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12. LEARNING ENVIRONMENTS IN HIGHER EDUCATION

A Study of Environmental Education Programming in Teacher Education

INTRODUCTION

This chapter describes the importance of psychosocial learning environments in education, and how these can help us in achieving our environmental learning goals. For many years, environmental education has been discussed with reference to the sciences often ignoring the ecology of "human societies and cultures (and their technologies) within physical communities" (Zandvliet & Brown, 2006, p. 207). Unfortunately, this has led us to ignore the cultural behaviours now overwhelming the viability of natural systems (Bowers, 1999). Knowledge of the science behind nature is important, but of equal value is knowledge of the socio-cultural values that we place upon or associate with nature. So, in this respect environmental education can also be viewed as a distinct pedagogical approach and context that also acknowledges the quality of the interpersonal relationships among people and their communities.

Wright (2006) argues that universities produce students who are incapable of dealing with our current environmental issues due to the premise that universities often do a poor job of illustrating the connections between humans and the natural environment that they live in. The current state of the planet, as well as its future is gaining ground in the political arena, and higher education is now being depended upon to facilitate change to a more sustainable way of life (Chalkley, 2006). Universities and colleges most valuable contribution may be to produce graduates who think sustainably so that they may take this knowledge into the workplace, and into society as a whole (Chalkley, 2006). Unfortunately, "the overarching objective of creating an ecologically literate, motivated and engaged corps of graduates [in higher education] remains elusive" (Havlick & Hourdequin, 2005, p. 386). If environmental education is only emphasized in K-12 schools, we may have to wait thirty years for a sustainable movement to finally take effect.

A common tool to evaluate the effectiveness of a program are measures of student achievement, such as test scores. A major reason for the use of test results in program evaluations is 'top-down' in origin, coming from government, state or provincial ministries/departments of education. While there is no argument that students must be tested on their skills learned, in assessing student achievement alone for program evaluations we may risk the chance of describing the human qualities that make education a worthwhile experience for students (Fraser, 2001). The study of learning environments has the possibility of improving assessment

norms by providing another aspect of the program that can be evaluated. Trends in learning environment research have indicated to us that a positive learning environment as perceived by the student is a predictor of greater learning (Fraser, 2012), and that place-based environmental education settings tend to have positive learning environments as perceived by students (Zandvliet, 2012). Currently, there does not exist a reliable measure to describe learning environments in environmental education courses or programs. This led us to pose three research questions to focus our efforts to understand the relationship between learning environments and environmental learning in post-secondary education:

– Can aspects of the learning environment in post-secondary classrooms using place-based and constructive pedagogies be validly measured?
– What differences exist between actual and preferred environments in post-secondary classrooms using place-based and constructive pedagogies?
– How might post-secondary learning environments using place-based and constructive pedagogies be characterized or described?

This chapter, reports on an alternative methodology to evaluate environmental education programs; one that acknowledges important psychosocial factors in educational settings (i.e. learning environments) that influence students' learning. The next section gives a brief description of place-based education, learning environment research, and environmental learning. After providing details of the methods used in this research, we discuss our interpretations of our results and discuss how learning environments research has important insights for the field of environmental education.

ENVIRONMENTAL EDUCATION

Environmental education is a constantly evolving concept (Sauvé, 2005). Sauve mapped out environmental education and identified, fifteen currents in the field. Some have been around since the early years of environmental education in pedagogy in the 1970s, and others having emerged much more recently. The value of each current depends primarily on the worldview that is at its foundation and the "unique characteristics of each pedagogical situation including objectives pursued and the context of intervention" (Sauvé, 2005, p. 12). These established currents are most commonly associated with human-environment relationships, and they all share a commonality, they have failed in breaking the barriers to being fully integrated in school curriculum.

An early and popular current of environmental education could be described as a *naturalist* one by its centeredness on the relationship between humans and nature. This characteristic came under critique during the 1980s as the sustainable development movement began to garner strong support (Sauvé, 2005). The critique was that environmental education had preoccupied itself with human-nature relationships and had ignored the social and economic factors associated with the environment. By the end of the 1980s sustainable development had become one of the stronger currents within environmental education.

