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Enhancing Cultural Awareness through an Agricultural Sustainability Course in Costa Rica

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ABSTRACT International learning experiences are increasingly considered critical by universities in order to address the breadth of knowledge and skills required by food and agricultural scientists. An international experience helps create an awareness of international perspectives and prepares students for a global workforce. This article discusses the impact of a study abroad course in Costa Rica focused on agricultural sustainability and cultural awareness. The experimental design had three components: a pre-test, 7-week intervention, and post-test to assess participants' changes over time, regarding their cultural awareness and interests to pursue careers in agriculture. The experiment occurred in 2009 and 2010. Participants agreed the course enhanced their cultural awareness and that as a student studying agriculture it was important for them to understand other cultures. They indicated the ability to apply their learning to their careers in the United States. In addition, within the open ended question section, 27 of the 33 students participating in the course reported that as a result of the course they would like to work with agriculture in an international capacity in the future. In summary, this study succeeded in reaching its goals to enhance students' cultural awareness.

Impact Statement This article helps to display the importance of international learning experiences related to food and agricultural sciences. An international experience helps create an awareness of international perspectives and prepares students for a global workforce. This article discusses the impact of a study abroad course in Costa Rica focused on agricultural sustainability and cultural awareness In addition, this article provides what assessment questions were provided to evaluate the program. In summary, this study succeeded in reaching its goals to enhance students' cultural awareness.

International learning experiences are becoming critical to an undergraduate's education as the need for global food and agricultural scientists continues to increase (Zhai and Scheer, 2002). The Association of American Colleges and Universities (2007) stated that 72% of more than 300 executives of companies in the United States want colleges to place more emphasis on "global issues and developments and their implications for the future." There is a shortage of personnel possessing sufficient skills in language (particularly Spanish) and team-work, and especially culturally and ethnically diverse. As a result, international experiences are not only desired but even required in some cases (Thornton, 1992). In addition, employers within the government are seeking individuals who possess agricultural knowledge. The U.S. Agency for International Development (USAID) describes the need for such professionals as "urgent." Above and beyond the desired background in agriculture is the need for individuals to have international experience (USAID, 2010).

In addition, across many higher education disciplines, attempts are being made to broaden cultural awareness (Starkey and Osler, 2001; Bardhan, 2003; Mushi, 2004). The development of international education initiatives empowers students as global citizens and bridges the cultural gaps of their international awareness. Combining cultural awareness with experiential learning about agricultural practices provides an opportunity for students to develop higher order thinking and problem solving skills, which is often seen as a valuable experience for a future employer (Acker and Scanes, 1998). More so, some studies show that following study abroad, students have named increased cultural knowledge and increased social competence in unfamiliar settings because of the experiences abroad (Carlson et al., 1990; Opper et al, 1990).

Within the United States, the number of students studying abroad in higher education has increased from almost 130,000 in 1998–1999 to more than 260,000 in 2007–2008 (Institute of International Education, 2009). Agricultural

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Abbreviations: CPP, Cal Poly Pomona; EARTH, Escuela de Agricultura de la Region Tropical Humeda; NCSU, North Carolina State University; PU, Purdue University; TAMU, Texas A&M University; UF, University of Florida; USAID, U.S. Agency for International Development.

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students have consistently made up the smallest percentage of those going abroad, averaging around 1.34% (Institute of International Education, 2009). Therefore, agricultural educators should seek ways to increase student participation in study abroad programs. These elective programs enrich the student educational experience by offering benefits not traditionally available in the classroom. These benefits include broadening global perspectives, enhancing cultural appreciation, developing cross-cultural communication skills, increasing one's own cultural consciousness, and acquiring non-native language (National Association for Foreign Student Advisers, 2002). Study abroad programs can vary in duration; however, this study looks only at short-term programs, typically 3 weeks in length. Short-term programs are attractive because they work with certain limitations such as budget, family, work and school schedules, and apprehension about spending longer durations abroad (National Association for Foreign Student Advisers, 2002).

Traditionally, the focus of undergraduate education has been based on the lecture–discussion method, with an emphasis on face-to-face interaction. Stimulating enthusiasm for the subject material represents a major challenge, especially in large and information-driven lower division introductory courses (Sulzman, 2004). There is not only a great need to improve the critical thinking and problem solving skills of undergraduate agricultural students, but to include critical thinking and problem solving skills within a curriculum requires an interactive approach in which instructors must employ hands-on instructional methods in novel and innovative settings to simulate the real-world problems students might expect to encounter (Irani et al., 2004; Friedel et al., 2008).

