

Meaningful Sustainability Learning: A Study of Sustainability Pedagogy in Two University Courses

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Educators are increasingly aware of the importance of sustainability and the need to educate for sustainable change within higher education. This article addresses the growing need to focus on how teaching and learning can be re-oriented towards sustainability, and more specifically how educators can effectively address increasingly well-known sociocultural and ecological problems in ways that transform learners and empower them to make change based on a sense of civic responsibility and sustainability. This research study draws on the Burns Model of Sustainability Pedagogy, which integrates ecological design, systemic and interdisciplinary learning, multiple perspectives, an active and engaged learning process, and attention to place-based learning. Focusing on the implementation of sustainability pedagogy within two different university courses, this study highlights the importance of sustainability learning that is thematic, introduces diverse and non-dominant perspectives, and is experiential. Pedagogical implications and practical suggestions for teaching sustainability in higher education are discussed.

Postsecondary institutions are shaping students' worldviews, attitudes, leadership skills, participation levels in the community, decision-making, and interactions with ecosystems (McKeown & Hopkins, 2002), so it makes sense that more and more colleges and universities are focusing on the goals of sustainability. As ecological and social crises accelerate, the need for sustainability education that prepares learners to understand complex issues and to participate in social and ecological regeneration is evident and paramount. At a basic level, sustainability is about stabilizing the disruptive relationships between human culture and the living world (Hawken, 2007), but sustainability also refers to a deep ethical and spiritual understanding of living within the limits of natural systems, and of our relationships to earth and one another (Capra, 2002; Macy & Brown, 1998). From a teaching and learning perspective, sustainability is perhaps best understood as an emerging paradigm that involves shifting to holistic, systemic, connective and ecological ways of thinking and learning (Sterling, 2002). This shift requires moving from teacher-centered and transmissive models of education to models that are learner-centered and transformative. Helping learners to understand their interconnectedness with all life, to become creative problem solvers, and to engage personally and intellectually in the tensions created by the interconnectedness of social, ecological, economic, and political issues are at the heart of sustainability education (Nolet, 2009). As the sustainability message gains momentum within higher education, there is a growing need to address how teaching and learning can be re-oriented towards sustainability. How can postsecondary educators effectively address troubling and increasingly well-known problems in ways that transform learners and empower them to make decisions based on a sense of civic responsibility and sustainability?

This paper draws on a research study that addresses these questions by taking a descriptive stance and an in-depth look at the implementation of sustainability pedagogy within two postsecondary courses. The following provides a theoretical outline of the pedagogical model used in this study, reviews the methodology and some key results of the study, and concludes with a discussion of implications for the implementation of transformative sustainability pedagogy in higher education settings.

