Beyond Recycling: Developing "Deep" Sustainability Competence

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Abstract

The purpose of this chapter is to advance a competency framework for sustainability, arguing that sustainability initiatives should move beyond basic awareness to deeper knowledge, including understanding of root causes, and development of political skills. This chapter's discussion and critique of sustainability competence is grounded in data from more than 500 undergraduate residents' responses to seven open-ended questions about sustainability initiatives in the residence halls; what sustainability means to them; their environmental values, attitudes, and behaviors. These data were analyzed using qualitative methods to determine students' understanding and definition of sustainability; their green behaviors; and the impact of perceptions about sustainability on green behaviors. Along the three competency domains (awareness, knowledge, and skills), respondents' understanding of sustainability was overwhelmingly environmental (recycling, and reducing waste), and skills did not extend beyond individual actions. Sustainability initiatives must not only develop individual-level competencies (i.e. awareness of personal consumption, reduction of personal waste and energy usage), but also equip individuals to act at institutional and structural levels (i.e. advocating for changes in policy and practices). An expanded conceptualization of sustainability competence would be useful for educators to design initiatives that deepen sustainability competence, developing students' capacity for thinking and acting systemically.

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1 Introduction

The seeds of the contemporary sustainability movement in U.S. higher education go back to environmental activism in the 1960s and 1970s. Today, sustainability efforts on campus range from "greening" facilities to "minimize the ecological footprints of universities" (Tilbury 2004, p. 97), to curricular developments that require "educating about and for sustainability" (p. 98). The latter—education for sustainability (EFS)—calls for restructuring courses, and entire curriculum, to yield "graduates with the personal and professional knowledge, skills and experience necessary for contributing to sustainability" (Tilbury 2004, p. 98).

As EFS grows, little attention has been given to understanding or defining these knowledge or skills, or rather, what competencies for sustainability students should develop and be able to demonstrate through their learning in informal and formal settings, and as citizens after they graduate (Barth et al. 2007; Torres-Antonini and Dunkel 2009). Students have been "raised on recycling" (Dungy 2011, p. 272); however, recycling and volunteerism will not, in and of itself, address the fundamental challenges facing our environment. Educators, then, must identify approaches to EFS that will move students beyond basic competencies for sustainability, to what is known as "deep sustainability"—the capacity to extract and apply meaning (Warburton 2003).

Drawing upon several bodies of work from the social sciences, the aim of this chapter is to advance a competency framework for sustainability that would move beyond an overly narrow conception of sustainability that is limited to individual environmental actions, to deeper sustainability knowledge and the development of political skills. Further, this chapter makes the argument that experiential learning is important to the development of deep sustainability competence. First, this chapter reviews relevant literature on deep learning, experiential learning, and on competencies for sustainability. Next the chapter reports findings from a study of undergraduate students' thinking about sustainability, and then uses these findings as a springboard for discussion and critique of sustainability competencies. Finally, the paper concludes with implications for EFS.

2 Review of Relevant Literature

2.1 Defining Sustainability

As sustainability in higher education continues to grow, the concept of sustainability has vague definitions and some misconceptions (Filho 2000; Wals and Jickling 2002). For the purpose of this chapter, sustainability is comprised of three

dimensions: environmental, economic, and equity (sometimes also referred to as the "social" dimension). The first, *environmental* (sometimes referred to as ecological), tends to dominate discussions. It focuses on the reduction of negative human impact on the ecosystem, and yields efforts such as greening campus facilities, recycling campaigns, and energy reduction initiatives. These environmental efforts illuminate *economic* concerns and benefits. For instance, programs to reduce energy usage produce financial gains in addition to being good for the environment. Thus, campuses focus on the effects of individual lifestyle choices and spending patterns; the impacts of institutional, national, and global economies; and the exploitation of resources for economic growth. Finally, situated at the intersection of environmental and economic concerns is the relationship between human rights, environmental justice, and corporate power, yielding a focus on *equity* or the social impact of sustainability. Educating about this trilogy of sustainability is described by some as EcoJustice Education—an "emerging framework for analyzing the deep cultural roots of and intersections within social and ecological violence …[and] the destructive effects of a worldview organized by a logic of domination" (Lowenstein et al. 2010, p. 101).