One approach used to stimulate enthusiasm in the subject matter and improve problem solving ability is experiential learning, where students were immersed into hands-on learning within a real-world setting where they must identify relevant issues and discover how to solve them before exposure to the broader knowledge base. Through experiential learning students actively engage and then reflect back on their experience (Kolb, 1984). Experiential learning activities can include hands-on laboratory experiments, practicum, field exercises, and studio performances (Center for Research on Learning and Teaching, 2007). In addition, Battisti et al. (2008) provided an extensive review of experiential learning, indicating that learning is achieved best through action enabling societal change. However, experiential and other active learning approaches have been applied to only a limited extent to international course experiences. Most often, the approach to such curricula is based on "principles first, application second" (MacKay et al., 1999). The traditional pedagogical view has been that students must be taught the fact basis first, most often in a lecture setting, before applying concepts. In order to document the impact, short-term study abroad classes have demanded integration of knowledge, skills, and sensibilities to have absolute benefits (N. Gillespie, unpublished data, 1997; Suvedi and Farrell, 2003) for student self-confidence, professional capacities, and perspective of the world.

In addition, courses with an emphasis on sustainability need to be created. As indicated by the Brundtland report, the World Commission on Environment and Development defined sustainable development as meeting "the needs of the present without compromising the ability of future generations to meet their own needs" (United Nations, 1987). In 2000, the United Nations Development Programme created the Millennium Development Goals project, which aims to combat extreme poverty around the world by 2015. Goal 1 strives to reduce the number of those suffering from hunger by half (United Nations Development Programme, 2000). Education based on sustainable development has been a global agenda since the United Nations World Summit on Sustainable Development in Johannesburg (United Nations, 2002). Focusing a curriculum centered on sustainability provides the opportunity to create comparisons between traditional farming practices and modern farming technologies encompassing cultural differences, applying critical thinking and drawing comparisons to these differences. In order to maintain agricultural food production, ecological responsibility, economic feasibility, and social acceptability must be acknowledged and equally considered (Unruh and Fick, 1997). Continued advances in agriculture depend upon our students' ability to understand increasingly complex problems with greater efficiency.

This project examined how a study abroad course designed to engage students through hands-on and problem-based applications influences student global engagement and cultural awareness. It is part of a larger study designed to capture student perceptions regarding short-term study abroad. The overarching goal of the course was to employ experiential learning to solve real problems in agricultural sustainability in Costa Rica.

The following research questions were used to inform this study:

RQ1: Do students in an international experiential learning course express changes and growth in their cultural awareness?

RQ2: Does a course of this type increase student interest in international engagement through agricultural careers?

METHODS

Course Information

The objective of the course was to establish a multi-institutional, international, experiential learning program focused on the principles of sustainable agriculture and entrepreneurship for undergraduate students predominately from Purdue University (PU) and the University of Florida (UF) with the collaboration of the Escuela de Agricultura de la Region Tropical Humeda (EARTH). The three universities involved PU, UF, and EARTH established this pilot program to enhance student international engagement during May to June of 2009 and of 2010; however, the program was open to the universities participating with the EARTH consortium.

The course was conducted for a total of 7 weeks each time: 4 weeks of pre-trip sessions, using PolyCom to connect the classes from UF and PU, followed by a 3-week

international travel course (3-credits) titled Promoting Sustainability: Training Agricultural Practitioners in the Humid Tropics, which was offered for 21 days during May and June.

The learning objectives were as follows:

1. Define agricultural sustainability and outline its core components.
2. Demonstrate the unique challenges and constraints involved in maintaining sustainable tropical agroecosystems by visiting and working directly with farmers.
3. Identify interfaces among the soil, plant, and animal sciences and how their relationships with economics and social considerations shape the decision making process for small-scale integrated farmers.
4. Comprehend today's Costa Rican reality from a historic perspective.
5. Provide an immersive multi-cultural learning environment for students who promote networking opportunities with peers, EARTH students as mentors, faculty, staff, and with farmers and local entrepreneurs.

