



Sustainable Higher Education Teaching Approaches

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Abstract

The goals of public higher education are to generate knowledge and transfer knowledge and skills to students to prepare them for making the world a better place. Given current severe threats to human well-being from climate change impacts, biodiversity loss, and global trends of inequality, we will need a strong commitment to sustainability education to achieve that “better place.” This chapter focuses on several key concepts and teaching approaches that can engage students in sustainability challenges and give them some of the necessary knowledge and tools to become thoughtful leaders and followers, problem-solvers, and active citizens. It discusses how key concepts such as intrinsic and extrinsic values help students understand the role of values in human decision-making about addressing bigger-than-self sustainability challenges (e.g., global poverty). The concepts of overconsumption, social commodity chain, metabolic rift, the commons, polycentricity, and resilience allow instructors to traverse disciplines and help students recognize the complex, interdependent nature of social-environmental problems and solutions. The chapter also describes teaching approaches that help students understand how people, problems, and ecological conditions are interconnected and encourage them to move from individual to collective approaches to sustainability. These approaches include place-based experiential learning, project- or problem-based learning, case study conflict studies, collaborative learning, social learning, and community service learning. To effectively engage higher education students in sustainability, educators must provide interdisciplinary and experiential learning experiences and put students in positions where they imagine themselves using innovation, experimentation, trial-and-error social learning, and adaptive management to become future problem-solvers and change agents.

Keywords

Sustainability education · Core interdisciplinary concepts in sustainability · Pedagogical approaches to teaching sustainability

Introduction

There is a convergence of voices that call for sustainability, and a common adage they offer is “Everything is connected.” While it may seem trite, it is actually very profound – internalizing this notion of how connected we are quickly moves us beyond our individual interests to realize our interdependence. We learn how the welfare of one species, such as bees, is connected to the welfare of food production, for example, in the ways bees pollinate plants. We see how the conflicts in a country like Syria reverberate in debates and policy changes throughout the world about how countries accept and treat refugees and immigrants. A multitude of voices from sciences, humanities, arts, Indigenous peoples, spiritual movements, and religions are saying the same things – that we are all connected and that long-term thinking and planning about how we can protect interdependent social and ecological systems will sustain us all.

The big questions nations face will require a huge amount of cooperation among people and organizations who see themselves in a web of relations that are shaped by the past and relations that are highly influenced by our collective view of the future. This requires that the students in higher education engage with deep questions of where they want to see the world change for the better, and generally this means striving for sustainability. Such striving requires increasing understanding across all disciplines, in ways that are believable and personally meaningful. A student's ability to see themselves as part of a connected web of relations counteracts the Western focus on individuality and individual rights, to a worldview of responsibilities for the collective. This requires higher education students view the present as a set of consequences from decisions of a past that was heavily influenced by colonialism, industrialization, differential contributions to environmental damage and resource scarcity across regions of the world, and impacts from the exploitation of people and resources. This peopled and ecological history of the world has to be part of sustainability education for students to understand the relations of power and decisions that have led to where the world is today. By understanding the past, students can more readily recognize the significant social and political shifts that will be needed to support ecosystem health and human well-being long into the future and the central role of human agency in doing things differently.

Consistent with Escrigas (2016), we believe higher education institutions have an intergenerational responsibility to engage students with sustainability because of the power of such institutions to shape civilization. Higher education reaches and influences large numbers of current and future leaders. Worldwide, an estimated 150 million students attend approximately 20,000 higher education institutions each year (UNESCO 2014). Higher education institutions possess a unique academic freedom that enables them to generate and advance new ideas, comment on societal challenges, and experiment in sustainable living (Cortese 2003). University scholars and students can share and discuss their ideas and knowledge with society at large through their service and outreach. They also have the ability to engage in multi-decadal partnerships to identify, study, and solve sustainability issues (Hart et al. 2015). Given their ability to generate information, advance ideas, and influence large numbers of people, we agree with Escrigas (2016) that higher education institutions must go beyond just helping students develop the necessary skills to earn a livelihood. They are also responsible for helping students become critically engaged citizens who are open-minded, creative, and critical contributors to society (Escrigas 2016).

Worldwide, there is a growing acknowledgment that higher education has an important responsibility in addressing sustainability challenges. This is demonstrated by an increasing number of universities and colleges around the world that are signing higher education declarations and charters on sustainability, such as the 1990 Talloires Declaration, the 1994 COPERNICUS Charter, as well as dozens of others (International Association of Universities 2018). Additionally, a large number of academic articles on sustainability in higher education call for universities to adopt a more prominent role in both sustainability and sustainability education (Stephens and Graham 2010).

The United Nations (UN) also recognizes the important role and responsibility of educational institutions in addressing environmental and development issues. The UN recognized that sustainability education and learning are necessary to achieve a more sustainable future by designating the years 2005–2014 as the Decade of Education for Sustainable Development (UNESCO [n.d.](#)). The United Nations continues to urge educational institutions and all sectors of society to engage with sustainability in reaching 17 sustainable development goals (SDGs), for which the UN has generated agreement among 193 world leaders (United Nations Development Programme [2015](#)). The fourth SDG is specifically focused on quality education (UNESCO Media Services [2017](#)).

The growing number of organizations dedicated to promoting and fostering sustainability in higher education also attests to the important role of higher education institutions. One prominent professional organization is the Association for the Advancement of Sustainability in Higher Education (AASHE). AASHE provides development webinars and workshops and holds an annual conference for those involved in sustainability education.

While education is not a panacea to engage an entire country in sustainability challenges (or convince everyone that climate change is real, for example), it is an essential part of social change. Most of the leaders of the world, in government, industry, nongovernmental organizations, and charitable organizations, spend several years learning about the world by earning a bachelor's degree or higher. Further, there has become a dramatic upward shift in education required for many occupations. Fifty-three percent of adults aged 25–64 have had some postsecondary education in Canada (Charbonneau [2014](#)). In the USA, 40% of Americans have finished an associate's (usually 2 years) degree or above, and an additional 22% have attended some college but did not graduate (Kelly [2015](#)). The Organisation for Economic Co-operation and Development (35 more developed countries of the world) average for at least some postsecondary education is 32% (Charbonneau [2014](#)). A key opportunity to learn about sustainability thus rests in student experiences through higher education.

