ABSTRACT

SMITH, SARAH ANNE. Improving Professional Skills in Soil Science Outreach through Experiential Service-Learning Initiatives. (Under the direction of Dr. Julie Grossman.)

We investigated the development of professional skills by agriculture students through a community-engagement project in which students taught 7 weeks of soil science lessons to diverse populations in under-served communities. Our objectives were to (1) determine the skill sets desired by employers for community-based agricultural work, (2) measure the effectiveness of course activities to develop and improve these skill sets and prepare students for employment post-graduation, and (3) quantify the degree to which service-learning experiences improve student knowledge about soil science and agriculture. Quantitative and qualitative analyses were conducted for two years and included a survey of student participants, individual student interviews, and field observations. A comparison of student survey and interview data shows that when compared to a non-service-learning control group, service-learning students rate themselves as significantly more confident in career-relevant skills following the seven week community engagement project Field observation and student interview data indicated that by serving as community educators, students developed knowledge of agriculture, comfort working with diversity, leadership skills, and increased ability to teach soil science to the public. Preliminary findings suggest that service-learning projects incorporated into agriculture curricula provide students with experience pertinent to future employment in extension and agricultural outreach.

In addition to measuring skills developed from the service-learning experience, we also designed and piloted a training guide to improve student preparation to teach diverse
audiences. As agricultural curricula expand to include a focus on the social justice aspects of food systems, service-learning and community engagement projects in this area are increasingly popular on university campuses. Some projects involve immersing university students in diverse urban neighborhoods where they learn to share agricultural knowledge with under-served populations while increasing personal awareness of social justice and inequalities. Project participants are eager, but often unprepared for the challenges of such projects, and therefore may benefit from diversity and teacher training that equips them with culturally competent educator skills. A training manual developed at North Carolina State University has been piloted and evaluated for two years in a service learning-based soil science course. The manual consists of seven learning modules that can be used by university instructors, non-government organizations and other food systems and agricultural outreach programs to increase diversity awareness and improve basic teaching and classroom management skills. This study demonstrates that students who participated in the training prior to embarking on their service learning project credit the modules for helping them learn skills to become culturally competent educators.
Improving Professional Skills in Soil Science Outreach
Through Experiential Service-Learning Initiatives

by
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DEDICATION

All of the hard work represented here, is dedicated to my husband Jeremiah, my sons Rohan, and Declan. Thank you for your patience and support. And to my mom, for encouraging me to stay focused and “just do the next thing.”

Lord, thank you for giving me the strength and perseverance to finish this task.

I owe everything that I accomplish to you.
BIOGRAPHY

Sarah Smith grew up in Quincy, Massachusetts and attended the University of New Hampshire where she studied Biology and Microbiology. Following graduation in May, 2002 she moved to DC where she worked as a Biological Research Technician for the National Cancer Institute at the National Institutes of Health in Bethesda, MD. There she became a published author in several peer-reviewed scientific journals and began teaching with a volunteer after-school group called “Hands-On Science”. She continued to work as a substitute teacher and tutor for academically challenged students upon returning to Massachusetts. She moved to the desert in 2005 and began to develop a love for sustainable agriculture, food systems and green living while working as the member coordinator and graphic designer for the Food Conspiracy Co-Op also in Tucson, Arizona. Sarah returned to Massachusetts in 2007 to work as an Advanced Placement Biology teacher, chemistry teacher and track coach at an all-girls private school outside of Boston. After two years of teaching science, her students convinced her to attend graduate school to study agriculture. Sarah spent 1 month teaching for the Global Young Leaders Conference in Beijing, China and then 3 months exploring the diversity of farming systems all over Asia. When she returned to the states, she and her husband, Jeremiah moved to North Carolina to start an eco-sensitive pest control company, explore urban farming, and learn to keep bees. Sarah studied soil science at North Carolina State University. Her passion is educating her surrounding community on sustainable approaches to local food production in urban agricultural settings. Sarah has a two year old son Rohan, another baby arriving in September, three dogs, 6 chickens and 30,000 bees.
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PREPARING STUDENTS FOR A DIVERSE FUTURE: USING SERVICE-LEARNING FOR CAREER TRAINING IN AGRICULTURAL COMMUNITY OUTREACH

Introduction

The Soil Science Society of America (SSSA) has declared food security as one of the greatest challenges facing our country, stating that educational tools and soil quality controls are necessary to foster urban agriculture development and improved nutrition for urban children (Grand Challenges 2010). Land grant universities and colleges of agriculture make education accessible to the public (NRC 1996; LaMay 2001) and therefore can utilize educational community service projects to train students to respond to this challenge. It is therefore imperative that agriculture curricula evolve to provide students with opportunities to witness firsthand the complexities and challenges of modern agriculture, communicate the role of soil in sustaining a growing global population, and develop skills to work with the public and create social change (Parr and Trexler 2011).