The course included a variety of learning activities including pre-sessions on cultural awareness, content lectures, cultural activities, travel, and hands-on experiences in the field. Course content details along with the syllabus and objectives are listed on the website: http://www.ag.purdue.edu/agry/costa-rica/Pages/default.aspx (verified 26 July 2011). Some of the highlights of the course included visiting a cotton breeding station of a multinational company and learning the steps of cotton breeding, working directly with rural farmers, milking cows, learning about the steps to creating compost, and working on an organic farm. In addition, research application groups were formed. The U.S. students were paired with local Costa Rican farmers to assist in solving an agricultural sustainability issue. The students were separated into three groups. Each group went to a different farm. The first day the students were asked to work individually, using their previous life experience and personal observations of the farm to identify the beneficial assets and potential risk on the farm with a focus on the themes of economic and technical agricultural issues. The second day the students returned to the farms to work as a group with the farmers. The students were asked to engage in the daily activities of the farm to gain a group perspective on what life is like as a farmer in Costa Rica and how the farmers made economic and technical decisions. On the third day, the students returned to the farms to discuss their observations with the farmers. They were expected to discuss how they linked social, environmental, technical, and economic aspects of agriculture to the beneficial assets and potential risks identified on each farm. At the conclusion of the farm visits, each group of students made a final oral presentation. The students then invited the farmers to EARTH University for a luncheon, gave their oral presentations, and held a discussion with the farmers on the aspects of learning about sustainability. Throughout the process the students were guided by EARTH University professors who work daily in the communities of the farmers,

The U.S. students actively worked with EARTH students (mentors) to engage in their hands-on learning environment. Furthermore, students were able to participate in a variety of other cultural and touristic activities such as hiking Arenal (an active volcano); zip-lining in the rainforest; visiting museums in San Jose; touring coffee, pineapple and banana plantations; viewing and learning about the flora and fauna of both the Pacific and Caribbean sides of the country; and enjoying a visit to the Costa Rican hot springs.

Population (*n*)

The target audience for the project was agricultural undergraduate students from UF and PU; however, a few students from the consortium universities participated. All three universities (UF, PU, and EARTH) advertised the course and students submitted their application through either UF or PU. The program recruited 17 student participants for 2009 and 16 student participants for 2010 for a total number of 33 participants (n = 33) for 2 years. The participants recruited to take part in this project represented PU, UF, Cal Poly Pomona (CPP), North Carolina State University (NCSU), and Texas A&M University (TAMU). Eighteen of the participants were female and 15 were male, ranging in age from 20 to 28 years of age. Twenty-eight participants were undergraduate students with 2 freshmen (6%), 18 sophomores (54%), 4 juniors (12%), and 4 seniors (12%). Five of the participants were graduate students (16%). Twenty-four of the participants were White, 4 were Hispanic, 1 was African American, and the other 4 reported "other" as their ethnicity.

Where students were raised offers a glimpse into their previous experience with agricultural topics outside of the classroom. In this case, students were asked to answer a categorical question regarding the location of primary place they were raised prior to attending college. Seventeen students grew up in a subdivision of a town or city, 11 grew up on a farm, 2 grew up in a rural setting, and 3 students grew up in the city.

The 33 participants came from 19 different majors. The majority of majors were: agricultural business (n = 8), animal sciences (n = 4), horticulture (n = 3), agricultural education (n = 2), biology (n = 2), plant medicine (n = 2), and the remaining 12 (n = 12) came from the following majors: biochemistry, botany, chemistry, crop and soil management, economics, ecological science and engineering, environmental science, environmental and natural resources engineering, environmental horticulture, food and resource economics, farm management, and mathematics.

Evaluation Design

Assessments were created to document student learning and experiences. The evaluation design was based on a quantitative approach combining data analysis of participants' perceptions to specific items with content analysis of participants' writing samples. Instruments used to collect data from the students were reviewed by a panel of experts for subject matter, survey design, and content. All instruments were reviewed by the internal review board at the University of Florida and approved as protocol no. 2009-U-0283. Two surveys were conducted using a web-based survey research design following Dillman et al.'s (2009)

tailored design method. A pre-test was given before the 7-week course experience (4 weeks of pre-sessions and 3 weeks of the international experience), and a post-test was given on the last day of the course. All students filled out both assessments for a 100% response rate.

