
Successes and snags of a sustainability course in higher education

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Abstract: By means of an action-research methodological approach, this article analyses the accomplishments and challenges of a university-wide course that offers sustainability theory and practice to help students adopt pro-sustainability behaviours and analyse public policies that seek to transform urban areas into truly sustainable places. Through the lens of the four pillars of sustainability – environmental, social, economic, and cultural – the course explores various topics related to sustainability (e.g., energy and water conservation; housing design and construction; transportation; social and biological diversity; and war and peace) but pays particular attention to the themes of education; food production; and intentional communities. Despite the popularity of the course, it has encountered various ideological and logistical challenges that at times have imposed significant constraints on the course's trajectory. The article examines ways of overcoming these obstacles.

Keywords: sustainability; higher education; university; college; curriculum; undergraduate course; service learning; community service; challenges; home environmental improvement; sense of place; manual work.

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1 Introduction

Sustainability promises to offer a new foundation for academic disciplines at the college level. The humanities, social sciences, natural sciences, mathematics, and the arts, all stand to benefit from considering the theory and practice of understanding the deep interconnections between environmental, social, economic and cultural systems. Sustainability can constitute a road map for revamping in an integrated fashion the university curriculum, research, campus operations, the university's financial investments, and university and community engagement, as numerous publications from around the world have made explicit (e.g., Martin and Samels, 2012; McMillin and Dyball, 2009; Rhodes, 2006; SEMARNAT, 2006). One of the areas that has received ample theoretical attention is the curriculum itself, both in terms of critiquing the lack of dialogue between the various disciplines and in terms of actual proposals for bringing these together (AASHE, 2010; Blewitt and Cullingford, 2004). Notwithstanding these theoretical advances, in actual practice most universities are still far away from reaching the goal of infusing sustainability throughout the curriculum and in ensuring that a true interdisciplinary curriculum becomes the norm (Martin and Samels, 2012). What do we mean by this? Essentially, colleges and universities have historically been structured as a co-habitation of disciplines in a single campus where there is little to no collaboration between faculty members across disciplines. As a result, faculty tend to provide highly incomplete answers to extremely complex societal problems, as in the case of an economist suggesting ways of increasing agricultural productivity by means of massive industrialisation without considering how such a strategy may affect the livelihood of peasant communities or the biological richness of the soil (for an expanded explanation of this example, see Orr, 1992, p.167). Under such a scenario the insights from a historian, a sociologist and an ecologist may assist the economist in deriving a more complete and accurate answer.

While faculty tend to readily acknowledge the importance of collaborating with other disciplines, numerous reasons prevent this from happening – including career-ladder incentives to publish in single-discipline journals, institutional inertia, a lack of a sense of urgency to make change happen, and a lack of know-how on how to bring about change (for an exploration of these and other limitations, see Chase et al., 2012). This paper

addresses this latter explanation, specifically by focusing on a higher education course that has as its main theme the theory and practice of sustainability.

While this paper does not focus on the larger theme of the importance of the philosophy and practice of an integrated sustainability curriculum that covers all disciplines at a university (for such a lofty goal, see Cortese, 1999), it does dwell on the achievements and limitations of a single course that practices interdisciplinarity entitled 'Sustainability and Education'. While the goal of the paper is modest relative to the larger imperative of creating a full-fledged framework of sustainability for a whole university, it nonetheless adds a much needed analytical element: It opens up the black box of a sustainability course to reveal its inner workings. This paper may benefit instructors and researchers interested in the field of sustainability as efforts are made in colleges worldwide to better transform the curricular content and the pedagogical process of each course.

The authors of this paper – who are also the same researchers and instructors – used action-research methodology to analyse their course (Stringer, 2007). Action-research methodology enables researchers to investigate their own site of work (in this case, the course itself) through the systematic collection of data to improve their praxis. As is common in action research in education, instructors collaborated with students to improve their course, attempting to make it interesting, up-to-date, hands-on and relevant to the students' daily lives. The main sources of data used were the end-of-semester evaluations by students, along with journal entries kept by the students and instructors. This paper is divided into three sections: The first one offers a brief exploration of the concept of sustainability, including criticisms levelled against it; the second one provides a detailed description of the course, including goals, service learning activities, and required books; and the third section analyses key ideological and structural issues that have surfaced during the semesters the course has been taught.

2 Sustainability as a conceptual framework

As a result of the Brundtland Commission of 1987, the concept of 'sustainability' acquired a whole new connotation, from being an unexceptional noun that simply meant anything that could be sustained or upheld over time to a revolutionary concept that took into account the interrelationships between people, environment, development, and future generations (Bookhart, 2012). Other groups took this connotation even further and pushed the boundaries of the environmental movement to go beyond the environmental realm and the protection of fauna, flora and biodiversity to include such issues as social justice, economic fairness and biocultural diversity.

