

2012

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7-1-2012

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Kelly, Jennifer Rebecca and Abel, Troy D. (2012) "Fostering Ecological Citizenship: The Case of Environmental Service-Learning in Costa Rica," *International Journal for the Scholarship of Teaching and Learning*: Vol. 6: No. 2, Article 16.
Available at: <http://digitalcommons.georgiasouthern.edu/ij-sotl/vol6/iss2/16>

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Abstract

The intent of this study was to explore how experiential education fosters ecological or environmental citizenship. In this context, we investigated the impact of international environmental service-learning in a college course. Specifically our research question was does environmental service-learning have an effect on ecological citizenship? Using a multimethod approach of both qualitative and quantitative instruments our study drew on 13 participant interviews, 19 student journals and 10 survey responses. Employing variables from the Value-Belief-Norm Theory our findings suggest that environmental service-learning experiences impact both awareness of environmental consequences and personal normative beliefs. We conclude that ecological citizenship was indirectly impacted through these social psychological predictors. Results of this study provide environmental educators with some important insights while implications of this study indicate the need for further research into experiential education and especially environmental service-learning as a means to encourage this type of citizenry.

Keywords

Environmental education, Service-learning, Environmental citizenship, Ecological citizenship, Value-belief-norm theory

**Fostering Ecological Citizenship:
The Case of Environmental Service-Learning in Costa Rica**

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Abstract

The intent of this study was to explore how experiential education fosters ecological or environmental citizenship. In this context, we investigated the impact of international environmental service-learning in a college course. Specifically our research question was does environmental service-learning have an effect on ecological citizenship? Using a multi-method approach of both qualitative and quantitative instruments our study drew on 13 participant interviews, 19 student journals and 10 survey responses. Employing variables from the Value-Belief-Norm Theory our findings suggest that environmental service-learning experiences impact both awareness of environmental consequences and personal normative beliefs. We conclude that ecological citizenship was indirectly impacted through these social psychological predictors. Results of this study provide environmental educators with some important insights while implications of this study indicate the need for further research into experiential education and especially environmental service-learning as a means to encourage this type of citizenry.

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Introduction

Environmental education faces the challenge of enabling students to see themselves as members of communities encompassing both humans and nature and to recognize their civic responsibility not just to each other, but as active participants in critical environmental issues. In this paper we suggest environmental service-learning is one way to foster this civic responsibility. In this context, we draw on both the Value-Belief-Norm Theoryⁱ and the concept of ecological (Light, 2003) or environmental citizenship (Dobson & Bell, 2006; Stern, Dietz, Abel, Guagnano, & Kalof, 1999) to guide a pilot assessment of an annual two week travel course to Costa Rica offered from 2003 to 2006 through the University of Wisconsin-Green Bay. We argue that service-learning assessments must be theory driven. In that vein, we focus on both theoretical and practical implications of this educational experience in order to better understand what service-learning has to offer to the scholarship of teaching and learning in environmental studies.

Background

Alternative Pedagogical Models

Thinking beyond traditional pedagogy is not a new concept. In fact it dates back to John Dewey (1916) who embraced experiential education as a tool for social change. Today scholarship continues to highlight the role of education and its imprint on our social fabric (Gilpin and Liston, 2009; Dees 2008) where the university contributes to efforts of sustainability, and that experiential education be considered in that role (Wright 2009). In an applied setting, Stepath (2006) found a coral reef monitoring experience had a greater change in environmental attitudes and ecological intention to act when compared to a traditional pedagogical model. In a similar example, Kusmawan and colleagues (2009) compared a traditional to an active or experiential learning model and found the experiential learners gave environmental protection a greater priority than their non-experiential counterparts (Kusmawan, O'Toole, & Bourke, 1999).

It is studies like these that have fueled researchers to suggest conventional education programs are ineffective because they focus only on knowledge, whereby cognition or knowledge alone is not adequate to produce a change in behavior (Kollmus & Agyeman, 2002; Pooley & O'Conner, 2000; Stepath, 2006). In other words, knowledge does not provide citizens with the skills to combat environmental problems (Clifton, Mauney & Falkner, 1998).

Beyond external measures of success, students have identified the intrinsic value of experiential education. A study done by Hunter and Brisbin (2000) found that "90% ranked the service experience as the most important part of their overall university education" (p. 624). Programs may therefore benefit by refocusing their attention on experiential education, such as, environmental service-learning, where civic skills and knowledge are coupled to provide a comprehensive understanding of environmental issues. Service-learning allows individuals to understand public issues from a different perspective (immersed in the problem) rather than as an outside observer, thereby, enhancing the learning process in a way that cannot be reached through conventional learning. In this context hands on experiences enable one to understand *how* to make a difference in both an individual and collective capacity, whereby, knowledge becomes practice and ideas are cemented through behaviors.