The pre-test included (1) 1 open-ended question regarding participant expectations prior to the study abroad course, (2) 9 Likert-type questions regarding the participants' interests in engaging in international opportunities, and (3) 6 Likert-type questions regarding the participants' cultural awareness as it relates to sustainable agriculture and demographic questions. The post-test included (1) the same 6 Likert-type questions regarding participants' cultural awareness as it relates to sustainable agriculture, (2) 14 Likert-type questions addressing the participants' interactions with people in Costa Rica, and (3) 1 open-ended question asking the participants to reflect on how the course had influenced their future aspirations. All Likert-type questions were on a 5-point scale (1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, and 5 = strongly agree) participants checked the term best describing their level of agreement.

The ease in collecting data and an expected high response rate were the main strengths of the design. Participants had access to the web and participants were offered a small percentage of optional participation points if they took part in the online program assessments. A high response rate was expected because most of the participants felt a social obligation to participate. While the design does not include a comparison group as those in a quasi-experimental research design (Sutton et al., 2007), the pre-test/post-test design allowed changes over time to be noted and provided evidence to make tentative inferences about possible causal connections between the students' international environments and learning. This design does not allow for a true cause-and-effect relationship to be identified, as observed changes could be due to other factors outside the activities of this study abroad course. In addition, the students self selected to enroll in this study abroad course.

Data Analyses

The researchers used SPSS (http://www.spss.com; verified 26 July 2011) to analyze the quantitative results. Descriptive statistics were run on the responses to both the pre-test and post-test. Frequency distributions were analyzed, with means and standard deviations calculated and combined over the 2 years. In addition to quantitative measures, open-ended questions were asked on both the pre-test and post-test to assess participants' expectations for the course and participant's future engagement in international experiences. All 33 participants answered the open-ended questions. The researchers used a basic qualitative design utilizing content analysis for this study. Content analysis allowed the researchers to gain an in-depth understanding of the phenomenon of interest through the identification of emerging themes (Lincoln and Guba, 1985; Merriam, 1998) found in the participants' open-ended statements (Neuendorf, 2002). Emergent themes from each of the individual responses were identified, categorized, and then combined to create overall themes from the experience (Lincoln and Guba, 1985). An audit trail, triangulation with journals kept by the participants, member checks where participants were asked to verify the correct interpretation of their statements, and acknowledgement of researcher bias were used to establish trustworthiness (Lincoln and Guba, 1985). Themes in the areas of participant expectations, perceptions of global agricultural engagement, and future involvement in international professions were sought.

RESULTS AND DISCUSSION

RQ1: Do students in an international experiential learning course express changes and growth in their cultural awareness?

Prior to participation, students in both cohorts (2009 and 2010) were asked to comment on their perceptions and/or expectations for the course. Information gained from the students' pre-course expectations allowed the teaching team to address the students' questions by including discussions surrounding identified topics of interest during the course. Student comments included:

> To understand multi-national companies and their impact on the local society.
>
> To learn from the farmers, take what is needed in Costa Rica, and find a solution here in the states.
>
> To understand how different animals, crops, and harvesting techniques are integrated and adapted to the environment in which they are raised.
>
> To open my eyes to new perspectives.
>
> I really hope I can further define my life goals. I have, to an extent, narrowed my broad life path and have focused on agriculture for some time now, while still not fully committing to it. I hope that this experience will allow me to know more of what I would like to do in life, as well as gaining a lot of personal growth.
>
> I hope this course will increase my understanding of and technical proficiency in sustainable plant agriculture practices.
>
> I am very excited to travel and be able to see other cultural farming practices and diverse ecosystems.

To gain an understanding of the participants' previous international experiences, they were asked to identify the international opportunities they had been involved in before and during college on the pre-test (Table 1). An interesting outcome to highlight is that of the 33 students participating in the 2009 and 2010 cohorts only one student had previously participated in a study abroad course in Ireland during college.