Sustainability education has the potential to unleash the imagination by teaching students the connections between thought, practice, and the conditions of life that must be understood to create lasting improvements to sustainability challenges. Education is in fact the most powerful force in bringing new science, with a focus on the public good, to bear on sustainability challenges. Better linkages between educational institutions and industry, government, and nongovernmental and civil society organizations are needed to use precious time and resources in the most well-informed way to create change.

Our suggestions in this chapter stem from our combined scholarship and experience. The first author has served for 20 years as a professor of environmental sociology at a research-intensive university and 4 years leading university initiatives to further sustainability research, curriculum, and transdisciplinary connections to communities of interest. The second author is currently an instructor of environmental sociology, served for 3 years as a research assistant for an academic arm of sustainability in higher education, and her thesis research is on how introductory

sustainability courses are being taught in Canada and the USA. The first author has also served on a watershed management board, a Chamber of Commerce committee on sustainability, and has been engaged in numerous community efforts to further sustainability in city planning. As an associate dean in the Faculty of Graduate Studies and Research, the first author increasingly witnesses a call from industry, government, the nonprofit sector, and charitable organizations for educated employees who have collaborative intelligence, can work across disciplines and sectors, and accept that the world is changing and the need to change along with it by preparing for the future.

These skills are central to engaging with sustainability. Consistent with the World Commission on Environment and Development 1987 Report (commonly referred to as the “Brundtland Report”), we define sustainability as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs” (WCED 1987, p. 43). The sustainable development definition in this report calls on decision-makers to focus on “the essential needs of the world’s poor, to which overriding priority should be given” (WCED 1987, p. 43). Too often issues of poverty and equity are left out of technology and resource-driven agendas of sustainability. We believe this oversight is counterproductive (from the costs of human desperation and suffering) and may inadvertently disengage students from sustainability if they do not see how addressing human needs, social change, and better governance is central to the world’s sustainability challenges.

Sustainability as a concept is contested (Caradonna 2014). Many are familiar with the term in regard to the “three E’s” (environment, economics, and equity) or the “triple bottom line” (Hacking and Guthrie 2008). Those who follow the Natural Step philosophy hold that sustainability requires that fundamental conditions must be met so that humans do not extract resources, destroy habitats, and pollute in ways that undermine their capacity to meet their needs (The Natural Step 2016). For others, sustainability means “thriving” or creating more abundance and enrichment of individual and collective life (Edwards 2010) or “flourishing,” where the focus is on nurturing possibility for all humans and other life on earth (Ehrenfeld and Hoffman 2013). Some academics view sustainability as a discourse or an emerging set of ideas as greater connections in our social and ecological system are understood and politicized (Dryzek 2013). Confusion about the meaning of the term also comes from the loose use of the term “sustainability” outside the classroom, where students in higher education often question to what extent the term is used to gloss over the cradle-to-grave issues in products advertised as sustainable, and in the glib treatment of sustainable lifestyles (that might focus on wearing second-hand clothing, for example, or recycling rather than reducing the volume of materials flowing through one’s life). Some critics of the term “sustainability” think it means very little because the definition is so broad.

Sustainability as a concept has increasingly included more elements of systems (environmental, social, economic), although introductory sustainability courses are often taught with a specific focus. Most sustainability curriculum in higher education is interdisciplinary or engages sustainability from various disciplines. For example, if a course focuses on sustainable transitions in cities, it would likely include

instruction from planning documents on transportation, sociology documents on social welfare, and generalist documents on housing, air and water quality, and energy and waste systems in the city. Many courses are also taught by instructors who seek to make them transdisciplinary or to include the voices and lessons from practitioners and other key knowledge holders (e.g., resource managers, local leaders, or Elders in Aboriginal communities) who are at the forefront of solving specific sustainability challenges.

Sustainability education often uses forms of constructivist learning (Barth 2015). Constructivism acknowledges that people gain their knowledge about the world through perception, thought, and language (Carolan 2005). It recognizes that knowledge claims about the objects of knowledge could be incorrect and that it is therefore worthwhile to critically examine them (Carolan 2005, p. 396). Sustainability education uses a number of different constructivist learning approaches, including active, experiential, problem- and project-based, self-directed, and collaborative learning approaches (Barth 2015), in which learners engage in constructing knowledge through their experiences (Moore 2005). Some approaches, such as the transformative learning approach, also encourages learners to revise their assumptions and how they interpret their experiences through processes of self- and critical reflection (Cranton 1996).

These teaching and learning approaches try to encourage students to question taken-for-granted perspectives, values, beliefs, and assumptions that could be shaping the way they and others understand and react to the world around them. They encourage students to explore complex problems using diverse perspectives to understand that there are alternative ways to approach problems (Barth 2015; Burns 2011; Moore 2005; Tilbury 2011). Burns (2011) attests that it is very important to include different perspectives in sustainability education because they provide diverse ways of understanding sustainability issues. Burns contends that perspectives should also include questioning and critiquing the dominant paradigms and the underlying power relationships and cultural assumptions that contribute to unsustainable practices. By doing so, learners may come to recognize the important role that culture plays in our sustainability crises (Burns 2011).

