An Evaluation of Environmental Content in the University of California, Berkeley's Undergraduate Curriculum

Andre Adao

ABSTRACT

Environmental education (EE) addresses human relationships with natural and built environments, awareness of environmental problems, and skills to combat threats to human health and environmental quality. Because environmental consciousness is important to the future of ecological sustainability, EE must be broadly included in higher education, but the degree of EE in the curricula of different academic fields is unknown. I evaluated the degree of environmental content and topics covered in courses across different academic fields at the University of California, Berkeley. I sampled undergraduate course syllabi and professors across academic disciplines in the natural sciences, social sciences, humanities, formal sciences, and professional and applied sciences. Using content analysis and surveys, I found that most courses do not emphasize environmental topics in the syllabi, yet more than half of the professors said they include environmental content within their courses. And those courses that did include environmental content did so in less than 20% of the lectures. The natural sciences and professional and applied sciences included the most environmental content in their coursework, while the formal sciences and humanities have the least. The most frequently occurring environmental themes are climate change, food, the built environment, sustainability, and the natural environment. Furthermore, most professors do not believe that it is a good idea to formally introduce EE into their courses; however, a greater percentage of professors in the social sciences (39%) and professional and applied sciences (34%) would incorporate EE into their course. From my findings I inferred that most academic departments are in one of the first four stages of innovation: (1) *lacking awareness*, (2) *awareness*, (3) *interest*, or (4) *evaluation*.

KEYWORDS

environmental education, sustainability, syllabi, content analysis, innovation theory

INTRODUCTION

Environmental education (EE) focuses on human relationships with natural and built environments, awareness of environmental problems, and skills to address threats to human health and environmental quality. Human individualistic behavior is one major factor driving over-exploitation of natural resources, effecting biodiversity loss, climate change, and water shortages (Rees 2003). Environmental education motivates actions of resources conservation (Uitto et al. 2011), making EE vital for achieving sustainability (Scott 2011). Although EE often focuses on science-based content, it also draws on the social sciences and humanities to examine issues of social justice, economics, politics, and culture (Roth 1969, Mckeown-Ice and Dendinger 2000, Cole 2007). Environmental education also addresses sustainability, encompassing the interaction of society, environment, and economy (Hegarty 2010, Rusinko 2010). Thus, the interdisciplinary nature of EE has enabled higher education institutions to incorporate it into curricula across many fields.

Environmental education has penetrated higher education in many forms. Because EE promotes behavior change in support of ecological sustainability, many studies suggest that EE should be implemented in university undergraduate courses (Cortese 2003, Lozano 2006, Lozano et al. 2011). Moreover, the United Nations formally recognized education as an integral instrument for environmental protection at the Stockholm Conference in 1972 (UNEP 1972), and many declarations and partnerships have been produced to foster EE and sustainability at the university level (Lozano et al. 2011). For example, many universities are signatories of the Talloires Declaration, which addresses educating environmentally responsible citizens (Lozano et al. 2011). In an attempt to proactively address environmental problems, the U.S. congress passed the Environmental Education Act of 1990, which allocates annual grants of up to $3 million toward the development of environmental programs (Lindsey 2011). For example, The University of California, Berkeley's law school, Boalt Hall, received funding in 1993 to establish the Bay Area Environmental Law Clinic, so students could practice fieldwork techniques in environmental law (EPA 2011). Many steps have been taken to promote environmental education and sustainability in universities, but the programs and levels of commitment vary greatly.

Institutions of higher education, such as the University of California, Berkeley have begun to embrace sustainability through curriculum, research, campus operations, community outreach, and assessment reporting (Cortese 2003, Lozano 2006). The College of Natural Resources offers ten undergraduate majors addressing biological, social, and economic approaches to environmental issues. The UC Berkeley Sustainability Plan addresses campus operations associated with energy, climate, water, buildings, waste, purchasing, transportations, food, and land use (Brooks et al. 2005). Furthermore, UC Berkeley is a participant of the American College and University Presidents' Climate Commitment (ACUPCC), through which the university has committed to mitigating carbon emissions through operations and curricula. As a signatory, UC Berkeley promises "to make climate neutrality and sustainability a part of the curriculum and other educational experience for all students (ACUPCC 2006)." Yet, while UC Berkeley has developed sustainability policies, it lacks a specified emphasis on EE in undergraduate curricula, and has conducted no assessment of the degree of environmental content in undergraduate classes. Thus, while EE content is taught in many academic departments at UC Berkeley, the degree of EE implemented in the curricula of different academic fields and departments remains uncertain.