Sustainability has become over time such an all-encompassing term that it has elicited critical responses from a number of observers (for a thorough critique of sustainability, see Oosterman, 2008). The main criticism is that unless the subscriber of sustainability is not constantly vigilant about its definition and practice, sustainability turns into a totalising experience that means everything and nothing at the same time. In many ways the concept has become such a buzzword that it has lost its meaning through overuse. More alarmingly, critics claim, sustainability is such a cure-all term to all the environmental, social, economic and cultural malaise affecting our societies (as we will see below) that its amorphous political agenda has been appropriated with almost religious zeal by capitalists, socialists and anarchists alike.

Despite this important critique of sustainability, we still consider it a highly useful term because sustainability helps in understanding the inter-relationships of the various dimensions affecting complex problems. In fact, it is telling that beyond the Brundtland Commission's well-known definition of sustainable development, sustainability itself is a polysemous term with many different definitions and interpretations, and perhaps, at the end of the day, that is highly advantageous. Advantageous because in the moment sustainability becomes defined by one specific set of factors at the exclusion of others, it reduces its scope to such a degree that it goes back to the one-dimensional strategy of yesteryear, along with its faulty analyses of entrenched and multi-faceted societal problems.

To facilitate an understanding of the various dimensions involved, sustainability has been organised into four pillars: Environmental, social, economic, and cultural (UNESCO, 2007). While different theoreticians and practitioners have placed emphasis on different pillars, depending on their needs and interests, for the purposes of our course we have decided to stress as much as possible all four pillars of sustainability simultaneously, as expounded by the United Nations Decade of Education for Sustainable Development (UNEP, 2002; UNESCO, 2007). The four pillars are:

2.1 Environmental pillar

We placed this pillar first to emphasise the importance that all human endeavours have an impact on the environment. At the same time, a healthy environment assists with the well being of the other three pillars; that is, without a wholesome natural environment the other pillars have much-diminished chances of survival. In terms of the themes explored in our course, key ones are climate change, energy; air and soil; water; solid waste; and biodiversity.

2.2 Social pillar

This pillar opens up the possibility for public participation in public affairs and for citizens to actively forge the creation of democratic societies. It seeks to combat classism, imperialism, colonialism, militarism, racism, sexism, homophobia, and other forms of oppression that seek to subjugate peoples worldwide. In terms of the themes explored, in addition to the ones just mentioned, this pillar addresses education and learning; health and wellness; food and nutrition; and poverty and homelessness.

2.3 Economic pillar

The key concept here is the fair distribution of resources through the development of an economic system that emphasises the sustainable production and consumption of goods and services. It analyses economic globalisation policies while supporting local economies that enable communities to be self-reliant for as many basic needs as possible. This pillar focuses on fair salaries; healthy and safe working conditions; the role of unions and labour agreements; and life cycle analysis of products, including cost-benefit analyses.

2.4 Cultural pillar

This pillar is based on the defence of cultural diversity, human rights, and intercultural dialogue. The concept of ‘progress’ is challenged as an adequate strategy for contemporary societies, and instead of having First World countries be the model for other countries to emulate, this pillar understands that societies’ different historical and cultural trajectory also entails a different form of development. Themes that are developed here include the arts, entertainment and creativity; history and heritage; active citizenship; and human diversity in all its forms.

While the idea of the four pillars is useful from a conceptual standpoint because it helps to clarify the various issues to be considered, sustainability is actually driven by the integration and connections between and among these pillars. Consequently, in the course itself we analyse three main sociological dimensions – education, food, and intentional communities – and we study these through the lenses of the four pillars.

3 Description of the course ‘sustainability and education’

‘Sustainability and education’ seeks to explore the complex web of relationships between environmental, economic, educational, and social systems. The course is divided into two main themes:

- *foundations of sustainability and education* – which focuses on the history, definitions, and competing paradigms related to sustainability and formal education
- *key issues of sustainability*– which focuses on topics such as sustainable energy; production and consumption; water; construction of built environments; and transportation, but it particularly studies three main issues, namely education, food, and intentional communities, through the prism of the four sustainability pillars.

The course requires students to reflect on personal behaviours while at the same time inform students about public policies from around the world related to sustainability.