In the following sections, we will discuss key concepts and teaching approaches to engage higher education students with sustainability. Many educators and scholars are experimenting and writing about hundreds of concepts and approaches that are being used in higher education classroom ideas (e.g., Sipos et al. 2008; Tilbury 2011; Wals 2009, 2012; Wright 2013). In this chapter, we will focus on the concepts and approaches that can be used across disciplines. The concepts we have chosen involve social, environmental, and economic systems, across geographical scales and time frames, necessarily involving many disciplines. Indeed, teachers of interdisciplinary programs (e.g., environmental studies, conservation sciences, planning, or global health) need to better coordinate the sequence and complementarity of courses and more deliberately follow key learning objectives to illuminate the connections across human well-being, human decision-making, the built environment, land, water, atmosphere, and life systems. As it currently stands, university program leaders often throw a bunch of courses together and leave the integration and action part up to students (Clark et al. 2011; Foote et al. 2006). We emphasize concepts that put humans at the center of

systems of sustainability because it is important for students to see the essential role of human agency, the ability to organize, the influence of power and politics, and the social learning from trial and error that drives sustainability action and inaction.

Key Concepts to Engage Students with Sustainability

Values and Bigger-Than-Life Problems

For students to have a sense of direction in how some part of the world can be more sustainable, they must understand “why” (Sinek 2009) changes to the status quo are necessary. Undergirding answers to “why” are the values embedded in human action, as every organized effort people make is normative (Heifetz et al. 2009). Values are conceptions of what one finds desirable. They tend to come in clusters and are able to coexist with competing values (Crompton et al. 2010). A reading we have found immensely useful to mobilize students to reflect on what they want to see changed, and why, is a report called “Common Cause: The Case for Working with our Cultural Values” (Crompton et al. 2010). In this report, Crompton and others convincingly explain how the cluster of intrinsic or self-transcendent values are far more likely to guide our behavior to address “bigger-than-self” problems (such as climate change adaptation, human rights violations, biodiversity loss, and global poverty) than extrinsic values. Intrinsic values include a sense of community, affiliation to friends and family, self-development and understanding, and appreciation and protection of people and nature. In contrast, extrinsic values emphasize social status, physical pleasure, material wealth, achievement, and power over others. While people hold both of these clusters of values within themselves, Crompton et al. (2010) prompt the reader to think about how these values are reinforced in sustainability rationales, political debates, public policy, career choices, advertising, and education, for example. When students are asked to identify their own values and ferret out the values undergirding social practices in society, they awaken to the role they play in reinforcing these values in their careers as citizens and as consumers.

Students learn that Western societies often overemphasize extrinsic values at the expense of intrinsic values and thereby diminish our motivation to address bigger-than-self problems or sustainability challenges. Students like to report their observations of how media coverage reinforces extrinsic versus intrinsic values. For example, many of our students point to the disproportionate media coverage of the career successes of high-status individuals (in sport, entertainment, business, and politics) over leaders that address bigger-than-self problems such as poverty alleviation and food security. Emphasis on extrinsic values also reinforces individualism. For example, students often give examples of product advertisements that emphasize attractive, employed, middle- to upper-class people who distinguish themselves by their leisure activities and what they consume. Students are increasingly interested in how messages from advertising and popular media intensify a feeling of social comparison and competition. They connect how these messages of individualism can discourage their sense of worth (and cause anxiety) as a human being in a community.

When students see themselves as part of a community, they more readily discuss how the fate of our environment is shared with others and the role of collective action, based on intrinsic values, that can embolden commitment to change sustainability systems. To personalize this understanding, we also invite students to reflect on the messages that were reinforced by their parents and extended family about success, living the “good life,” and one’s obligations to society (pay taxes, vote, volunteer, “give back” in some form, etc.) to see how one’s connection to sustainability is influenced by the norms we abide to in our primary groups. Those norms are based on values that are sometimes hidden and unarticulated, and students often struggle with naming their core values and how they are manifested in their daily lives. When students grapple with naming the “why” behind what they do and do not do, as tied to their values, they also become more aware of the context in which certain intrinsic and extrinsic values are reinforced and honored. By addressing intrinsic values, students often recognize gaps between their own values and behavior and begin to contemplate ways they can more deliberately address bigger-than-self problems within their lifetime and with others. Students start to see themselves as change agents within certain communities by the behaviors they promote, demonstrate, and articulate as important and with whom they spend their time.

Overconsumption

A sustainability issue students immediately identify with is overconsumption. In fact, students all too often assume that a switch to green consumerism significantly offsets the profound influences of consumption practices on the planet’s ecosystems. Overconsumption as a “bigger-than-self” problem engages students in sustainability by inviting them to discover the differential environmental and social justice impacts of consumption trends in relation to geographic scale, time, and rates of collateral damage (as especially driven by more wealthy countries) to our global ecosystem. Students can explore how the material production, use, and waste processes tied to consumption drive most environmental problems by creating pollution streams (in air, water, land) and degrading landscapes. By studying overconsumption, students learn about the “ecological rucksack” or the resource requirements for a good from cradle to grave, and when they learn this, they see that while to live is to consume, the way people consume has huge implications for the health of the planet (Sachs et al. 1998). Over the past few years, popular overconsumption subjects among students in our classes have been the human costs of electronic waste, fast fashion and the glut of clothing, and food waste.

Metabolic Rift

The term metabolic rift, developed by John Bellamy Foster from Marxist writings, points to the lack of connection humans have had with nature, where the intensification of production at one site creates an irreparable rift between the production

region and where the product is consumed (Foster 1999). The rift is the lack of recognition and awareness by those who use the products and the living system from which the products were sourced, including the net loss of renewability at the extractive/production site. For example, there is often a metabolic rift between town and country. If labor conditions are poor in one region (country) (e.g., many miners experience this in countries like South Africa and Mongolia), the workers are sacrificed, in a sense, to support the consumptive habits of people in another region (city). When students engage with the notion of metabolic rift, they can look at the growing number of large cities and the consumptive habits across classes of people in those cities and explore the supply chain implications. Students engage with sustainability when they see that most of the needed resources in cities (food, construction materials, and household items) are sourced from rural places. The places and people in rural areas are often hidden from the students' view, but the people who live near the source of the good are often left with high risks from destructive extractive processes, resource scarcity, precarious employment, and contamination from waste.

