Perceived Learning, Critical Elements, and Lasting Impacts on University based Wilderness Educational Expeditions.

Wilderness educational expeditions offer unique opportunities for learning and there is a growing body of research that investigates their learning dynamics and outcomes. Studies have investigated the relationship between specific course components and learning outcomes (McKenzie, 2003; Beames, 2004a; Martin and Leberman, 2005); changes in personal, social, and technical skills (Stott and Hall, 2003); what participants remember and have learned (Daniels, 2005); critical elements of educational expeditions (Beames, 2004a; Martin and Leberman, 2005); and most recently, the possible long-term impacts (Takano, 2010). This study seeks to increase our understanding of educational expeditions by integrating the investigation of students' perceptions of learning, critical elements, and lasting impacts; to provide empirical support for theoretical claims; and to pursue identified needs for further research. For example, Conrad and Hedin (1981) encourage investigating "students' assessment of what aspects of their experiences seemed particularly valuable a year or two after as opposed to during or immediately following the experience" (p. 20). Hattie, Marsh, Neill and Richards (1997) and McKenzie (2000) suggest further inquiry into which aspects of which programs are effective. Similarly, Beames (2004a) identified the need for investigating the universal applicability of critical elements. Takano (2010) encourages longitudinal perspectives on "how outdoor education experiences are experienced and understood" (p. 78), especially participants' perceived influence of the experiences, and what elements they considered had led to the outcomes" (p. 78).

Our primary goals are to identify perceived learning outcomes and lasting impacts from extended wilderness canoe expeditions in Canada's Arctic and to connect that learning to specific course elements. To do this, we asked three questions: 1) what are students' perceptions of learning?; 2) what specific course components (critical elements) do students identify as having facilitated their learning?; and 3) what are the lasting impacts on students, in terms of changes in perceived learning and impacts on personal and professional lives? These questions were asked of university students who completed a for-credit wilderness canoe expedition as part of their studies at the (authors' institution) between 1993 and 2007.

Review of Literature

Perceived Learning

Hattie et al. (1997) conducted a meta-analysis of 96 studies that examined the effects of adventure programs. They identified 40 major outcomes, summarized into six categories of leadership, self-concept, academic, personality, interpersonal, and adventuresome and conclude that while adventure programs are effective, they are not all equally effective. Rather, adventure programs are most effective for adults over 20 years of age and programs over 20 days in length are more effective than shorter programs. In addition, adventure programs provide especially strong and long-lasting benefits related to self-control (independence, confidence, self-efficacy, self-understanding, assertiveness, internal locus of control and decision making).

Some studies have examined Raleigh International youth expeditions. Beames (2004b) identified learning outcomes from a 10-week expedition to West-Africa in the categories of relationship to self, others, and greater society. Later, Beames and Stott

(2008) identified outcomes of a 10-week expedition to Costa Rica as becoming more self-resilient and self-aware, more confident leading and working with others, and more comfortable interacting with other cultures. In a 20-year retrospective study of the impact of Raleigh expeditions on Japanese participants, Takano (2010) reports that at least 60% of respondents identified the following learning outcomes from a multiple choice list: international understanding/cultural diversity/global perspective, influence on values and worldview, and development of friends and networks of people (Takano, 2010). Additionally, nearly 50% of respondents also identified the following learning outcomes: understanding of surroundings of self and society that one is part of, ability to take action, teamwork, willingness to challenge something new or difficult, way of looking at oneself, and confidence as learning outcomes. Based on responses to open-ended questions, the following learning outcomes emerged: self, humanity and behavioural guidelines; culture and society; communication (relationship with others); and increased awareness and understanding of human-nature relationships and values. In a study of New Zealand Outward Bound participants, Martin and Leberman (2005) identified increased self-awareness and self-confidence as key outcomes and learning about respect for others as a secondary outcome.

These studies point to the diverse array of possible outcomes of educational expeditions that we summarize in five broad categories of personal skills (e.g., confidence, self-awareness, self-esteem, relationship to self), social skills (e.g., communication, problem solving, group living, relationship to others), technical skills (e.g., climbing, paddling, outdoor cooking), human–nature relationships (e.g., ecological

knowledge, human impacts, sustainability issues) and cultural and global diversity/perspective (e.g., relationship to greater society).