I evaluated the environmental content of undergraduate education in various fields at UC Berkeley. Specifically, my objectives were to: (1) assess the degree to which environmental content has been incorporated into courses in the natural sciences, social sciences, humanities, mathematics, and professional and applied sciences, (2) identify key environmental themes in course offerings, and (3) document professors' motivations for including environmental content in their courses.

METHODS

Sampling course syllabi

To evaluate the degree of environmental content and topics covered within courses across different academic fields at UC Berkeley, I sampled undergraduate course syllabi in the natural sciences, social sciences, humanities, formal sciences, and professional and applied sciences in five colleges and schools (Letters & Science, Haas School of Business,

Chemistry, Engineering, and Environmental Design) that serve undergraduate students (Table 1). I omitted the College of Natural Resources, in which most courses include environmental content. I attempted to obtain an exhaustive sample, in which I contacted all professors who taught undergraduate courses during the 2011-2012 academic year, and requested his or her undergraduate course syllabi. I emailed 1374 professors, 104 professors responded to my emails, yielding 119 course syllabi.

Table 1. Categorization of sample of departments into respective academic fields

Formal Sciences	Humanities	Natural Sciences	Professional and Applied Sciences	Social Sciences
Mathematics, Statistics	Art History, English, Film, History	Astronomy, Biology, Chemistry, Earth and Planetary Science, Physics	Business, Computer Science, Civil Engineering, Industrial Engineering, Landscape & Architecture, Material-Science Engineering, Mechanical Engineering, Nuclear Engineering, Public Policy	Anthropology, Asian American Studies, Economics, Gender and Women Studies, Psychology, Sociology

Syllabus structure

I used an open code system to identify common sections (such as titles and course objectives) of syllabi from phrases and words found in the documents (Ison 2010). I determined that syllabi are commonly separated into sections including course title, contact information, course objective/description, course assignments/exams, lectures, readings, and grading policies. I then analyzed environmental content represented in course titles, course objectives/descriptions, and lectures.

Levels of environmental content

To determine the degree of environmental content in each course, I open-coded words or phrases relating to environmental topics. Manifest vocabulary was easily interpretable for its environmental content, but some terms were ambiguous. In such cases, I sought to determine the meaning of terms such as "externalities" by reviewing available online lecture slides and crosschecking with professors' survey responses. I classified each lecture in two categories that were mutually exclusive: environmentally based content and non-environmentally based content. Then I evaluated the courses' degree of environmental content by documenting the percentage of lectures dedicated to environmental matters. I split the percentages into 6 groups and coded them with a level to easily distinguish each

degree of environmental content (Table 2). I then used Microsoft Excel to create a spreadsheet to compare the percentage of environmental content for each course.

Table 2. Types of levels corresponding with percentages of environmentally based lectures

Level	Percentage of lectures with environmental content
Level 1	0%
Level 2	1 – 20%
Level 3	21 – 40%
Level 4	41 – 60%
Level 5	61 – 80%
Level 6	81 – 100%

Themes

I used open coding of course titles, course descriptions, and lectures to identify environmental themes in courses. First, I looked for words that would potentially indicate environmental content, such as "sustainability" or "water". I then categorized syllabi content in terms of broad classes of environment content, such as food, landscape, sustainability, etc.

Sampling departmental courses through surveys

To verify findings from the inherently subjective interpretative methods described above, I supplemented my analysis with a survey that I distributed via e-mail to all professors whose course syllabi I had sampled. Survey questions sought to determine professors' perceptions of how and why they incorporate environmental education into their courses, whether they consider environmental sustainability important to their field, and if they would consider change their curricula to emphasize more environmental content (Table 3).