Environmental Service Learning and Citizenship in the Costa Rica Course

Global Conservation Science & Policy Interfaces provided participants with experience in tropical conservation field work through the development of participatory monitoring projects in collaboration with Carara National Park. Aiming to produce both useful inventories of ecological conditions and opportunities for community involvement in natural area conservation in connection with place, our effort combined the development of scientific indicators of ecological integrity and volunteer participation in natural resource monitoring. Moreover, these pursuits were designed as a service-learning experience rather than a traditional tropical science research experience.

Service-learning is a growing field of academic pedagogy being implemented in study abroad programs (Grusky, 2000). In 1990, the U.S. Congress passed the National and Community Service Act providing a unified definition of service-learning. We include the

relevant excerpts here.

The term 'service-learning' means a method...under which students or participants learn and develop through active participation in thoughtfully organized service that...is conducted in and meets the needs of a community...is coordinated with an...institution of higher education...helps foster civic responsibility...is integrated into and enhances the academic curriculum...provides structured time for the students...to reflect on the service experiences integrated into and enhances the academic curriculum. (The National and Community Service Act, 1990, p. 5)

Furco (1996) further clarified service-learning pedagogy by comparing it to other forms of experiential education along a continuum. Internships are on one side focusing on the students' career development while volunteer activities emphasizing service or philanthropy to a recipient are on the other side. Service-learning rests not only in the middle, but on the top of the experiential education pyramid because proponents hold this pedagogy as more effective in developing civic skills. Likewise, Gibson and Levine (2003) found effective civic education programs "link service with academic lessons and the broader curriculum" (p. 26). We were particularly interested in how international service-learning fosters environmental civiness.

Meeting the needs of a community through a collaborative service experience is a key feature to transformative international service-learning (King, 2004). "When the relationship between the parties is egalitarian rather than hierarchical, and when opportunities for structured reflection are incorporated in the experience, students are more likely to value and learn from the perspectives of those they are serving" (King, 2004, p. 135). Embracing these tenets, this course attempted to foster an egalitarian relationship with Costa Rican partners where student service involved not only the technical part of conservation, but also routine and often unskilled work in and out of the national parks—students repaired existing trails, built bridges, constructed a biological station, painted homes in a park's neighboring community, and planted trees around a town's drinking water source—many of the things necessary to maintain a conservation area.

Evidence suggests that service learners have felt that they made a positive contribution to the community they served (Billig & Conrad, 1997). Gibson and Levine (2003) consider allowing students to engage in meaningful work on serious public issues with the ability to see positive results within a reasonable time, a key criterion for civic education. Furthermore, these experiences can challenge students' existing belief systems as they are confronted by the diverse perspectives of those they collaborate with (King, 2004).

Extensive research has found participation in service-learning not only improves the students sense of efficacy or perceived ability to make a difference (Cone, 2009; Moely, Mercer, Ilustre, Miron, & McFarland, 2002), but that service-learners both *plan* (Dingman, 2003) and *continue* service (Andolina, Jenkins, Zukin, & Keeter, 2003, p. 275; Gibson & Levine, 2003; Kirlin, 2002). They are also more willing to actively make changes in their community (Billig, 2002; Billig, Meyer, & Hofschire, 2003) leading service learners to be civically engaged (Billig, 2000; Gallini & Moely, 2003).

Other outcomes of service-learning programs found both improved civic attitudes (Heinisch & Hartman, 2003; Melchior & Bailis, 2002) and a heightened sense of civic responsibility (Dingman, 2003; Kim & Billig, 2003; Klute, Sandel, & Billig, 2002). Finally, the results of an environmental service-learning study showed better critical thinking performance among

high school seniors treated with service-learning versus a control group (Ernst & Monroe, 2004).

In line with one of the effective civic education criteria identified by Gibson and Levine (2003) and an important element of service-learning (Morgan & Streb, 2001, Wade, 1997), this program has provided the opportunity for students to have a voice through the design of their projects. Moreover the student research projects are experimental efforts to develop participatory techniques for use by volunteers in Costa Rican parks. Students also collaborate with park staff to enhance management plans and education curriculum for collaborative ecological monitoring of flora and fauna. These efforts are also grounded in the growing body of work on community-based environmental monitoring (Chopyak, 2001; Fleming & Henkel, 2004; Gasteyer & Flora, 2000; Gouveia, Fonseca, Camara, & Ferreira, 2004; Shultz, Sáenz-Segura, Hyman, 1998).