Theoretical Framework: The Burns Model of Sustainability Pedagogy

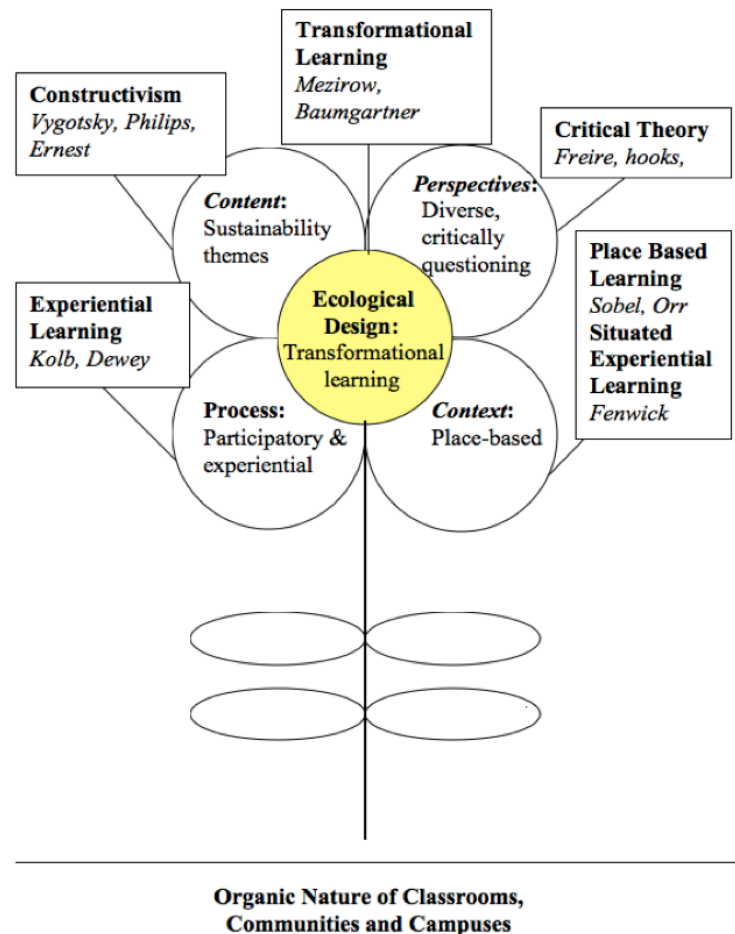
The Burns Model of Sustainability Pedagogy (Burns, 2009, 2011) was developed to address the need for a practical way to effectively teach sustainability. This model takes an integrated approach to examining complex issues by incorporating systemic and interdisciplinary learning, multiple perspectives, an active and engaged learning process, and attention to place-based learning. With a central focus on transformative learning through ecological design, the Burns model acknowledges the need to shift to more ecological ways of thinking and teaching (Sterling, 2002). This pedagogical model also recognizes that learning sustainability must emphasize the responsibility of human relationships within the biotic community (Orr, 2004). This responsibility must be rooted in learning that is practical; place-based, and problem oriented (Orr, 2004). The Burns Model of Sustainability Pedagogy shifts toward problem-based learning and collaborative group work because these pedagogies focus on learning sustainability through inquiry, experience, and reflection (Moore, 2005). In order to be able to truly understand and address the interrelated issues we face today, educational practice

must both develop and embody the practice of sustainability.

The Burns Model of Sustainability Pedagogy has five dimensions, each of which is rooted in learning theory (see Figure 1). First, this model emphasizes *Content* that is thematic, multidisciplinary, and co-created. The content dimension is rooted in systems theory (Capra, 2002; Meadows, 2008) and social constructivism (Ernest 1993; Philips, 2004; Vygotsky, 1978). Second, the design includes *Perspectives* that are diverse and critically question dominant paradigms and practices. The dimension is grounded in critical theory and critical pedagogy (Freire, 1970; hooks, 1994). Third, the model incorporates a *Process* that is participatory, experiential, and relational. This dimension relies primarily on experiential learning theory (Dewey, 1938; Kolb, 1984). Fourth, the model includes a *Context* that is place-based, with its foundation in place-based learning theory and situated experiential learning theory (Fenwick, 2001; Orr 2004; Sobel, 2004). Fifth, the Burns Model of

Sustainability Pedagogy emphasizes an ecological *Design* for the purpose of transformational learning (Baumgartner, 2001; Mezirow, 2000). The Burns Model of Sustainability Pedagogy holds multiple goals for learners. It seeks to: (a) increase learners' systemic/thematic understanding of the relationships between complex sustainability issues (*Content*); (b) provide learners with opportunities to think critically about dominant paradigms, practices and power relationships and consider complex ecological and social issues from diverse perspectives (*Perspectives*); (c) enhance learners' civic responsibility and intentions to work toward sustainability through active participation, experience, and through relationships with other learners (*Process*); (d) increase learners' understanding of and connection with the geographical place and the community in which they live (*Context*); and (e) utilize an ecological course design process that intertwines the other four dimensions to create transformational learning experiences (*Design*).