Table 3. Questions and types of responses available on the survey

Question	Response
Q1. Do you presently deal with aspects related to the environment in the courses that you teach?	No Very Little Yes, the course sporadically permits it Yes, it is systematically presented in the course subjects
Q2. What environmental topics do you touch upon?	Sustainability Climate Change Food Natural Environment Built Environment Environmental Justice Open Answer
Q3. Why have you incorporated environmental content in your course?	Open Answer
Q4. How important is environmental sustainability in regards to your field?	1 2 3 4 5
Q5. What do you think of the idea of devising a curricular environmental plan for the subject matter for your course subject(s)?	I don't think it's a good idea. It's not pertinent for my course/discipline. I have no specific opinion I think it's a good idea, provided it does not cause too much disorder I think this project is needed and should be done.
Q6. If you were offered the chance, would you focus the content and methodology of your course subject(s) environmentally?	No Yes

RESULTS

I analyzed 5 formal sciences syllabi, 22 humanities syllabi, 19 natural sciences syllabi, 42 professional and applied sciences syllabi, and 32 social sciences syllabi (120 total). I also surveyed 104 professors: 5 formal sciences, 9 humanities, 23 natural sciences, 36 professional and applied sciences, and 21 social sciences professors. By combing the two sources, I determined the reasons for teaching environmental content in courses, whether the degree of environmental content varied across different academic disciplines, and the most common environmental theme taught in each academic field.

Degree of environmental content

In all academic fields, I found a discrepancy in the level of environmental content found in the syllabi's lecture schedule and that expressed in professors' responses.

Syllabus content analysis

The level of environmental content varied across each academic field (Table 4 and Fig. 1). The formal sciences had the least environmental content, with 100% of the syllabi collected categorized as level 1. In the humanities, 48% of the course syllabi included environmental content, most of it at a level 2. Sixty three percent of natural sciences course syllabi included environmental content, mostly comprising courses at a level 2 or level 6. According to the syllabi, 55% of the professional and applied sciences courses incorporated environmental issues, with most at a level 2. Finally, 45% of social sciences courses had environmental content, mostly at level 2.

Table 4. Level of inclusion of environmental content in academic fields (according to syllabus content analysis), number of syllabi collected from each department among the academic fields

Academic Field	Department	Syllabi Count	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6
Formal Sciences	Mathematics	1	3	0	0	0	0	0
	Statistics	2						
Humanities	Art History	6	13	6	1	0	0	2
	English	10						
	Film	1						
	History	5						
Natural Sciences	Astronomy	2	7	5	2	0	0	5
	Biology	10						
	Chemistry	5						
	Earth & Planetary Science	1						
	Physics	1						
Professional and Applied	Business	16	20	11	2	0	0	9
	Computer Science	1						
	Civil Engineering	8						
	Landscape & Architecture	3						
	Material-Science Engineering	1						
	Industrial Engineering	1						
	Mechanical Engineering	7						
	Nuclear Engineering	2						
	Public Policy	3						
Sciences Social Sciences	Anthropology	4	19	10	0	1	0	3
	Asian American Studies	2						
	Economics	9						
	Gender Women Studies	5						
	Geography	2						
	Native American Studies	1						
	Psychology	2						
	Sociology	8						

Professors' survey responses

In all academic fields, more than half of the professors stated that they include environmental content in their courses (Table 5 and Fig. 2). Sixty percent of formal sciences professors said that there was "sporadic" to "little" environmental content. In the humanities, 74% of professors incorporated environmental content in their courses, mostly at the level of "very little." The natural sciences incorporated environmental content the most at all levels (systematically, sporadically, and very little), with 87% of professors including environmental topics in their courses. The professional and applied sciences had the greatest percentage of professors, 83%, who incorporated environmental content "systematically" into their courses. Finally, 81% of social sciences professors said that they incorporate environmental content in their classes. And of all the fields, social sciences have the highest percentage of professors who made courses that enable "sporadic" inclusion of environmental content.

Table 5. Counts of level of inclusion of environmental content in academic fields (according to professor survey responses)

		Responses			
Academic Field	**Professor Survey Response Count**	**No**	**Very Little**	**Sporadically Permits**	**Presented Systematically**
Formal Sciences	5	2	2	1	0
Humanities	19	5	9	4	1
Natural Sciences	23	3	6	8	6
Professional and Applied Sciences	36	6	11	5	14
Social Sciences	21	4	3	11	3
Aggregated Fields	104	20	31	29	24