Structured reflection time is another key component to successful service-learning programs (Gibson & Levine, 2003), as well as a fundamental feature in civic skill development (Kirlin, 2002), and a necessary ingredient to fostering an egalitarian relationship with members of the community (King, 2004). As part of the course students were given time for reflection both in the evening group discussions and in a private journal that the students were required to write in daily. Overall the goal of this course was to offer an international public service experience that might lead to future ecological citizenship initiatives.

Ecological Citizenship

Scholarship on ecological citizenship (Light, 2003) or environmental citizenship (Dobson & Bell, 2006, Stern et al., 1999) has emerged as a response to both environmental problems and the noteworthy decline of public participation (Putnam, 2000). As defined by Light (2006), ecological citizenship "involves some set of moral and political rights and responsibilities among humans as well as between humans and nature" (p. 176). But such a fundamental value is not sufficient to lead to environmental behavior without corresponding beliefs and norms. Light's (2003) work on the ethics of ecological restoration implicitly shows us how these values can be activated by connecting people to nature.

...restoration restores the human connection to nature by restoring the part of culture that has historically contained a connection to nature. This kind of relationship goes well beyond mere reciprocity; it involves the creation of a value in relationship with nature beyond obligation...this kind of relationship is a necessary condition for encouraging people to protect natural systems and landscapes around them rather than trade them for short-term monetary gains from development. If I am in a normative relationship with the land around me...I am less likely to allow it to be harmed further (Light, 2003, p. 407).

We hypothesize conservation education coupled with community-bounded service initiatives can have a similar impact. In doing so we draw on Schwartz's norm-activation theory (1973) and its application by Stern et al. (1999) to explicitly describe how awareness of environmental consequences lead to personal normative beliefs that oblige people to then engage in pro-environmental behavior. While we acknowledge there are differences between ecological and environmental citizenship, in this study we use the term ecological citizenship at the same time employing measures of environmental citizenship.

Theory

This study draws on a modified version of the Value-Belief-Norm Theory (VBN). The process begins with a stimulus, or the student's immersion in the environmental service-learning experience, where students have the ability to become aware (or more aware) of consequences (AC), which accounts for more narrowly focused beliefs and is more problem specific. For example, they become aware or more aware of rainforest degradation as not only a threat to Costa Ricans, but also a global threat, thereby connecting local to global issues. Following this enlightened understanding, personal normative beliefs become transparent. These are "...beliefs about responsibility for causing or ability to alleviate threats to any valued objects" (Stern et al. 1999, p. 83). For example, students now believe actions can mitigate the threat to something they value, such as destruction of rainforests. Pro-environmental personal norms guide pro-environmental behavior and therefore the next step in the process leads to ecological citizenship or as defined here environmental citizenship.

Although few service-learning studies have evaluated social psychological impacts or any variables short of behavioral outcomes, one study done by Maher (2003) found, "Students became more in tune with their beliefs, changed their beliefs, and articulated their beliefs more clearly through...service-learning immersions..." (p. 95). We contribute to the paucity of theory underlying the impacts of environmental service-learning. In that vein, we draw on the Value-Belief-Norm Theory to guide a pilot assessment of an annual two week travel course to Costa Rica offered from 2003 to 2006 to answer the question, does environmental service-learning have an effect on ecological citizenship?

Methods

We conducted a multi-method study employing both quantitative and qualitative components. The qualitative dimension used both student journals and semi-structured interviews from students who participated in the course. A pilot survey instrument was the basis for our quantitative component. The independent variable in all three methods was the environmental service learning experience. The dependant variables were extractions of the VBN theory: awareness of consequences (AC), personal normative beliefs, and ecological citizenshipⁱⁱ. Furthermore, both our interviews and journals provided pedagogical insight into the overall student conceptualization of environmental-service learning.

Sample

The subjects of study were the University of Wisconsin Green-Bay students who participated in one or more of the 2003, 2004, 2005 or 2006 Costa Rica travel courses. Although most students who participated in the course were upper level undergraduates (juniors and seniors) some sophomores participated throughout the four year range.

Interview Design

The sample of 13 students was comparable to the general participant population of thirty-nine studentsⁱⁱⁱ. The interviews were conducted throughout March 2006^{iv}.

Journal Design

We conducted a content analysis on 19^v student journals from the 2004 and 2005 course.^{vi} Responses from three questions were coded and evaluated to better understand the independent and dependant variables.