To develop a deeper understanding of participants' interests in international experiences, they were asked to identify international opportunities in which they would be interested in partaking (Table 2). Participants were asked how much they agreed with specific statements regarding their interest level. The top three interests were going to an

Table 1. **Percentage of students participating in international opportunities prior to the course.**

Statement	Prior to college	During college
	%	
Going to an international restaurant	94	91
Meeting with international exchange students	70	82
Listening to an international guest speaker in a class	67	79
Attending an international festival	64	70
Taking a class focused on international issues	42	64
Hosting an international visitor	27	18
Participating in an international study tour	21	27
Participating in a church mission trip to another country	6	18
Participating in a semester-long study abroad program	0	3

Table 2. **Mean and standard deviation (SD) of participants' interests in international opportunities, on a scale from 1 to 5 with 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, and 5 = strongly agree.**

Statement	Mean	SD	*n*
I am very interested in going to an international restaurant.	4.73	0.57	33
I am very interested in engaging in an international study tour.	4.67	0.60	33
I am very interested in attending an international festival.	4.58	0.56	33
I am very interested in listening to an international guest speaker in a class.	4.52	0.57	33
I am very interested in taking a class focused on international issues.	4.52	0.62	33
I am very interested in meeting with international exchange students.	4.27	0.72	33
I am very interested in participating in a semester-long study abroad program.	3.67	1.05	33
I am very interested in hosting an international visitor.	3.48	0.83	33
I am very interested in participating in a church mission trip to another country.	3.06	1.17	33

Table 3. **Participants' level of agreement to statements about cultural interactions before the course (Pre) vs. after the course (Post) responses related to, on a scale from 1 to 5 with 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, and 5 = strongly agree.**

Statements	Pre (SD)	Post (SD)	Mean diff. (Pre–Post)
As a student studying agriculture, it is important for me to understand other cultures.	4.61(0.56)	4.70(0.53)	0.09
As a student studying agriculture, it is important for me to understand issues related to international agriculture.	4.85(0.36)	4.70 (0.68	–0.15
Participating in this program has enhanced my cultural awareness.	4.61(0.56)	4.45(0.79)	–0.16
I am very interested in sustainable agricultural practices.	4.39(0.75)	4.15(0.71)	–0.19
Participating in this international program will help me choose the right job when I graduate.	4.45(0.66)	3.70(1.05)	–0.75*
The probability that I will be able to apply what I learn in this program in the United States is very high.	3.76(0.83)	3.55(1.00)	–0.21

* $p < 0.05$.

Table 4. **Participant's level of importance (I) vs. level of the experience (E) related to exchanges with the Costa Rican community, on a scale from 1 to 5 with 1 = no importance or no experience to 5 = great importance or great experience.**

Exchanges	Importance (I)	Level of experience (E)	Mean difference (E–I)
Having an EARTH student as a mentor/partner	4.24	2.91	–1.33
Communication with EARTH students	4.30	3.27	–1.03
Friendship with EARTH students	3.94	3.03	–0.91
Communication with Latin American farmers	4.00	3.58	–0.42
Hands-on learning experiences	4.79	4.12	–0.67
Learning about the perspectives of Costa Rican farmers	4.45	3.64	–0.81
Actual experience on a Costa Rican farm	4.76	4.12	–0.64

international restaurant (M = 4.73; SD = 0.57) engaging in an international study tour (M = 4.67; SD = 0.60), and attending an international festival (M = 4.58; SD = 0.56). This information was used to understand students' interests as they related to experiences they might be exposed to as part of the course.

Participants were then asked to assess their level of agreement with specific statements regarding their cultural awareness as it relates to sustainable agriculture before and after the experience (Table 3). These questions and responses were designed to demonstrate the importance of creating opportunities for students to enhance their

global perspectives. The mean differences for the pre-test vs. post-test scores for the all responses were negative, opposite of the desired response. Even though negative differences were recorded, only one of the differences was statistically significant. Therefore, the students' agreement did not from the beginning of the course to the conclusion, except that the students believed it was less likely after the course that the possibility of participating in the international program would help them choose the right job when they graduate. While this was the result of the assessment, the researchers believe the participant's lack of previous experience abroad may have led to this result. With the exception of one student, the population of students who selected to participate had never had an international experience prior to the course. Before the trip, the students had only experienced cultural exchange through the lens of intercultural experiences within their home state. In essence, exposure to international issues during the course may have caused the participants to acknowledge what they did not know and therefore lowered their level of perceived agreement from their overestimation reported on the pre-test. This negative difference also brought to light that during these short-term courses, developers need to add evaluations that include interventions to see what is impacting the students' engagement related to cultural exchanges (Lamm et al., 2010b). Even though they were mostly negative, the benefits of acknowledging the negative mean difference between pre-test and post-test responses allows for further investigation of why the students' perceptions changed over the course of the experience.

