

Teaching Sustainability: Recommendations for Best Pedagogical Practices

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Abstract:

Although sustainability has become a key focus in higher education, developing a better understanding of *how* sustainability competencies can be cultivated in college and university courses and programs is still needed. This article argues that learners who are to become capable of affecting holistic sustainable change, transforming values and culture, healing the earth and human communities, and designing creative solutions, must have the opportunity to engage in learning processes that reflect these learning outcomes. We outline key elements of sustainability pedagogy and suggest best pedagogical practices for designing engaging and holistic sustainability learning, and highlight these practices through a sustainability course offered at our institution.

Keywords: Transformative learning, pedagogy, ecological design

Introduction

Sustainability has become a major focus in higher education and refers to “changing our ways of being and working collaboratively to create regenerative, interconnected, just, and thriving systems and communities” (Burns, 2016a, p. 250). The emphasis on integrating this field of study into both academic curriculum and co-curricular activities continues to grow as both

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students and institutions recognize that sustainability issues must be considered as part of a full educational experience (Bettencourt & Kaur, 2011; Devereaux, 2013). Sustainability educators in higher education generally agree that the purpose of teaching sustainability is to foster change agents who are capable of addressing complex sustainability challenges (Jones, Selby, & Sterling, 2010; Nolet, 2009; Orr, 2004; UNESCO, 2014). In order to achieve this goal, learners need to be able to: Think systemically, creatively, and critically; recognize interconnections; consider various perspectives including those that are non-dominant; shift mental models; work effectively with others and collaborate on real projects; resolve conflict and controversy; build and sustain meaningful relationships with the communities and ecosystems where they live; and develop as whole individuals with an understanding of their identities as physical, emotional, spiritual, cultural, and intellectual beings (Burns, 2011, 2015).

Despite higher education's growing focus on sustainability, there is far less agreement, understanding, and research about *how* sustainability competencies can be cultivated in college and university courses and programs. The Association for the Advancement of Sustainability in Higher Education (AASHE) encourages its member institutions to create their own methodologies for course identification with support from its comprehensive Sustainability Tracking and Rating System (STARS). AASHE also provides opportunities for institutional representatives to share their processes for identifying courses and teaching sustainability with colleagues via publications, webinars, conferences, and other professional development activities (AASHE, 2016). However, most sustainability course identification focuses on content alone. There is currently a lack of widely used methodologies that include pedagogical processes as criteria for identifying sustainability courses and programs, or for determining their rigor. Co-curricular programming tends to be more experiential in theory and practice, yet sustainability co-curriculum is still an emerging field with nascent clarity about best practices and guiding theories (Spalding, Williams, & Wise, 2014).

If learners are to become capable of affecting holistic sustainable change, transforming values and culture, healing the earth and human communities, and designing creative solutions, then the educational processes in which they engage—the pedagogy—should reflect these learning themes. Transformative learning theory and ecological design principles offer promising opportunities to create meaningful learning experiences that can develop the personal, intellectual, and socio-cultural skills necessary to create resilient and regenerative systems. This article highlights one model of sustainability pedagogy that is centered on transformative learning and ecological design and offers specific recommendations for best pedagogical practices in designing and teaching sustainability in higher education.

Sustainability Pedagogy

The Burns Model of Sustainability Pedagogy provides a practical and adaptable model for teaching sustainability in a variety of contexts that include academic courses, co-curricular and student leadership programs, and non-formal education. The model recognizes that ecological systems themselves are our best teachers in designing sustainable and regenerative educational systems (Burns, 2009, 2011; Capra, 2002; Holmgren, 2004). This model incorporates best practices and theories for effectively teaching sustainability, especially in higher education settings. The central goal of the Burns model is to provide opportunities for transformative learning in which learners are motivated and inspired to shift their values, and make sustainable and authentic changes in their own lives as well as within their communities and places. The Burns model has five key dimensions: (1) *Content*; (2) *Perspectives*; (3) *Process*; (4) *Context*; and (5) *Design* (see figure 1).