To demonstrate metabolic rift, the first author has used Edward Burtynsky's dramatic photos of industrial landscapes in her classes to show the human faces of those gathering raw materials (e.g., farmers or miners) or cleaning up or living in the mess left behind (e.g., garbage pickers, cleanup crews). By providing examples of the metabolic rift, students see that sustainability is at once local and extra-local. They also realize that the relationship between consumption and sustainability must be examined across space and time and that there are significant implications for who benefit and who lose along the commodity chain of the product. Consequently, students internalize this awareness even more so by doing a social commodity chain project. In this project, they choose an item, such as a banana or household cleaning product, and trace out the material place of origin and throughput processes required to put that product on the shelf. They also investigate the safety and welfare of the workers at each part of the chain. As they trace each step, from the source of extraction through material processing, manufacture, distribution, use, repair, maintenance, disposal of the item, and its absorption back into the earth, issues of environment, health, livelihoods, trade, and lifestyles become even more apparent. Similarly, students can also learn about sustainability by doing a standardized life cycle assessment to calculate the lifetime environmental impact of a product, service, or human activity, an analysis often done by engineers (Curran 2013).

The Commons and Polycentricity

The commons and polycentricity are two important concepts that help students understand the importance of governance and the challenges of natural resource management. The commons refers to shared resources that morally or legally belong to everyone (Bollier and Helfrich 2014), such as the oceans, the air we breathe, most of the oil and gas resources in Canada, and many other public goods. The late Elinor Ostrom won the Nobel Prize in Economics in 2009 for her cumulative work on

problems of collective action for individuals using common-pool resources. Common-pool resources are resources that are used by a group of people, such as forests, fisheries, and the air, that provide diminished benefits to everyone if each individual pursues his own self-interest (Ostrom et al. 1994). The gift of Ostrom's work, and that of many other scholars in this area, is that students can learn about successful ways that common-pool resources have been, continue to be, or can be sustainably managed. This work is an antidote to the rhetoric that it is only through privatization that a country can protect its stake in common-pool resources. By understanding that there are institutional features that are repeatedly associated with the protection of various natural resources, as well as features that undermine their protection, students dive deep into the nature of governance, fairness for stakeholders who rely on the resources, and alternative efforts that could be tried to correct deteriorating trends for many resources critical to the health of large ecosystems, such as wetlands and fresh water systems.

Elinor Ostrom, Michael Polanyi, and many others also brought us the term polycentricity, which captures the challenges of managing resources in social systems where many decision-makers are operating under an overarching set of rules. For example, watershed systems are often managed by multiple decision-makers, including farmers, industrial owners, wildlife managers, municipal regulators, utility companies, acreage owners, recreational operators, and any other active decision-makers for the land and waterways in that watershed system. There may be overarching rules in regard to water quality and streamflow standards that must be maintained, wetland environmental regulations, stream corridor protection zones, etc., but those protections notwithstanding healthy watersheds generally also require a place-based level of commitment, communication, cooperation, and collaborative intelligence to manage a watershed for particular values (e.g., riparian biodiversity or wildlife protection). By grasping the concept of polycentricity, students begin to carefully unpack what kind of cooperative approaches work, and are needed, for the particular sustainability challenges on that land base. The polycentricity concept invites students to see the different kinds of decision-makers on that land base, the nature of the resource as a common property, and the informal and formal rules operating in that cultural and political system.

Governance is at the heart of sustainable resource management, and students can learn a great deal from case studies that show the interactions that drive resource management decisions. By addressing the commons and polycentricity, this also opens the door to a large area of scholarship that combines social learning with sustainable resource management, often referred to as "adaptive management." Adaptive management refers to the experiments and lessons learned by managers, scientists, and other stakeholders to create and maintain sustainable ecosystems (Walters 1986). Case studies on adaptive management illustrate the trials and tribulations of decision-making in governance systems and the long-term commitment to manage a watershed, forest, or fishery sustainably, across geographic scales. It is only by making these governance decisions (and nondecisions) transparent in real places with real people that students can appreciate the complexity and channelization of decisions (where social learning is often suppressed) that often

characterize the management of forests, fisheries, protected areas, agricultural areas, watersheds, and so on.

Resilience

Resilience is a term used across many disciplines, especially in reference to social-ecological systems and psychology. In the former, resilience refers to the ability of a social-ecological system to absorb stressors and continue to carry out crucial functions, self-organize, learn, and adapt (Holling 1973; Gunderson and Holling 2002). Similarly, in the psychology literature, resilience refers to the ability of an individual to bounce back after failure, tragedy, trauma, threats, or other significant sources of stress. Resilient individuals tend to be able to regulate emotions, see failure and hardship as setbacks from which to learn, and tend toward optimism (American Psychological Association 2017). Resilience is an engaging concept for students in higher education because of its basis in processes over time that highlight organizational behaviors and individual thoughts and behaviors that demonstrate adaptation and invoke hope (Youssef and Luthans 2007). By studying resilience in social-ecological systems, students learn how local people have adjusted their livelihoods to live sustainably within watersheds, delta systems, Northern tundra, mangrove wetlands, etc. By studying psychological resilience, students also learn about how people use social capital to rebuild their lives and communities after natural and technological disasters (Aldrich 2012). Like the common property resource management approach, students are invited to see alternatives that people have used to address sustainability challenges in specific ecosystems and cultures and in response to specific stressors. This broadens students' notions of pathways to repair ecosystems and support human dignity and health.

Again, case studies in particular provide students with an arsenal of examples where social-ecological systems are wisely managed or improve over time. Students need these examples to see a more sustainable future in places across the world and to imagine phronesis. Phronesis is a term from Aristotle (1980, Bk 6) that refers to wise practical reasoning built upon experience and sharp judgment. As students learn about how people across the world use phronesis to cooperatively and politically address their own sustainability challenges, it sets students up to ask, "How can I support that problem-solving from what I do in my own career and life?" An appreciation for the phronesis that different land managers possess, for example, helps students to envision local capacity for sustainability challenges and guards against the assumption that educated Westerners have all the answers. We have found that students show remarkable enthusiasm for learning about collaborative or community-based forms of natural resource co-management, as well as culturally appropriate approaches to sustainability improvements across the world.