Despite the United States’ position as a global food producer, in 2010 14.5% of households were food insecure in that they had limited or uncertain access to enough food for all household members to sustain active, healthy living (Gunderson 2008; Nord et al., 2004; Coleman-Jensen et al., 2011). Obesity, which is linked to food insecurity, has been attributed to a lack of resources and education that lead to an inconsistent diet of low-cost energy-rich foods (Drewnowski 2003). Food insecurity disproportionately affects minority populations with 25.7% of African-American households and 26.9% of Hispanic households reporting a lack of consistent access to food, compared to 10.7% of white households (Wang and Chen 2011; Nord et al., 2009). Such households are primarily located in diverse low-income urban
neighborhoods, with “low income” defined as annual income at or below the Department of Health and Human Services poverty guidelines of $19,090 per 3 person household (NC Department of Health and Human Services, Division of Social Services 2012). Access to fresh fruits and vegetables in such environments is often limited, and safety issues and urbanization may preclude children from outside activity and exercise (NC Department of Health and Human Services, Division of Social Services 2012; Rose and Bodor 2006).

Urban community garden development is one of the strategies used by non-government organizations (NGOs) to combat food insecurity and empower communities (Teig et al., 2009). Globally, urban gardens are instrumental in growing and distributing food to underserved populations, while increasing food production capacity (Milligan et al., 2004, Zezza and Tasciotti, 2010), and are an excellent setting in which to teach agricultural principles to the public. While in general the United States has made technological advances to greatly increase agricultural yield (Sassenrath, et al., 2008) access to healthy food in under-served neighborhoods is limited (Andreyeva et al. 2008; Franco et al. 2008). The result is that as a whole the U.S. continues to fall short of meeting the nutritional needs of a significant portion of society.

Many students seeking admission to soil science and agriculture programs today are interested in applying science to the environmental, social justice, and human health implications of our current food production system. Prospective employers for these students following graduation include university extension programs, as well as domestic and international government and non-government organizations that are developing educational tools for sustainable soil management. Consequently, courses in agroecology, organic
farming and sustainable agriculture (focusing on food systems and food insecurity) are becoming more prevalent on university campuses (Grossman et al., 2010; Grabau 2008; Sriskandarajah et al., 2005; Bhasvar 2002). Lecture and laboratory-based courses impart technical information, yet courses containing community-based learning activities potentially provide students opportunities to apply their knowledge in their immediate environment and develop the interpersonal skills necessary to become future community leaders.

Service-learning is a pedagogical tool that can integrate meaningful community service with instruction and reflection to enrich the learning experience, teach civic responsibility, and simultaneously serve the community by meeting stated needs (National Service-Learning Clearinghouse 2012; Stavrianopoulous 2008). A service-learning experience (SLE) can be an especially useful tool for addressing food and agriculture related issues and may be useful to successfully reinforce class concepts, develop student values and skills, build student confidence, and address on-the-ground community problems (Leege and Cawthorn 2008; Flannery & Ward 1999). Whole curricula have even been designed that focus on immersing students in real life agronomic phenomena to help them direct their own learning and decide relevant theory to learn (Lieblein et al., 2004).

Although academic institutions are responsible for preparing students for careers in agriculture, a lack of communication between educational institutions and the employers of their graduates can cause graduates be deficient in desirable competency areas (National Research Council 2009). The number of employers interested in hiring students with a global outlook and international multicultural competency has grown exponentially within the last two decades (Navarro and Edwards 2008). Hansen and Hansen (2007) identified
multicultural sensitivity, problem-solving, ability to work and manage a group, organizational communication, analytical, problem-solving, and field-related technical skills as the most important attributes for job applicants. The extensive volume of content taught in typical agriculture lecture courses leaves instructors little time for practical experience beyond the classroom. Interestingly, 87% of employers surveyed desired to see internship experience beyond the classroom in addition to coursework, due to its usefulness for developing skills that complement technical abilities (Briggeman and Norwood 2011).