Figure 1
The Burns Model of Sustainability Pedagogy and Learning Theories



Ecological design lies at the heart of this model, which according to Hemenway (2000), includes five basic steps: (1) observation, (2) visioning, (3) planning, (4) development, and (5) implementation. These steps are not necessarily linear, however, and any steps can be revisited throughout the process of designing and implementing a postsecondary course. Ecological design focuses on mimicking patterns and relationships in nature (Holmgren, 2002) and when applied to the context of teaching, ecological principles can be valuable guides that can show us how to create social and cultural systems that are resilient and sustainable (Capra, 2002). An ecological course design process applies the lessons of key ecological principles at every design step. Some of these ecological patterns and processes include: networks, nested systems, cycles, flows, adaptation, and dynamic balance (Center for Ecoliteracy, 2012).

The following provides a description of a research study that focused on how the Burns Model of Sustainability Pedagogy could be used to design and teach sustainability in two very different university courses.

Research Questions

The purpose of this study, which was my dissertation research, was to describe and explain how students responded to the Burns Model of Sustainability Pedagogy when it was used to design and implement two university courses. I wanted to know: Is the Burns Model of Sustainability Pedagogy a viable approach for teaching sustainability? While the study examined each dimension of the Burns model, this paper looks specifically at the following subquestions which are connected to the Content and Perspectives dimensions of the model: (1) How do learners come to understand sustainability issues? and (2) How do learners think about dominant paradigms, practices and power relationships, and consider complex sustainability issues from diverse perspectives?

Methodology

This study took a descriptive stance and an in-depth look at the implementation of the Burns Model of Sustainability Pedagogy within two postsecondary courses. The two courses were chosen because they were courses that I taught. This study used mixed methods and an insider approach to data collection.

Research Sites and Course Design

The two courses that I studied were: Pollution Carries No Passport: Sustainability in the US-Mexico Border Region (the border course), a 4-credit course

offered at Portland State University, and College Writing, a 3-credit course offered at the University of Portland. Studying the Burns model within two courses provided some comparison and contrast since the courses are from different disciplines, Social Science and English, are offered at two different types of postsecondary institutions, public and private, and are courses taken at different levels of college, approximately third year and first year. Both courses were specifically redesigned for this study using an ecological design process and the dimensions of the Burns model.

The border course is an 11-week course taught once a year that explores sustainability issues in the US-Mexico border region. I taught this course with a co-instructor and for this study we re-designed the course together. The course included classroom sessions as well as a five day immersion experience that takes place in the twin towns of Nogales, Senora (Mexico) and Nogales, Arizona where multinational factories, a free trade zone and a major border crossing provide a rich setting in which to explore topics of global sustainability. This immersion trip was organized and facilitated by the nonprofit organization BorderLinks, a bi-national organization with centers in both Tucson Arizona and Nogales Mexico. During the border trip, students explored sustainability topics on both sides of the border—including food systems, alternative technology, financing, immigration, and resource management—to get first-hand information on the economic and ecological implications of sustainability within the broader context of global trade. During the trip, learners participated in homestays with working class Mexican families, and stayed at a migrant shelter, and visited an Arizona community committed to sustainable living. The assignments for this course included two reflective writing assignments related to sustainability and reading on weekly themes related to the border region such as the history of economic globalization in Mexico, US-Mexico immigration history, environmental sustainability and public health, and language, culture and gender issues. Students also completed a community based learning project in which they participated in a community activity related to immigration issues in their home community, and wrote a reflection paper about this experience. The major assignment in the course was a research paper in which students focused on one aspect of sustainability in the US-Mexico border region (of their choice) and incorporated both research and experience gained from the border trip. This course is considered a short-term study abroad course, and is a general education course that has a clear and stated focus on sustainability.