Students also engage with sustainability when they investigate who the knowledge holders are in a place and how that place-based knowledge is maintained or built over time. In our Canadian context, where a recent federal Truth and Reconciliation Commission has stated renewed commitment to improving Aboriginal and

non-Aboriginal relationships, we see a heightened student interest in Aboriginal traditional knowledge among hunters, fishers, trappers, healers, and agriculturalists and how their practical reasoning can inform sustainability plans for land, water, wildlife species, and protected areas. Much of this material can be effectively taught by incorporating neo-colonial and post-colonialist literature (Wisker 2006) that identifies the legacies of colonialism and invites students to consider epistemology, i.e., different ways of knowing that are historically, culturally, and politically informed and constrictive about what actions, and by whom, sustainability should entail. Returning to an earlier point, when students contextualize a sustainability challenge in a historical framework, they can more critically understand the epistemology that undergirded the way a land, sea, or resource was managed. They can also see how social relations were embedded, relations that gave certain people the power or the right to make decisions, use the resources, and reap the benefits, while others live with the consequences.

Each of these concepts can be taught in a variety of discipline-based or interdisciplinary courses, such as in sociology, political science, human geography, environmental studies, conservation sciences, economics, history, and literature. In the next section, we turn to some of the ways in which these concepts can come to life for students across these disciplines.

Key Teaching Approaches to Engage Students with Sustainability

The context of teaching in higher education has changed significantly in the last 20 years, with far more student demand for courses that are relatable to their lives and in teaching formats that are entertaining and varied. Instructors are far more likely to use social media in the classroom, to use class websites to store various forms of digitized materials, and to require students to demonstrate knowledge in varied ways, beyond test-taking and standard research papers.

Sustainability in particular is best taught in ways that make sustainability challenges real and approachable. Early environmental education tended to rely on transmissive teaching approaches (Sterling 2004), where instructors tried to transfer predetermined knowledge to students through presenting, lecturing, and using supporting materials like workbooks and instruction forms (Wals 2012). The underlying assumption of this approach was that presenting information about the environment would be sufficient to encourage personal and social change (Sterling 2004). In practice, however, transmissive-based models of teaching have a limited capacity to engage people meaningfully in sustainability challenges (Wals 2012).

There is widespread recognition that we need to use alternative teaching and learning approaches if we are to work toward sustainable outcomes (Tilbury 2011). Worldwide, scholars and practitioners of sustainability education have proposed a number of alternatives, including participatory, collaborative, problem-based, interdisciplinary (Wals 2012), transdisciplinary (Evans 2015), project-based (Wiek et al. 2014), place-based, experiential, transformative, and service learning approaches (Sipos et al. 2008). These different learning approaches share a “family

resemblance” in that they recognize that learning is more than just knowledge-based and that it requires more than a single discipline or perspective (Wals 2012). Thus, many of these approaches complement one another; they focus on real issues that engage learners, and they emphasize the importance of quality interactions with others and with the learning environment (Wals 2012). Rather than trying to transmit knowledge and train people to behave in particular ways, they engage in processes of inquiry, participation, and social learning that challenge current frameworks and practices that are unsustainable (Tilbury 2011). Through the use of active or participatory learning methods, they also encourage students to actively participate in the learning process itself (Wals 2012).

Many researchers and practitioners worldwide view active, experiential, and participatory methods as central to sustainability education because they encourage students to ask critical reflective questions, clarify values, think systemically, and envision more positive futures (Tilbury 2011, p. 29). Participatory learning is also thought to empower students and help them build their capacity to address sustainability problems (Burns 2011). Moreover, active and participatory approaches can potentially increase student engagement in sustainability. For example, Mintz and Tal (2018) looked at environmental courses and found that courses that address sustainability topics and include active and participatory learning activities report increased student motivation to promote sustainability. In this section, we will discuss several key teaching approaches to engage students in sustainability.

Place-Based Experiential Learning

Engaging sustainability is more likely when students learn about real and nuanced sustainability challenges facing a particular city, watershed, municipality, etc. Place-based learning situates the curriculum within the context of the learner’s own life, community, or region, taking advantage of the learner’s interest in the local (Sipos et al. 2008). Experiential learning is “learning by doing” (Domask 2007), where students have and reflect on direct experiences and then form ideas that are applied to new experiences (Sipos et al. 2008). It can include things like internships, simulations, fieldwork, or service learning (Domask 2007). In place-based experiential learning, students can be asked to investigate what they would do to address a challenge, identified by those who live in that place. By listening to residents or authorities in a particular place, students more readily see the social nature of moving toward sustainability improvements (Domask 2007; Sipos et al. 2008). The instructor might ask the students: How is the problem defined? Who are the actors most influential in its definition and controversy? What has been the history in that place that led to this state? What policies exist that constrain or support changing the situation? What is available to understand public opinion and engagement on the issue? Who benefits from the current contributors to the problem? Who would most benefit from a sustainable solution? Who has power among the stakeholders of the problem to change the status quo? What would have to change to implement certain solutions? Students who work on a sustainability challenge in a particular place

begin to understand which values that are threatened by the sustainability challenge, the commons at stake, the key stakeholders, the polycentricity of the governance system, and the options to create more social-ecological resiliency. Additionally, by learning about and interacting with places, students can strengthen their connections with those places and with the people who live in them (Gruenewald 2003).

Problem- and Project-Based Learning

Similar to the approach above, many educators are finding that students learn more and can more readily draw on knowledge from across the disciplines if they are posed with a problem for which there is no one right answer, although there are well-informed and carefully reasoned answers (Wiek et al. 2011, 2014). Problem- and project-based learning combines two learning approaches: problem-based learning and project-based learning (Wiek et al. 2014). Problem-based learning helps students investigate a real-world sustainability problem and try to develop a deep, critical understanding of that problem. In project-based learning, students work on projects to understand and develop solution options to problems. In both approaches, students are self-directed and often work in small teams (Wiek et al. 2014).