Survey Design

Our pilot survey assessment from 2006 included an experimental group of 10 participants. While this small sample precluded statistical testing and generalizability, some theorized post-test movement in the experimental group was observed. The quantitative research was a quasi-experimental design based on survey data gathered from a convenience sample. The survey employed both a pre and post-test while the questions reflected those tested in pre-existing literature.^{vii}

Results

Interview Results

Awareness of consequences

1. "Did this experience lead to a change in your awareness about environmental problems?" All students answered yes to this question. Many students stated that they were already aware of the environmental problems, but the experience gave the problems a whole new meaning. The same environmental problem that they knew prior to the experience, such as the destruction of the rainforest, took on a place-based presence. By helping to alleviate the problem, through education and the service they provided, the students were able to gain a more comprehensive understanding of the problem and therefore increase their awareness.

2. "What environmental problems did you become aware of?" The most frequent response to this particular question was water pollution, where six students had this same answer; four students indicated habitat/rainforest destruction and endangerment of species; three students responded with poaching and biodiversity loss; and lastly one respondent indicated a lack of regulations on agriculture. Furthermore, some of these respondents indicated that by poaching and destroying the rainforest the Costa Rican people are destroying their own livelihood in addition to jeopardizing the survival of endangered species.

Personal normative beliefs:^{viii}

1. "Who do you think should take action to these [environmental] problems?" When asked this question, only five of thirteen students made any reference to themselves as part of a larger whole. Of those five, two said that there should be a worldwide effort to alleviate environmental problems. Another student indicated that tourists who travel to Costa Rica should participate in hands-on efforts to improve environmental conditions. The other two students made a more direct reference to themselves by indicating that students who participate in the course experience have the ability to help alleviate Costa Rica's environmental problems. One student indicated this could be accomplished through fundraising efforts. The other student indicated that their efforts to help promote eco-tourism in Carara National Park along with their pursuit in helping to educate the Costa Rican people were actions that they personally took in combating the problem. Of the thirteen students, nine ascribed responsibility to the Costa Rican government. In general they indicated that the government, through regulations and/or financial power, should help alleviate environmental problems. Furthermore, out of the thirteen students interviewed, nine indicated that the people of Costa Rica, in some capacity, whether through influencing the government or becoming educated, need to alleviate environmental problems. Overall, responses indicated that international governance, Costa Rica's government, and the

peoples of Costa Rica and other countries should help alleviate the environmental problems discussed.

Ecological citizenship:

1. "Did the experience have an impact on your life or change your life in any manner? If so, how or in what way(s)? If not, why?" Unexpectedly, none of the students made any reference to any behaviors or activities related to ecological citizenship. However, three out of thirty-nine students who participated in the Costa Rica travel course returned a second time, actions that reflect ecological citizenship. Furthermore, two students referenced personal normative beliefs, which according to the norm activation theory and the VBN model is the step prior to environmental citizenship. One student indicated he wanted to go back to Costa Rica and help, whereas the other student indicated she wanted to help people realize and become more aware of environmental problems.

2. Students were asked to choose the most civically engaging of all the educational experiences they discussed. Out of the educational experiences discussed by the thirteen respondents, nine indicated that the Costa Rica experience was, in their mind, the most civically engaging experience. Some indicated that the experience enabled them to understand public policy. All spoke to the service they provided, where six specifically discussed how that service is making a difference in that particular area. Out of thirteen students, eight spoke about their immersion into environmental issues on a day to day basis and how that immersion enabled them to gain a better appreciation and understanding of environmental problems than a traditional class would have provided. Out of the four students who did not identify Costa Rica as their most civically engaging experience, one described another service-learning experience and the remaining three detailed other forms of experiential education.

Environmental service-learning

Of the thirteen students interviewed, seven stated that Costa Rica was their most memorable educational experience. If students did not mention this course in the first two questions they were probed to discuss the experience. At this point two out of the five who did not address Costa Rica prior, indicated, that they forgot to mention this experience in the earlier questions. One of the two students stated, "I totally forgot about Costa Rica...I obviously didn't take the appropriate amount of time to think about the questions...it was the most influential experience and had a huge impact on my life." Another important finding was that six out of eight participants from the 2003 and/or 2004 courses indicated that Costa Rica was their most memorable educational experience.

Journal results

Awareness of consequences:^{ix} "How has your experience in Costa Rica changed your beliefs about the need for environmental protection or sustainable practices?" Here five students indicated that it reinforced awareness or beliefs. Three students indicated it heightened awareness. Other answers indicated that students had a pre-existing knowledge of the problems, but that the experience fostered an emotional engagement with the people of that area which then created a deeper sense of understanding. Two students indicated that before the Costa Rica experience they never focused on environmental problems. As one student stated,

I have always heard from little on that the rainforest is being destroyed, but I felt there was little I could do to help, and it really wasn't an issue for me because I had never seen it or experienced it for myself. I'm actually still unsure about how I can

help Costa Rica/the national parks achieve their goals, but I know that they will benefit from volunteer groups returning year after year to help continue the work that has been started there.