PLACE-BASED EDUCATION

The concept of place-based education is an evolving curricular and instructional approach that over the years has been referred to as community-oriented schooling, ecological education, and bioregional education (Woodhouse & Knapp, 2000). Due to the multidisciplinary aspect of place-based education it is difficult to find a clear and concise definition for it. For the most part, this approach is "designed to help students learn about the immediate surroundings by capitalizing on their lived experiences" (Knapp, 2005, p. 278). It features a multi-disciplinary and infused approach in its application.

Early work by Sobel (1993, 1999, 2004) has described the concept of place-based education but since then it has been expanded on and developed by others in community contexts (Hutchinson, 2004), eco-literacy (Orr, 1994), experiential learning (Woodhouse & Knapp, 2000), and critical pedagogy (Gruenewald, 2003). As Gruenewald (2003) claims, place-based education does not have its own theoretical tradition; rather it is an assimilation of theories belonging to experiential learning, contextual learning, problem-based learning, constructivism, outdoor education, indigenous education, environmental education, as well as others that share in emphasizing the value of learning from one's own community or region. Inherent in all of these approaches are an increasing importance of interpersonal relationships in the educational experience.

One of the greatest appeals of place-based education is the ability it has "to adapt to unique characteristics in particular places" (Smith, 2002, p. 584). This trait of place-based education makes it a strong tool to "overcome the disjuncture between school and children's lives that is found in many classrooms" (Smith, 2002, p. 585).

Smith (2002), and Woodhouse and Knapp (2000) have both acknowledged common forms and characteristics of place-based education. Smith (2002, p. 593) identifies a number of common place-based education forms: (a) surrounding phenomena are the foundation for curriculum development, (b) an emphasis on students becoming the creators of knowledge rather than only consumers of knowledge created by others, (c) students' questions and concerns play central roles in determining what is studied, (d) teachers act primarily as co-learners and "brokers" of community resources and learning possibilities, (e) the walls between the community and school buildings are crossed frequently, and (f) student work is assessed based on its contributions to community wellbeing and sustainability. Woodhouse and Knapp (2000, p.1) claim that place-based education have the following common characteristics: (a) the curriculum content is multidisciplinary; (b) the curriculum goals are broader than just "learn to earn;" and (c) the curriculum integrates self, others, and place and includes ecological, economic, multigenerational, and multicultural dimensions.

Interestingly, Knapp (2005) makes the comment that "all five patterns form a conceptual umbrella commonly called experiential learning, because they are situated in the context of community life and involve active student engagement" (p. 280). A second look also reveals that environmental learning is a common

pattern among themes. Sobel (2004, p. 7) best explained place-based education and its relationship with environmental learning as:

> The process of using local community and environment as a starting point to teach concepts in language arts, mathematics, social studies, science, and other subjects across the curriculum. Emphasizing hands-on, real-world learning experiences, this approach to education increases academic achievement, helps students develop stronger ties to their community, enhances students' appreciation for the natural world, and creates a heightened commitment to serving as active contributing citizens. Community vitality and environmental quality are improved through the active engagement of local citizens, community organizations, and environmental resources in the life of the school.

LEARNING ENVIRONMENTS

From learning environment research, there is compelling evidence to suggest that the classroom environment has a strong effect on student outcomes (Fraser and Rentoul, 1980; Wang, Haertel & Walberg, 1993; Fisher & Khine, 2006; Fraser, 2012). Unfortunately, academic institutions have tended to place an emphasis on student achievement rather than on the environment that influences it (Fraser, 2001). A strong argument to support this is that for the most part, educational programs have been institutionalized by top-down, politically driven movements that have dictated how and what learning should look like (Noble, 1998), with no regard for the learning environment (Fraser, 1998).

The development of learning environment research can be traced back to the work done by Kurt Lewin, Henry Murray, Herbert Walberg and Rudolf Moos (Fraser, 2012). Several decades later, the work of such people as Walberg (Walberg & Anderson, 1968) and Moos (1974) adapted the work of Lewin (1936) and Murray (1938) to the classroom environment. Moos' (1974) development of social climate scales for human environments such as work, school and health care settings, and Walberg and Anderson's (1968) development of classroom environment assessments for the *Harvard Project Physics program* created the foundation for what is now a forty-year old research tradition.