Sustainability pedagogy has the potential to be transformative and meaningful when learning is designed in a way that: is thematic, focuses on interconnected systems, and co-creates *content*; critically questions dominant norms and incorporates diverse *perspectives*; utilizes active, participatory, experiential, and relational *processes*; and is grounded in a specific *context*—real ecosystems and communities where learners live, learn, and contribute (Burns, 2009). The intentional and purposeful weaving of these dimensions together into a course or program, in a way that mimics ecological systems, constitutes ecological *design*. This design process creates opportunities for transformative learning: Learning that has the potential to transform learners' attitudes and values, ultimately transforming unsustainable values and cultures to communities that cultivate sustainable systems (Burns, 2015).

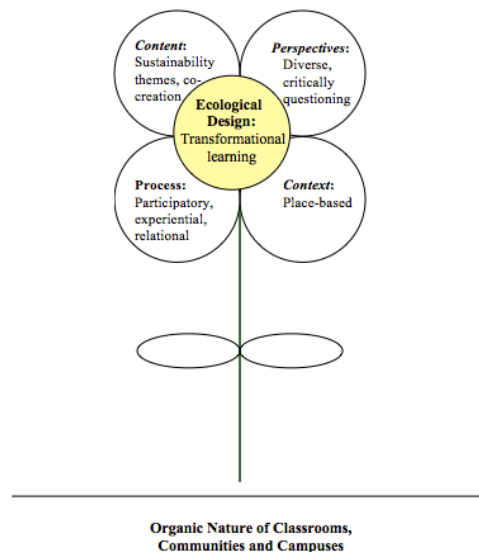


Figure 1. The Burns Model of Sustainability Pedagogy; Source: Burns (2009).

Rooted in the need for regenerative change in our world, transformative learning processes have the potential to create deep personal shifts to more healthy ways of living and relating that honor our interconnectedness with all life. Transformative learning is relational, affective, extrarational, and/or experiential (Cranton, 2006), and is best facilitated by engaging multiple dimensions including affective, spiritual, imaginative, somatic, sociocultural, or rational (Tolliver & Tisdell, 2006). Sustainability pedagogy designs for “integral transformative learning” which, according to O’Sullivan (2002) is a deep cultural shift that

...involves our understanding of ourselves and our self-location; our relationships with other humans and the natural world; our understanding of the relations of power in interlocking structures of class, race and gender; our body awareness, our visions of alternative approaches to living; and our sense of the possibilities for social justice, and peace, and personal joy. (p. xvii)

Thus, the purpose of sustainability pedagogy is to create meaningful, integral, transformative learning through intentional design that weaves together multiple dimensions. As we describe these dimensions throughout this paper, we have highlighted activities from a course entitled Advanced Global Political Ecology (GPE) in the Leadership for Sustainability (LSE) Education program at Portland State University to provide case-in-point examples of sustainability pedagogy in practice. GPE is an 11-week course that explores and interrogates the historical, political, economic, and ecological impacts of globalization, particularly the Global North’s domination and exploitation of the Global South. This sustainability course often stirs up many emotions and tensions, and focuses on the relationships between individuals, communities, and global systems; therefore, it is vitally important to support learners holistically. Thus, GPE serves as a practical example of how the Burns Model of Sustainability Pedagogy can be applied in sustainability courses and programs.

Ecological Course and Program Design

The ecological design process involves creating and framing learning experiences that focus on cultivating “a change of heart and a new set of eyes, a new way of viewing and valuing the world in which we are embedded and on which we depend” (Benyus, 2005, para 44). Many sustainability problems stem from design failures of inequitable, industrial societies. In contrast, ecological design contextualizes “human purposes with the larger patterns and flows of the natural world and the study of those patterns and flows to inform human purposes” (Orr, 2011, p. 165). When designing educational experiences, these patterns and flows of the natural world can inform learning processes, practices, and content.