The college writing course is a 15-week course taught every semester at the University of Portland

(UP) that focuses on the development of writing skills. This course has no stated connection to learning sustainability and thus provided an example of how sustainability pedagogy can be implemented within a skills-based disciplinary course. The University of Portland is a small, private, catholic university. I redesigned the syllabus for this course around the sustainability theme “sustainable local food systems.” This course includes several major writing assignments including an expository essay, an interpretive analysis essay, a research-based argument essay, and a personal reflection final essay. All these assignments were related to the course theme. Other assignments included weekly reading, journal entries based on readings in the book *Animal Vegetable Miracle* (Kingsolver, Hopp, & Kingsolver, 2007) and two mini essays. Weekly discussion sessions led by students, guest speakers, and field trips were incorporated into this course, in order to provide contextual and experiential learning about sustainable local food systems. For example, the class visited the campus Student Led Unity Garden (SLUG) for a tour and a discussion with the president of this student group. The class also visited New Seasons Market, a local grocery store that promotes the importance of local and sustainable foods, and conducted an experiential food security activity on site. One assignment also required students to visit a local farmer’s market and write about the experience. A variety of guest speakers were invited to speak about innovative projects related to local community food systems.

Research Participants

There were 12 student participants in the border course, eight of whom were women. These participants ranged in aged from 20- to 30-years-old, and all were full time students. The majority of students were Caucasian

(10) and eight different majors were represented in the class. All students lived off campus, commuting to school and in most cases working 20 hours or more per week while in school. Most students had work and travel experience before they came to college. In the college writing course there were also 12 students, nine of whom were women. A total of nine students were in their first semester of college as at the University of Portland. The students ranged in age from 17 to 19 years of age. The majority of these students were Caucasian (eight) and most were nursing majors (eight). All but one of these students lived on campus, and only four of these students worked while in school. All but one student had come straight to college from high school. All names included in this article are pseudonyms.

Data Collection and Analysis

The data collection required a number of strategies, which varied for each dimension of the Burns Model of Sustainability Pedagogy and for each course. For each of the five dimensions of the model, I identified a benchmark definition, and several data collection strategies for each course. Data collection included student reflective writing, pre and post concept maps, assignments, pre and post surveys, focus group interviews, co-instructor interview, researcher notes, researcher journal, and lesson plans. The data collected for this study are both qualitative and quantitative. However, because of the small number of participants and the descriptive nature of this research, the qualitative data has more potential to provide the thick description necessary to deeply understand the connections between the Burns Model of Sustainability Pedagogy and student learning. Table 1 provides an overview of the primary data collection strategies used for the Content and Perspectives dimension of the study.

Table 1
Overview of Data Collection Strategies

Dimension	Benchmark definition	Border course data collection strategy	College Writing data collection strategy
Content	Learners will create a new understanding of sustainability that reflects multiple, interrelated dimensions	<ol style="list-style-type: none"> 1. Pre and post reflective writing. Reflective writing on the comparison of pre and post 2. Post-course focus group 3. Pre and post student self-reported knowledge survey 	<ol style="list-style-type: none"> 1. Pre and post brainstorm list and concept map. Reflective writing on the comparison of pre and post 2. Post-course focus group 3. Pre and post student self-reported knowledge survey
Perspectives	Learners will have the opportunity to critique the underlying causes of complex problems based on comparing and contrasting diverse perspectives	<ol style="list-style-type: none"> 1. Reflective writing assignment 2. Post course survey on teaching and learning techniques 	<ol style="list-style-type: none"> 1. Reflective writing assignment 2. Post course survey on teaching and learning techniques

I collected and coded data on an ongoing basis, using the constant comparative method of analysis in order to continually review existing data and compare and categorize new data based on the coding of that data (Glaser & Strauss, 1967). As categories and theories emerged from the data in which they were grounded, I wrote researcher memos about this process to capture analytic thinking and insight (Maxwell, 2005).

Results

Content Dimension: How Do Learners Come to Understand Sustainability Issues?

Through this study it became clear that students created a new understanding of sustainability that reflected multiple yet interrelated dimensions. Specifically, learners came to understand sustainability holistically and more concretely (border course) and multi-dimensionally (college writing).