Over the years LER methods have grown considerably, now boasting an array of widely applicable questionnaires that have been developed, tested and validated in a variety of settings and in a variety of countries (Fisher & Khine, 2006; Fraser, 2012; Zandvliet, 2012; Dorman, Fisher & Waldrip, 2006; Wubbels & Brekelans, 2012; Tal & Morag, 2007). Murray (1938), when referring to the study of the learning environment, used the term *alpha press* to refer to an external (outside) observer's perspective of a learning environment, and the term *beta press* to refer to the insiders' (internal) perspective, or better to put the participants of the learning environment under investigation. Stern, Stein and Bloom (1958) further developed Murray's (1938) ideas by arguing that the beta press could be separated between an individual's insider perspective of the learning environment (private beta press), and that of the whole insider group's perspective (consensual beta

press). In current practices in LER, private beta press is recognized as data collected from interviews and focus groups with constituents of the learning environment (qualitative research methods) and data collected on the learning environment from surveys and questionnaires (quantitative research methods) representing consensual beta press (Zandvliet, 2012).

The study of learning environments is a growing field of academic inquiry and although it is most prevalent within science education, it has application possibilities in many different areas and is particularly applicable to inter -- or multi-disciplinary fields of study such as environmental or place-based forms of education. Today, the study of learning environments has a valuable role to play: in pre-service teacher training; professional development, evaluation of new curricula and generally as an important field of inquiry in its own right -- the description of a valuable component of educational experience. It is for this reason a central assertion of this research is that learning environment research has much to offer in the description of the educational experience in place-based, environmental education settings in higher education.

METHODS

This study utilizes a mixed methodology that incorporates both qualitative and quantitative research methods. The selected participants for this study were two post-secondary environmental education courses at a Canadian University. The courses were part of the Professional Development Program (PDP), which participants take as part of their teaching certification. The two PDP courses each had 24 students; one took place in an urban and semi-residential setting (Case 1), and the other in a rural and residential setting (Case 2). Within these courses the environment is looked at either as a subject, an object or a topic, and educators are asked to consider the place for environmental issues across diverse curricula and practices. All students and teachers voluntarily participated in the study, and the relevant university research ethic protocols were followed. Data collection protocols included administration of quantitative surveys (PLACES), focus groups and participant-researcher observations.

The questionnaire selected for this study was one that had been tested and proven to be reliable in measuring learning environments in secondary classrooms (Zandvliet, 2007). As the questionnaire is not time or age sensitive, the questionnaire was easily adapted for use in post-secondary classrooms. The questionnaire is known as the Place-based and Constructivist Environment Survey (PLACES). The eight scales incorporated into PLACES were adapted from the previously referenced inventories and were derived from data that emerged from a series of focus groups with environmental educators. PLACES is a compendium on constructs that were viewed by place-based and environmental educators as being most important for their practice (Zandvliet, 2012). These eight scales are listed in Table 1.

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Table 1. Sample statements from the selected scales for the PLACES questionnaire

Relevance/Integration (RI)	I want my lessons to be supported with field experiences and other field-based activities.
Critical Voice (CV)	It would be ok for me to speak up for my rights.
Student Negotiation (SN)	I want to ask other students to explain their ideas and opinions.
Group Cohesion (GC)	I want students to get along well as a group.
Student Involvement (SI)	I want to ask the instructor questions when we are learning.
Shared Control (SC)	I want to help instructors plan what I am to learn.
Open-Endedness (OE)	I want opportunities to pursue my own interests.
Environmental Interaction (EI)	I want to spend most of the time during field local trips learning about my environment.