Findings from syllabus content analysis

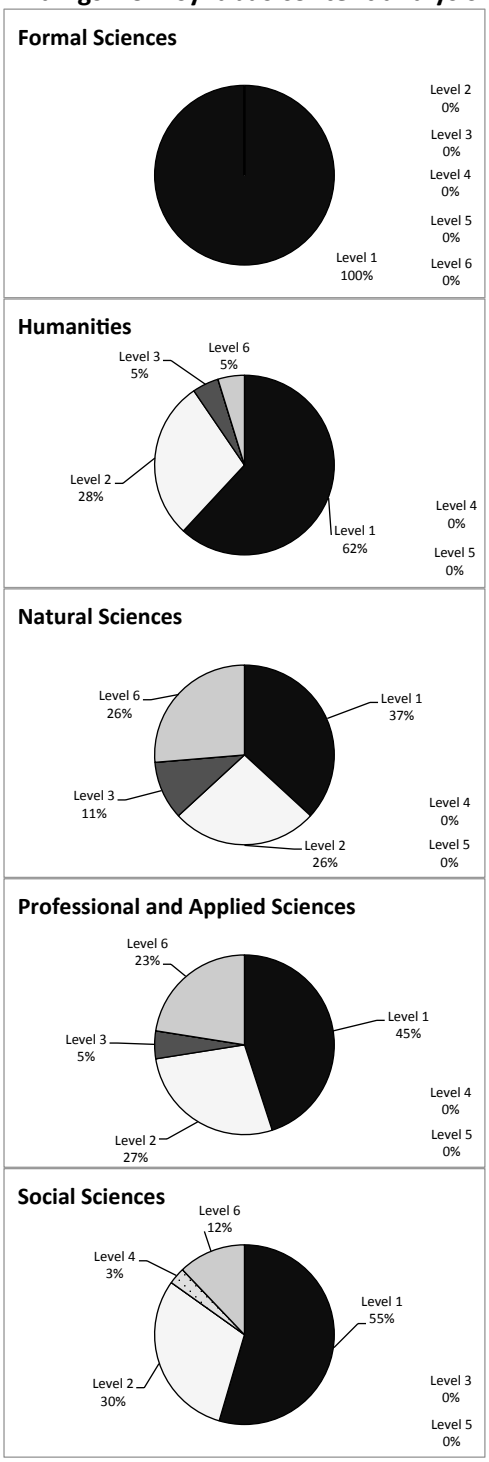

Figure 1. Degree of environmental content in academic fields determined by content analysis of syllabi (n=119).

Findings from professor surveys

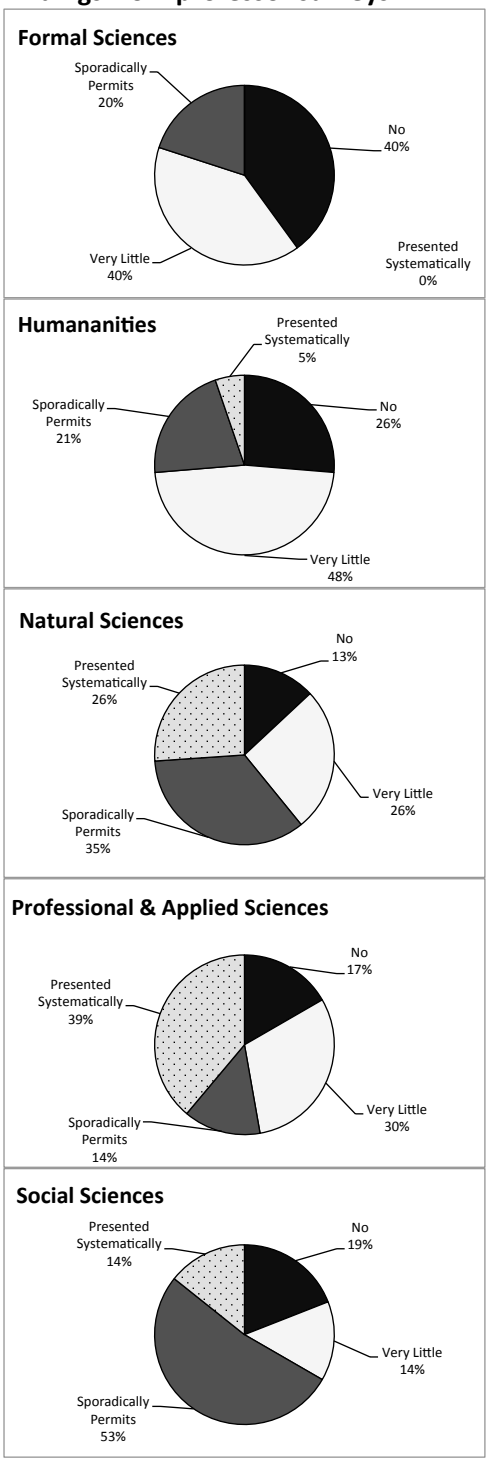

Figure 2. Degree of environmental content in courses in academic fields determined by professors' responses (n=104).