The course was originally taught at the graduate level for Master’s and Doctoral students. Given the success of the graduate level course during its initial year, as measured by its excellent student evaluations, an undergraduate version was created that was opened to the entire university community. Since then, the course has been taught every semester since 2009 for a maximum number of 35 students. The number of students has been purposefully kept small to ease coordination of the service learning activities and to ensure students’ maximal participation in them. The course has had students from all disciplines but particularly from education, sociology, engineering, business administration, and psychology. The course is currently an elective but at the university there have been talks to create a mandatory course on sustainability for the entire student body.

The goal of the course is to provide a foundation for a broad definition of citizenship, so to better understand how one’s duties extend beyond the narrow notion of civic duties (e.g., respecting traffic lights, not loitering, and voting in elections, as important as these actions are) to one of planetary duties in which we understand and account for decisions related to sociological dimensions affecting us on a daily basis. Simultaneously, we look

at the role that education ought to play (and sometimes currently plays) in fostering a new sustainability consciousness and practice. A mix of theory and practice is used to examine individual behaviours, institutional strategies, and public policies that minimise our ecological footprint on the planet, support biological and cultural diversity, and promote an equitable distribution of material wealth for all individuals.

In terms of pedagogy, there are three main educational philosophies that instructors employ in this course:

- Essentialism, in which instructors select the content that they then teach in a lecture format. This is the standard format in many college courses (Hirsch, 2006).
- Progressivism, in which students select part of the content and it is either studied by the entire class or just by the students who suggested the topic, and it has a strong hands-on component (Dewey, 1916). For instance, on one occasion an architecture student wanted to study in-depth the merits and problems with LEED (Leadership in Energy and Environmental Design), a widely used green building certification program in the USA and some other countries; as a class we discussed the idea and ended up adopting it for the whole class, and the student who suggested the topic became the main instructor for that portion of the class and as a whole class activity we analysed and critiqued LEED as a design and construction model.
- Social reconstructionism, in which an important component of the course involves service learning activities that are intended to instil in students a sense of civic engagement and empowerment for improving local communities towards environmental, social, and economic sustainability (Stanley, 1992).

3.1 Service learning

An integral part of the course revolves around service-learning activities that are tied to required readings and class discussions (for the value of service learning and civic service in general, see Arenas et al., 2006). These activities are mandatory and a main purpose of them is to teach hands-on, practical experiences that students can then apply in their daily life. Every semester instructors choose two or three activities based on their knowledge, skills and contacts in the local community. Here is a brief description of the main service learning activities that have been employed in the course:

3.1.1 Home environmental improvement

In this activity students spend one weekend at a local home doing environmental improvements to save on electricity, water, and gas usage. The improvements are done at the home of one of the students or at a local home in from the community. The instructor and students put in the labour, know-how, and tools whereas the homeowner pays for the needed parts. Prior to the visit, the instructor discusses with the students in class about the importance of environmental repairs, retrofits, and low-cost garden strategies to save on energy and water, and the long-term economic savings for the tenant. The instructor then does a prior visit to the home to make sure there are enough activities for a class of 35 people. Ideally, there should be two homes to divide up the class. Once there, the class engages in the following improvements as needed based on a visual inspection and by using a blower door test to help determine the home's airtightness: blow insulation in the

attic; inject insulation foam in electric outlets; add silicone or caulking to cracks around windows; install CFLs and/or LED light bulbs; clean the refrigerator; replace air filters from AC unit; install a clothes line; check and repair leaky faucets and pipes; install water-saving devices such as low-flow shower heads and faucet aerators; place plastic bottles in toilets tanks so that they use less water per flush; plant trees on south, west and east sides of the home for passive cooling and heating; and install a compost bin.

3.1.2 Community farm

In this activity students spend one full day working at a local community farm. The farm belongs to the regional Community Food Bank, which provides educational opportunities for the community at large. On a volunteer basis, the farm staff provides workshops to our students on how to grow food in the desert in a sustainable manner. The farm staff accomplishes this by teaching students about organic food production, composting, ecological restoration, sustainable site design, and permaculture. The farm also serves as a demonstration site for organic beekeeping and chicken raising, and has interesting ecological features such as composting toilets, all of which is taught to students as well.

3.1.3 Internships at local sustainable organisations

In this activity students spend up to 20 h volunteering at a local organisation that engages in sustainable social, environmental or economic activities. The instructor comes up with a list of organisations (or students may suggest some), but it is the students' responsibility to establish the initial contact. In each organisation there can be up to three students participating. Some of the organisations that have hosted students in the past have included one that specialises in teaching residences and businesses on how to save water (including rainwater harvesting); an NGO that teaches bicycle repair and bicycle recycling; various groups that organise festivals throughout the year, including those supporting peace, water conservation, and the arts; an NGO that supports refugees in the city; a group that supports the homeless; and so on. At the end of the internship, students must submit a 'confirmation form' completed/signed by the person they worked most closely with during the internship, along with an essay reflecting on their experience and an oral presentation.