Critical Elements

Other studies have identified critical elements (also called course components, curriculum elements, program variables, key factors) that elicit positive outcomes from educational expeditions. Conrad and Hedin (1981) identified critical elements that led to the greatest psychological, social, and intellectual development of secondary school students. These elements were length (at least 12 weeks but better if greater than18 weeks), intensity (at least weekly seminars and field placements of at least 2 hours/day 4-5 times weekly), engagement in new and unfamiliar activities, and formal reflection.

In a review of the adventure education literature, McKenzie (2000) identified six critical elements assumed to contribute to positive program outcomes: an unfamiliar physical environment; adventure activities; intentional processing or reflection; the challenge and support of working in a small group; positive, cooperative, and supportive instructors; and participant characteristics (age, gender, background, and expectations). However, she is clear to point out that these claims are largely theoretical and not well supported by empirical research. Later, in a study of Outward Bound participants, McKenzie (2003) found that positive course outcomes (i.e., increased self-concept, concern for others, and concern or the environment) were associated with specific qualities of the course activities (especially achieving success and experiencing challenge), specific course activities (particularly backpacking/mountaineering, solo, and rock climbing), the physical environment (wilderness setting and weather), instructors (chiefly instructors' expectations, instructors as role models, and curriculum presented by

instructors), and the group (primarily working as a group, interacting with other group members, and relying on other group members). In addition, her findings indicate that the solo led to the greatest increases in self-awareness, that achieving individual success and challenge led to the greatest increases in self-confidence, and the curriculum presented by the instructors as well as the wilderness setting led to the greatest appreciation of and concern for the environment. McKenzie (2003) also identified a few course components that had a negative impact on course outcomes, including failing to achieve success, the required course-end run, and working as a group. Finally, this study found that adult participants reported greater benefits than youth participants.

Investigations of Raleigh International youth expeditions have yielded the following results. Beames (2004a) identified group isolation, changing groups, diverse groups, physically demanding experiences, and self-sufficient living as critical elements leading to positive courses outcomes. Beames and Stott (2008) identified living with a host family/community, diverse groups, and mental and physical challenges as critical elements. Takano (2010) identified living and working in diverse groups, new environment, physical and social challenges, flexible program, and post-expedition reflection and sharing as critical elements that facilitated positive course outcomes.

In a 25-year retrospective study of a spiritual oriented wilderness program (Daniels, 2005), former students identified the solo experience as the most significant course component (37%) while rock climbing and teamwork ranked second (15%). Specific elements of the solo that contributed to its effectiveness included novelty (something new), timing (following an intense group experience), challenge (solitude, fasting, and boredom), spiritual influence (connection to God), perspective (new lens to

see life through), and setting (nature). In a study of New Zealand Outward Bound students, Martin and Leberman (2005) identified critical elements as the group (teamwork, support), instructors (knowledge, enthusiasm), activities (high ropes course, tramping, sailing, and solo) and reviews (group discussion, debriefing).

Based on these studies, we summarize the common critical elements of educational expeditions into five broad categories related to: activities, new environments, intentional processing and reflection, group experiences, and physical and mental challenges.

Lasting Impacts

Compared to the research regarding outcomes and critical elements of educational expeditions, there have been very few attempts to understand the lasting impacts of expeditions, in terms of how students' perceptions of learning change over time and influences on personal and professional lives. Takano (2010) summarized the scant research and concludes, "the longitudinal perspectives from programme participants represent an obvious gap in the literature surrounding how outdoor education experiences are experienced and understood" (p. 78). Her respondents believed that their expedition experience was a significant life event and that it played an important role in shaping who they are today.

Knapp and Benton (2006) investigated participant recollections one-year following an environmental education program. Three themes that contributed to increased long-term memory were active experiences, repetitive content, and presentation of information that is relevant to the learner. To help explain and understand these themes, Knapp and Benton use episodic and semantic memory (or learning) theory.