2.2 Developing Sustainability Competence

The modern competency movement, referred to by some as a controversial trend, is often attributed to teacher education curriculum development (Zeichner and Liston 1990); and today, is shaping everything from entire academic programs (e.g., College for America) to particular knowledge areas (i.e. multicultural competence). Broadly, competency models emphasize three domains: knowledge, awareness (or attitudes), and skills—or what Sipos et al. (2008) refer to as the head, heart, and hands, respectively. Knowledge competence is viewed as the cognitive domain. Awareness consists of the affective domain inclusive of values, attitudes, dispositions (Savageau 2013; Shephard 2008). The skills domain demonstrates the behaviors that embody the awareness and the application of knowledge. Growing scholarship investigates how EFS might, or does, yield particular learning outcomes or develop sustainability competencies (Filho 2009; Hungerford and Volk 1990; Mochizuki and Fadeeva 2010, 2012; Stubbs and Schapper 2011; Wals 2010; Wiek et al. 2011a, 2011b). However, critics of EFS and students' learning assert that graduates may have a "commitment gap" (Emanuel and Adams 2011, p. 90)—meaning insufficient skills to tackle sustainability problems and upset the status quo (Barry 2006; Kopina and Meijers 2014). Further, as Werner (1999) critiques, psychological studies provide "passive descriptors of how things are" and lack empirical evidence of "how to empower people" to convert knowledge and awareness into skills and behaviors (p. 223).

These gaps or shortcomings in competency development have implications for society as a whole, since EFS may (unintentionally) over-emphasize one dimensional thinking (i.e. environmental concerns) and yields solely individual actions

(i.e. recycling). An EFS approach that falls short in its attention to economic and equity dimensions of sustainability, risks producing superficial enactments of citizenship (Barry 2006). Citizenship education scholars critique that *personally responsible or participatory educational approaches may yield individual responsibility (i.e. picking up trash, recycling) but fail to achieve transformative or justice-oriented potential* (Westheimer and Kahne 2004). Graduates should not have only abstract knowledge of sustainability; or only skills in recycling; or have the misperception that sustainability competence only has utility for "green" jobs. Rather, graduates must have the skills to serve as sustainability change agents in "societies and economies not yet prepared to absorb them" (Wiek et al. 2011a, p. 212; also Svanstrom et al. 2008). To this end, "deep" competence is needed.

2.3 Deep Learning

My use of the word "deep" draws from the social science literature on deep learning. The identification of different approaches to learning is attributed to educational psychologists, Marton and Saljo (1976), who studied students' approaches to learning, and identified that some students sought to comprehend the whole picture, link new ideas to already known concepts, and apply principles to other contexts. Such "deep" learning is differentiated from "surface" learning wherein students typically engage in rote memorization of "unrelated bits of information" (Entwistle 2000, p. 3). With deep learning, students make connections between ideas, examine underlying arguments, explore root causes of problems, and engage in active learning (Entwistle et al. 2000; Warburton 2003; Wiek et al. 2011b). Such a process involves a "metacognitive alertness" that is more likely to translate into "how students act in everyday situations" (Entwistle 2000, p. 3). A third approach, "strategic" learning, "is characterized by competitiveness and attempts to maximize academic achievement with minimum effort" (Warburton, p. 46; Tait and Entwistle 1996). EFS will benefit from an emphasis on deep learning, so that students move beyond surface knowledge yielding only individual level change, to competence for thinking and acting systemically, critical consciousness, and activist skills.

2.4 Experiential Learning and EFS

Experiential learning has become increasingly popular in higher education. Experiential learning, a concept attributed to educational theorist David Kolb (1984), is the process of learning by doing *and* reflecting upon that experience. Examples include internships, service-learning, community action projects; and scholars in the social sciences attest to many benefits including developing students' abilities to think critically about social problems and solutions to those problems (Allan and Iverson 2004; Balliet and Heffernan 2000; Eyler and Giles 1999; Parker 2012). Yet,

experiential learning remains under-utilized in EFS. Domask (2007) describes the benefits of one experiential learning program in international sustainability studies, but also observes the "dearth of research" on experiential learning (p. 65).