The other student indicated,

Before this trip I never really paid much attention to environmental protection or sustainable practices. I now am more concerned about environmental protection and sustainable practices and I will now have to educate myself more on these issues.

Another student pointed out that the experience challenged their prior belief that protected areas were sufficient and made them realize that protecting an area is not where environmental stewardship stops (e.g. problems w/poachers), concluding with the remark that weak environmental protection needed to be ratified by the Costa Rican government. And lastly, one student stated,

Before going on the trip I didn't have really any strong beliefs about Costa Rica's environmental protection. Now that we are returning, I am appalled at how weak their protection really [is.] I would mainly blame that on their government.

Personal normative beliefs: "What are you willing to do?" All students provided a way in which they wanted to help the environment. Answers included: return to Carara as a volunteer, continue to point out birds to anyone who is willing to look, educate others about the environment, personally advance their education on environmental protection and sustainable development, adopt more sustainable practices on an individual basis at home, dedicate their life to environmental protection and sustainable development, raise and donate money for a protection program, adopt an environmentally friendly lifestyle that would include conscious consumerism. One of the more profound normative impacts stated,

I feel this travel course to the country reaffirmed my position on this issue. It is extremely important to protect the rainforest in Costa Rica and preserve the rich biodiversity of the area as well as keeping the Earth's resources plentiful and pristine. Everyday I rationalize in my head what my actions are compromising in the world and I try to limit my impact on the environment. I think should our society provide for it, I would go further with my sustainability efforts to help alleviate pressures on the environment.

Environmental service-learning: "Describe what you have learned that you could not have learned in a campus-based course." Some of the answers were: appreciation of culture, biodiversity and, living conditions; general appreciation; memory and care were stronger from the experience; relationships to the people, flora and fauna cannot be put into a textbook; hands on experience and immersion into the culture; stronger relationships between peers and professors; interaction amongst people; experiencing the touch, smells and sights of the rainforest; more depth on the subjects; learning and character building through learning a labor trade. Other answers included:

- "Being able to see and experience the park first hand gives you a new perspective that cannot be granted through a campus based course;"

- “Experiencing first-hand the appreciation of the Costa Rican’s for our help;”
“The amount of knowledge you receive from learning while experiencing is so much greater and stays with you the rest of your life;” and
- “Getting to see and feel and hear everything all at the same time is much more than any combination of classes in my entire school career could have ever shown me.”

And the more extensive responses which indicate the comprehensive nature of experiential education follow:

In Costa Rica we were able to live and breathe with other Ticos and learn their culture and learn about their experience so that we could truly appreciate what we did for them and their culture. We got to experience first hand, their appreciation for our help. It was a wonderful feeling. Compared to a campus based course, where you might raise and send it somewhere but you don’t get to be there to meet.

For me the best part of this trip was/is knowing that not only have I learned, but I’ve also experienced. When you’re in a classroom, 9 times out of 10, you only learn. The amount of knowledge you receive from learning while experiencing is so much greater and stays with you for the rest of your life.

Survey results

Awareness of consequences: Attitudes towards negative consequences included a total of nine items. By in large there was an unexpected decline in post-test responses, signaling, perhaps the small sample size and/or framing of the questions. Reactions to deforestation and pollution for other species remained the same. Climate Change for other species and pollution as a threat to you and your family, were the only post response increases.

Personal normative beliefs: Post respondents strengthened their personal normative beliefs for preventing tropical forest loss and their belief in being responsible for preventing climate change. Furthermore, post responses indicated more strength in government’s obligation to do something about climate change, whereas, governments obligation to do something about both deforestation and pollution decreased along with one’s personal obligation to do something about pollution. We included four additional questions that were labeled as environmental citizenship. We consider them to be personal normative beliefs. Post-test agreement increased for all four of these items.