The PLACES questionnaire also has two forms: 1) Actual and 2) Preferred. The Actual-PLACES form of the questionnaire has students reflect on their experiences in an actual learning environment, while the Preferred-PLACES has the students contemplate what their ideal, or preferred, learning environment would feel like. As an example, the ninth statement in the Preferred-PLACES that students are asked to contemplate is: '*It would be all right for me to express my opinion*'; the ninth statement in the Actual-PLACES that students are asked to reflect on is: '*It's all right for me to express my opinion*'. As you can see the statements are similar but one is in the future conditional (preferred) while the other is written in the present tense (actual). These two forms of the PLACES questionnaire have value on their own and when together. The Preferred-PLACES can be used as a diagnostic tool at the beginning of a course to understand the expectations of students. The Actual-PLACES can act as an evaluation tool at the end of their course to see if their students had enjoyed their learning environment through the course. Together, these two forms of the PLACES questionnaire can be compared with one another to see if a student's preferred learning environment was actually the learning environment they were in, or better put they can aid in the research into person-environment fit interactions. For more information on the PLACES questionnaire please refer to Zandvliet (2012).

On the first day of the course each student was asked if they would complete the Preferred-PLACES questionnaire, and on the last day of the course each student was asked if they would complete the Actual-PLACES questionnaire. To evaluate the questionnaires each statement was coded, following a Likert-type scale, from

never (1) to *always* (5), and if a student left a statement unanswered the statement was rated as equivalent to a neutral score (3). Validity and reliability data were calculated for this sample.

Further data was collected qualitatively via focus groups and followed a phenomenograhic study structure. A phenomenography, as defined by Marton and Booth (1997), aims to document how people understand, experience and assign meaning to a phenomenon. By doing so, the researcher attempts to examine the relationships between the subject (participant) and object (phenomenon), therefore recognizing each person's perspective on their experience with the phenomena (Loughland, Reid & Petocz, 2002). The argument for this was that the information gathered from the students during focus group sessions could be compared with the data gathered from the questionnaire to corroborate its findings and to deepen these descriptions of educational experience. To interview a sample that would be representative of the class, five students (approximately 20% of the class total) were asked to volunteer from each class to take part in a focus group. In order to remain random in my selection of the focus group, I took the first five students who volunteered. During interviews the researcher recorded detailed notes during the course of the discussion. The quotes from the students in this project are not the exact words but have been paraphrased while trying to remain as accurate to the students' original comments. Focus groups were conducted at the beginning of a course and again at the end. At the beginning of the course, I asked the focus group two open-ended questions:

– What were your reasons for taking this course?
– Do you have any expectations of this course?

At the end of the course, I then asked the focus group two other open-ended questions:

– Taking into consideration your expectations at the beginning of the course, did this course meet those expectations?
– Is there anything else you would like to comment on with regards to this course?

These questions were selected based on their generality and openness, therefore allowing the opportunity for any of the eight scales to be discussed in the focus group without having to be asked directly.

RESULTS

In this section we present the results from observations as a participant-researcher in the two courses, as well as the results from the administration of the PLACES questionnaire and the focus group interviews. They are presented within the context and description of each course section, studied to detail, a concise case summary of each study location.

Description of the Learning Environment

Non-Residential format EE field school. The first day of class aimed to create a comfortable group dynamic among the newly introduced class. The instructors had asked students to bring in an environmental artifact, which was to be something that belonged to them, whether it be a story or an object, that was special to them and reflected their connection to the environment. Students were then asked to present this artifact with their classmates. It should be mentioned that the room was organized in a way that everyone could see each other's face and did not place the instructors in an authoritative position. The next activity activity had the students work in groups with the objective of deciding when their class assignments were due. This example of sharing the control of the course structure took some students by surprise. The activity that followed was one that had the students working in groups again to take part in a scavenger hunt. The hunt had the groups find out information on their local environment and surroundings. Afterwards each group was asked to present what they had found on the scavenger hunt.

From this researchers' own experience, activities like these ones just mentioned do not occur in post-secondary classrooms. While it could be argued that in a large two hundred student first year undergraduate course these types of "bonding" activities are just not possible, this does not mean that the activities are not practical. While there was some discussions on environmental educational theory, the majority of the first day of class had been used as a 'get to know', creating community session as were the next few days. The course took a field trip together, learning about their local port on their way to a camp/lodge site where they stayed the night. At the camp/lodge site a number of EE learning activities took place, such as lessons from Project Wild and Project Wet. At the end of the first of the three day set weekend classes, the course had emphasized the important of community, and encouraged discussion between students and their peers. Reflective of this, a student in the focus commented:

> After the field trips and their experiences I missed the people in our class and so I looked forward to each class to reconnect …

The following 5 weeks of the course followed a similar format, an emphasis on group work and discussion whilst participating in outdoor activities visiting local Metro Vancouver parks, water reservoir, sewage plant and garbage dumps, with each setting having its own associated lesson plan. Each week was treated as a module that would focus on a specific environment, natural or human-made, that could act as a learning environment for K-12 educational programming. .It was one of these activities that had one of the students comment:

> The selection of experiences chosen by the instructors had a lasting effect. I had not expected to be as affected as I realize now at the end of the course. I plan to go back to the places we visited.

From our perspective, the settings chosen to correspond with specific activities was effectively thought out by the instructors because of the apparent effect it had on the students. Even though some of these students had previously been to the

selected outdoor settings, it was the context that they were put in by the instructors that seemed to stimulate reflective thought. It seemed to have struck a chord in some students, as this one student commented:

> Before this I was a consumer with little consideration for the environment; this class has now changed who I am, and how I view the planet. I was so affected by the experiences we had that I wish the class was longer so I could have time to absorb it all.

Reference to the portfolio exercise was an example of the open-ended nature in the course assignments. The final assignment was a journal, or alternatively a portfolio, which was to be created by the students to embody what they had learned in the course. The portfolio could take any form. When all was said and done, the students' portfolios were as unique as each student's character. The presentations of the portfolios took place at a camp/lodge at the end of the course, much the same way as the course had begun. One student commented:

> The environment created provided open learning and provided me with the freedom to learn. I realized that environmental education has the potential to help children and adults understand where they are. I realize now that environmental education is my thing.

Residential format EE field school. The Haida Gwaii-based PDP Summer Institute in Environmental Education began 14 days of intense programming with students setting up their camping tents inside a secondary school in Queen Charlotte Village, which was to be their 'home' for the duration of the course. The community building in this scenario was evident. The first day ended with a class get-together in the evening playing a name game for everyone to introduce themselves and a small discussion of the course's syllabus.

The next few days of the course incorporated similar activities and exercises to those of the Vancouver-based course. The environmental artifact and the assignment deadline activity played a similar role in helping to create a good group dynamic. Of course in this setting, because they lived together these two activities were not the only way for students to get to know one another at a personal level. For this reason it was not surprising to see that these students had scored Group Cohesion as their highest scale in the Preferred-PLACES questionnaire.This led a couple of students, when reflecting back, in the final focus group to say:

> The living accommodations at the school created a type of community with everyone in the class. I felt it was a lesson in being tolerant and understanding of other people.

> I learned a lot that I did not expect, things that I had not associated with environmental education, such as group dynamics through spending time together in our living accommodations at the school as well as on our camping trips.

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Although the students had got to know one another quite well after the first few days, they were still strangers; strangers to the very environment they were living in, Haida Gwaii. The activity that was chosen to remedy this was called 'community mapping'. This exercise had also been an activity included in the Vancouver-based course, but with this course it had a different impact on the students, and a much more powerful one on the learning environment. The community mapping activity entailed groups collecting information on the dynamics of the community. To do so the groups spent the whole day in their given community to collect information on the community whichever way they pleased. From the perspective of a participant-observer, there was a visible change in the comfort zone of the students in their new environment before and after this activity. Students returned at the end of the day with stories, information and objects from their respective communities, and were energetic to present and recount how their day went. This was mentioned by one of the students in the focus group:

> The community mapping exercise was the highlight for me of the course because I no longer felt like an outsider in the community, which made my stay in Haida Gwaii much more enjoyable and memorable.

Connecting to the people living in Haida Gwaii, especially the Haida Nation themselves, was one of the objectives set out by the instructors. When possible, the instructors referred to examples in the Haida culture or in Haida Gwaii when discussing course material. When talking about activities, every excursion that took place occurred in a place that held historic and present value to the Haida people:

> While I had taken courses on First Nations history and culture, I feel I gained a deeper understanding of the Haida people because of this course.