As an example, instructors might pose this problem to students: “Climate change induced extreme droughts are expected to rise dramatically in this century. Choose a region of the world and propose how this area might prepare for such droughts to reduce human suffering and ecological degradation, and protect its ability to provide water, food and housing to the region’s inhabitants.” This can be even more transformative when students visit the place they are studying, such as doing a semester abroad. When they do this, they can embed themselves in the culture to imagine addressing a problem, such as drought in rural Italy versus the Australian outback. Rural areas in particular invite students to see where phronesis resides, such as in Indigenous Elders or other local knowledge keepers, and they often see where the metabolic rift is apparent in resource-dependent communities. When students integrate their academic or other expert knowledge from academia with the traditional or practical knowledge of stakeholders outside of academia, this moves student into transdisciplinary learning, which is considered essential for addressing sustainability challenges and solutions (Remington-Doucette et al. 2013). These are inherently complex, interdisciplinary challenges, and solving them will require people to think holistically, integrate knowledge of human and natural systems, and collaborate across institutional and disciplinary boundaries (Remington-Doucette et al. 2013).

One form that problem- and project-based learning can take is a “campus as a living lab” program, which uses the university and/or community as a real-world context in which students can experiment to solve local sustainability problems (Rowe and Hiser 2016). For example, the University of British Columbia (UBC) developed a program called the Social Ecological Economic Development Studies (SEEDS), in which students, staff, and faculty collaborate to develop and implement a number of different on-campus sustainability projects (UBC n.d.). Students can work on projects in many different themes, such as biodiversity, climate, energy,

food, land, waste, water, and community. For example, students in one class helped UBC Food Services select and recover edible food from several residence kitchens, restaurants, and retail outlets, creating a buffet meal out of recovered food. This project led to a partnership between UBC Food Services and a local food bank for the ongoing recovery of food (UBC n.d.). Solutions-oriented, real-world projects like these can be very impactful because they help to generate hope and agency in students (Evans 2015).

Conflict-Focused Case Study Learning

Students can begin to understand the enormity of the stakes for people involved in vexing conflicts over natural resources by comparing ways in which different groups have confronted high-conflict natural resource or environmental problems (see examples in Clark 2002; Clarke and Peterson 2015; Daniels and Walker 2001). Sustainability conflict case studies may be over forest management, public transit infrastructure, large industrial developments, or predator control, for example. Students can be invited to examine the values held and threatened for different stakeholders and understand the relationship of the conflict to consumption drivers linked to increased housing, roads, mineral extraction, forestry or agricultural production, luxury item production (e.g., diamonds), tourist developments, and economic development in general. Students can use the case studies to learn how groups can define the problem. They also learn about processes for engaging stakeholders, meeting management, negotiation approaches, practices to sustain positive community relations, and policy influences and changes as part of the solution. The case studies can also involve role-play activities, which will give students a better understanding of the different perspectives involved and help them empathize with others (Tilbury 2011). By deep analysis of these case studies, students can begin to imagine how they might play a role in working with others to find a resolution. Additionally, they will better appreciate the sustained commitment for trust-building and communication that may be required to find longer-term resolutions to environmental conflicts.

We observe that students are generally eager to learn about different approaches to public consultation, public participation, and collaborative approaches for local and extra-local stakeholders for a particular sustainability challenge. There are a vast number of case studies to draw on from the literature on how to implement sustainability-focused policies, address conflict over natural resources, collaboratively manage natural resources, co-manage, and effectively work with government and/or industry advisory groups. Students learn that democracy is messy and any democratic process is imperfect. Case studies can reveal the finesse required to lead a sustainability change, and illustrate to students that incorporating the values and priorities of appropriate groups in sustainability actions is often finessed, based on a large number of factors in that location. By learning about the trial-and-error efforts of governing bodies to reflect citizen priorities, students in higher education recognize that sustainability must be credible to those who are expected to comply

or adopt new behaviors, and widespread acceptance and adoption can take considerable time.

Collaborative Learning

Collaborative learning encourages learners to construct knowledge together, with an emphasis on questioning and exchanging ideas (Cranton 1996). Collaborative learning assumes that knowledge is not something that is transferred from one person to the next (Moore 2005). Instead, in collaborative learning, groups or communities socially produce knowledge by talking together and reaching a consensus (Cranton 1996). There is an emphasis on process, in which people exchange experiences, information, ideas, and feelings. Members listen to each other, ask questions, try to understand the different perspectives that are expressed, and negotiate points of view. The aim is to arrive at a shared understanding that all group members find acceptable (Cranton 1996).

In courses that include collaborative learning, the educator is responsible for creating an open and supportive environment that is open to self-reflection. The educator establishes the context and may provide materials but is not considered the expert, instead adopting the role of a co-learner or participant (Moore 2005). Course activities that can foster collaborative learning might include things like role-playing activities, group projects, and case-based learning (Remington-Doucette and Musgrove 2015).

Collaborative group work in sustainability education is believed to foster a number of skills that are needed to address sustainability problems, such as planning, communication, organization, negotiation, delegation, and conflict resolution skills. It can also increase empathy and tolerance of differences (Remington-Doucette and Musgrove 2015). However, collaborative group work can also be challenging, since group processes can be difficult and students may find it frustrating to depend on other group members for their grade. There is only so much time in any given academic term to work through differences for class projects. Thus, faculty need to plan group projects that are well-supported and structured (Remington-Doucette and Musgrove 2015).