Further, studies of EFS have focused largely on classroom-based or curricular contexts, with little attention to the experiential learning that occurs in "informal (e.g., student activities)" spaces (Barth et al. 2007 p. 416). Just has sustainability inquiry has disproportionately focused on natural sciences, resulting in "sustainability being largely disregarded" by the social sciences (Becker et al. 1999), so too EFS has focused namely on "formal" or classroom contexts, failing to recognize the transformative potential for out-of-classroom education (such as residence hall programming) through which students "learn from what we do rather than what we teach" (Cohen 2007, p. 90). Existing literature on co-curricular initiatives has been limited and largely descriptive of sustainable housing trends and residential sustainability programs (e.g., Brewer et al. 2011; Torres-Antonini and Dunkel 2009; Shimm 2001; Shriberg 2000). This chapter describes findings from a study of undergraduate students' thinking about sustainability, and uses these findings for critique and rethinking about sustainability competence.

3 Methods

3.1 Site and Setting

Kent State University (KSU) has sustainability initiatives incorporated into its residence hall program. In addition to renovation projects designed to enhance conservation (e.g., new windows, new HVAC systems), residents have participated, for several years, in two annual competitions. First, the "do it in the dark" energy reduction program is held each fall, putting residence hall versus residence hall in competition to reduce electricity during a two-week period. Second, Recycle Mania, an inter-hall recycling competition, is hosted each spring; this is an international competition where universities promote waste reduction. Over an 8-week period the amount of recycling and trash collected are reported, and colleges are ranked based on who generates the least (About Recycle Mania n.d.). Residence hall staff promote and implement the competitions, and provide incentives for students to be "caught" exhibiting green behaviors.

3.2 Data Collection

In a study of undergraduate students' thinking about sustainability, DuBois and DuBois (2010) administered a survey to 768 undergraduate resident students at KSU to determine students' perceptions of the residence hall sustainability programming, students' understanding and definition of sustainability, and the impact

of perceptions about sustainability on green behaviors.[1] In addition to Likert-scale questions, over 500 respondents provided answers to seven open-ended questions on the survey about sustainability initiatives in the residence halls; what sustainability means to them; their environmental values, attitudes, and behaviors.

3.3 Data Analysis

The data from the open-ended questions were analyzed using summative content analysis. This qualitative approach to data analysis "starts with identifying and quantifying certain words or content in text" (Hsieh and Shannon 2005, p. 1283). However, it moves beyond a quantitative counting of words, to include a process of interpretation of content. Yin (2011) describes several phases of qualitative data analysis, beginning with *compiling* and sorting the data to put them in some sort of order; then *disassembling* the data into smaller pieces and assigning codes; next, *reassembling* the data using substantive themes or code clusters; and finally, *interpreting* "the reassembled material to create a new narrative" (p. 179). Finally, an examination of the coded data for conceptual patterns and linkages enabled me to uncover "underlying meanings of the words or the content" and see broader themes (Hsieh and Shannon 2005, p. 1284).

3.4 Limitations

Findings from studies that employ a summative content analysis are limited by "their inattention to the broader meanings present in the data" (Hsieh and Shannon 2005, p. 1285). This limitation can be mediated by showing that the textual evidence is consistent with the interpretation. Use of a peer debriefer or member checking with participants is a mechanism to demonstrate credibility (Hsieh and Shannon 2005). The latter option (member checking) was not viable, as the survey was anonymous; however, the researcher employed a peer debriefer during analysis, thus contributing to researcher confidence in the coding process and contributing to the trustworthiness of the findings (Onwuegbuzie and Leech 2007).

Another limiting factor of this study is its use of one institution for collection of data. Future study should seek a larger random sample of institutions. Further, respondents may have attempted to provide answers that make themselves appear more socially responsible. While this effect is mitigated by individual anonymity, future survey administration should be coupled with the use of a social desirability scale will help to determine the degree to which this bias exists. Finally, the study is limited by "nonresponse bias" (Groves 1989)—the inability to determine which potential respondents declined to participate. It is not evident the extent to which those who participants were more likely to be stakeholders who are involved in

[1]Findings from the quantitative analysis have been reported elsewhere (see DuBois and Dubois 2010).

sustainability initiatives. However, that some respondents (9 %) knew nothing about sustainability suggests that a cross-section of perspectives were captured.