This research assesses a service-learning component of a soil science course at North Carolina State University entitled *Service-Learning for Sustainable Soil Management in Community Gardens*. North Carolina State University is a land grant institution of over 34,000 students located in the urban state capital of Raleigh, North Carolina. This course partners with the Inter-Faith Food Shuttle (IFFS), a non-profit organization located in Raleigh, whose mission is to alleviate hunger by developing systems to recover, prepare, and distribute wholesome, perishable food for North Carolina’s poor, hungry, undernourished, and homeless. Community gardens started by IFFS in 2009 are one of their efforts to combat food insecurity by providing increased access to healthy local foods.

The *Service-Learning for Sustainable Soil Management in Community Gardens* course represents a new form of education that seeks to expose students to the many different aspects of sustainability and agriculture in the US via outreach projects designed to prepare them for future work in food systems and agriculture. Through student evaluation of a service-learning experience, this project evaluated how pre-course training improved student preparation to enter the urban agriculture and community food security workforce. The three
primary objectives of this project were to (1) determine the skill sets desired by employers for community-based agricultural work (2) evaluate the effectiveness of course activities to develop and improve these skill sets and prepare students for employment post-graduation and (3) quantify the degree to which service-learning experiences improve student soil science and agricultural content knowledge.

Methods

Determining Professional Skills and Qualifications: Survey of Employers

We contacted fifty employers in the field of community agricultural outreach, food security and urban agriculture to determine which skill sets they desired to see in potential employees. Of the fifty, twelve responded to our survey. Three were academic institutions and nine were NGOs. These employers were contacted directly via email or phone and asked the following two questions:

1. Could you provide a list of qualifications that you would like to see in a person applying to work at (name of employer)?

2. Are there any specific skills that are required for working at your organization?

Staff members answered via email or directed us to a current job opening notice on their website to provide rich examples.

Service-Learning Course Design

Beginning in 2009, the Department of Soil Science at North Carolina State University offered Service-Learning for Sustainable Soil Management in Community Gardens (SSC 428), an advanced 400 level, 1 credit course for undergraduate and graduate students. It was
designed to complement an upper level lecture-based ecological soil management course. Through a required service-learning project, enrolled students used the information gained through lecture and reading to design teaching tools and accompanying lessons to educate the public on topics of sustainable soil management and its relevance to human health and nutrition. The students were assigned a low-income community in which they delivered the soil science lessons to urban youth at IFFS’ gardens. Student-community contact occurred once each week for 3 hours over a 7 week period, providing each NC State student with over 20 hours of direct community contact. Although the course has been in existence since 2009, the evaluation of professional skills developed through the course began in 2010 (Y1) and continued through 2011 (Y2).

Prior to embarking on their service-learning project, students participated in 3 days (10.5 hours) of cultural competence and teaching training to improve both student preparation and community members’ enrichment. During the training, students worked with their team to create lessons and develop teaching strategies appropriate for the diverse community to which they had been assigned. Three times during the course of the semester students completed 3-5 page written reflections about their service-learning experience. At the end of the semester following the completion of their 7 weeks, students gave a 15 minute presentation emphasizing successes and challenges of their experience to community partners, department faculty, and their peers.

**Teaching Environments: Community Locations for Student Service-Learning Projects**

Students in SSC 428 course were assigned to work at one of three sites: a high school horticulture class, a community garden in a subsidized housing neighborhood, or a
community garden in a manufactured home community (Table 1.1). All three sites have been identified by IFFS as food insecure and are communities in which IFFS provides programming designed to improve community health and nutrition and improve control over food choices.

**Student Professional Skill Development**

All data were collected using a mixed methods approach. We used the following three specific methods: (1) quantitative survey data collection that took place pre- and post-SLE, (2) qualitative individual pre and post-SLE student interviews, and (3) qualitative field observations recorded during students’ community teaching. Quantitative data was used to validate themes that emerged from student interviews and field observations while qualitative data provided insights into survey scores.