Table 1. Survey assessment

Survey Items	Pre-Test Avg.	Post-Test Avg.	Change
<i>Awareness of Consequences</i>			
climate threat for you	2.30	2.22	-0.08
climate threat for nation	2.50	2.44	-0.06
climate threat for other species	2.80	3.00	-0.20
deforestation threat for you	2.40	2.33	-0.07
deforestation threat for nation	2.90	2.44	-0.46
deforestation threat for other species	3.00	3.00	0.00
pollution threat for you	2.60	2.78	0.18
pollution threat for nation	2.90	2.78	-0.12

pollution threat for other species	3.00	3.00	0.00
	<i>Personal normative beliefs</i>		
climate obligation for you	4.10	4.33	0.23
climate obligation for gov't	4.60	4.67	0.07
deforestation obligation for you	4.40	4.56	0.16
deforestation obligation for gov't	4.70	4.22	-0.48
pollution obligation for you	4.30	4.11	-0.19
pollution obligation for gov't	4.80	4.67	-0.73
service involvement	4.40	4.44	0.04
impact	4.60	4.67	0.07
obligation	4.20	4.44	0.24
	4.60	4.89	0.29

Discussion

By assessing the interface between awareness of consequences, personal normative beliefs and ecological citizenship (in part) it was found that this environmental service-learning experience had an effect on ecological citizenship, if not directly, through its social psychological predictors. Given our three modes of comparison, we think this multi-method approach, even without a large population, has added a unique layer to answering our question. Furthermore, we think it provides useful insight to the social psychological factors that shape ecological citizenship and how environmental service-learning is a useful tool to foster this type of citizenry.

Both affirmations and newfound awareness of environmental consequences in the student journals and the interviews were revealed in the post course data, where post survey response revealed an overall decrease. At first blush, findings from the survey response appear counter intuitive for an immersion program acting to conserve rainforests. On the other hand, the experience may have helped students better appreciate the social and economic complexity of forest conservation. Consider the following student observation.

It is easy to live in an affluent country and blame the people of the developing world for the destruction of the rainforest, but being in Costa Rica gave me a better appreciation for their way of life, when your livelihood depends on the rainforest it becomes a more complex problem.

This is similar to Packer's (2009) findings, which suggests student attitudes and values changed as a result of the educational experience and reflection on that experience.

Yet another student indicated that the Costa Rica experience enabled them to see how rainforest preservation amounted to more than setting aside protected areas. In other words, preserves did not necessarily protect species from poaching. Furthermore, some students commented on the issue of poaching and how it is destroying not only the rainforest and survival of endangered species, but also the livelihoods of the people.

The first two responses may speak to defamiliarization which, according to King (2004), is a key piece in a transformative experience. In this context, as new situations and perspectives disrupt existing belief systems students begin to critically examine their own norms and beliefs. In that vein, participants revealed how their preconceived beliefs about tropical conservation were challenged by their experiences. Overall, these responses illustrate a comprehensive understanding of coupled human and natural systems, while validating that students are indeed aware of environmental consequences.

The unexpected survey responses may also be a result of framing in the various methods. In this context, both interviews and student journals asked specifically about personal experiences in connection with awareness of consequences, whereas, the survey asked about awareness of environmental consequences more generally (tropical deforestation, pollution and climate change), ascribing no connection to personal experiences in Costa Rica or any place. In a similar vein, as noted above, student journal and interview responses tended to reveal comprehensive understandings of ecological and sociological systems acting together and therefore dichotomized survey questions targeting one environmental issue may not address the complexities that unfold in immersion experiences.

This multi-method approach provided a lens into personal normative belief structures. In this context, we found that survey results exposed a strengthened personal normative belief for preventing tropical forest loss as well as a belief in being responsible for preventing climate change, where student journals elicited a plethora of personal obligation responses. However, the aggregate of methodological results reveals students ascribed responsibility to the government to help solve environmental problems, with the interview responses carrying the most weight. This comes as no surprise given that past researchers have found the public believes "...government has a moral obligation to act to solve certain kinds of collective problems whether or not government is responsible for causing them" (Stern, Dietz & Black, 1986, p. 218).

As with awareness of environmental consequences, we do acknowledge that differences in survey, interview and journal responses were most likely a result of the differing questions. Journal questions regarding personal normative beliefs asked specifically, "what are you willing to do?" While interview questions allowed for a more open ended response and furthermore the survey question failed to connect environmental problem to place. Given the results, we conclude that perhaps a more sophisticated quantitative instrument is necessary to capture social psychological conditions of an international service-learning experience. Nevertheless, the interview and journal questions provided solid insights, and like the survey, were based on key variables of the VBN—which is the most widely used social psychological theory of environmental behavior.

Overall, the results demonstrate that students believe problems can be solved within multiple layers of society, from individuals to higher levels of governance. And that it may be contingent on whether they have made the connection between personal experience bounded to place-based environmental problems or not. At an aggregate, we have found the program to illuminate comprehensive and integrative thinking. This may speak to a well developed body of literature on solving common pool resource problems through multi-nested, context specific mechanisms (Dietz, Ostrom, & Stern, 2003; Ostrom, 2010). Moreover, we found environmental problem solving must be both integrative and context driven to allow the appropriate connections to be made and actions to emerge.