The relationship between students and instructors was a close one because of the amount of time that was spent with each other. That being said, being social everyday can be tiring but the instructors always appeared enthusiastic. As one student commented:

> I felt comfortable with the [instructors]. They were personable; they never lectured and always treated me as their equal.

With regards to how this translated into how the class was taught, it appeared students felt free and comfortable. There was not a feeling that you were being judged or graded on every move you made or every comment or question you asked. This openness allowed for some great discussions not only at times when the class was indoors but also when they were outdoors. Personal freedom was also evident in the group and in individual exercises that were part of the course. As an example, one group assignment was to read over an article, and then present and summarize the article's main points but no one was told how they were to present it. Students took advantage of this and came up with some memorable presentations, such as a rap song and a Shakespearean-like play. A few students commented on this flexibility in the class:

I like how the instructors did not push students and did not act as an authority figure. They were supportive and I felt like they were more colleagues than instructors, and they allowed the students to figure things out on their own.

I liked how the instructors allowed the students to explore things on their own, were knowledgeable and were always accessible.

Once again, the end project was a portfolio that could take any form. While there was some curious confusion with what exactly the portfolio could be. In the end this brought about unique and personal interpretations of what it was that they learned.. A parting comment made to me by one of the students in the focus group acknowledges this unique learning environment:

The environment created by the instructors and Haida Gwaii epitomizes what environmental education is to me. Now that I think of it, this class exceeded my expectations.

QUANTITATIVE RESULTS: THE PLACES QUESTIONNAIRE

In addition to the qualitative comments from students made in the interviews and focus groups of this study, an attempt to quantify the learning environment was made through administering the Place-based and Constructivist Environment Survey (PLACES) to both classes in this study. Our results indicated that the calculated values from the Cronbach alpha and discriminant validity from the PLACES responses in Case 1 and 2 indicated that the eight constructs in both forms of the questionnaire demonstrate acceptable within scale reliabilities but also validly measured eight distinct constructs (Table 2). For our purposes, the PLACES questionnaire does validly measure learning environments in post-secondary classrooms that use place-based and constructive pedagogies.

Table 2. Calculated values for Cronbach alpha and discriminant validity for each scale

	RI	CV	SN	GC	SI	SC	OE	EI
Cronbach Alpha	0.76	0.72	0.76	0.70	0.70	0.86	0.73	0.70
Discriminant Validity	0.14	0.21	0.38	0.23	0.38	0.29	0.24	0.30

As noted, the PLACES questionnaire allowed students to rate their perceptions of the learning environment in their courses along eight constructs deemed important for student learning in environmental education settings. Students responded on a five-point Likert scale and he results indicated that students rated

most aspects of the learning environment very positively. The highest rated aspects of the environment in both settings included factors such as Group cohesiveness, Community relevance and integration and environmental interaction. The factor 'Shared control' was rated as lowest in importance for both course locations.

Mean scale responses from Case 1 (Figure 1) and Case 2 (Figure 2) from the Preferred- and Actual-PLACES questionnaires also indicated that there was little or no large differences between preferred and actual learning environments in both settings. The actual learning environment that the two instructors created in Case 1 and 2 (using place-based and constructive pedagogies) met or closely paralelled students' expectations of their preferred learning environment on many of the constructs measured.
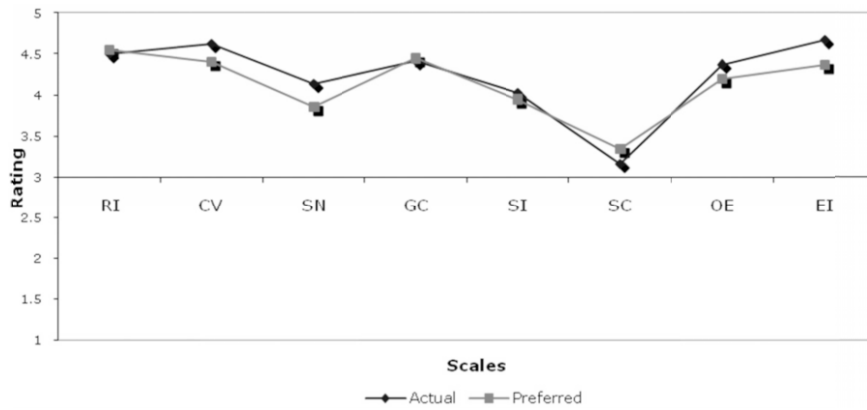

