process of formal instruction. It may be, however, that formal classes form the backbone for future autonomous student action, providing a safety net, and a standard from which students can measure their progress. Considering that it may be undesirable or impossible to add a greater quantity of formal classes to a curriculum, outdoor education programs will benefit by making their formal classes of the highest quality.

Course experience is also represented in each of the six NOLS learning objectives. This student-oriented mechanism is characterized by students acting autonomously, honing recently learned

skills, and assessing choices and decisions. One student said he learned "through being placed in situations where the knowledge they were giving us was being tested through our actions." Another added, "Living outdoors for so long, interacting with hazards and each other, it's hard to identify exactly what made me learn it [judgment in the outdoors].? It was just the whole experience." Other students echoed the sentiments expressed in these passages time and again. It becomes evident that student-led, autonomous behavior is a fundamental part of learning in outdoor education. Including more opportunities for these processes would benefit outdoor education programs.

Coaching was another process that was reported to lead to learning across objectives. It should be no surprise that one-on-one instruction is powerful. By training instructors in the art of effective coaching and then encouraging them to make time for coaching, outdoor education programs will be able to maximize the effectiveness of this important learning technique. In contrast to the findings of Martin and Leberman (2005), however, the debriefing/feedback/review process did not play a major role in learning for NOLS students-although it did appear.

It is important to note that students only reported how they perceived they learned, which may be different than how they actually learned. It could be that there are learning processes occurring of which they are not cognizant. In addition, students can only report methods of learning that are possible on a given course. Although a NOLS course utilizes many different ways of teaching (the inference being that students have multiple ways to learn), the course cannot present all ways of teaching or provide for all modes of learning. This needs to be taken into consideration when comparing our findings to existing literature; it is certain other potential ways of learning exist yet are unreported in our findings.

With regard to the several major learning theories/models introduced at the outset of this paper, it is clear that each can explain some of the learning accomplished by NOLS students. This explanation varies by specific technique, however, rather than by overall mechanism. For instance, the specific technique of coaching might be best explained by Vygotsky's idea of the zone of proximal development, in which learners acquire skills and abilities by having a knowledgeable other in close range to guide performance and provide feedback. The specific technique of practice, in contrast, is best explained by the cognitive theories of learning in which rehearsal is a key element. Social learning theory may explain parts of the learning achieved as well. The technique of role modeling, in particular, is a key element of Bandura's model and contributed significantly to student learning. Our findings suggest that no single theory of learning can encapsulate the varied mechanisms that contribute to student learning, but, rather, that each can shed light on different aspects of them.

Conclusion

Inquiry into student learning in outdoor education must move forward if we are to understand how the process works best. This study sought to report ways though which students learned course content and can serve as a departure point for future work. Understanding the multitude of ways that students reported learning and the specific instructional techniques from which they learned will help programs hone their curricula and maximize outcomes. While the idea of "learning by doing," for example, is certainly not new to the field of outdoor education, the specificity of what that experience is and when it is most influential can better inform efforts toward intentionality. Success in being able to aptly describe the learning process will help define and develop the field of outdoor education.

[Reference]

References

Bandura, A. (1977). Social learning theory. Englewood Cliffs, NJ: Prentice-Hall.

Cain, K. D., & McAvoy, L. H. (1990). Experience-based judgment. In J. C. Miles & S. Priest (Eds.), Adventure education (pp. 241-250). State College, PA: Venture.

Curtis, R. (1998). The backpacker's field manual: A comprehensive guide to mastering backcountry skills. New York: Three Rivers.

Dowd, T., & Tierney, J. (2005). Teaching social skills to youth (2nd ed.). Boys Town, NE: Boys Town.

Drury, J. K., Bonney, B. F., Berman, D., & Wagstaff, M. C. (2005). The Backcountry Classroom (2nd ed.). Helena, MT: Globe Pequot.

Gilbertson, K., Bates, T., McLaughlin, T., & Ewert, A. (2006). Outdoor Education: Methods and strategies. Champaign, IL: Human Kinetics.

Green, P. J. (1981). The identification of outdoor adventure leadership competencies for entry-level and experience-level personnel. Unpublished doctoral dissertation, University of Massachusetts.

Green, P. (1990). Outdoor leadership preparation. In J.C. Miles & S. Priest (Eds.), Adventure education (pp. 241-250). State College, PA: Venture.

Gookin, J. (2006). NOLS Wilderness Educator Notebook. Lander, WY: National Outdoor Leadership School.

Harvey, M. (1999). The National Outdoor Leadership School's wilderness guide: The classic handbook, revised and updated (2nd ed.). New York: Simon and Schuster.

Hattie, J., Marsh, H. W., Neill, J. T., & Richards, G. E. (1997). Adventure education and Outward Bound: Out-of-class experiences that make a lasting difference. Review of Educational Research, 67(1), 43-67.