Episodic memory is the ability to recall the details and sensations of specific events and experiences. However, the details and sensations of episodic memory are susceptible to transformation and information loss. Nevertheless, episodic memories can be transformed into semantic memories, which are more conceptual in nature and longer lasting. In semantic memory, meanings and concepts are stored, which are learned from our life experiences, and which form the foundation of knowledge. For example, during an educational expedition, there are many episodic memories created because of the active, repetitive, and relevant nature of the experience, which are then available for transformation into more generalized meanings and concepts about the world that are stored in semantic memory (Tulving, 1972). Therefore, the creation of semantic memory, or the establishment of more general meanings, concepts, or knowledge about the world, are dependent on the creation of episodic memories which are enhanced by active experiences that repeatedly present content relevant to the learner. Knapp and Benton (2006) conclude that, "experiences associated with the program can create vivid episodic memories that potentially aid in the development of semantic memories and hence direct knowledge" (p. 175). Therefore, it is not surprising that Takano's (2010) respondents report that their expedition experiences were significant as they are the source of many episodic memories that have been transformed into semantic memories that store the general concepts and ideas that they claim to have learned from their expedition 20-23 years earlier. While they may not be able to recall all the details and sensations of the expedition, respondents do associate the expedition with development of meaningful and long-lasting knowledge.

Methodology and Study Participants

Augustana's Wilderness Canoe Expeditions

The Augustana Campus of the University of Alberta offers a liberal arts and sciences education to about 1000 students. The institution's goal (Augustana, n.d.) is to educate "the whole person in an intimate, small-campus setting so that students and mentors alike are capable of engaging life with intellectual confidence and imaginative insight, equipped for leadership and service, and committed to the betterment of their world" (para. 3). Expedition courses support these institutional goals and the principles of good practice in undergraduate education (Chickering & Gamson, 1987) because they promote, for example, considerable instructor-student contact, cooperation among students, and active learning (Asfeldt, Hvenegaard, & Urberg, 2009; Kuh, Pace, & Vesper, 1997). In addition, these educational expeditions employ experiential learning strategies and promote pedagogical unity by linking the decision-making and expedition planning activities of semester-based courses to their respective expeditions by increasing relevance, responsibility, and direct consequences (Dewey, 1973). Furthermore, they do not succumb to neo-experiential trends such as being "tightly bounded and scripted" (Roberts, 2012, p. 95) or the "characteristics of McDonaldization–efficiency, calculability, predictability, and control" (p. 93). Rather, they are a return to a more organic form of experience and learning that has potential for being powerful and transformative which Roberts distinguishes as an "*actualization*" rather than a "*simulation*" (p. 100). Finally, they reflect "the Canadian way" (Henderson & Potter, 2001, p. 226) of outdoor education in Canada with a key nexus of geography, interdisciplinarity, wilderness travel, and the iconic role of North in Canada's identity.

We co-teach a package of two optional senior courses: Geography of the

Canadian North and Arctic Canoe Expedition. These involve regular class meetings during the winter semester (January to April), followed by a 21-day canoe expedition in June or July in the central part of the Canadian Arctic (Northwest Territories or Nunavut). These interdisciplinary courses have been taught every second year since 1993. Specific goals of the courses are for students to: engage in an interdisciplinary learning expedition; learn and implement an organizational framework to discover and explore the people, landscape, flora and fauna of northern Canada; create and shape their own experience; investigate and share topics of personal interest; develop wilderness expedition planning and leadership skills; and to gain an appreciation and awareness of the Canadian North. These courses typically involve 10 students and 2 instructors and use teaching strategies outlined in Table 4.

Data Collection and Analysis

We gathered information in two ways. First, we used a questionnaire to inquire about: 1) students' perceptions of their learning from these courses (open-ended question); 2) which aspects of the courses facilitated that learning (how much respondents agreed [1=strongly disagree, 2=disagree, 3=neutral, 4=agree, 5=strongly agree] with statements that said, "This [critical element] facilitated my learning"); and 3) how that learning has changed over time (open-ended) and how the courses affected (lasting impact) their personal and professional lives (open-ended). In June 2009, we contacted the entire population of past participants (80 in total) from the 1993-2007 expeditions by email, inviting them by to participate in a voluntary written self-administered survey. Contacting the entire population is desirable in survey research to minimize sampling bias (Newing, 2011). We followed up with two reminders, after two

months and after six months, producing 57 responses (71% response rate). We did not detect any nonresponse bias (Newing, 2011), as known characteristics (e.g., trip year, gender) of non-respondents were similar to those of respondents.