Figure 1. Learning environment comparisons from Case 1 Preferred- and Actual-PLACES questionnaires
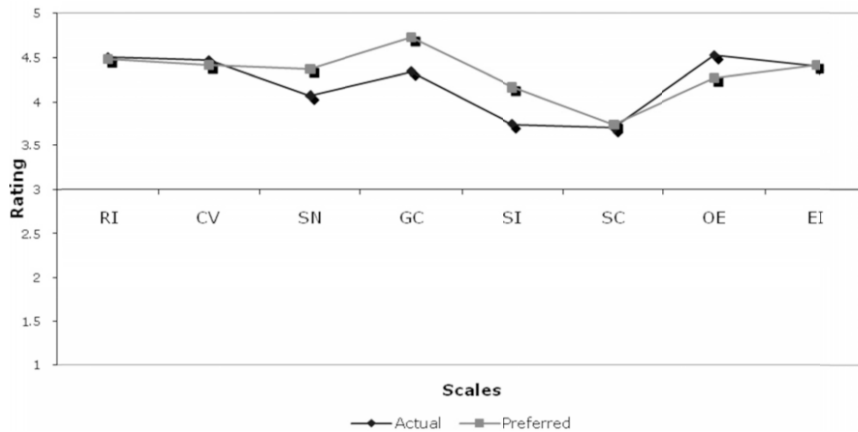

Figure 2. Learning environment comparisons from Case 2 Preferred- and Actual- PLACES questionnaires

DISCUSSION

Measuring and Comparing Learning Environments

One questions asked in this research was 'can aspects of the learning environment in post-secondary classrooms, using place-based and constructive pedagogies, be validly measured quantitatively?'. After reviewing the data collected by the PLACES questionnaire and triangulating it with the information collected from the focus groups and participant-researcher observations we believe that the PLACES questionnaire can validly measure learning environments in post-secondary classrooms that use place-based and constructive pedagogies. Besides the congruence between the responses from the questionnaires, their corresponding focus groups and participant researcher observations, there are also similarities between the responses to the Preferred-PLACES questionnaire in each course.

While this questionnaire was not created to compare learning environments between different courses, results from the Preferred-PLACES yielded some interesting similarities. The most interesting is that both courses rated Shared Control as the lowest of all eight scales. Further, the scales Critical Voice, Group Cohesion and Environmental Interaction were highly rated in both courses. Figures 1 and 2; they all seem to share the same 'peaks' and 'valleys' in their data sets. These similarities and the corresponding student commentary indicated to us that this questionnaire has assisted us in validating and evaluating these eight constructs of a learning environment in environmental education settings.

While the total sample size was comparatively small to statistically compare preferred and actual scores, the sample size was suitable to test for reliability and validity of the constructs in each form of the questionnaire. The calculated values from the Cronbach alpha and discriminant validity indicated that not only did the eight constructs in both forms of the questionnaire demonstrate acceptable within scale reliabilities but also validly measured eight distinct constructs. With the strength of having statistical reliability and validity, and the commonalities between questionnaire, focus groups and observation, as well as the similarities between courses in their Preferred-PLACES results we are quite confident that the PLACES questionnaire does validly measure learning environments in post-secondary classrooms that use place-based and constructive pedagogies.

A second research question asked 'what differences exist between actual and preferred learning environments in post-secondary classrooms using place-based and constructive pedagogies?'. Current trends in learning environment research has noted that preferred and actual learning environments had a much closer fit in interdisciplinary, outdoor-based learning environments than single discipled, classroom-based learning environments (Zandvliet, 2012). Having this in mind, it was believed that the results from these two outdoor-based courses would agree with this trend.