Henderson, K., & Fox, K. (1994). Methods, measures, and madness: Possibilities for outdoor education research. In L. McAvoy, L. A. Stringer, and A. Ewert (Eds.), Coalition for Education in the Outdoors Second Research Symposium Proceedings (pp. 9-13). Cortland, NY.

Hutchinson, D. C. (1999). The basic book of sea kayaking. Guilford, CT: Globe Pequot.

Kosseff, A. (2003). AMC guide to outdoor leadership. Boston: Appalachian Mountain Club.

Klint, K. A. (1999). New directions for inquiry into self-concept and adventure experiences. In J. Miles and S. Priest (Eds.), Adventure Programming (pp. 163-168). State College, PA: Venture Publishing.

Leemon, D. (2006). Risk Management at the National Outdoor Leadership School. In J. Gookin (Ed.), Wilderness educator notebook (pp. 108-114). Lander, WY: The National Outdoor Leadership School.

Leemon D., & Schimelpfenig, T. (2005). Risk management for outdoor leaders: A practical guide for managing risk through leadership. Lander, WY: The National Outdoor Leadership School.

Long, J. (2003). How to rock climb! (4th ed.). Guilford, CT: Falcon.

Luebben, C. (2004). Rock climbing: Mastering basic skills. Seattle, WA: Mountaineers.

Martin, B., Cashel, C., Wagstaff, M., & Breunig, M. (2006). Outdoor leadership: Theory and practice. Champaign, IL: Human Kinetics.

Martin, A. J. & Leberman, S. I. (2005). Personal learning or prescribed educational outcomes: A case study of the Outward Bound experience. Journal of Experiential Education, 28(1), 44-59.

McKenzie, M. (2003). Beyond the "Outward Bound process:" Rethinking student learning. Journal of Experiential Education, 26(1), 8-23.

Petzoldt, P. (1984). The new wilderness handbook (2nd ed.). New York: W.W. Norton.

Phipps, M., & Swiderski, M. (1990). The "soft" skills of outdoor leadership. In J.C. Miles & S. Priest (Eds.), Adventure education (pp. 241-250). State College, PA: Venture.

Priest, S., & Gass, M.A. 1997. Effective leadership in adventure programming. Champaign, IL: Human Kinetics.

Propst, D., & Koessler, R. A. (1998). Bandura goes outdoors: Role of self-efficacy in the outdoor leadership development process. Leisure Sciences, 20, 319-344.

Raiola, E. (2003) Communication and problem-solving in extended field-based outdoor adventure education courses. The Journal of Experiential Education, 26(1), 50-54.

Ryan, G. W., & Bernard, H.R. (2003). Data management and analysis methods. In N.K. Denzin & Y.S. Lincoln (Eds.) Collecting and interpreting qualitative materials. Thousand Oaks, CA: Sage.

Sibthorp, J., Paisley, K., & Gookin, J. (2007). Exploring participant development through adventure-based recreation programming: A model from the National Outdoor Leadership School. Leisure Sciences, 29, 1-18.

Sibthorp, J., Paisley, K., & Gookin, J. (2005). Participant development through adventure-based programming: A model from NOLS. In D.L. Kerstetter and B. Hendricks (Eds.) Abstracts from the 2005 Symposium on Leisure Research. Ashburn, VA: National Recreation and Park Association.

Spradley, J. P. (1979). The ethnographic interview. New York: Harcourt Brace Jovanovich.

Slavin, R. E. (1997). Educational psychology: Theory and practice (5th ed.). Boston, MA: Allyn & Bacon.

Sternberg, R. J. (2006). Cognitive psychology (4th ed.). Belmont, CA: Thomson Wadsworth.

Swiderski, M. (1987). Soft and conceptual skills: The often overlooked components of outdoor leadership. In G. Robb (Ed.). The Bradford Papers Annual 2. Martinsville, IN: Bradford Woods Center for Outdoor Education.

Vygotsky, L. S. (1978). Mind in society: The development of higher psychological processes. Cambridge, MA: Harvard University.

Walsh, V., & Golins, G. (1976). The explanation of the Outward Bound process. Denver: Colorado Outward Bound School.

Wells, D. (2005). Wilderness navigation. Mechanicsburg, PA: Stackpole.

[Author Affiliation]

Karen Paisley, Ph.D., is an Associate Professor in the Department of Parks, Recreation, and Tourism at the University of Utah in Salt Lake City, Utah, USA.

E-mail: karen.paisley@health.utah.edu

Nathan Furman is a doctoral student in the Department of Parks, Recreation, and Tourism at the University of Utah in Salt Lake City, Utah, USA.

E-mail: nathan.furman@health.utah.edu

Jim Sibthorp, Ph.D., is an Assistant Professor in the Department of Parks, Recreation, and Tourism at the University of Utah in Salt Lake City, Utah, USA.

E-mail: jim.sibthorp@health.utah.edu

John Gookin is the Curriculum Director for the National Outdoor Leadership School in Lander, Wyoming, USA. E-mail: john_gookin@nols.edu