Ecological design includes five basic, iterative steps: (1) *observe*; (2) *envision*; (3) *shape*; (4) *pattern*; and (5) *engage-observe*. These steps are non-linear and typically revisited, though not necessarily in order, throughout the design process. The design is ecological because it is grounded in principles of living systems that include diversity, resiliency, relationships, interconnectedness, creativity, patterns, and feedback loops (Holmgren, 2004). These and other ecological principles can be intentionally woven into the design and implementation of a learning experience in order to cultivate a social learning system that is based on ecological principles and practices.

Starting with observation and visioning, before immediately jumping into shaping and patterning, is one way that ecological design process is unique. Planning courses without first observing and envisioning may lead to design challenges and flaws as a result of assuming what students need and how they will learn most effectively.

Observation can begin with considering: Who the learners are and what they hope to learn; what interdisciplinary and thematic learning can be applied; what campus and community resources can be integrated; and what constraints might apply during the learning experience (e.g. time, perspectives, and familiarity with course topics). *Envisioning* what kind of learning may happen, how it may feel, what kinds of relationships and projects will be nurtured, and how these may have an impact on lives and communities, will allow for more intentional and meaningful planning toward course learning outcomes. Once these initial steps have been attended to, designers can begin to *shape* general decisions about learning activities that may be included to support a dynamic interdisciplinary understanding of the topic, critical perspectives, relationship building, and connection to place. The design can then move on to *patterning* in order to create a lesson plan that honors the patterns most conducive to sustainability learning. For example, designers might consider: What are the patterns of participation and relationship building? What are the patterns of contemplation and co-creation? What are the patterns of opening and closure? In the *engage-observe* phase of ecological design, the design is implemented, and the instructor(s) can again focus on the observation cycle.

Ecological design was integrated throughout the design of the GPE course. For example, before shaping specific learning objectives or assignments, we spent time envisioning the learning environment we sought to create. We wanted to create a space that would nurture the emotional well-being of students as we explored difficult topics related to globalization such as the exploitation of people and ecological systems. We also wanted to design learning experiences that would not only allow students to deepen their conceptual understanding of complex topics, but also feel empowered as change agents. Finally, we wanted to uncover the diverse knowledge, experiences, and perspectives that students would bring to class, and utilize those as assets in the

learning community. With a vision for the course and awareness of the community context, we then began the shaping and patterning phases of the ecological design process, to weave in the other dimensions of sustainability pedagogy including content, perspectives, process, and context. The following section offers further examples for pedagogical design and implementation, using the elements of the five key dimensions of the Burns Model of Sustainability Pedagogy as a framework.

Ecological Course Design: The Burns Model of Sustainability Pedagogy

Designing for Content

Sustainability content is inherently interdisciplinary and should help learners understand and appreciate their interconnectedness with all life systems while engaging personally and intellectually in the tensions created by the mutually inclusive relationships between personal, social, economic, political, and ecological issues (Brofenbrenner, 1979; Nolet, 2009). In doing so, learners try to understand relationships *between* aspects of a sustainability issue, and even as they do so, acknowledge that they cannot know all the relationships in a system or all the effects of their actions and decisions. Thematic understanding is rooted in Systems Theory (Capra, 2002; Meadows, 2008) and can bring together economic, cultural, historical, relational, ecological, and spatial aspects of a sustainability issue. Thus, the study of interrelationships becomes an intellectually challenging way to explore and learn sustainability content. Rather than disparately studying issues as separate and discreet, focusing on the study of interconnections between topics such as food systems, livable cities, watersheds, globalization, and immigration, among others, can provide opportunities for students to deeply understand and map the interdependence of these diverse topics.

Innovative pedagogical methods that cultivate interdisciplinary understanding of content include building class activities around articulated weekly themes (Filho, 2002), identifying connections between sustainability issues discussed in class and current events, and incorporating participatory experiences that allow students to take action on issues studied in the course or program. Students might write and submit an article on a sustainability topic to student media outlets, collaboratively host an event that addresses course topics, participate in service related to course themes, or collaborate on a research project. The instructor might design learning experiences in which students co-create their own meaning about content together or reflect on topics and readings from different disciplinary lenses.