3.1.4 Neighbourhood water harvesting map

In this activity students spend one full day at a local neighbourhood mapping out specific types of water harvesting features present there and their precise location. Prior to the visit, the instructor and a small group of students attend a neighbourhood association meeting to better understand residents' perspectives on water harvesting and to discuss why the mapping will benefit the neighbourhood, as well as logistical aspects of the project so the intentions of residents and students coincide. The instructor discusses the role of community engagement in effective sustainable practices for both passive and active water harvesting methods. Data collection procedures, including a set of symbols to represent each type of feature, are discussed. The instructor provides students with a neighbourhood map that is used as a reference, and the students are then divided into seven groups of five. Each group (armed with a data collection map, a neighbourhood map, and a camera to document each feature) is assigned to one of seven neighbourhood

sections. All students record the water harvesting features they come across to eventually create one single collective map per group. At the end, the class meets with residents to share their results to better improve the neighbourhood's water collection efforts.

3.2 Required readings

In terms of readings, instructors use four main books, each focusing on a different aspect of sustainability. At every moment we invite students to challenge the contents of the books and to offer critical perspectives on them. The first one presents a general view of sustainability while the next three address a specific aspect of sustainability.

- Orr (1992)

This book offers a foundational basis for critiquing modernity and presenting a bird's eye view for how a new society based on sustainability can be envisioned. While the main focus of the book is a critique of the formal system of education for ignoring the social and environmental malaise that affects the planet, Orr offers a much wider wake-up call to fully engage ecological literacy beyond the walls of schools and directly into our public policies, daily behaviours, and communities.

- Pollan (2007)

Pollan's book introduces the first specific sociological dimension that the course discusses in depth: food and food policies. By analysing the content of four different meals – a fast food meal; an industrial, organic meal; a local, small, organic meal; and a hunter-gatherer fare – the book presents a tour-de-force starting with the source of the ingredients all the way to the moment the meal is consumed. He explains how the foods Westerners consume have changed more in the last 50 years than in the previous 10,000 years, forcing readers to confront their own blind spots on the food choices they make. Excerpts from the book are explored in the discussion of the 'Community Farm' service learning activity.

- Zehner (2012)

Zehner's book critiques 'green' alternatives to fossil fuels that are generally touted as solutions to the energy crisis and climate change. By analysing the side effects and limitations of solar cells, wind energy, and biofuels, Zehner concludes that the solution lies in changing consumption patterns more so than in switching to new, renewable technologies. This new sustainable consumption must be aided by progressive social and economic policies that view issues such as women's rights as a fundamental basis for action. The service learning activity "Home Environmental Improvement" benefits from several of the chapters of this book.

- Weisman (1998)

The course ends with Weisman's portrait of Gaviotas, an intentional community in the eastern plains of Colombia that against all odds – endemic violence from paramilitaries and guerrillas; an extremely harsh environment in a nearly uninhabited place; and a constant lack of resources – has become a vibrant town that has been called by the United Nations as a model sustainable community for the world. Founded by one of the most extraordinary inventors of the 20th century, Paolo Lugari, Gaviotas has become one of the most hopeful social and environmental stories ever told. The concept of inventing and

re-inventing community, a key theme of the service learning activity “Internships at Local Sustainable Organisations” finds great support in this book.

4 Issues encountered

To analyse the various issues we encountered, we used the end-of-semester evaluations by students from 2012 until 2014. As part of the evaluations at the end of the semester, students were asked the questions below (to assist students recalling events, they used their syllabus and notes):

- In what specific ways, if any, did the course help you understand the theory of sustainability?
- In what specific ways, if any, did the course help you put into practice in your daily life any issues related to sustainability?
- In what specific ways, if any, did the course help you analyse things in your everyday world through a lens of sustainability?
- In what specific ways, if any, were the service learning trips/hands-on activities useful to your understanding of sustainability?
- What would you do differently to improve the course?

In addition, students and instructors were informed to keep journal entries throughout the semester on challenging aspects of the course and ways in which it could be improved. These entries also date from 2012 to 2014. Below are the comments that occurred most often from the data, which were then organised into key themes, as suggested by Stringer (2007).