Second, near the end of only the last six of the eight study expeditions, we asked students to identify what they have learned from the expedition experience using an open-ended question (we didn't ask these questions of student in the first two expeditions). Their responses were recorded individually in the group journal and we used these responses to represent students' perceived learning immediately following the expedition. We included these results from only the respondents who had also completed the survey questionnaire.

We used NVivo 9 (Richards, 1999) to code responses to the open-ended questions with no limit on the number of responses per respondent. We then triangulated the coding (Farmer, Robinson, Elliott, & Eyles, 2006) using the co-investigators and two colleagues who are familiar with educational expeditions. We used the same categories to code the group journal responses as were used to code responses from the similar question on the survey questionnaire. For open-ended responses, we inputted the number of responses in each category for every respondent. For open-ended questions, the dependent variables were the total number of responses for each question and the number of responses in each category. For closed-ended questions, the dependent variables were the Likert scores for each question. We tested for relationships with several independent variables, including gender, age and year status at the time of the expedition, and years since the expedition. We analyzed the data with SPSS (Norusis, 2008) and used independent sample t-tests and one-way analyses of variance to test for differences. We also used Pearson regression

analysis to examine correlations. In general, we report only those relationships that are statistically significant.

Findings

Study Participants

We received responses from every offering of these courses (mean = 7.1 respondents per expedition, *SD* = 1.4). At the time of the expedition, the mean (*SD*) age of respondents was 24.1 years (6.9); 82.5% were 24 years of age or younger. The gender split was 54% female and 46% male (compared to 58% and 42%, respectively for the entire campus in 2011 – authors' institution, 2011). Most respondents were in their 3rd (53.8%) or 4th year (32.7%) of university study; the mean (*SD*) year status was 3.3 (0.8). Most of the respondents were enrolled in Outdoor Education (31.6%) or Environmental Science programs (28.1%). The mean (*SD*) age of respondents at the time of the survey was 32.9 years (9.0). At the time of completing the survey, the mean (*SD*) number of years since the expedition was 8.8 (4.7).

Perceived Learning

To obtain information about perceived learning, we compiled and analysed content from expedition group journals. Of the 42 potential respondents, 40 replied, with a total of 230 unique responses (Table 1). The mean (*SD*) number of responses was 5.5 (2.8). Most of the responses related to nature and place appreciation (27.4%), outdoor skills (23.5%), group living (19.6%), and self-awareness (17.8%).

In addition, in the 2009 survey, we asked, "As you think back to your Arctic Course experience today, please describe what you feel you learned from it". Of 57 potential respondents, 54 replied, for a total of 176 responses (Table 2). The mean (*SD*)

number of responses was 3.1 (2.5). Most of the responses were connected to nature and place appreciation (32.3%), outdoor skills (22.2%), self-awareness (21.6%), and group living (18.8%). Females provided more total responses (3.84) than males (2.27; t = -2.465, df = 55, p = 0.017). Females also provided more responses about self-awareness (1.06) than males (0.19; t = -2.909, df = 55, p = 0.005). Participants on more recent trips provided more responses about nature and place appreciation and about leadership (see Appendix). Younger respondents provided more responses related to nature and place appreciation than older respondents (see Appendix).

The results from this study parallel findings of similar studies with one exception; nature and place appreciation was a more dominant learning outcome than in other studies. This may result from several factors. Nature and place appreciation is an explicit goal of this study's program, the instructors intentionally model related practices, and perhaps most importantly, the setting of the expeditions in this study (tundra landscape of northern Canada) is very remote and undeveloped. For example, it is common to not see other people for the duration of a 21-day journey. In addition, this setting, which is very unfamiliar to participants, may play an important role in facilitating learning (McKenzie, 2000, 2003; Takano, 2010). Specifically, McKenzie (2003) claims that the curriculum presented by the instructors as well as the wilderness setting lead to the greatest appreciation of and concern for the environment. Our past participants have regularly seen great numbers of wildlife (e.g., caribou, musk oxen, wolves, and grizzly bears), observed few signs of human development, and drank directly from the lakes and rivers. This unique environment contrasts with most participants' everyday lives and our results support previous research (McKenzie 2000, 2003 and Takano 2010) that identify a new

and unfamiliar environment as a critical element that elicits positive outcomes from educational expeditions.