4 Findings

4.1 Meanings of Sustainability

When respondents were asked "what does sustainability mean to you?" they focused on a "better" world and future. Illustrative data excerpts include, "making the world a better place for the generations to come and making the world last a little longer;" "help the world be a better place by taking care of it;" and "keeping things nice for the future!" This "better" world and future would be realized, according to respondents, through various efforts, ranging from "not doing more harm to the Earth," to "helping to keep the Earth clean;" from "protecting the environment" to "caring about our future and taking precautions now." Largely, however, respondents' understanding of sustainability was dominated by the 3 Rs: recycling, reducing, and reusing. Or really, one and a half Rs—recycling was most evident, with some attention to reducing, and minimal attention to reusing.

4.2 Recycle

Recycling was overwhelmingly the main point of emphasis in the data. Recycling was mentioned over 1000 times in 82 pages of data generated by more than 500 respondents. Many respondents simply wrote the word "recycle" in response to what sustainability means, or what they do—or needed to do—in their daily lives, or what is a "green behavior" that they or others could adopt; however, others elaborated. They described the importance of providing recycling bins[2] in the residence halls (and elsewhere on campus), as this is "motivating students to realize what they can do to help change the path America is on;" the presence of these bins cultivates "the habit of recycling for later in life;" and one respondent connected these habits to her academic discipline: "I am a design major, and a big part of our projects is to use materials in a sustainable way and to come up with new ways to use recycled materials."

4.3 Reduce

Many respondents identified "waste" as a significant problem and delineated ways to reduce consumption and waste. These data excerpts are illustrative:

[2]Residents are provided one trash receptacle and one recycling bin in every residence hall room.

- Take shorter showers, use sun light as desk light, turn off computer screens, and keep the laundry room light out.
- I always take the stairs, turn off lights, and unplug appliances not in use. I don't leave water running, I wash dishes by hand, and at home use a low-pressure shower head (maybe those could be incorporated into the residence halls) and my car gets about 40 mpg highway which isn't too shabby.
- I bring my own grocery bags (not just in grocery stores but all kinds of stores), adopt a vegetarian diet, eat local when available (which is somewhat limited in this part of the country), use energy-saving bulbs, walk when possible, purchase items with minimal or recycled packaging, use the least chemicals as possible.

Intriguingly, several respondents also pointed to the use of posters in the residence hall to promote sustainability initiatives as wasteful. They observed that posters are vandalized and/or eventually discarded, and the environment would be better served by eliminating the use of posters, and replacing it with electronic communication. This observation regarding what an entity (larger than an individual) could, or should, do is a point which is discussed later in this paper.

4.4 Reuse

Less evident in the data were references to reuse. A few respondents described using—or their intent to use—"reusable water bottles;" or "reusable mugs for coffee;" or "reusable bags at the store." One respondent mentioned reading newspapers discarded by others, and another identified shopping at Goodwill.

4.5 Beyond Environmental, Beyond the Individual

As described above, the weight of evidence was on the environmental dimension of sustainability, and it also emphasized individual action. Yet, the literature on sustainability illuminates the intersections of environment with economy and equity/social; and how sustainable actions must extend beyond individuals' efforts to discuss institutional impact and systemic change (Lowenstein et al. 2010; Miller et al. 2011). Knowledge extending beyond environmental understanding and skills beyond individual actions were less evident in the data, but are important to consider, in light of students' developing competence for sustainability.

As noted above, students' definitions of sustainability and examples of how, in their daily lives, they promote sustainability centered on individual actions that benefit the environment. Yet, when asked what was environmentally damaging, on campus and in the world, students named broader, systemic concerns. For instance, in the world, students identified the following issues: global warming, fossil fuels, deforestation, and industry. On campus, they observed the following problems: not having individual controls over temperature; inefficient electrical use, and not only on an individual level, but that the institution failed to do enough to manage when

lights would be on or off. Students also identified pollution as a significant issue, from too many cars on campus, to the "smog" generated by the campus buses. Paper waste was deemed problematic, namely the failure to replace hand towels with hand dryers in the bathrooms. The dining facilities were also cited for troubling choices, such as using Styrofoam "to go" containers.

These examples illuminate that students understand sustainability issues more broadly and deeply than just the 3 Rs. However, they may over-conflate environmental (and individual) dimensions of sustainability, and not have the language to express economic, equity/social, or institutionalized dimensions of sustainability, or the skills to apply such knowledge. Thus, when considering EFS and the development of sustainability competence, educators must consider what do we want students—citizens—to have competence for? Sustainability competence—knowledge, awareness, and skills—could risk being diluted into environmental knowledge, awareness of individual actions that are environmentally damaging, and skills in little more than recycling and reducing.