Social Learning

The UN Decade of Education for Sustainable Development recognized that social learning is an important part of aligning education systems and practices with sustainability (Tilbury 2011). Social learning can be understood as “a special kind of learning that contributes to realising the learning society that is essential in realising a more sustainable world” (Wals et al. 2009, p. 11). Social learning is believed to be important to help develop the foundations that are needed for reflexivity and change (Tilbury 2011). It brings together people from different backgrounds and leads to an ensemble of knowledge, experiences, and perspectives. Wals et al. (2009) contend that this

ensemble will be necessary for creatively seeking answers for questions that have no ready-made solutions in an ever-changing society.

An important characteristic of social learning is that people learn from and with each other. As a result of this learning, they become collectively better equipped to withstand setbacks and deal with complexity, risks, and insecurity (Wals et al. 2009). Social learning assumes that people will learn more from each other if everyone does not think or act alike. Thus, to encourage people to accept and make use of different perspectives, it is about building social cohesion and trust (Wals et al. 2009). When there is cohesion, the articulation of different perspectives can help people see that there are different ways of approaching and solving problems. When it works well, social learning can therefore contribute to creative and innovation solutions. Social learning is also concerned with collective meaning-making and with creating ownership of the learning process and solutions that people discover (Wals et al. 2009). Finally, social learning involves indeterminacy, since it cannot be known precisely what students will learn ahead of time and learning goals may shift during the process (Wals 2012).

Social learning is not limited to formal educational settings but can be used in many different contexts. For example, governments can create municipal- or regional-level forums where local actors develop actions for sustainable regional development through cooperation and consultation. At the neighborhood or community level, social learning processes can assist with improving the liveability or sustainability of a neighborhood (Wals et al. 2009).

In the context of higher education, Owens et al. (2015) discuss how a field school offered through the University of Victoria in Canada can provide a social learning and transformative experience that combines both critical reflection and practical action. In the month-long travel study program, students learned how sustainability was understood, practiced, and struggled over in the Pacific coastal region of Canada. Owens and colleagues (2015) describe how the program was carefully designed to expose students to multiple perspectives and to provide diverse learning experiences; students engaged with multiple actors, including scholars, planners, activists, other students, and the instructors. Students were encouraged to participate in ongoing self- and group reflection, as well as individual and group debates. Instructors acted to facilitate experiences rather than dictate or transmit information. Thus, in addition to providing structure and guidance, the program also included community-based learning and self-directed learning (Owens et al. 2015). The authors noted that, at the end of the field school, students were able to ask more qualified or conditional questions about sustainability and understand sustainability as a contested social construction.

Community Service Learning

Community service learning (CSL) is a form of experiential education that aims to balance student learning with service to the community (Taylor et al. 2015). In CSL, students collaborate with members of the greater community toward mutually beneficial outcomes (Sipos et al. 2008). CSL integrates “intentional formal learning

activities” with learning that occurs through community service (Taylor et al. 2015, p. 5). Service learning is a very heterogeneous practice: it appears in a number of forms, takes place at many different kinds of sites, and involves collaborations with a variety of community partners (e.g., schools or not-for-profit organizations). Additionally, it is often combined with other pedagogical approaches, such as place-based learning, project-based learning, or community-based research (Taylor et al. 2015).

In sustainability courses, the use of community service learning allows students to grapple with real-world issues in their communities. At the University of British Columbia (UBC), for example, students participated in two short credit courses in 2003 and 2004 to initiate and then further develop a pilot ecovillage at the UBC Farm (Sipos et al. 2008). The 2003 course focused on collaborative group work, participatory decision-making, and nonformal education, while the 2004 course focused on personal sustainability and building practical skills (Sipos et al. 2008).

The literature reports a number of student outcomes from community service learning: among other benefits, it includes learning about oneself in relation to others, greater commitment to community engagement, commitment to social justice, reflective and collaborative learning, and an increased awareness of how theory and practice are linked (Taylor et al. 2015). Additionally, CSL initiatives have the potential to foster civic responsibility and critical thinking, as long as they are carefully organized, have a clear purpose, are relevant to the professional future of the students, and include ongoing student reflections that are guided by faculty (Taylor et al. 2015).

These outcomes are important for sustainability. To work toward a more sustainable future, we will need to change and to learn ways to live and work more in balance with nature. To make change, Burns (2011) argues that we will need to engage with ourselves, with others, and with places. Civic responsibility means actively participating in public issues in a manner that is informed, constructive, and that focuses on the common good (Dresner and Blatner 2006). The literature on sustainability education has consistently stressed the importance of critical thinking to enable learners to autonomously and authentically contribute to sustainability (Tilbury 2011). Critical reflective thinking helps learners clarify values, deeply examine the root causes of unsustainability, and recognize the biases and hidden assumptions in the knowledge, opinions, and perspectives of themselves and others (Tilbury 2011). Both civic responsibility and critical thinking are important for addressing the complex and challenging environmental and humanitarian problems that we face. If we are to democratically discuss, debate, and propose solutions to these problems, we will arguably need citizens who are informed, concerned, and actively engaged and who can understand and assess different information and perspectives.

Conclusion

Higher education has the power to shape civilization. Along with this power comes the intergenerational responsibility to help students become informed, active, creative, and critically engaged citizens who are concerned about the collective good.

There are a multitude of concepts from across the disciplines that can be used to engage students with the fundamental relationships that characterize or undermine sustainability. This chapter offers a few of those concepts, chosen in particular for the potential to use them as anchor concepts across numerous disciplines. Students in more developed countries in particular need to learn how overconsumption is harming humans and the environment, as well as potential alternatives to provide for our needs while preserving ecological integrity and human well-being. The concepts of the commons, polycentricity, metabolic rift, resilience, and adaptive management point to the many ways that groups at different scales have learned from past experiences and sustainably managed resources.