Themes

I identified 19 environmental themes covered across various undergraduate courses. The top 5 frequently occurring themes are climate change, food, the built environment, sustainability, and the natural environment (Table 6). Table Appendix 1 displays the complete coded environmental themes. Although the sample size for formal sciences courses is very limited, the most frequently occurring theme was climate change, appearing in 3 courses. Among humanities courses, the most reoccurring environmental theme is the built environment—found in 16 courses. The most common theme of the natural sciences is climate change, found in 16 courses. Sustainability was the prevalent theme found in professional and applied sciences, occurring in 14 courses. Climate change is another issue that is most talked about in the social sciences, which appeared in 10 courses. Overall, the natural environment is the most reoccurring environmental theme, incorporated in 47 undergraduate courses.

Table 6. Top 5 environmental themes in academic courses
**Most frequently occurring theme in academic field*
***Most frequently occurring theme in aggregated undergraduate courses*

Academic Field	Climate Change	Food	Built Environment	Sustainability	Natural Environment
Formal Sciences	*3**	0	0	0	1
Humanities	2	3	*16**	3	15
Natural Sciences	*16**	7	3	6	13
Professional and Applied Sciences	13	3	13	*14**	9
Social Sciences	*10**	7	4	6	9
Aggregated Fields	44	20	36	29	*47***

Motivation for implementing environmental content

I identified five major reasons for professors to include environmental content into the courses: (1) Educational Tool, (2) Environmental Awareness Advocacy, (3) Students' Interest, (4) Professors' Interest, (5) and Inherent in the Course Material (Fig. 3). Professors whose responses fell under the "Educational Tool" category included environmental topics to enhance their courses' principal material. For example, a medieval English professor explained, "I teach medieval literature courses, and it is sometimes helpful for students to understand the effects that medieval economic and social practices had on the landscape." The second code is "Environmental Awareness Advocacy," in which respondents sought to spread environmental

awareness to students. An example of this is seen in an Engineering professor's response, "To introduce students to the importance of society and the environment in engineering." Another code is "Student Interest," in which professors simply stated that "students are interested" in environmental topics. Respondents who stated that it was their "professional interest" or that "the environment is central focus of [their] research" fell under the category of "Professors' Interest." Finally, the "Inherent in Course Material" category contained all responses from professors who said that the topic that they teach organically incorporated environmental content. An English professor, who teaches a course on Emily Dickinson's work stated, "Dickinson was perhaps the first major American poet to read Darwin, when Origin of Species appeared in 1859, and take him seriously, which affected her ideas of nature and of religion."

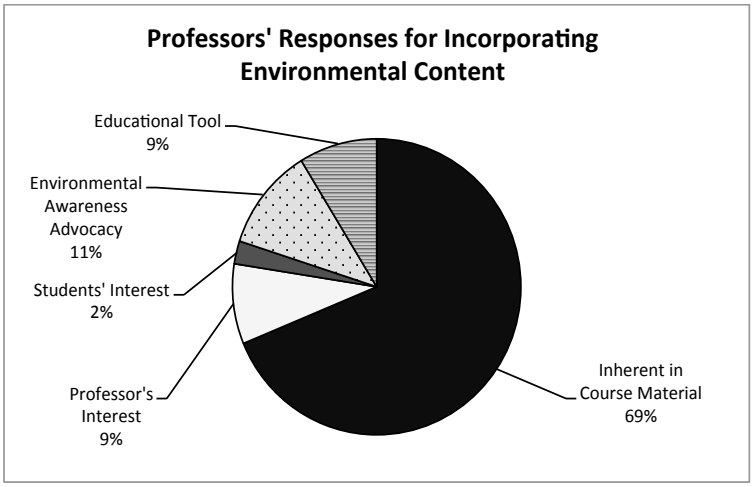

Figure 3. Professors' reasons for implementing environmental content into the curricula across academic fields.