While the number of responses decreased from immediately following the expedition to a point in time 2-16 years later, the order and percentages of responses for each category remained very similar (Tables 1 and 2). This suggests that while the details of the learning experience may have changed over time the core of the learning is long-lasting. This is supported by Takano's (2010) findings that reveal long-lasting and significant learning from educational expeditions as well as by Hattie et al. (1997) who state that adventure programs, particularly those over 20 days in length and with participants over the age of 20, "have a major impact on the lives of participants, and this impact is long lasting." (p. 70).

The number of responses received per student immediately following the expedition was higher than 2-16 years after. This makes intuitive sense and may be explained using episodic and semantic memory theory. Given that episodic memories are commonly transformed into more long-lasting semantic memories, it is not surprising that respondents gave fewer responses a number years after because of the loss of details and sensations once stored in episodic memory (Knapp & Benton, 2006).

Females provided more responses than males overall and gave more responses related to self-awareness specifically. This may be explained by Neill's (1997) suggestion that "women who choose to participate in outdoor education programs may be a self-selected group who have higher ideal self-concepts and are more motivated towards personal development than their male counterparts and women who choose not to participate" (p. 7). Furthermore, Van Velsor, Taylor and Leslie (1998) found that women

rate themselves higher than men on knowledge of self, which is one aspect of their self-awareness scale.

Critical Elements

To learn more about which critical elements promoted learning, we asked students "What aspects of your Arctic Course experience facilitated your learning the most?" Of 57 respondents, 49 replied, producing 89 responses (Table 4). The mean *(SD)* number of responses was 1.56 (1.09). Most of the responses related to the experiential approach (46.1%), group living (20.2%), and nature and place immersion (18.0%). Females provided more total responses (2.00) than males (1.04; t =-3.685, df =55, p = 0.001). In addition, females provided more responses about the experiential pedagogy (0.87) than males (0.54; t =-2.227, df =55, p = 0.030). As time passed, the number of responses related to nature and place immersion decreased (see Appendix).

Over 80% of respondents agreed or strongly agreed that most components facilitated learning (Table 5). The mean score for components occurring during the semester components was 4.12, while the mean score for components occurring during the expedition was 4.33. Most of this difference results from the low score for the final exam; nevertheless the test component on the expedition (nature ID quiz) was rated fairly high by respondents.

As the years passed, respondents thought more favourably of the thoughts for the day (typically a short reading chosen and delivered by students with the goal of promoting reflection on a pertinent idea or issue (see Appendix). Older students thought more favourably about writing in the group journal than younger students (see Appendix).

Common critical elements that facilitate learning on educational expeditions identified in the literature include the physical environment (new and unfamiliar), self-sufficient living, group isolation, and living and working in diverse groups (Beames 2004b, McKenzie 2003, Takano 2010). This study revealed three key critical elements of experiential approach, group living, and nature and place immersion. Group living and nature and place immersion are similar to critical elements identified by Beames (2004b), McKenzie (2003), and Takano (2010). Other studies have not specifically identified an experiential approach as a critical element. However, we assume that other expeditions also employed some form of experiential pedagogy. Participants in this study may have identified experiential approaches for a few of reasons. First, the experiential approach is in contrast to most other university course experiences (Pocklington & Tupper, 2002) as demonstrated by students who said: “Everything involved in the course is so different from any other classroom type course I’ve ever taken” and “because Arctic Course was such a unique and extreme experience it stands out more than most of my past experiences.” Second, the course is an outdoor education course which students may perceive to be experiential, whether they fully understand that distinction or not. Third, perhaps the experiential design of the course was truly effective and actually resulted in meaningful learning, and students recognized that the pedagogy played a critical role in their learning.