Understanding sustainability holistically and concretely. In the border course students reported that their understanding of sustainability changed as a result of this course and they began to understand sustainability differently than they had before, with new dimensions. Students came to understand sustainability more holistically and concretely, primarily through their experience in the border region and the examples they encountered of people and organizations that are working for sustainability. In the end of course reflection assignment Alexis wrote, “My understanding of sustainability changed to include more diverse, human centered systems like business, living situations, and food. I also gained many more concrete examples of what sustainability can actually look like.” On the same assignment Jessica wrote, “Sustainability is such a bumper sticker slogan; it was difficult at first to think of it in a concrete and perceivable way. Now, I understand sustainability as more solid and understandable.”

In their reflection assignments, almost all students noted specific examples of people they had met or experiences they had had at the border in describing their understanding of sustainability, showing the importance of this experiential learning approach to their overall understanding of sustainability. Emily wrote,

I feel that in absorbing the information, beliefs, perspectives and stories of people we met in the border region, I view sustainability as the conscience maintenance of the web of life, human and environmental, for today and for the sake of the future.

During the focus group interview, students noted that their concepts of sustainability changed from being more focused on environmental aspects such as

recycling or organic farming, to encompassing a larger systemic view of sustainability.

On the last day of class students did a reflective writing exercise, comparing their pre and post reflective writing about sustainable communities. Several students expressed that what changed for them was not so much their understanding of sustainability, but that they “believe in it more” or that “the words have more meaning.” This was likely due to their trip to the border region, in which they experienced first hand real people and organizations who were addressing sustainability challenges in their day to day lives.

In my co-instructor interview, she also expressed her opinion that the meaning of sustainability had changed for students in this course. Jennifer noted,

I think that by the end of the course they really got it, that sustainability is much more than environmental sustainability and were able to see that it has to do with culture and social networks, economic issues, political issues. So they saw from a much broader perspective no doubt about that. And they saw how those pieces are linked. So rather than just isolating one aspect of sustainability, by the end of the term they could see that sustainability is much more complex and that those areas are related (interview 4-11-09).

Students grappled with how to make sense of learning sustainability through complicated issues such as poverty and immigration policy. However, by the end of the course, the complex and sometimes confusing experiential and thematic learning process contributed to a more holistic and concrete understanding of sustainability content. In the post reflective writing, David wrote,

I have a more clear understanding of how the themes of sustainability are actually interconnected with each other, my life, as well as the lives of those living in the border regions . . . the issues of sustainability are textured and complex.

Paradoxically, students came to understand sustainability as more complicated than they had imagined and this created a more concrete understanding in and belief in sustainability. Experiential learning was key to this new understanding of sustainability.

Understanding sustainability as multidimensional.

In the College Writing course, students also came to understand sustainability as more multidimensional and interrelated than they had previously thought and in relationship to the course theme, local community food systems. In the personal reflection essay Emilia wrote, “I not only learned about academic writing, . . . I also

learned about a very important topic, sustainability. Sustainability is interlinked with every problem.” Katrina wrote, “I learned that sustainable food systems are also about being supportive of the economy, environment, social and nutritional well-being of others with concern and moral values toward the earth, workers, and food.” In the focus group interview, I asked students how their concepts of sustainability had changed over 16 weeks. Jill commented,

Now I realize it seeps into everything . . . it is part of all aspects of society, even though the parts that are presented by the media mostly have to do with food and energy. It’s a bigger concept than I thought it was.

In addition, comparisons of the pre and post student knowledge survey show an increased understanding of sustainability topics in every area, especially in the areas of food miles, community food security and sustainable local food systems. This data is represented in Table 2.

Students expressed that they arrived at this increased and multidimensional understanding of sustainability through the guest speakers they met, the field trips they participated in, the farmers’ markets they visited, the local organizations they researched and wrote about, and the text that we read, all of which were related to our course theme. Learning sustainability content thematically in this skills-based course provided a new understanding of sustainability as multidimensional. Experiential learning and learning from a variety of perspectives was essential to this new interpretation of sustainability.

Perspectives Dimension: How Do Learners Think About Dominant Paradigms, Practices and Power Relationships and Consider Complex Sustainability Issues from Diverse Perspectives?