4.1 Ideological conflicts

Sustainability is inevitably infused with a set of values and beliefs related to social and environmental justice, equity and fairness, poverty alleviation, the role of science in society, and the type of society we ought to create (Jucker, 2002). In the context of the USA, sustainability has become highly politicised and one’s beliefs that social and environmental problems are something we should worry about depend greatly on one’s political orientation. For instance, a 2014 Gallup poll (Saad, 2014) on climate change in the USA found that whereas 57% of respondents blamed humans for climate change, this percentage varied significantly depending if a respondent was a democrat (79%) or a republican (41%). It should be noted that since the course is an elective one, it naturally attracts students who are already concerned with sustainability issues, but not uncommonly it also attracts students who are sceptical of the information presented. Consequently, this combination leads to fascinating debates in class that are not easily resolved. As one student wrote in his end of the semester evaluation (Course Evaluation, 2013):

“I enjoyed this course but there are certain issues that the instructor took for granted that are far from resolved. Case in point is global warming. There is still too much uncertainty. For future semesters I suggest for the instructor to be more objective and present the other side more fairly.”

As a result of comments like this one, instructors tended to be more cautious on how they presented controversial material. For instance, as one instructor wrote in his journal entry (Journal Entry, 2012a),

“M. [initials are being used to keep his identity anonymous] is a fantastic student and I could see how he was struggling to understand the material of climate change. He has shared in class how he has a conservative philosophy of life and how he distrusts the idea that global warming is caused by human activities, but at the same time he has shown an open mindedness and a diligence to understand the material that self-professed liberal students have not shown.”

Interactions with students such as M. make for a more interesting course. At the same time, it means that teachers should not avoid presenting material that some students consider controversial – which climate change is not, but students like M. did believe so – but it does mean that they have to be attentive not to alienate students who may harbour an ideology that contrasts with that of sustainability. This involves several strategies, including

- welcoming diverse opinions from the student body but noting that, depending on the evidence, not all opinions are equally valid
- investigating with the student body how politicised climate change has become in the USA and contrast it to how it is dealt with in other industrialised countries
- stressing that the vast majority of scientists support the idea of human-caused climate change, and that an increasing number of sceptics that used to decry the anthropocentric causes of climate change are now embracing it
- designing and proposing possible solutions (Cutraro and The Learning Network, 2014).

4.2 *Manual work*

One of the differences between this course and others at the college level is its emphasis on manual work. Historically, the liberal arts have given more importance to lecture-style presentations and intellectual discussions than to hands-on, experiential education. In this course we have attempted to create a better balance between hand, mind, and community, following John Dewey’s dictum that “the aim of work is not the economic value of the products but the development of social power and insight” (Arenas, 2008, p.381).

Of the various service learning activities that instructors organise every semester, the “Home Environmental Improvement” activity is the one that demands from students the greatest variety of manual skills. From mixing the cement that will hold down the clothes line poles to blowing insulation in the attic to installing low-flow showerheads, each mini-activity requires a level of knowledge and skill that many students have not experienced before. Given that this service learning activity involves skills that have been traditionally dominated by men, female students tend to report the greatest satisfaction and a sense of empowerment. As one female student reported (Course Evaluation, 2012),

“What I loved most about the course was working with my hands. In my house, my brothers and dad fixed everything. My mom and I did the more stereotypically female chores like cooking and washing clothes, but we never had to fix the car or anything like that. When we went to Kathy’s house [the

home where the activity took place] for the first time in my life I handled a blower [to blow insulation in the attic] and that was tons of fun! The day I own my own home, I will make sure it has enough attic insulation. If not, I will blow it in myself!”

Female students were not the only ones to express great satisfaction with the manual activities. Other students expressed orally how much they enjoyed leaving the classroom and university campus and going into the community to work there. The following comment reflects the general mood:

“Spending a whole Saturday at the Milpitas [Community] Farm, with a shovel and a pick, was extremely invigorating. We learned lots about farming, and it felt really good to be sweating in the sun.”

Another student expressed how the farming activity inspired her to start a vegetable garden at her own house.

“Shoveling the manure to eventually make compost that was then used at the [farm’s] vegetable plot felt extremely good, especially because we tasted the veggies that had been planted. We could see the entire cycle of gardening in one single day! I liked this activity so much that I will start planting tomatoes – not more than that at first, but it’s going to be a very good start.”

4.3 Evolving, incomplete and uncertain knowledge on sustainability

The implementation of new technologies in the context of sustainability involves, by definition, long-term considerations, and the Precautionary Principle inevitably comes into play. Too often modern public policies require a black or white answer to a specific social or environmental problem, but too often the answer is greyer than anything else. Knowledge on sustainability is continuously evolving and it tends to be incomplete and contradictory, which leaves policy-makers in a state of uncertainty (Grunwald, 2007). This poses a dilemma to instructors, who

- are not experts in certain knowledges and technologies
- do not have the time to do research on their own regarding the merits (or lack thereof) of new technologies
- are exposed to a plethora of available studies that reach contradictory conclusions which can greatly confuse instructors and students alike.