Most professors (69%) included environmental topics because it was inherent to the coursework, and courses inherently related to environmental topics had varying levels of environmental content according to professors. While "Students' Interest" (2%) and "Professors' Interest" (9%) motives for including environmental content were linked to courses that "present systematic" or "sporadically permit" it (Table 7).

Table 7. Comparison of professor and student interest to level of environmental content

Academic Field	Reason	Level of Environmental Content
Professional and Applied Sciences	Professor's Interest	Presented Systematically
Social Sciences	Students' Interest	Sporadically Permits
Professional and Applied Sciences	Inherent in Course Material, Professor's Interest	Sporadically Permits
Formal Sciences	Professor's Interest, Educational Example	Sporadically Permits
Natural Sciences	Professor's Interest	Presented Systematically
Professional and Applied Sciences	Professor's Interest	Presented Systematically
Social Sciences	Professor's Interest, Environmental Awareness Advocacy	Sporadically Permits
Natural Sciences	Students' Interest	Sporadically Permits
Social Sciences	Professor's Interest	Presented Systematically

Importance of environmental sustainability to professors of undergraduate students

On a likert scale from 1 to 5, 1 being of no importance and 5 being very important, most professors believed that environmental sustainability is "not important" (27) to their respective field. Additionally, 24 professors felt neutral about the importance of the environmental sustainability to their field, and 35 professors believed that environmental sustainability is important in their field. No professors in the formal sciences, and most professors in the humanities (74%) and natural sciences (52%) believed that environmental sustainability is not important to their field. Conversely, most professors (58%) in the professional and applied sciences believed that ecological sustainability is important to their field. And most (52%) social sciences professors felt neutral about environmental sustainability to their subject (Table 8).

Table 8. Percentage of professors' thoughts on level of importance of environmental sustainability to their respective fields

Academic Field	Not Important	Neutral	Important
Formal Sciences	100%	0%	0%
Humanities	74%	26%	0%
Natural Sciences	52%	13%	35%
Professional and Applied Sciences	28%	14%	58%
Social Sciences	19%	52%	29%
Aggregated Fields	43%	23%	34%

Changing curricula

Ninety-three professors commented on changing course content to include more environmental content (Fig 2). Twenty eight percent thought that "it's not a good idea" (28%), while only a few people felt "it is needed" (12%). However 25% had no opinion on this.

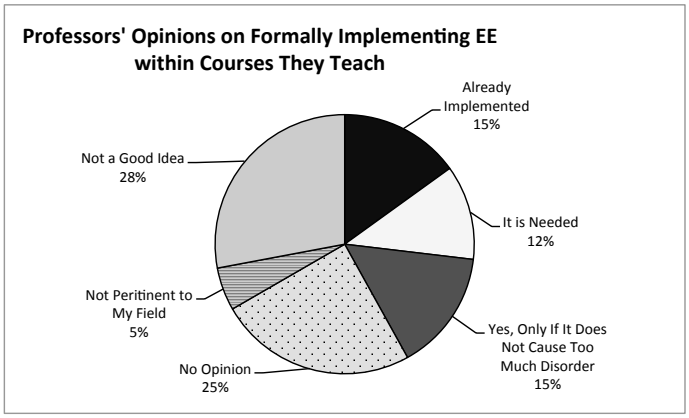

Figure 4. Professors' opinions of devising a curricular environmental plan for the subject matter they teach

Of 104 professors, 25 in all fields were willing to change their courses to include more environmental content, but 72 said they would not do so. The professors within the social sciences had the greatest percentage (39%) of individuals that would change their curricula to emphasize the environment more. Not far behind, the next greatest percentage (34%) of professors that would alter their curricula is found in the field of professional and applied sciences. And the percentage of professors that are willing to change their curricula in the humanities and natural sciences fields are far behind, at 16% and 17%, respectively (Table 9).