Although scarcely tested compared to the other two dependent variables, we found ecological citizenship was demonstrated in various dimensions. First, the fact that three students' participated in the Costa Rica course a second time reflected ecological citizenship behavior. Secondly, student examples in both journals and interviews reflected engagements in ecological citizenship during their time in Costa Rica. Lastly, although not direct acts of ecological citizenship, the triangulation of methodologies revealed normative responses to ecological citizenship as a way to minimize environmental problems. These are examples of both one's capacity and obligations towards the environment.

Despite our small sample size (interviews 13; journals 19; surveys 10), results of this study provide environmental educators with some important insights. First, overall our respondents indicated experiential education as their most memorable educational experience, with the majority of the participants identifying courses in service-learning and over half of the students identifying the Costa Rica course in particular. Next, we found that six out of eight students who participated in the course during the first years of inception still identified it as their most memorable educational experience. This speaks to the salience that this pedagogical model still has, despite the time lapse. Lastly, the learning outcomes of this course validate pre-existing literature: appreciation of culture and living conditions which speaks to intercultural competence (Porter & Monard, 2001) and enhanced international understanding (Myers-Lipton, 1996); character building through learning a labor (a point made by King 2004 when he discusses collaborative service work as a key feature of transformative international service-learning); and lastly the more depth on the subjects, strength of memory and care, interaction amongst people, experiencing the people, as well as the touch, smells and sights of the rainforest all give purchase to the improvement of student's understanding of complex global problems related to their academic program of study (Kiely & Nielson, 2003; Kiely, 2004; Kiely, 2005).

In the end our research has highlighted some gaps that are worth mentioning. First and foremost, if ecological or environmental citizenship is a desired outcome, it should be reflected in the course design, including goals and objectives (Billig, 2000), whereby a greater emphasis on civic skill building is a crucial component (Gibson & Levine, 2003; Kirlin, 2002). As indicated by one student in response to the question-what are you willing to do? "Not sure what I can do. I would like to further study the different possibilities of what I can do." Although it is evident that the students who participated in this environmental service-learning experience have provided service on an international level as well as designed their own projects to help the conservation efforts of the park—there is always room for greater emphasis to be placed on civic skill building by allowing students to have a voice (Morgan and Streb, 2001; Wade, 1997) through the design and organization of activities which then encourages the students' "...discovery of what problems do exist, whom they need to contact to address the issues, and what types of projects they will undertake" (Kirlin, 2002, p. 573) to alleviate the problems. Next, to ensure the validity of awareness of consequences, personal normative beliefs and ecological citizenship—variables from the VBN theory—these will need to be tested in future studies using both qualitative and quantitative measures. For example, our survey findings related to awareness of consequences were unexpected in that we saw a decline in most of the questions during post course responses. Although this may have been a result of how the questions were framed—in the abstract or non specific nature of the survey questions—we acknowledge it may also have been due to the small sample size and therefore are not significant. And lastly, to further enhance our understanding of these impacts our efforts must focus on longitudinal evaluations (Gibson & Levine, 2003; Hunter & Brisbin, 2000).

Conclusion

Our study contributes to the theoretical gap in discussions of environmental education and service-learning by measuring awareness of consequences and personal normative beliefs—variables of both Schwartz’s norm-activation theory and the VBN theory—one of the most widely used social psychological theories to predict pro-environmental behavior. We used a multi-method approach to test the validity of this theoretical orientation in explaining how service-learning experiences can foster global ecological citizenship. Although we may need a more sophisticated survey instrument, as well as a larger sample within all three methods, both the journal and interview questions melded important insights into the social psychological workings of students in such a learning context. Moreover, by placing student’s learning experience into a theoretical model we have conducted a comprehensive evaluation that will provide useful insights to environmental educators and the future of experiential pedagogical assessments. The combination of immersion into a place-based community and tangible action in rainforests holds promise as an effective pedagogical design for fostering ecological citizenship.

The world is shrinking because of globalization while the scale of environmental degradation transcends human, political and geographical boundaries around the world. Students need experiences that expand their notions of citizenship from the local to the global. They also need to have their civic obligations stretched beyond just the social realm and into the natural world. One of the underappreciated environmental challenges we now confront is the combination of indifference and apathy among citizens in the face of global climate change and declining biodiversity. Global Conservation Science & Policy Interfaces is an example of a place-based program that provided a teaching response to these global challenges.