A case in point is hydraulic fracturing (commonly known as fracking), the rupturing of rock layers by pressurised fluid. In 2013 almost 70% of natural gas in the USA was extracted in this manner (US Department of Energy, 2013). In one given semester when fracking was being taught, two different studies from reputable institutions were published with highly contradictory results, one supporting fracking, the other rejecting it. At the end of the lesson the instructor and students were clearly confused whether or not to support it as a policy. As one student noted in his journal (Journal Entry, 2012b),

“So what does this all mean? Clearly there are health and environmental implications to using fracking. But the alternative, which is to use more coal, is not any better. And you [referring to the instructor] even talked about the possibility of earthquakes caused by fracking. So at the end of the day, I’m not sure what to believe.”

The instructor brought up this comment to the whole class and many felt a sentiment of intellectual impotence. The instructor agreed with them and concluded that such is the dilemma faced by supporters of sustainability, an answer that clearly left the whole class unsatisfied. To add to the challenge, the instructor himself did not understand many of the technical issues mentioned in the reports, and he was frank to the students about his ignorance, but he could sense that students themselves wanted a ‘yes’ or ‘no’ answer to fracking. An instructor’s journal entry expressed this ambivalence (Journal Entry, 2013a):

“Today was not a good class. I felt walking on quick sands when talking about fracking. And I cannot help but think of the advantages that the U.S. is accruing from the cheap gas, at least in the short term. Every day there are new reports coming out, some for, some against fracking. My sense is that the government as a whole should not engage in fracking until more experiments are done to make sure it is safe. ‘Wait for how long?’, asked J. To which I could only answer, “until we have more information on the matter.” The class ended and the feeling of uneasiness was still there.”

4.4 *A sense of place*

A hallmark of a course on sustainability is passing on to students a sense of place. The importance of place is often undervalued and ignored by academic institutions that tend to focus more on national and global concerns that leave little space for local issues. Part of the difficulty of including it in college courses (at least in the context of the USA) is that professors often find themselves working in cities where they did not grow up nor did they attend school there, and thus their knowledge of place is limited. This course was partly conceived to redress this issue. For instance, during the first couple of years when the course was taught, one of the required textbooks was *Coming Home to Eat* (2001) by Gary Nabhan (Nabhan, 2001), a pioneering book in the local food movement. The author chronicles a year during which he and his family ate a diet of native flora and fauna found within 250 miles of Tucson, Arizona where he lived. As a result of complaints from a large percentage of students who felt that the author was too preachy and offered excessive detail in each description, the book was replaced by Michael Pollan’s *The Omnivore’s Dilemma* (2007), a book that the vast majority of students greatly enjoy. Pollan’s book does not focus on this bioregion, though, and thus an important connection to place was lost, but instructors have compensated via the farming activity and teaching in class about native local and regional ethnobotany.

In this context the service learning activities were extremely important in helping students connect with place. As one student wrote (Course Evaluation, 2014):

“The SL activities were eye opening. I like that they gave me a sense of the Tucson culture and all that is has to offer. It also gave me ideas for additional volunteer opportunities.”

This positive experience was generalised in the evaluations of the other semesters. That is, students felt that the service learning fieldtrips were extremely important in connecting them with the locality (in this case Tucson) and with their own body, as when they mentioned how invigorated they felt when they had to do work with their bodies.

While the service learning activities do an important job at connecting students to place, the course’s curriculum could be improved to help students develop a sense of attachment to the locality (Shepard, 1998). For instance, few students know that this city is the oldest continuously inhabited settlement in the USA, going back possibly

as far back as 12,000 years. Also, few students understand the paramount role that mining, specifically copper extraction, has historically played in this region. This region is home to one of the largest copper mining operations in the world, and throughout the 20th century it saw labour strikes that led to watershed moments in the history of the US labour movement. Presenting this social history to students, along with the environmental consequences of copper mining, would be extremely important for better developing a sense of place.

4.5 Excessive focus on environmental sustainability

The sustainability movement in higher education has been deeply involved with the *environmental* dimension of sustainability, but the connections with the social, economic, and cultural dimensions, as exemplified by the four pillars of sustainability, still leave much to be desired. As Anthony Cortese wrote, college and university leaders who have embraced many tenets undergirding environmental sustainability still have not sought a concerted effort to integrate them with “socially focused movements such as civic engagement, social justice, economic development in impoverished parts of the USA and the world, and human rights” (Cortese, 2012, p.24). The problem stems in part from the fact that a large percentage of educators involved in the sustainability movement have originally come from the fields of science and environmental education, and given the fragmentation of disciplines there has been little contact between the social sciences and the natural sciences.