Table 9. Number and percentage of professors across academic fields willing to put more emphasis on environmental content

Academic Field	Count	Percentage of Survey Responses for Q6
Humanities	3	16%
Natural Sciences	4	17%
Professional and Applied Sciences	11	34%
Social Sciences	7	39%

DISCUSSION

In each field, with the exception of the natural sciences, over half of the courses did not include any environmental content on syllabi. Conversely, more than half of the professors in all of the fields studied, stated that they incorporate environmental topics in their courses, indicating that there were discrepancies in the amount of environmental content listed in the syllabi and professors' descriptions. Most professors believe that environmental sustainability is not important to their field, and only 25.7% would consider placing an environmental emphasis on subject they teach. Environmental content varies greatly between academic fields, with the natural sciences and professional and applied sciences including the most environmental content and the formal sciences and humanities having the least. "Professor" and "student interest" in environmental topics seem to have a greater effect on the degree to which content is included than "inherent" links between environmental themes and course subject matter. In sum, my findings showed that many professors have not embraced environmental education. However, knowing that environmental consciousness is important to the future of ecological sustainability, environmental education must be included in higher education. I address the pathways and barriers to increasing the level of EE in UC Berkeley's undergraduate curriculum.

Increasing the level of environmental consciousness in higher education

Recently there has been a push for sustainable development in higher education, and UC Berkeley has expressed interest in achieving sustainability, for instance through their sustainability plan (Lozano et al. 2011, Wright and Pullen 2007, Wickenberg et al. 2008, Brooks et al. 2005). To be a truly sustainable university, UC Berkeley must produce environmentally literate students, which can be achieved by incorporating environmental content into curricula across various fields (Lozano et al. 2011). Because the incorporation of EE in the university setting is relatively new, the process of integration can be described using innovation theory (Rogers 1995). Innovation is anything that is new to people, or in this case, an institution; and innovations can involve a process, product, or an idea, such as the idea of integrating EE into higher education curricula (Lozano 2006).

Level of environmental content in syllabi

In order for innovations to be institutionalized in higher education, university stakeholders must follow a process of becoming *aware* of the idea, developing an *interest*, evaluating the idea, implementing the idea through *trial*, and then *adopting* it into the institution (Rogers 1995). I would posit one step preceding *awareness*, in which stakeholders are *lacking awareness* of the idea. Before professors are exposed to an idea at a sufficient degree to prompt awareness, they *lack awareness* of the idea. *Awareness* occurs when professors are sufficiently exposed to the idea. Professors become *interested* when the idea motivates them into action. *Evaluation* occurs when professors try the idea and review its usefulness. Implementation of *trials* involves a professor applying the idea on a small scale. *Adoption* of the idea may follow assessment of trial results. By situating my findings in innovation theory, I can infer that most departments are in the first four stages: (1) *lacking awareness*, (2) *awareness*, (3) *interest*, and (4) *evaluation*, reflecting the observation that most professors do not incorporate the idea of EE explicitly into their courses. Most undergraduate course syllabi that I analyzed did not mention environmental content (Fig. 1), which suggests that EE, for the most part, is not being trialed or adopted into practice.

Level of environmental content determined through survey

Rogers (1995) theorizes that there are also five different categories for stakeholders in regard to an innovation. They consist of (1) *innovators*, (2) *early adopters*, (3) *early majority*, (4) *late majority*, and (5) *laggards*. *Innovators* are defined as those who are willing to take risks and try new ideas with high degrees of uncertainty. *Early adopters* are the most important category in that they have the power to catalyze or hinder the implementation of innovation. The *early majority* category comprise of stakeholders who adopt new ideas before average stakeholders. *Late majority* adopts ideas after the average stakeholders, once the idea has proven to be rational. *Laggards* are the last to adopt ideas and are the hardest to convince. Twenty six percent of professors stated that they "would you focus the content and methodology of your course subject(s) environmentally." These are *innovators* or *early adaptors* because they realize the need for the integration of EE early relative to other stakeholders. Furthermore, a little over 40% of professors who teach undergraduate courses had created or were willing to create a

curricular environmental plan for their course. More professors in the professional and applied sciences than in any other field incorporated environmental content in their courses; therefore, this group contains *innovators, early adopters,* and is building their *early* majority. The formal sciences, on the other hand, did not systematically include environmental content and had a great non-response bias, suggesting that this group is made of the *late majority* and *laggards.* This highlights my contention that UC Berkeley is at the beginning stages of integrating EE.