A noteworthy finding is that students rated both the in-class and expedition components of the course as important elements that facilitated their learning. Intuitively, we anticipated that the expedition components would be more highly rated as it is the expedition that draws students to the course. In fact, from time-to-time, we note that

students sometimes lack enthusiasm for expedition planning and preparation. This result points to the importance of pedagogical unity between the classroom and expedition and to the value of ensuring a high degree of relevance and connection between the classroom and expedition experience.

Lasting Impacts

To explore lasting impacts we investigated changes to perceived learning over time and how the expedition experience had since impacted their personal and professional lives. To do this we asked students to indicate if their learning from the Arctic Course experience had changed since taking the course. Only 12.3% said “no”. When asked to describe what learning had changed, of the 57 respondents, 37 provided 45 responses (Table 5). Most of the responses related to self-awareness (37.7%), group living (20%), greater appreciation of the experience (15.6%), and greater appreciation of nature and place (8.9%).

When asked to describe why those changes have taken place, 19 respondents provided one response each. Nine reasons for changes to learning were related to post-expedition reflection and ten reasons were related to the passage of time. Some representative quotes regarding post-expedition reflection include: “what you learn and experience can be applied to your life continually as you experience new things”; “my experience serves as a bank of memories and experiences that I continue to draw on”; “I continue to reflect on the experience even today”. Quotes regarding passage of time include: “I now see the experience through older more experienced eyes”; “maturity has changed my perception of the experience”; “as I get farther away from the actual experience I value the people and memories more than the hard skills”.

These results point again to the long-lasting impact of educational expeditions as supported by Takano (2010) and Hattie et al. (1997) and to the central role of reflection in the experiential learning process (Dewey, 1938; Kolb, 1984). While it is common practice to facilitate reflection during expeditions using a variety of strategies (Simpson, Miller, & Bocher, 2006), it is important for educators to remember that effective educational expeditions can serve as a foundation for learning for many years, and perhaps a lifetime. Furthermore, because of the interdisciplinary and experiential nature of educational expeditions, they are particularly well suited to contributing to the goals of a liberal arts and sciences education (Asfeldt, Hvenegaard, & Urberg, 2010) such as promoting the intrinsic value of learning, cultivating intellectual virtues for career preparation, and nurturing a connection to a higher purpose or calling (Roche, 2010). However, to maximize their effectiveness, it is important for educators to not fall victim to neo-experientialism as described by Roberts (2012) and to maximize student "participation, deliberation, community, and responsibility" (p. 101).

Post-expedition reflection is also important. Some avenues for informal post-expedition reflection include reading the group journal, interacting with expedition members at university and beyond, sharing stories with friends and family, and participating in expedition reunions within and among cohorts. One student said "conversing with another course participant and a past participant also helped in learning." In addition, even completing a questionnaire about an expedition that happened 20 years earlier help them to "reconsider the meaning and importance" of the expedition (Takano, 2010, p. 90).

Respondents reported changes to learning over time related to self-awareness (37.7%), group living (20.0%), greater appreciation of the experience (15.6%), and appreciation of nature and place (8.9%). The categories of learning identified immediately following the experience were remarkably similar to the categories identified 2-16 years after (Tables 1 and 2). Consequently, it may be that the learning hasn't really changed over time as much as it has been strengthened and deepened. For example, students commented (Table 5) "[my] experience has been enhanced and deepened as I have continued my education and had additional experiences" and "I think it has deepened, not changed". That is, as a result of post-expedition reflection and the passage of time, the learning for students continues and expands, once again supporting the notion that educational expeditions are a source of meaningful and long-lasting learning. The only new category identified here is a greater appreciation for the experience. Respondents commented that, as they look back on the experience, they realize how fortunate they were to have had these Arctic experiences and how unique they really were. One student commented: "[I have] a greater appreciation for the opportunity it was–to learn the hard and soft skills associated with an extended paddling expedition, as well as simply the time to step away from the demands of everyday life."

When asked if and how the Arctic Course experience has impacted their personal lives, all 57 respondents indicated "yes" to the first part of the question. When asked how, we received 79 responses from 50 respondents (Table 6). These responses primarily dealt with positive life experiences (30.3%), nature and place appreciation (24.1%), confidence (20.2%), and skill development (16.5%). Older students provided more

responses in the positive life experience category than younger students ($r = 0.321$, $p = 0.020$, $N = 52$).