If we first examine the Vancouver-based course, the mean scale responses from the Preferred- and Actual-PLACES questionnaire were quite similar. Of the eight scales, only three of the scales (relevance/integration, Group Cohesion, and shared control) had lower scores on the Actual-PLACES questionnaire than those from the

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Preferred-PLACES, and their differences were only slight. The remaining five scales (Relevance/Integration, Critical Voice, Student Negotiation, Group Cohesion, Student Involvement, Shared Control, Open-Endedness, and Environmental Interaction) had higher mean scores in the actual questionnaire than that of the preferred. After looking over the results, it would appear there is little difference between the preferred and actual learning environment. The actual learning environment that the two instructors created using place-based and constructive pedagogies not only met the students' expectations of their preferred learning environment but in some aspects exceeded them.

In the results from the Preferred- and Actual-PLACES questionnaires, from the Haida Gwaii-based PDP Summer Institute in Environmental Education, five scales (Student Negotiation, Group Cohesion, Student Involvement, Shared Control, and Environmental Interaction) had lower scores in the Actual-PLACES questionnaire than those from the Preferred-PLACES, and three of the scales had higher scores (Relevance/Integration, Critical Voice, and Open-Tenderness). The range in the differences of these five scales was minimal, 0.02 (Environmental Interaction) to 0.42 (Student Involvement). To give this some scope, there is a general trend in current learning environment research showing substantially large gaps between preferred and actual learning environments in classroom-based courses (Zandvliet, 2007), much more than we see here in this field-based course. Taking this a step further, if we look at all eight scales they were on average 0.11 lower in the actual learning environment than in the preferred learning environment.

Describing Learning Environments

The third and last question posed in this research was 'how might post-secondary learning environments using place-based and constructive pedagogies be characterized or described?'. In the focus groups that took place at the end of the course, a number of the students in the Vancouver-based PDP course made comments that could be perceived as referring to 'personal growth', such as "it provided the wake up call"; "what it did was change my outlook on life"; "[it] moved me" ; and "it was an awakening" . In contrast, the students in the Haida Gwaii-based course made comments of having gone through 'pedagogical growth', even though a number of students at the beginning of the course had commented they had taken this Haida Gwaii-based course for reasons that could be construed as 'personal growth'. This is an important difference between these two courses especially since they were the similar courses in content but in different environmental settings. The Vancouver-based course visited local water reservoirs, parks and dumpsites to name but a few. These environmental settings exposed the students to the sources and discharges that are a part of their daily life. As if they had been given a new sense, a 'sense of awareness'. This is what I believe brought about the comments on personal growth in the Vancouver-based students. The environmental settings in the Haida Gwaii-based course, on the other hand, were most often wilderness settings in attempt to expose students to a foreign environment and in doing so, rather then giving rise to a sense of awareness as with

the Vancouver-based course, these students were 'awoken' to outdoor activities. These activities they could do with their own courses once they finish their PDP program. It is possibly for this reason these students made a number of comments that referred to 'pedagogical growth'.

CONCLUSION

Research on learning environments and environmental learning is still in its infancy. Thus there is a need to continue similar research to this study but on a wider scale. Reflecting on the three research questions, it appears that we can validly measure learning environments in post-secondary classrooms using place-based and constructive pedagogies with the PLACES questionnaire; further, the use of this questionnaire (coupled with interviews and focus groups) assisted us in determining the unique characterization and description of different post-secondary learning environments. Our questionnaire was demonstrated to be statistically valid and reliable tool: this may provide opportunities for future research using the PLACES questionnaire in similar place-based classroom environments.

With regards to environmental learning, comments made by students in the focus groups indicate that they are serious about environmental education in their future classrooms. Unfortunately there is a working reality for teachers whereby the pressures and expectations from top-down legislation suppresses the innovation of environmental learning in the classroom. Special attention needs to be placed on the learning environment of our students if we want to attract and retain students interest in environmental education. As our program engaged prospective teachers, the course activities also served as an opportunity to model some effective strategies that can positively impact the learning environment of students.

Therefore while students in teaching programs may show interest in environmental education, the question that whether this interest is trans-located to their classrooms once they graduate is something that needs to be asked. Further, what role does the post-secondary learning environment play in promoting this disposition towards 'environmental pedagogies'. An improved understanding of the learning environment as experienced in environmental education has the potential to help us understand the effectiveness of environmental education programs (more generally) but also the potential to understand the barriers new teachers may have in promoting environmental learning in their own classrooms.

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