Due to the course design, participants interacted with Costa Rican farmers and students in a variety of activities. To assess the participants' perceptions of their interactions with Costa Ricans, they were asked to rank the importance of and experience with seven different interactions (Table 4). A scale was used to rank the level of perceived importance and satisfaction of the experience of the interaction items with the scale ranging from 1 = no importance or no experience to 5 = great importance or great experience. The students' level of importance and experience responses were compared to examine the difference between how important the interaction items were to the students with the level to which the students perceived they experienced the interaction items.

Results indicated a difference between the level of importance participants associated with specific interaction and the degree of satisfaction they experienced. The greatest differences occurred with respect to having an EARTH student as a mentor/partner and communication with EARTH students. These differences reflect the students' perception that interacting with Costa Rican students was important to them, but their actual experience with the EARTH students did not rise to their expectations. Based on the open-ended responses designed to gain a deeper understanding of the quantitative results, themes were identified describing why they were unable to have the desired interaction. Content analysis identified a lack of time the EARTH students had to connect and engage with the U.S. students as the primary barrier. Because the EARTH students needed to attend their own classes, they were unable to allot time to help and connect with the visiting U.S. students.

RQ2: Does a course of this type increase student interest in international engagement of agricultural careers?

On the post-test, 27 of the 33 students participating in the course would like to work in agriculture in an international capacity in the future.

One participant stated, "I would love to continue working in international agriculture. There is so much out there and so much to learn. We have it so amazingly good in America. Maybe I won't be able to do much or change much internationally, but I would like to give it a shot."

Another said, "I can't wait to go abroad again. I think I would like to work for the USDA in an international setting for about 6 months after I finish graduate school."

A third stated, "I want to research and implement international agricultural programs as a career after my Master's degree."

Students also reflected upon how the course influenced their global perspective and initiated their interest in learning more about their world.

One stated, "I think that traveling to other countries really expands your perspective on different topics and allows you to experience new things that you may not get a chance to experience at home."

A second said, "I really would like to take every opportunity I can get to travel. I plan on traveling abroad next summer for certain. Hopefully, I can also work in international agricultural development one day."

Another student reflected, "I would like to get involved so that I could see other parts of the world from the outsider perspective that I have learned much about here. I think I would like to visit Europe and Asia to gain a better perspective of agriculture around the world."

Another student summed up the responses well when ssying, "I want to participate in as many international programs as possible. I absolutely love going abroad and learning about different cultures and different sectors of the workforce, like agriculture."

From a broad perspective, a summary of the ways students involved in the course would like to be involved in international agricultural careers included:

1. Employment: international trade policy, international economic development, U.S. Agency for International Development (USAID), internationally focused non-government organizations (NGOs)
2. Participating in another study abroad trip
3. Practicing Spanish skills
4. Serving as a teaching assistant for an international course
5. Completing a global engineering project in Costa Rica
6. Researching and implementing international agricultural programs
7. Participating in the planning process of this course in future years
8. Enrolling in the Peace Corp

The National Association for Foreign Student Advisers (2002) identified broadening global perspectives, enhancing cultural appreciation, developing cross-cultural communication skills, and increasing cultural consciousness of students is necessary for students abilities to become employed in an increasingly more diverse and global workforce. This program provided an excellent opportunity to provide students these skills in a sound scientific and practical learning environment. In addition, it offered an environment that promoted a 1:1 teacher/student interaction and personalized learning opportunities. One approach used to stimulate enthusiasm in the subject matter and improve problem solving ability was experiential learning, which focuses on immersing students in a real world setting where they must discover what the issues are and how to solve them. This study tried various ways to incorporate communication with EARTH students and required students to experience independent research with local farmers to create and analyze the quality of pineapple silage for dairy farms, planting palm trees to sell for heart of palm food industry, and making and selling chocolates and soaps to local communities, all of which helped to increase their cultural awareness and experiences while in Costa Rica.

Achieving measurable success with the envisioned model requires the instructors to both expand existing courses and develop new ones to emphasize issues of regional, national, and international importance. To encourage faculty to develop collaborative problem-solving situations where students can solve real challenges for stakeholders and expand their university experiences is of real urgency in order to enhance the graduates' visibility with local, state, national, and international environmental and agricultural entities, humanitarian agencies, and global markets. The collaboration with EARTH University in this study abroad was essential for broadening our agricultural students' educational experiences, particularly because it was the educational model that the students were exposed to which was student centered focus on a highly participatory methodology grounded in practical experience.