We also asked students if and how the Arctic Course experience has impacted their professional lives? All but one of the potential 57 respondents indicated "yes". When asked how, we received 69 responses from 54 respondents (Table 7). The primary impact was related to job skills (62.3%). Older students provided more responses than younger students related to confidence ($r = 0.337$, $p = 0.015$, $N = 57$), however younger students provided more responses overall than older students ($r = -0.270$, $p = 0.042$, $N = 57$).

We asked "If you were to take your undergraduate education over again, would you participate in the Arctic Course again?" All but one respondent indicated yes. When asked "Why or why not?" we received 60 responses from 54 respondents (Table 8). These responses related primarily to this being a highlight learning experience (48.3%) and a positive life experience (38.3%).

These results point to the holistic and long-lasting nature of educational expeditions (Daniels, 2005; Hattie et al., 1997; Takano 2010). In addition, they highlight students' desire and appreciation for relevant and engaging learning experiences that contrast their common classroom experience (Pocklington & Tupper, 2002). Clearly, these Arctic experiences have had a long-lasting impact on the respondent's personal and professional lives and have been a highlight of their university learning experiences.

Conclusions

This study supports other findings indicating that educational expeditions have the potential to provide significant and long-lasting impacts (Hattie et al., 1997; Takano,

2010). In addition, this study found perceived learning outcomes similar to past research while revealing a unique outcome related to nature and place appreciation. Furthermore, this study affirms previously discovered critical elements and identifies an experiential approach as a unique critical element. This study also demonstrates that these Arctic wilderness experiences provide a foundation for enhancing and deepening learning for many years after the expedition as a result of post-expedition reflection and the passage of time. As well, participants' personal and professional lives were shaped by their expedition experience, were a highlight of their university education, and point to students' desire and appreciation for relevant and engaging learning experiences that contrasts their common classroom experiences. Finally, given the unique goals and settings of individual educational expeditions, combined with distinct instructor skills and passions, perceived learning and critical elements will vary from expedition to expedition. For example, the age of participants influences some aspects of perceived learning (i.e., younger respondents indicated more learning about nature and place appreciation than older respondents) and critical elements (i.e., older participants liked group journal writing more than younger students). Nevertheless, because of the nature of educational expeditions, they lend themselves to the implementation of sound experiential pedagogical practices that promote active, engaged, and relevant learning.

We recognize the limited sample size from which we draw conclusions, but attempted to corroborate findings with multiple approaches to gathering data. For example, regarding perceived learning, we obtained data from students immediately following their expedition and then in the post-expedition questionnaire. Similarly, we asked students to identify critical elements from the expedition for learning in an open-

ended and closed-ended manner. We also acknowledge that perceptions of learning do not equate to actual learning (Spinello & Fischbach, 2008), but these can be useful proxies for understanding some of the trends and dynamics of learning (Hergert & Hergert, 1990). Last, we acknowledge that the survey, as a method of reflection, may elicited different responses than pre-survey perceptions of learning, critical elements, and lasting impacts; however, this is an inherent limitation of survey research.

Nevertheless, we suggest the following practices to maximize learning and long-lasting impacts of educational expeditions: employ well developed experiential teaching strategies; structure expeditions to promote meaningful group living experiences; recognize potential differences in participants regarding learning potential and use of critical elements; maximize nature and place immersion; ensure pedagogical unity and strong linkages between classroom and expeditions experiences to ensure a high level of relevance and connection; promote post-expedition reflection by encouraging reunions; and facilitate group journals and photo books that allow participants to revisit their experiences.

In the future, we encourage continued research investigating the learning dynamics of educational expeditions beyond the 2-16 years of this research. In addition, we encourage research to investigate students' post-expedition perceptions of critical elements, learning outcomes, and the connection between them (Beames, 2004b; Conrad & Hedin, 1981; McKenzie, 2000; Stott & Hall, 2003; Takano, 2010) as well as the efficacy of post-expedition reflection. Ideally, future inquiry will examine a variety of educational expeditions (youth and university-based), varying settings and lengths, and

diverse participants. We found the blended research appropriate of employing both quantitative and qualitative data, as it helped to deepen our understanding.

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