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Appendix 1: Survey Questions

Awareness of Consequences (AC)

(Stern et al., 1999)

Response categories: strongly agree/ somewhat agree/ unsure/somewhat disagree/strongly disagree

1. In general do you think that climate change, which is sometimes called the greenhouse effect, will be a very serious problem for you and your family, somewhat of a problem for you and your family or won't really be a problem for you and your family?
2. Do you think that climate change will be a very serious problem for the country as a whole, somewhat of a problem or won't really be a problem for the country as a whole?
3. Do you think that climate change will be a very serious problem for other species of plants and animals, somewhat of a problem or won't really be a problem for other species of plants and animals?
4. Next, I'd like you to consider the problem of loss of tropical forests. Do you think this will be a very serious problem for you and your family, somewhat of a problem or won't really be a problem for you and your family?
5. Do you think that loss of tropical forest will be a very serious problem for the county as a whole, somewhat of a problem or won't really be a problem for the country as a whole?
6. Do you think that loss of tropical forest will be a very serious problem for other species of plants and animals, somewhat of a problem or won't really be a problem for other species of plants and animals?
7. Next, I'd like you to consider the problem of toxic substances in air, water and the soil. Do you think this will be a very serious problem for you and your family, somewhat of a problem or won't really be a problem for you and your family?

8. Do you think that toxic substances in air, water, and the soil will be a very serious problem for the county as a whole, somewhat of a problem or won't really be a problem for the country as a whole?
9. Do you think that toxic substances in air, water, and the soil will be a very serious problem for other species of plants and animals, somewhat of a problem or won't really be a problem for other species of plants and animals?

Personal Normative Beliefs

(Stern et al., 1999)

Response categories: strongly agree/ somewhat agree/ unsure/somewhat disagree/strongly disagree

1. The government should take stronger action to clean up toxic substances in the environment.
2. I feel a personal obligation to do whatever I can to prevent climate change
3. I feel a sense of personal obligation to take action to stop the disposal of toxic substances in the air, water, and soil.
4. Business and industry should reduce their emissions to help prevent climate change.
5. The government should exert pressure internationally to preserve the tropical forests.
6. The government should take strong action to reduce emission and prevent global climate change.
7. Companies that import products for the tropics have a responsibility to prevent destruction of the forests in those countries.
8. People like me should do whatever we can to prevent the loss of tropical forests.
9. The chemical industry should clean up the toxic waste products it has emitted into the environment.

Environmental citizenship

(Heinisch & Hartman, 2003)

Response categories: strongly agree/ somewhat agree/ unsure/somewhat disagree/strongly disagree

1. Through environmental service, I can apply knowledge in ways that solve "real-life" problems.
2. It is very important to me to be involved in efforts to improve the environment.
3. Having an impact on the environment is within the reach of most individuals.
4. Individuals have an obligation to consider how their actions affect the environment.

ⁱ We acknowledge that the VBN theory builds on Schwartz's norm-activation theory (1973).

ⁱⁱ The surveys and journals did not measure this variable.

ⁱⁱⁱ The participant population is characterized in a similar fashion. Of the thirty-nine: thirteen majored in Environmental Science or Environmental Policy and Planning, thirteen were Biology majors and the remaining thirteen students were either undecided or majoring in a field outside of the environment. Out of the thirty-nine students, who have participated in the Costa Rica experience from all four years, eleven were male and twenty-eight were female.

^{iv} Response rate: 2003-67%; 2004-50%; 2005-33%; 2006-22%; where 1 student participated in 2003 & 2004 experience was not contacted due to her pre-existing knowledge about the study; 1 student participated in 2004 & 2005 experience; 19 students actually participated in the 2006 experience, but only 9 of the 19 were contacted for interviews.

^v 9 students participated in the 2005 course, but only 8 journals were recovered for analysis. Likewise, 12 students participated in the 2004 course, but only 11 journals were recovered for analysis.

^{vi} The analysis was conducted utilizing anonymous photocopies of the original journals, where each student journal was assigned a letter of the alphabet.

^{vii} See Appendix I for survey questions and the connected citations.

^{viii} Responses to personal normative beliefs were not mutually exclusive. In this context students may have ascribed responsibility to both themselves as well as the Costa Rican government to solve the environmental problems.

^{ix} Some of the responses in this AC section reflect at the same time both AC and personal normative beliefs because the journal questions reflecting these two variables were grouped. The journal question for that day's journaling stated: "How has your experience in Costa Rica changed your beliefs about the need for environmental protection or sustainable practices? What are you willing to do? What does Costa Rica and what does the United States need in order for sustainability to be more widely adopted? Are the United States and Costa Rica on different sides or the same side of the problem? Explain. How could NE Wisconsin achieve sustainability? What national, state, and even local policies do you think need to be most immediately addressed?"