This course has not been immune to this problem, but instructors over time have attempted to redress the initial overemphasis on environmental issues by ensuring a better integration with social, cultural and economic issues. For instance, when the topic of sustainable transportation came up, originally only the environmental consequences of automobiles were discussed, but over the semesters instructors have included a much more comprehensive and holistic analysis, and now it is common for instructors to pose such questions as, “What are the political and social reasons for why the automobile has had such a predominant presence in contemporary societies?”; “What shifts (political, economic, social, and cultural) need to occur for modern individuals to embrace walking, bicycling and mass public transport as the main modes of transportation around cities?”; and “What specific strategies can the university adopt to increase the campus population usage of low-impact modes of transportation?”

Still, some students felt that the content and the service learning activities were still too focused on environmental themes at the expense of social and cultural ones. As one student wrote (Journal Entry, 2013b):

“I wish there were better service learning trips. I did not enjoy either one [referring to the fieldtrips which indeed all had an environmental focus]. I’d like to see more social things like maybe helping out at a homeless shelter or some other meaningful social service. EX: Beads of Courage, Ben’s Bells, Our Family Services, Casa Maria Soup Kitchen, Festival of Books [all social activities around Tucson].”

While the student did not mention it specifically in this entry, this student had already verbalised how the social and cultural pillars were lacking in the sustainability analysis in class. As a result of comments like hers, instructors attempted to be more cognizant of the imbalance and sought to remedy it by using the four pillars to analyse as many problems

as possible, and by offering more fieldtrips that did focus on social and cultural issues.

These include physical work at

- a local bicycle repair and bicycle recycling NGO
- a pedestrian and bicycle only downtown street festival that celebrates local sustainability efforts
- the community food bank.

4.6 *Challenges faced by instructors*

In this sustainability course instructors face a series of challenges that tend to be absent (or at least much less present) in regular, lecture-style courses with a bounded body of knowledge. These challenges are:

- a Given the importance of active, hands-on, experiential forms of pedagogy associated with sustainability, instructors spend an enormous amount of extra time organising the service learning activities, which often take place during weekends to be able to go outside the school campus. This additional effort goes unrecognised by the university under its current forms of evaluating ‘success’, given that academic institutions tend to equate faculty excellence with publications and the awarding of grants, and much less with creative, original, thorough, and hands-on pedagogy. This problem has been identified by others who are reformulating the purpose of the university along a new sustainability path (cf. Chase et al., 2012). As such, when an instructor goes above and beyond the call of duty, the institution offers no incentives to engage in alternative forms of pedagogy, making it more difficult for a course like this one to be replicated and sustained elsewhere.
- b Given the highly complex nature of sustainability, instructors regularly end up teaching material they are unfamiliar with. While guest lecturers can certainly alleviate this problem, it does call for innovative strategies in which instructors must invite students to become co-instructors and co-learners throughout the course, something which is not easy to do given the highly rigid roles that are often assumed by both students (as recipients of knowledge) and professors (as purveyors of truth), often leaving little intellectual space for ambiguity and uncertainty, which are hallmarks of sustainability (Grunwald, 2007). Instructors must be upfront about their limitations and instil in students a sense of responsibility as knowledge co-creators. Instructors can also use group work as an important strategy for responding to the reality that ignorance is an immanent aspect of the human condition.
- c Just as instructors may be unfamiliar with important aspects of the sustainability curriculum, they may also be ignorant about the accompanying manual skills that the course attempts to pass on to students. With regard to the visit to the Community Farm, this issue is attenuated given that they are organic gardeners themselves. However, for other areas of sustainability, say ecological design and construction for which the instructors may be unfamiliar with, they must rely on invited guests or even on students who may be more knowledgeable in these other skills. But nonetheless it always presents an additional challenge that sustainability instructors must face.

- d An issue that is highly relevant to the socio-economic context of the city where the university is located is how deeply ingrained its economy is to that of the US military-industrial complex. The largest private employer in the city is Raytheon, a major defence contractor and the largest producer of guided missiles in the world. Moreover, there are two large military bases in the area (one in the city itself and another one hour away) so it is not uncommon to have students in class who are military personnel themselves or who have family members who are in the military. A journal entry by an instructor reveals the complexities of the issue (Journal Entry, 2013a):

“I was hesitant today to talk about how Raytheon as a force of evil rather than a force of good in the world. I didn’t want to use my power as an instructor in ways that would alienate S., T., and P., all of whom I greatly enjoy in class and all of whom have relatives working at Raytheon. Nonetheless, I went ahead and I started my soliloquy by stating my unease about talking about an issue that touches the lives of several of the students in class. I personalised it by saying how I have cousins who are in the military, one of whom I like a lot, and how I myself, as a university professor, benefit indirectly from the grants received by the university from military contractors. Once I gave the disclaimer I went ahead and presented the facts. Then I allowed students to share their feelings and thoughts on the matter, and it went relatively smooth. S. surprised me by telling the class that her husband, who works at Raytheon but who also has a history of union activism, had qualms about working there but the salary and benefits were great and despite trying couldn’t find a comparable job elsewhere in Tucson.”