5 Sustainability Competence for What?

In this section, the sustainability competencies evident in the data are discussed relative to the question: "to what end?" To what degree will students use their sustainability knowledge to question the status quo and seek alternative solutions to age-old problems? How will students deploy their sense of agency and to what ends will they be committed? How will students interpret "the right thing" and how will they endeavor to "help" the environment? How "deep" is their competency for sustainability?

5.1 Expanding Knowledge

Students' knowledge was rooted primarily in environmental dimension of sustainability. They articulated knowledge of environmental problems, including global issues such as deforestation and pollution, and campus issues such as electrical inefficiencies. The majority of respondents defined sustainability as keeping their environment clean; conserving resources; and related efforts that individuals must in initiate to ensure the world is "better for our children." Yet, they also had insight about how organizations contributed to sustainability problems. For instance, citing the Dining Services, one respondent wrote, "Transport and production of foods for campus and on campus is environmentally irresponsible," while others criticized use of Styrofoam and called for "packaging that biodegrades quickly." Other respondents cited concerns related to residence life practices, such as the use of posters described above. Still another respondent expressed cynicism that campus "efforts to 'go green' are motivated by the green money rather than altruistic reasons." Notably, however, this organizational knowledge was limited as

compared with knowledge of individual sustainability behaviors, and the capacity to convert this organizational knowledge into actions was invisible in the data—a point to which this paper returns later in discussion of "skills."

Sustainability knowledge must be expanded to include attention to the historical, social, and political context of sustainability; what Cohen (2007) calls systems thinking. It must include a critique of anthropocentrism—the "pervasive belief that nature is solely a resource for human use," of androcentrism—the belief that men are superior to women (Russell and Bell 1996, p. 173), and of ethnocentrism—"the belief that some 'races' or cultures are morally or intellectually superior to others" (Lowenstein et al. 2010 p. 102), and the impact of these ideas on sustainability. Further, it must demand an examination of the power relationships at work in the environmental, institutional and socio-cultural contexts in which sustainability work occurs (Lowenstein et al. 2010; Russell and Bell 1996).

5.2 Expanding Awareness

It is argued that our knowledge about and relationship with nature is tied to self-awareness. Thus, sustainability competence must involve the development of students' awareness of their own assumptions, biases, and values. Yet, this domain of sustainability competence was less evident in the data. For instance, many respondents indicated that "people should be more aware;" yet, their calls for increased awareness seemed synonymous with (lack of) knowledge rather than with raised personal or social consciousness. Some respondents cited caring for the earth —"it can't save itself," or a "lack of feelings toward the environment" as an important aspect of sustainability. Many believed that the residence life sustainability efforts were evidence that the university "actually cares…not only for their wallet but for the environment." Residents' participation in sustainability initiatives "shows that the young people of this country are caring." Another respondent emphasized "Caring about the present, including all the people in the world that you don't know. Caring about the future generations… I don't want to have as much to be blamed for as other generations."

A raised, and critical, consciousness that might yield a deep shift in perspective (Cohen 2007; Miller et al. 2011), is under-developed in this campus', and likely on most campuses' sustainability efforts. As one respondent astutely observed, sustainability "means changing the way we view the world;" yet, the extent to which EFS teaches us "to suspend our own … assumptions, to avoid using our status or power to dominate others, [and] to develop empathy for [others'] values and positions" seems limited (Cohen 2007 p. 86). We must then identify mechanisms by which students can develop critical consciousness, environmental empathy, and compassion (Cohen 2007), in an effort yield affective learning outcomes (Shepard 2008). This expanded sustainability awareness "provides powerful motivation" for taking action and deepens the commitment to apply knowledge (Eyler and Giles 1999, p. 157; Emanuel and Adams 2011).