What emerged from the data in the border course was the importance of being exposed to a variety of perspectives at the border and from each other and in particular, hopeful perspectives. In the college writing course, learning from community perspectives was a key way that students came to understand complex sustainability issues and considered alternatives to dominant norms.

Learning sustainability from perspectives at the border and each other. Learning from a variety of perspectives in the border region helped students understand issues of power and privilege and critique dominant paradigms and practices. Based on her experience at the border, Isabel wrote in her end of course reflection assignment about how various visits, such as a visit with a sustainable rancher, and a visit to

a sustainable community shattered her stereotypical viewpoint of sustainability, and it became “more inclusive of other ideas and perspectives.” Emily wrote about how her experience in the border changed her perception of justice. She notes,

I feel that I will not be able to live my life with suspended emotion and apathy toward people and places which support my way of life. . . . I view myself as connected to the people of the border region, aware of their plight and striving to find ways . . . to work for justice and equity.

In addition to learning from the perspectives of those in the border region, students also leaned a great deal from the perspectives of one another. Group activities in class and group reflections at the border region were important in that students listened to one another, and gained new perspectives from each other. Having a chance to reflect on a variety of perspectives in a trusting group setting was very important. In her course reflection, Emily wrote about the group reflection process saying,

I can honestly say that I have never known the power of group reflection until this trip . . . talking in a circle, listening to one another and sharing our frustrations, observations, emotions and things we found hopeful and inspiring was a tremendous help for me. The reflections offered insight, individual perspective and support.

As evidenced in Table 3, students reported that they learned almost as much from each other and large group discussions, as they did from the overall trip to the border. Creating opportunities for relationship building with one another was clearly central to this pedagogical dimension, and provided a safe space for students to consider dominant practices, paradigms, and power relationships.

Gaining hopeful perspectives. Students also noted that being exposed to various perspectives helped them to feel hopeful and inspired to make change. In her end of course reflection assignment, Emily wrote that she was

inspired by Suzanna and Nick’s garden project at BorderLinks, and Michelle and Amanda’s work at the [Tucson] food bank to grow vegetables . . . our visit to Just Coffee has sparked my awareness about fair trade and our conversation with Duncan concerning sustainable ranching practices was enlightening.

In my research journal I wrote about our visit to the sustainable community Cascabel:

Table 2
Comparisons: Pre and Post Student Self-reported Knowledge Survey, College Writing

Topics	Pre course score	Post course score	Score increase
	<i>M</i>	<i>M</i>	
Sustainability	2.25	3.91	1.66
Local Sustainable Food Systems	1.75	4	2.25
Global Food Systems	1.83	3.91	2.08
Local Economies	2.25	3.35	1.1
Food miles	1.16	3.75	2.59
Community Food Security	1.25	3.75	2.5
The Writing Process	3.33	4.08	.75
Writing about Complex Issues	2.83	3.91	1.08

Note. Survey scale: 5 = a lot, 4 = adequate amount, 3 = some, 2 = a little, 1 = none. *n* = 12

Table 3
*How Much was Learned from the Following Teaching and Learning Techniques:
 Post Course Survey Results, Border Course*

Teaching/learning technique	Class score <i>M</i>	<i>SD</i>
Border Trip	5	--
Classmates	4.8	.3892
Large Group Class Discussions	4.5	.5222
Participatory Class Activities	4.37	.7723
Graded Assignments	4.08	.5149
Small Group Class Discussion	4	.6030
Reflective Writing	3.91	.5149

Note. Survey scale: 5 = a lot, 4 = adequate amount, 3 = some, 2 = a little, 1 = none. *n* = 12

The visit was so good, a sense of hope was instilled, a sense that it can be different . . . harvesting from the community garden, cooking and eating together, hearing how community members seek to live in a way that is right for them, all this inspires others in the process of learning.

Students left the border trip having been exposed to confusing and overwhelming issues, and yet the feeling within the group was one of hopefulness and desire to be a positive force for change. Learning to consider complex sustainability issues from diverse perspectives at the border and within their own group was a way for learners to begin to examine unsustainable dominant structures of power and privilege, and to consider alternatives. From this experiential and participatory approach, students also found hope.