Creating an interactive, dynamic relationship between instructor and learners is an important aspect of sustainability pedagogy. Sustainability studies, by nature, embrace complexity. If each learner can bring their own experience and thinking to the whole group, a more nuanced and

holistic understanding of themes can be created. Rather than relying on the professor's singular perspective of sustainability content, a focus on co-creation of knowledge allows the group to learn from diverse perspectives and, in the process, more fully engage as individuals. This approach is rooted in Social Constructivism (Ernest, 1993; Philips, 2004; Vygotsky, 1978) and emphasizes the importance of community and context to learning. Transformative learning is not about simply mastering and memorizing a subject; rather, it is a shared experience of meaning making, in which learners come to understand a topic more deeply within the context of a learning community. Therefore, designing sustainability content requires careful preparation of thematic and co-created opportunities for sustainability learning.

In GPE, we carefully designed course content around weekly themes that unfolded to expand background knowledge and understanding and led to experiences that empowered students as change agents. For example, during the first week, students reviewed a list of concepts and topics related to global political ecology, and then discussed their initial understandings and experiences in small groups. Each group generated a concept map that reflected their current ideas about how these interconnected topics related to global political ecology. Each year, the course is comprised of students with a range of background knowledge and experiences. Uncovering the experiences that shape each student's perspectives and treating them as assets is a critical first step in relationship-building. The concept mapping helps build a learning community that fosters co-creation of knowledge and understanding. This activity sets the stage for students to see themselves as equal collaborators in the knowledge-building process.

Designing for Perspectives

In addition to co-creating meaning, learners should also be introduced to a variety of perspectives on any sustainability theme. In particular, perspectives that are non-dominant or that challenge the dominant cultural or economic perspectives are important and transformative. Indigenous perspectives, hopeful perspectives, non-human perspectives, and perspectives that highlight power and privilege are becoming increasingly central within sustainability education. Indigenous perspectives offer ecological worldviews that are rooted in interconnectedness, relationships, and an understanding of the whole self (Armstrong, 2008). Hopeful perspectives help students feel empowered and engaged in designing creative solutions to sustainability issues, rather than disempowered and discouraged (Burns, 2013; Kaza, 1999). Non-human perspectives help students connect with the natural world and cultivate respect for life (Barnhardt & Kawagley, 2005). Helping learners understand systems of oppression and inequity that exist, and how these systems influence sustainability issues, is another important aspect of sustainability learning. Rooted in critical theory and critical pedagogy (Freire, 1970; hooks, 1994), the perspectives dimension of the Burns model highlights the importance of recognizing and unpacking unsustainable dominant economic and cultural systems that are rooted in power imbalances. Additionally, students' cognitive development is strengthened by considering

multiple perspectives, and comparing various lenses of an issue can support the development of post-industrial leadership skills (Komives, Longenecker, Owen, & Mainella, 2006).

As facilitators of learning experiences, instructors can introduce students to literature from non-dominant perspectives—especially voices not typically heard in academia. Learners can even be asked to compare and contrast dominant and non-dominant perspectives. For example, students might find and articulate points of synthesis and divergence between Traditional Ecological Knowledge and Western Science sustainability perspectives (Barnhardt & Kawagley, 2005). Instructors can invite learners to share their own perspectives in small and large groups, or ask them to investigate and analyze a local organization that works to build connections between social and environmental justice. They may also facilitate exercises that encourage reflection on personal power and privilege, as well as systems of oppression. Finally, an instructor might invite guest speakers that highlight diverse perspectives of sustainability and related topics. Students should also be encouraged to critically question dominant methods of teaching and learning in order to examine power dynamics and develop agency as emerging sustainability leaders (Sherman & Burns, 2015).