Barriers and pathways to the inclusion of environmental content in undergraduate courses

UC Berkeley should purposively integrate sustainability and the environment into curriculum, research, campus operations, community outreach, and assessment reporting to create environmentally conscious citizens (Cortese 2003, Lozano 2006). Yet barriers to integrating environmental content into undergraduate courses exist, including: (1) professors avoidance of foreign topics to maintain reputation (Peet et al. 2004), (2) overcrowded curricula (Chau 2007), (3) lack of administrative support (Velazquez et al. 2005), (4) little to no correspondence between EE and course topics, (5) extra labor needed to implement environmental content, (6) resistance to innovation (Lozano 2010), and (7) ambivalent attitudes toward environmental awareness (Hegarty et al. 2010). The UC Berkeley's Office of Sustainability was created to ensure environmental sustainability on campus. However, it has no jurisdiction over academics at UC Berkeley (McNielly, personal communication). Therefore, it offers little to no support in incorporating EE into curricula. But the underlying reason for the existence of many of these obstacles is lack of interests in the incorporation of environmental content. My results indicate that all the professors surveyed who expressed interest in environmental topics taught courses that "systematically" included or "permitted sporadic" incorporation of environmental topics. Therefore, if the professors were interested in environmental topics, they might encourage students to learn more about the issues in regard to their fields. To build interest among professors and students, a system wide cultural change in favor of environmental awareness must be promoted.

There are many ways of implementing EE on campus. Underlying all of these is the need for an institutional cultural change in order to promote environmental awareness in all classrooms (Hegarty et al. 2010). Moore (2005) suggests a campus-wide dialogue on sustainability to educate professors on concepts, values, tools, and procedures to incorporate

environmental aspects (Lourdel et al. 2005). *Innovators* exist in every field; therefore, these individuals can inform other professors about ways of incorporating environmental content into their coursework Furthermore, each field is inclined to include specific environmental topics. Professors should engage in a dialogue about these topics to show how similar courses can incorporate environmental topics related to their field. However, not all professors believe that environmental content should be in every course. For instance, a professor in the chemistry department stated that "there are specialized courses put in place" to inform students about environmental content, suggesting that special, multidisciplinary courses should be established to incorporate environmental awareness, rather than integrating EE in every course.

Departments could work together to develop multidisciplinary sustainability and EE courses to educate all UCB undergraduate students. Many professors at UC Berkeley do not believe that environmental sustainability is important in regards to their field; therefore, another option is to create stand-alone courses to educate students about environmental issues. Rusinko's (2010) study suggests that there are two ways to incorporate environmental education in an existing school structure; an institution can either (1) integrate content into existing courses or programs or (2) integrate a common requirement course. My study evaluated the incorporation of environmental content in existing programs; however, if the goal is to expose students to a minimal amount of environmental education, a stand-alone method will suffice. To achieve a sustainable future higher education must emphasize critical thinking skills, contextualized knowledge of the environment, and a desire for sustainability (Sherren 2008). Therefore knowledge of the environment and a desire for sustainability must be included in education either throughout all curricula or in a stand-alone "environmental conscious" course.

Limitations

My study was limited in its ability to identify environmental course content by what is explicitly stated in the available syllabi and interpretation of professors' survey responses. To get a complete understanding of degree of environmental content included in the curriculum, interviews with each professor of undergraduate courses is needed. Furthermore, the findings of my study are only applicable to undergraduate courses of UC Berkeley. They cannot be applied to academic fields across various universities. Therefore, the environmental themes among similar fields will differ between universities.

Future direction

Future studies should aim to identify whether the current level of environmental content in UC Berkeley undergraduate courses is sufficient to produce an environmentally conscious citizen. A study that examines the lifestyles of UC Berkeley alumni may expose whether UC Berkeley needs to adjust their curricula to attain their goal of becoming a sustainable university.

Broader implications

The methods of syllabus content analysis and a survey of professors, with the addition of supplemented professor interviews, can be used to determine the level of environmental content in other universities. Each university is unique and will produce different results for all three of the questions I answered. By implementing my methods, many universities can evaluate their own sustainable development in regards to their curriculum. If completed, this can give rise to needed dialogue and competition to support environmental education in higher education. This will allow more stakeholders to become aware and interested in EE, while also encouraging those who adopt the innovation to test ways of incorporating new environmental themes.

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