Many cities in the USA find themselves in a similar situation to that of this city, and it must be said that many sectors of the entire country also respond to a lesser or greater degree to the same logic of the military-industrial-academic-entertainment-media complex (Turse, 2008). These economic and social ties at times make it difficult for students who have a direct, personal connection to either Raytheon or the military to analyse the political, economic, social, and environmental consequences of the military-industrial complex with an impassioned, objective distance, and may end up feeling that the instructors’ analyses constitute a personal affront to them. Instructors have responded to this antagonism by letting students know that a genuine and honest discussion about sustainability cannot avoid the topic of War and Peace, and confronting head on the US military-industrial complex is paramount for advancing a new vision of sustainability that is inextricably linked to the defence of human rights. It must be said that the students’ reaction to this line of reasoning has been mixed and at least one has dropped out of the course in a sign of disapproval.

5 Conclusions

Many institutions of higher education recognise the importance of having courses with alternative contents and pedagogies that make a direct connection with real world situations. Even more so when these real world connections are tied to principles of sustainability, as an increasing number of colleges worldwide use these sustainability courses to be counted towards being considered ‘green’ and ‘sustainable’ by such assessment tools as AISHE from the Dutch Network for Sustainability in Higher Education; the ‘Green League’ from the British organisation People and Planet; the

‘Green Plan’ from the French Ministry of Ecology and Higher Education; the ‘UI Green Metric’ from Universitas Indonesia; and STARS from the American Association for Sustainability in Higher Education.

This paper has attempted to dissect a sustainability course to better understand its benefits and difficulties. As commented by the students in their evaluations and journal entries, along with the comments made by the instructors, it is a course that presents a series of challenges that regular courses do not exhibit. It is worth mentioning two that were salient, explained at length in the previous section:

- A course of sustainability that honours its theme has a strong hands-on component, which in itself poses a series of logistical challenges and extra work on the part of the instructor to make the experience meaningful and interesting to the students, especially when the course has a large enrolment, as in the case of this course.
- It forces instructors to deal with material they may be unfamiliar with (because it is a relatively new field); newer information and technologies displace older information and technologies that in themselves are relatively new (new LED light bulbs start to replace not-so-old CFL ones), which forces instructors to be constantly updating themselves; and studies conflict with each other, making it difficult for instructors and students alike to come up with a definitive answer, as in the case of fracking, mentioned before.

Despite the problems identified here, invariably a significant number of students said in their end of semester evaluations that it was one of the best courses they had taken at the university. We attribute this to the fact that the new generation of college students is avid to learn more about environmental issues, to be pro-active in improving their personal life and their communities, and to use their own hands to do so, which coincides with recent surveys on the attitudes of university students in the USA and elsewhere (Eagan et al., 2013). Equally clear is that instructors and institutions need to be patient with these courses, given that many mistakes will be made along the way, particularly in terms of keeping an adequate balance of the four pillars, and not just focusing on one or two of them at once. This specific course has been taught for five years and, as outlined in this paper, instructors have made numerous changes that it is hoped have improved the learning experience of the students.

In this paper we have focused on one single elective course located in a College of Education that attracts students from all over the university. But the elective character of this and other courses related to sustainability allow for a large percentage of students to graduate without a basic acquisition of sustainability literacy. Thus it is imperative for colleges to follow the example of the few forward thinking institutions that have made it mandatory for all undergraduate students to take at least one course that connects environmental, social, economic, and cultural dimensions in the context of real-life problems.

It should go without saying that making at least one course mandatory is only one first, very small step. STARS, of the Association for the Advancement of Sustainability in Higher Education, is perhaps the most comprehensive and sophisticated tool to date that assists colleges and universities worldwide – as of 2014, 650 universities from 17 countries had participated (AASHE, 2014) – to call for including sustainability in all areas of the university, including curriculum, research, daily campus operations, design and building construction, and college endowments. Only then will institutions of higher

education live up to its “profound moral responsibility to increase the awareness, knowledge, skills and values needed to create a just and sustainable future” (Second Nature, 1995, p.3).

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