We have utilized many of these approaches over the years in GPE. As complements to weekly themes, we have included a broad array of readings from diverse authors to elucidate each week's topic, sometimes in provocative ways. Additionally, we have invited guest speakers, including leaders and activists from Pacific Northwest Tribal groups, affordable housing developers, and grassroots community organizers. We have also designed several course activities that require students to consider diverse perspectives. One example was a "Salmon Summit" where students explored the positions of different stakeholder groups such as representatives from the fishing and logging industries, government agencies, tribal members, and even the salmon themselves. An entire class session was devoted to students participating in a "town-hall meeting" where they discussed a proposed dam project. Through this session, students were encouraged to practice active listening, non-violent communication strategies, and strive for collaborative solutions that meet community needs. This activity helped students develop a deeper understanding of the complexity of the issue and gain empathy for diverse perspectives through the process.

Designing for Process

Besides the inclusion of sustainability content and multiple perspectives, learners must have frequent, designated opportunities to learn and work together in a shared learning process. Group activities can be connected to course themes so that learning functions are "stacked" and built upon each other (Holmgren, 2004). Shared experiences that are tied to course themes can deepen students' relationships to each other and their learning experiences. Peer-to-peer learning

experiences have been identified as an essential element to sustainability learning, especially as it relates to developing leadership skills (Burns, 2016b; Donaldson, 2009; Eich, 2008).

Interactive and relational learning processes can be incorporated into classes and programs in a variety of ways. Designating even small amounts of class time for community building and creating trust can deepen a learning experience and enhance students' abilities to work together. Instructors can start or end class with check in questions, poetry readings, music, opening circle for breathing and centering, or sharing weekly highlights that relate to the class themes. Students can co-create group norms at the beginning of a course, complete group work outside of class sessions, or be assigned to design and lead group discussions. Instructors can also encourage small group activities such as role playing, artistic representation of course content and themes, and dialogue about case studies.

Processes that engage students in problem solving are also important aspects of the Burns Model, because they challenge learners to work through conflict and controversy. Instructors can design projects that are purposefully challenging while providing a corresponding level of support so that learners practice collaboratively working through difficult issues together (Daloz Parks, 2005). Sustainability learning that is active, participatory, and relational is grounded in experiential learning theory (Dewey, 1938; Kolb, 1984), which focuses on situating learning in concrete experiences, reflecting on those experiences, and forming knowledge and constructs based on that learning.

An example from GPE that highlights the integrating nature of the process dimension is a commodity assignment. Early in the term, students brainstorm commodities (e.g. coffee, paper, cell phones) that they will learn about in-depth in small groups. Throughout the term, they explore the history of their chosen commodity, as well as its economic, social, cultural, and ecological impacts, and then envision ways that the systems connected to this commodity could be more sustainable in the future. This project culminates in a 45-minute, student-facilitated learning session for each commodity. Following the learning session, students write papers reflecting on their experiences as learners and teachers.

Designing for Context

In addition to including relational and participatory processes, transformative sustainability pedagogy must be connected to real places—ecosystems, communities, social and cultural structures, economies—or it will remain abstract and intangible for students who are developing identities in relation to their social and environmental context (Komives et al., 2006).

Sustainability learning should connect learners to their context, to the places they live and work, and should allow them to connect with the real issues and problems that exist within those dimensions of their lives. This component of sustainability pedagogy is rooted in theories of place-based learning and situated experiential learning, which posit that places and communities are primary resources for engaged learning (Fenwick, 2001; Orr, 2004; Sobel, 2004).

Cultivating relationship to place is a key element in developing the ecological awareness and identity that is necessary to create sustainable systems in a complex, interconnected world. Sustainability teaching and learning can facilitate ecological awareness and identity, which includes developing an appreciation for all life systems, an understanding of the importance of mindfulness, learning to see nature everywhere, cultivating the capacity to be struck by wonder and awe, and using senses to connect (Thomashow, 1995).

To connect students' classroom learning to context, instructors may host shared experiences such as field trips and service-learning projects that tie to course themes or assign independent reflection activities in nature. While outdoor experiences may not be possible for some classes, ecologically-inspired reflection can be encouraged through individual assignments such as sit spots—in which students find one place to visit each week and just be, observe, and consider how they themselves are changing along with natural systems and cycles. Instructors may base projects on course themes that also address community needs or ask students to visit a local organization and interview community members. These can be assigned as an ongoing community based learning assignment that connects to course themes. Within the classroom, students may be guided through activities that analyze how ecological systems sustain human systems or discuss similarities and differences between sustainability solutions in local and non-local communities.