OVERALL CONCLUSIONS

This research asked: Do students in an international experiential learning course express changes and growth in their cultural awareness? More specifically, do students have an increased interest in agricultural careers after their study abroad experience? The answer is "yes." Students in this course experienced an increase in their cultural awareness and interest in international engagement. The qualitative data examining how the course influenced students' global engagement showed an increase noted in their interest to engage in international agriculture professionally. Thus, programs are being created by universities to provide opportunities to offer students sound scientific and practical learning in a personalized fashion in an environment that promotes skills development and an interdisciplinary curricula to enhance cultural awareness (U.S. Department of Agriculture–Higher Education Challenge grant no. 2008-01951). In addition, offering courses in an international professional development setting increases students' interests to engage even more (Lamm et al., 2010a).

The qualitative results of the study suggest that short-term study abroad programs indeed have an impact on participants. Participants reported a tendency to see other cultures in a more positive way. An overwhelming majority of students strongly agreed that they not only learned new information about agriculture, but also recognized its importance in a global setting and understood the information better by observing it firsthand. In conclusion, there was a tendency for students to report that they felt more confident that this experience helped increase their agriculture knowledge through the hands-on experiential learning while in Costa Rica.

As far as recommendations and implications, agricultural educators need to meet the occupational demand for graduates to have positive international experiences. Agricultural colleges and educators alike must find ways to enhance the global outlook and capabilities of their students. They must advocate for programs that foster experiential learning in agricultural settings abroad and increase their marketing and promotion of such programs. Capitalizing on students' positive perceptions of study abroad in terms of marketability, a greater effort should be made to link these programs with professional development courses. The collaboration between the U.S. institutions and EARTH University helped implement a plan to equip undergraduate students in applied sciences, prepare them to excel and effectively contribute to a global society, and raise their cultural awareness.

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REFERENCES

Acker, D., and C.G. Scanes. 1998. A case for globalizing U.S. colleges of agriculture. J. Int. Agric. Ext. Educ. 5:59–62.

Association of American Colleges and Universities. 2007. Global learning for the new global century: Executive summary with findings from employer survey. Association of American Colleges and Universities, Washington, DC.

Bardhan, N. 2003. Creating spaces for international and multi(inter)cultural perspectives in undergraduate public relations education. Commun. Educ. 52:164–172. doi:10.1080/03634520302473

Battisti, B., C. Passmore, and Y. Sipos. 2008. Action learning for sustainable agriculture: Transformation through guided reflection. NACTA J. 52(2):23–31.

Carlson, J.S., B.B. Burn, J. Useem, and D. Yachimowicz. 1990. Study abroad: The experience of American undergraduates. Greenwood Press, New York.

Center for Research on Learning and Teaching. 2007. Teaching strategies: Experiential learning and field work. Available at http://www.crlt.umich.edu/tstrategies/tsel.html (accessed 4 Feb. 2011; verified 25 July 2011). Univ. of Michigan, Ann Arbor.

Dillman, D.A., J.D. Smyth, and L.M. Christian. 2009. Internet, mail, and mixed-mode surveys: The tailored design method. John Wiley & Sons, Hoboken, NJ.

Friedel, C., T. Irani, R.D. Rudd, M. Gallo, and E.E. Eckhardt. 2008. Overtly teaching critical thinking and inquiry-based learning: A comparison of two undergraduate biotechnology classes. J. Agric. Educ. 49:72–84. doi:10.5032/jae.2008.01072

Institute of International Education. 2009. Open doors 2009 report on international education exchange. New York: Institute of International Education. Available at http://www.iie.org/opendoors (accessed 1 July 2011; verified 25 July 2011).

Irani, T., R.D. Rudd, C. Friedel, and M. Gallo-Meagher. 2004. Utilizing international students' critical thinking and perceptions to design an internationally focused course module for plant biotechnology. Proceedings of the 20th Annual Assoc. Int. Agric. Ext. Educ. (AIAEE), May 23, Dublin, Ireland.

Kolb, D.A. 1984. Experiential learning: Experience as the source of learning and development. Prentice-Hall, New Jersey.