The chapter also explored some of the key teaching approaches that can help student learn about and engage in sustainability, including place-based experiential learning, project- or problem-based learning, case study conflict studies, collaborative learning, social learning, and community service learning. Students will more likely engage with sustainability if they can work on real-world challenges, examine issues in a particular place, struggle with the need to try and understand the problem from multiple vantage points, and draw upon successes elsewhere in process and outcome. In the current era, with vast and deep differences across the public in North America (and also Poland, Germany, France, Turkey) about how to engage “difference,” curiosity and humility are key to be able to listen to mutually agreed-upon compromises and solutions. Thus, educators need to instill in students curiosity and humility about the uncertainty in offered solutions and the moral reasons to at least try. They also need to foster the courage to propose improvements to problems, learn from both the successes and failures in experiments (such as in campus as a living lab projects), and engage in their own efforts at adaptive management.

At the center of it all are human beings, and for students to imagine sustainability, they must also imagine a world in which improved systems of mutual respect, cooperation, collaboration, and sharing of the world’s wealth in resources are possible. Thus, a central element of sustainability education is in the recognition of the role of values and how these are communicated and tied to principles that guide ethical practices that promote a healthy ecosystem, human dignity, and sustainable livelihoods across all countries. In years to come, higher education must find ways to more effectively engage students in sustainability, as leaders and followers, as active citizens, and as problem-solvers.

Featured Case in Point

One engaged sustainability practice to encourage in higher education is to start with where you are and ask students, “What are the sustainability challenges at your work place, in your community, or at your university? Many universities and colleges have an active Office of Sustainability with various student-centered awareness, engagement, and transformative learning opportunities (Vaughter et al. 2015). Many higher education institutions also have a program along the lines of “campus as a living lab” for students to become engaged in research or programming to make the campus

more sustainable. Many student groups are addressing sustainability challenges, such as better access to healthy food. At our own university, students manage community gardens, a farmer's market in the Students' Union, and a student food bank. Community service learning opportunities, now offered at many universities, allow students to spend 20 hours or more a term to work with an organization to learn about how they are engaged with an issue and mobilize to change the status quo. Instructors could incorporate research internships, volunteer hours, community service learning, or, at the very least, participant observation credit, for students to learn about how people are organizing at various levels and intensity to make a workplace, community, or university more sustainable. We must expose students to collective organizing alternatives to engage students with sustainability.

Reflection Questions

The following are a number of questions that can help students think more deeply and reflectively about key concepts discussed in this chapter, including the commons, the overconsumption, and the role that values play in bigger-than-self problems:

1. How is flood protection related to the commons? What forms of governance influence flood risk? What values are threatened by floods, and who is most at risk in your state or province? How would government's recognition of the importance of climate change mitigation and adaptation affect its approach to flood risk planning? Who would be consulted to develop plans to mitigate harm from floods in your state or province?
2. How do your concerns for sustainability tie to your intrinsic and extrinsic values? What bigger-than-self problems draw your attention, and what is being done at the local, state, national, and international levels to address that problem?
3. Where do you find hope in the growing recognition of the importance of sustainable consumption? What trends of overconsumption most worry you, and in what social practices or policies do you find hope that these trends lead to a lowered ecological footprint?

Exercises in Practice

1. Case study in conflict. To engage students in a sustainability issue that is relevant to their lives, students could be asked to attend public meetings and read policy briefs and op-ed pieces related to an environmental conflict in the town or city in which they are attending college or university. Students could analyze the rhetoric and dialogue to see where there are arguments to protect intrinsic versus extrinsic values and how the solutions proposed suggest certain fundamental values. Students could identify the stakeholders and how the issue is related to protecting some form of the commons, observe informal and formal rules regarding social

practices and governance for the environmental issue, and identify who benefits and loses from the current status quo. Students could argue for a solution or set of solutions and provide evidence from other cases as to why they would take certain positions.

2. Project on sustainable consumption products. Students could look at the various ways in which coffee, bananas, and sugar have an environmental rucksack and how various organizations are addressing social justice and environmental impacts associated with these products through fair trade organizations, organic farming, eco-labeling, cooperative ownership, and local, small-scale production. What are the advantages and disadvantages for these efforts to address workers' well-being, community impacts for the production and harvest of these products, processing and distribution of environmental impacts, and consumer awareness and satisfaction?

Engaged Sustainability Lessons

1. Higher education has a unique role to play in engaging students with sustainability and shaping society by directly addressing ways to protect people and the planet for the collective good.
2. We must identify our values and encourage our students to do so to understand why we believe and advocate for lifestyles, social practices, and policies that have a profound effect on the sustainability of the planet. By priming intrinsic values more than extrinsic values, we elevate students' commitment to address the bigger-than-self problems of the world.
3. Students in more developed countries in particular need to learn about the role of consumption in driving environmental and human harm and the alternative ways people are organizing around providing for our needs to preserve ecological integrity and human well-being. Students need to understand how our systems of provision in housing, transportation, food, water, and infrastructure significantly influence land degradation, air and water quality, and pollution streams.
4. Concepts such as the commons, polycentricity, metabolic rift, resilience, and adaptive management point to the many ways groups at different scales have sustainably managed resources and learned from past experiences to improve on their management of resources and care for each other.
5. Students are more likely to engage with sustainability if they examine an environmental issue in a particular place and have the opportunity to draw across various disciplines to do a form of participatory learning, to understand the role of conflict, negotiation, and community engagement when they look at potential solutions.

Chapter-End Reflection Questions

1. How do current political debates about climate change reflect intrinsic versus extrinsic values?

2. What teaching or life experience is most memorable to you for igniting your interest in sustainability? What does that experience tell you about how you learn about sustainability or would teach sustainability yourself?
3. Who do students need to learn from outside of academia to address conservation? How can academia provide opportunities for students to engage in collaborative learning?
4. How can trends in sustainable consumption address multiple needs, such as lowering ecological footprint while at the same time enhancing a sense of community and willingness to organize around a collective problem?
5. How do you address conflict in your own life? How do you respond to conflict over environmental issues you care about? How can you address important challenges of our time, such as the many climate change actions that are necessary, and learn to work through the conflict with others, as difficult as that might be?

Cross-References

- ▶ [Education in Human Values](#)
- ▶ [Moving Forward with Social Responsibility](#)
- ▶ [Sustainable Decision-Making](#)

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