In GPE, the educational process is interrelated with context through a term-long community-based learning experience. As part of this graduate-level class, students are required to apply their learning in a community-based setting that may include a place of employment or an interesting non-profit organization, business, or agency. Students analyze their experience at the organization through the lenses explored throughout the class—specifically the political, economic, and ecological aspects of the community-based site. Another example that also highlights the iterative cycle of ecological design is a recent adaptation we made to the commodities project discussed earlier. As students explore their commodity, they are also required to spend approximately ten hours exploring one aspect of its production, distribution, consumption, or waste management in a local or regional context. For example, a group that chose nut butters as their commodity visited a local start-up company that was employing women who were recently released from prison in the production of small-batch nut butters.

Another group exploring wheat as a commodity visited a regional organic farm and grain mill. Adding this element to the commodities assignment has deepened the learning experience, and emerged from our students' reflections about how to improve the course. Just as ecological cycles respond to feedback and adapt to change, so too should sustainability courses follow an iterative ecological design process.

Connecting Elements of Ecological Design to Cultivate Personal Growth and Transformation

Connecting each dimension of the Burns Model of Sustainability Pedagogy is an ecological design process intended to create opportunities for deep and complex transformational learning. Throughout the sustainability learning experience, learners should be given opportunities for personal reflection, which is a key element for personal growth and transformation (Burns, 2015). Paying attention to students' inner spiritual and emotional work can in turn improve academic performance, psychological well-being, leadership skills, and college satisfaction (Astin, Astin, & Lindholm, 2011). Perhaps more importantly, learning experiences that focus on inner work and personal change send a message to students that learning is not limited to a mental, rational experience (Subbiondo, 2011). This kind of self-reflection is considered the inner work of sustainability. Schley (2011) describes this inner work as including reflection and contemplation, deep awareness of one's intrinsic relatedness to all living systems, and coherence of action. Designing learning for personal development and inner work supports an exploration of values, the meaning and purpose of our lives, and our sense of connectedness to one another (Astin et al., 2011).

Instructors can design opportunities for personal transformation by cultivating open reflection as to how students' understanding of sustainability may be changing as a result of the class. Students may be asked to reflect on their connections to place and their peers, as well as their own philosophy of sustainability in relation to the class or program learning outcomes. These contemplative practices can be introduced in class through activities such as journaling, centering, deep listening, or storytelling. Students can synthesize their learning by creating a personal portfolio or creative artwork that articulates how they or their sustainability engagement have changed. Students can also experience growth through the creation of a "personal sustainability" self-care plan or experimentation with a contemplative practice. Students feel inspired to continue growing as sustainability change agents when they experience personal transformation and are exposed to examples of hopeful and positive sustainable change in the world. Students can also feel empowered if the instructor provides time for students to give feedback on class processes and activities. These opportunities for synthesis allow all learners to experience how sustainability occurs. Using their own experience of personal change, they can apply this learning to other living systems. This transformative learning process may help

students feel empowered to engage in sustainability work and systemic transformation on a larger scale.

Conclusion

Sustainability is being woven into higher education with the goal of empowering students to develop intellectual knowledge in regards to sustainability challenges and being able to act compassionately and collaboratively in response to these complex challenges. If learners are to become citizens capable of affecting holistic sustainable change and finding creative solutions, then the sustainability pedagogy in which they participate should reflect these goals. Sustainability teaching and learning thus requires engaged, creative educators who are willing to be challenged and to challenge learners to connect with issues, problems, communities, and places in creative, systems-based ways. Using an ecological design process to create opportunities for transformational learning involves integrating content, perspectives, process, and context, with attention to personal development and meaning-making. These recommendations for pedagogical best practices are grounded in theory as well as our own experiences with learning how to best teach sustainability—in relational, meaningful, and transformational ways.

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