5.3 Expanding Skills

Sustainability skills are the "know how" to manifest actions that reflect one's knowledge and awareness. Resonating with Sipos et al.'s (2008) use of the hands metaphor for sustainability skills, one respondent described sustainability as being able "to take the earth into your own hands." Yet, respondents' practical application of their sustainability knowledge (and awareness) was largely evident in descriptions of individual actions. For instance, in response to the question, *what do you do in your daily life?*, respondents focused on how individual actions can 'solve' sustainability problems. While respondents had knowledge of organizational practices that were detrimental to sustainability, as described above, they do not articulate the skills to facilitate structural change. This distinction is most prominent in their responses to the question about what green behaviors they will adopt in the coming year. Most describe individual actions e.g., drive less, walk more, eat local, turn off lights and electronics, use less water, and recycle, among other individual efforts. Some also describe their intentions to educate others, i.e. plans to "get my Mom to recycle at home," or "getting my roommate to turn off lights when not in the room." However, when respondents describe organizational efforts that are needed (e.g., reducing Styrofoam products in the dining hall, designating a "lights out" time in the residence halls, putting hand dryers in the bathrooms), these are described using third person, they or it. Most students appear to have individual efficacy for environmental dimensions of sustainability (i.e. skills for recycling or energy reduction), but have little opportunity to develop the capacity to influence collective action or change on their campuses. Thus, EFS must develop skills that will prepare individuals to effectively intervene at not only individual levels (e.g., my personal decision to reduce, reuse, or recycle), but also the capacity to confront systemic factors and operate as a change agent at institutional levels. Further, skills must address not only environmental concerns, but also equity and economic sustainability.

6 Implications

The findings reported above resonate with others who have described similar results: students demonstrated a dominance of "conserving behaviors," and few report "taking initiative" behaviors (Ones and Dilchert 2012). Further, some have shown that increased awareness and understanding, and even "favorable attitudes toward sustainability" and motivation to act accordingly, "rarely lead to changes in behavior" (Zint and Wolske 2014, p. 190). However, some optimism can be found in the weight of evidence for individual environmental competence as seen through the respondents' stated commitments to recycling and reducing. Further, their knowledge of institutional practices that run counter to sustainability goals calls us to consider how EFS could yield "deep" sustainability competencies. Here, implications for EFS are considered that might hold transformative potential.

6.1 Developing "Deep" Competence

In EFS, such as the co-curricular initiatives implemented by residence life, students are acquiring basic competence—knowledge, awareness, and skills—in sustainability. They articulated knowledge of environmental problems, at an individual, institutional, and global levels; and expressed commitment to individual "green" behaviors (i.e. recycling). Yet, to deepen their knowledge, awareness, and skills, so that students can develop and apply their sustainability competence beyond the immediate context (in this case, the residence halls, but could also be the context of their academic disciplines), students must have iterative learning opportunities. One (or even several) initiative(s) in the residence halls, implemented consistently each year, does not afford students the opportunity to engage more deeply in a subsequent year, or differently depending upon their class standing. Educators need to consider if/how the fourth year student's experience is, or could be, different from the first year student's experience. Similarly, in academic disciplines, educators would be wise to consider how to sequence learning from one class to the next, or one year to the next; for one class may be a powerful starting position, but is insufficient.

The ability to achieve deep learning could be undermined by the competitive nature of the residence hall initiatives (or any incentivized learning); students may be demonstrating *strategic* learning, in which students can maximize achievement with minimal effort, and have no deeper learning that extends beyond the immediate context (Warburton 2003). To facilitate deeper learning, and thus deep competence for sustainability, educators are encouraged to devise more opportunities for EFS to deploy experiential learning, but to adopt a justice-oriented approach that will challenge students beyond personally responsible actions, to challenge existing social and political structures (Westheimer and Kahne 2004). Whether this occurs in curricular contexts (i.e. through use of service-learning), or through more purposeful intersections between curricular and co-curricular learning, such experiential opportunities would enable students to apply what they are learning, not only individual actions, but also skills to challenge institutional practices (Wals and Jickling 2002). Further, it is important to incorporate reflection into the design of these learning opportunities, as the development of reflexivity is essential for cultivating critical consciousness for *deep* sustainability awareness (Miller et al. 2011).