Lamm, A.J., G.D. Israel, and T. Irani. 2010a. A case study from Costa Rica: Using formative evaluation to enhance program implementation. Proc. of the Annual Conference of the Association for International Agricultural and Extension Education, Saskatchewan (AIAEE), May 14, Saskatoon, Canada.

Lamm, A.J., E. Rhoades, L. Snyder, T. Irani, T.G. Roberts, and J. Brendemuhl. 2010b. Utilizing natural cognitive tendencies to enhance agricultural education programs. Proc. of the National Meeting of the American Association of Agricultural Education (AAAE), May 27, Omaha, NE.

Lincoln, Y.S., and E.G. Guba. 1985. Naturalistic inquiry. Sage Publication, Newbury Park, CA.

MacKay, B.R., L. Emerson, M.B. MacKay, K.A. Funnell, and T.E. Welsh. 1999. Challenging the pedagogy of tertiary level horticulture. HortTechnology 9:272–276.

Merriam, S.B. 1998. Qualitative research and case study applications in education. John Wiley & Sons, San Francisco, CA.

Mushi, S. 2004. Multicultural competencies in teaching: A typology of classroom activities. Intercult. Educ. 15:179–194. doi:10.1080/1467598042000225032

National Association for Foreign Student Advisers. 2002. Association of International Educators. The guide to successful short-term programs abroad. NAFSA, Washington, DC.

Neuendorf, K. 2002. The content analysis guidebook. Sage Publications, Thousand Oaks, CA.

Opper, S., U. Teichler, and J. Carlson. 1990. Impacts of study abroad programmes on students and graduates. Higher Education Policy Series. 11, Vol. (2). Jessica Kingsley, London.

Sulzman, E.W. 2004. Games in an introductory soil science course: A novel approach for increasing student involvement with course material. J. Nat. Resour. Life Sci. Educ. 33:98–101.

Suvedi, M., and P. Farrell. 2003. Studying abroad in Nepal: Understanding impacts on student's lives. Frontiers: The Interdisciplinary J. of Study Abroad. Vol. (Fall).

Sutton, R., A. Miller, and D. Rubin. 2007. Research design in assessing learning outcomes. p. 23–59. *In* M. Bolen (ed.) A guide to outcomes assessment in education abroad. Forum on Education Abroad, Carlisle, PA.

Starkey, H., and A. Osler. 2001. Language, learning and antiracism: Some pedagogical challenges. Curric. J. 12:313–329. doi:10.1080/09585170110089646

Thornton, R. 1992. Rethinking undergraduate professional education for the twenty-first century: The public policy vantage point. p. 35–40. Available at http://www.nap.edu/openbook.php?record_id=1986&page=35 (accessed 4 Feb. 2011; verified 26 July 2011). Board on Agriculture, National Research Council, Washington, DC.

United Nations. 1987. Report of the World commission on environment and development. General Assembly Resolution 42/187. Available at http://www.un.org/documents/ga/res/42/ares42-187.htm (accessed 1 Jan. 2011; verified 26 July 2011). United Nations, New York.

United Nations. 2002. Report of the World summit on sustainable development. Available at www.un.org/jsummit/html/documents/documents.html (accessed 4 Feb. 2011; verified 26 July 2011). United Nations, New York.

United Nations Development Programme. (2000) What are the millennium development goals? Available at http://www.undp.org/mdg/basics.shtml (accessed 1 Jan. 2011; verified 26 July 2011). UNDP, New York.

Unruh, L.J., and G.W. Fick. 1997. Concepts of sustainability and the pasture ecosystems SCAS Teaching Series no. T97-1. p. 1–11. Dep. of Soil, Crop and Atmos. Sci., Cornell Univ. Ithaca, NY.

U.S. Agency for International Development. 2010. Careers. Available at http://www.usaid.gov/careers (accessed 1 Jan. 2011; verified 26 July 2011). USAID, Washington, DC.

Zhai, L., and S.D. Scheer. 2002. Influence of international study abroad programs on agricultural college students. J. Int. Agric. Ext. Educ. 9(3):23–29.

About the author...

Dr. Snyder has a passion for international education. She has initiated both teaching and scholarly research initiatives in four Latin American countries. Her leadership in teaching includes research and development of service learning and critical thinking pedagogies. She has also created pathways to broaden the crop science disciplines to include international experiential learning in sustainability including collaboration within the areas of plant breeding, and genetic diversity. She continues to strive to develop new ways to internationalize the crop science curriculum.