Learning from community perspectives. For students in the college writing course, learning from a variety of perspectives, especially in the local community, was very important to their learning. Students noted again and again that the guest speakers, field trips and class discussions were key to their learning, especially as it related to gaining new information about the sustainability theme. In the focus

group interview Jill noted, "I think speakers and class discussions were most beneficial, because we got to see from the outside perspective what actual people in our community are doing." In the post course reflective writing assignment Isabel wrote,

As a result of the speakers, visits and the reading I now know the huge attempts that people in Portland and here at UP are making to further develop a sustainable food system. I know where to find different farmers markets and I have visited some of them myself.

Similarly, Miley wrote, "Thanks to the guest speakers I learned that UP has a local sustainable garden and that most of the food they serve is local." Katrina wrote, "Learning about the Oregon Food Bank and City Garden Farms was interesting, . . . [it was] cool to see what organizations do to contribute to local sustainable food systems."

Hearing the stories and perspectives of local people and organizations really stood out for these students, and made learning more interesting and meaningful. As shown in Table 4, students reported these experiences and perspectives to be the most influential in their learning.

Table 4
How Much was Learned About the course Theme, Sustainable Local Food Systems, from the Following Teaching and Learning Techniques: Post Course Survey Results, College Writing

Teaching/learning technique	Class score <i>M</i>	<i>SD</i>
Guest Speakers	4.41	.6685
Class Discussions	4.25	.6215
Field Trips	4.08	.7929
Assignments	4.08	.9003
Journal Writing	3.83	.8348
Participatory Class Activities	3.75	.7537

Note. Survey scale: 5 = a lot, 4 = adequate amount, 3 = some, 2 = a little, 1 = none. $n = 12$

Having access to a variety of perspectives gave students a chance to explore a relatively new topic in a number of different ways, and students appreciated this opportunity. Kylie wrote, “the class did not seem to force any specific views, but instead would present a problem or aspect of sustainable local food systems then a multitude of solutions or organizations that focus on that aspect of discussion.”

Learning to consider a complex sustainability issue from diverse perspectives was a way for learners to begin to examine unsustainable norms and hidden power structures within our dominant food system, and to consider alternatives. Learning from the community in experiential and participatory ways was also engaging and meaningful to learners.

Discussion: Pedagogical Implications

In many ways, the results of this study highlight the transformational aspects of the Burns Model of Sustainability Pedagogy. But additionally, learners were impacted by their roles as co-participants in this research project. Their ongoing participation in the research and its explicit focus on teaching and learning gave learners the opportunity to really reflect, not just on what they were learning, but on how they were learning and why. Their insights, reactions, suggestions and willingness to engage and reflect, was imperative as I sought to make sense of the Burns Model of Sustainability Pedagogy in practice. The following pedagogical implications and suggestions emerged from the data results, but it is also important to note that these were the research participants’ lived and shared experiences.

Importance of Encouragement and Time for Reflection.

This research indicates that using a sustainability theme (i.e., Local food systems, or transnational borders) can work well to teach sustainability *content* systemically so that learning goes beyond the traditional three-legged stool of sustainability

(economics, environment, and society) to encompass more complex systems and to capture the ideas of interrelationships between these systems. By learning deeply about one theme, students start to see the relationships between culture, local ecology, their own families, the money they spend, structures of power, policy formation, economic paradigms, and psychology, to name a few aspects of complex sustainability issues. This shift in perception or paradigm is one aspect of the transformational nature of sustainability pedagogy.