6.2 Politicized Ethic of Care

Approaches to EFS are needed that develops in students the capacity for moving beyond individual level competence (i.e. *I will recycle*), to skills for taking institutional level actions (i.e. *I will advocate for changes in institutional practices*). To achieve "deep" sustainability competence, educators must politicize sustainability; not to preach an ideology, but to illuminate the political issues surrounding sustainability, and prepare students for environmental political participation (Levy and

Zint 2013). Such a capacity emerges from not only political knowledge, but also personally meaningful awareness of sustainability, and the skills to pressure their governments to work for needed environmental change (Levy and Zint 2013). This is what Russell and Bell describe as a "politicized ethic of care" (p. 175).

To this end, EFS efforts would benefit from purposeful intersections with citizenship education. Eyler and Giles (1999) identify five dimensions that are viewed as the "means to the end of citizenship" (p. 156). These are (1) values: students' recognition of what "I ought to do" (p. 157); (2) knowledge: students' "expertise and cognitive capacity" (p. 159); (3) skills: students' "know how" and "confidence in their ability to act" (p. 161); (4) efficacy: students' "personal self-confidence" to "take the risk of involvement" (p. 161); and (5) commitment: the "urgency to do something" (p. 162). Varied conceptions of citizenship exist; yet, a growing body of work illuminates the need for citizenship education to move beyond personally responsibility to include enhanced social consciousness and the skills to take collective action (Iverson and James 2010; Westheimer and Kahne 2004). If our graduates are disengaged in socio-political affairs then they are going to be less-equipped at meeting the challenge of sustainability (Colby et al. 2010; Hamrick 1998). Thus, the efficacy to engage in environmental politics is essential for developing deep sustainability competence.

6.3 Developmental Readiness

Students will be at various levels of learning readiness. To illustrate, 9 % of respondents in this study indicated they knew nothing about sustainability and did not know how to define the term; and 5 % of respondents could not identify anything that they believed was environmentally damaging on campus. At the other end of the knowledge continuum were a handful of respondents whose responses suggested a deeper understanding. For instance, this one respondent acknowledged the three dimensions of sustainability:

> Finding a balance –economically, equitably, and environmentally –so that the earth can sustain the human race forever. Right now it would take 2.4 earths to support our population; that number needs to be less than or equal to 1.

Another respondent indicated her understanding developed before college: "I became 'green' when I was in high school."

Students bring a range of prior knowledge, learning styles, and levels of cognitive complexity to college. Thus, it is important for educators to be cognizant of students' "developmental readiness" (Gayles and Kelly 2007, p. 204) in their design and delivery of EFS. Failure to assess students' readiness can lead to student (and educator) frustration. As Wals and Jickling (2002) observe, educating about sustainability includes "deep debate about normative, ethical and spiritual convictions" and requires the "transformation of mental models" (p. 127). Some students will be resistant to EFS. Some respondents in this study expressed skepticism and criticism about environmental concerns, and the degree to which human impact was the

cause. It is important to carefully design curricular and co-curricular experiences that provide a balance of challenge and support for students as they "sort through the complex mix of feelings triggered when new information collides with unexamined prior knowledge" (Chick et al. 2009, p. 11).

7 Conclusions

In sum, this chapter described findings from a study of undergraduate resident students' understanding and behaviors regarding sustainability. Respondents' understanding of sustainability was overwhelmingly environmental (recycling, and reducing waste), and skills did not extend beyond individual actions. Drawing upon educational theories of deep learning and experiential learning, this chapter argued that sustainability initiatives must not only develop individual-level competencies (i.e. awareness of personal consumption, reduction of personal waste and energy usage), but also equip individuals to act at institutional and structural levels (i.e. advocating for changes in policy and practices). Approaches to EFS are needed that will yield sustainability competencies that not only enable individual-level capacities (i.e. awareness of personal consumption, reduction of personal waste and energy usage), but also to equip individuals to act at institutional and structural levels (i.e. advocating for changes in policy and practices). Such *deep* sustainability competencies will be more likely to develop "innovative change agents that the world needs today and in the future" (Dungy 2011 p. 272). This "politicized ethic of care" will enable students to identify and address issues that are "personally meaningful" but also to examine "the structures that contribute to the problem and our own role in perpetuating these structures" (Russell and Bell 1996 p. 175). This chapter calls for others to build upon the ideas advanced to fuel future scholarship and lively debate for how EFS can develop deep sustainability competencies. These competencies will not be developed in one course in one semester; as Case (2012) notes, engaging in critical self-reflection, dismantling oppressive structures, and taking vigilant action toward social change, is a lifelong process.

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