Still, learning thematically was not always an easy or straightforward process for learners. Many times, students expressed frustration or confusion at the complexity of learning sustainability thematically. The importance of opportunities for reflection and encouragement emerged as important themes from this research. Learners needed rest stops along the way in which they could gather what they knew, spread it out, and to see what Sterling (2002) calls the “connections and patterns” (p. 16). Opportunities for reflection about what is being learned is perhaps best done within the learning community, so that students can learn from one another and develop a shared understanding of what sustainability means. Having opportunities for reflection is necessary for learners to be able to construct a new understanding of sustainability that is holistic, multidisciplinary, and transformative. This may be accomplished through reflective writing, journaling, and semi-structured group reflection sessions. This study also points to the need for instructors to give learners plenty of encouragement that they can and will learn sustainability content from a thematic focus. A positive and encouraging learning environment, along with assurance that they can succeed can go a long way in assuaging the fears that may accompany learning in a new way or about a new topic.

Importance of Multiple Perspectives

In addition to learning sustainability *content* systemically, learning from a variety of *perspectives*

proved to deepen students' understanding of sustainability and is another important element of transformational learning. While learning from a variety of perspectives and questioning dominant paradigms and power structures is not unique to the Burns model, it is often left out of sustainability learning. Without having the opportunity to hear from a variety of perspectives, including marginalized ones, learners may not be able to fully understand the implications of sustainability issues and decisions. Without questioning dominant paradigms and power structures, systemic ecological and social injustices may be left out of the dialogue about sustainable solutions. In particular, this research shows the importance of incorporating a variety of community perspectives, creating opportunities for students to learn from one another, and providing learners with opportunities to think and reflect critically. Incorporating hopeful perspectives were incredibly important as they gave students a sense of possibility and vision, while learning about challenging sustainability problems. Being exposed to social and ecological degradation can often be demoralizing to students (Kaza, 1999), and providing some examples of positive change or sustainable solutions can be extremely motivating. Incorporating hopeful perspectives also gives learners examples of what they could accomplish in their own lives and communities. This step from learning *about* something to being inspired to *do* something is a key element of sustainability learning that is transformational.

Importance of Participation and Relationship Building

The participatory and experiential process of these sustainability courses created perhaps the most impact on student learning. This may be because a participatory or experiential course is so different from the norm in college teaching and learning. It is known that active pedagogies promote greater abilities to connect abstract concepts to practical applications (Ebert-May & Brewer, 1997; Springer, 1997) as well as knowledge retention and retrieval (Yazedjian & Kolkhorst, 2007), and greater levels of social development, engagement, and general knowledge (Umbach & Wawrzynski, 2005). All of these qualities are important to sustainability learning. However, student participants in this research repeatedly talked about not having had opportunities in other courses to form relationships with their classmates, or to participate in active learning.

This study also points to the importance of relationship building in learning sustainability. Especially in the border course, relationship building created an atmosphere of trust that was essential for

considering diverse perspectives and for personal reflection about values and intentions about how to live in the future. Relationship building goes beyond providing opportunities for social interaction to providing opportunities to get to know one another personally, to dialogue with each other about learning topics, and to form what bell hooks (1994) calls a community of learners. Within a transformational learning process, learning is dynamic, and engages the whole person (Sterling, 2004), allowing for personalities to emerge from within the academic atmosphere, and acknowledging and honoring each person's knowledge and experience. Sustainability education requires creativity and participation from learners (Sterling, 2004), and true participation requires that learners feel comfortable with and understand each other.

Conclusion

As we move into an era of increasing ecological and sociocultural demise, it is more important than ever to encourage learners to engage in these complex issues and tensions, to provide opportunities for the transformation of unsustainable values and belief systems, to foster an understanding of interconnectedness, and to support learners in becoming creative problem solvers and change agents. While this study was limited in scope, it highlights the need to for increased discussion and research in effectively teaching sustainability within higher education. How can postsecondary educators effectively address troubling and increasingly well-known problems in ways that transform learners and empower them to make decisions based on a sense of civic responsibility and sustainability? In my own teaching practice, this research study has transformed my educational design and teaching work, highlighting the importance of teaching sustainability in ways that: are thematic and multidimensional, introduce diverse perspectives and alternatives to dominant practices, and are experiential and relational. Motivated by amazing students who are eager to learn how to make change in the world, my own research and pedagogical discovery in this area is ongoing.

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