**Survey Design**

We delivered an extensive online survey tool to students, pre and post SLE. All surveys were conducted with service-learning course students (treatment referred to as “SLE” students) as well as in a non-service-learning students (control) in an undergraduate soil science course (SSC 200), which included soil science content emphasizing the fundamentals of soil origin, composition, classification and chemical and biological properties (SSC 200). The survey collected a broad range of data regarding instructor learning objectives for students, however for this study only 15 questions on student gains and student demographics were used for data collection (Appendix A). The statements were followed by a five-point Likert scale ranging from strongly disagree (1) to strongly agree (5).
In both years the student survey focused on professional skill development resulting from service-learning involvement. In Y2 additional questions were added regarding student demographics to yield a wider range of information about the student population such as grade level, GPA, major, gender and age. Institutional Review Board approval was sought and obtained. A survey link was delivered via email and students were asked to complete it within two weeks of receiving the link. Student survey responses were anonymous. Only scores from students that completed both pre and post surveys were used in the final data analysis. In Y1 and Y2 a total of 11 students in the SLE class took both the pre and post SLE surveys. In the control course 17 students in Y1 took the pre SLE survey, however only seven of those individuals took the post SLE survey and thus were included in the data analysis. We saw the same trend in Y2, with 19 students participating in the pre SLE survey, and only 11 of those took the post course survey. Student responses to the questions in the pre and post tests were summed and the mean was taken. Mean response scores from pre and post SLE surveys were statistically examined for differences using a matched-pairs t test (JMP Pro 9.2).

Field Observations

Observation notes were taken during the 3 days of cultural competence training and when students were teaching in the community. Notations were made when students employed a professional skill or strategy that employers value and were then compared to survey and student interview findings (Miles and Huberman 1984).
Student Interviews and Open Coding

Through interviews comprising of open-ended questions (Creswell and Plano Clark 2007) students in the SLE course assessed their SLE and described both learning gains and project challenges. Interviews consisting of 20 IRB-approved questions (Appendix B) were conducted prior to their cultural competence training and SLE, and again following the completion of their SLE. Student interview responses were audio-recorded, transcribed, and all data were assigned anonymous numbers to ensure student privacy. Many questions were open-ended and therefore permitted students to communicate answers that include thoughts and reflections beyond the scope of the question. Pre SLE interviews focused on the student’s background, experience and confidence in skills relevant to the project. Post SLE interview questions were similar to pre SLE, but emphasized student perception of skill development and encouraged students to reflect on their service-learning experience by providing rich examples. Pre SLE interviews took approximately 20-25 minutes each, and post interviews ranged from 45 minutes to 1 hr. A systematic coding framework was used to quantify changes student confidence in the following qualifications: Adaptability, Agriculture, Collaboration, Diversity, Leadership, and Teaching skill development (Table 1.2) (Strauss 1987). The number of times students mentioned confidence in one of the above-mentioned skill areas was recorded in the margin of the transcription and added to the group total to compare mean pre and post SLE responses, generating quantitative data from their qualitative responses. Differences in mean values between pre SLE and post SLE response were tested using a matched pairs t-test (JMP Pro 9.2). Research-relevant quotes were
highlighted, categorized and used to explain survey and quantitative interview findings.

Interviews were not conducted on control course students.

Results and Discussion

Determining Professional Skills and Qualifications

Survey of Employers

The survey of 50 NGO’s and academic institutions offering positions in the fields of community agricultural outreach, food security, and urban agriculture resulted in responses from 12 organizations and yielded eight qualifications (Fig 1.1). Qualification categories listed in Figure 1.1 included the following: ability to adapt, be flexible, be resourceful and problem-solve (Adaptability and Flexibility Skills); knowledge of agriculture including horticulture, food production, soil management, gardening, and farming skills (Agricultural Skills); comfort in working with diverse populations (Diversity Skills); experience working in community food security and or urban agriculture (Experience); ability to lead and manage a group of people (Leadership Skills); patience and acceptance of differences (patience); ability to speak in front of diverse groups of people and direct a class (Public Speaking Skills), and ability to teach and design lessons for the purpose of outreach to diverse populations (Teaching Skills).

The twelve employers that responded to our survey were in the process of recruiting job applicants for open positions where the hire would be expected to teach soil science and other agricultural principles to a diversity of stakeholders, were used to determine desired skill sets. The 12 that responded to our survey were the following: Diverse Community
Resources, British Columbia; Inter-Faith Food Shuttle, North Carolina; Just Food, New York; Northeast Organic Farming Association of New York, NY; SEEDS, North Carolina; Raleigh City Farm, North Carolina; Tenderloin Neighborhood Development Corporation, California; The Food Project, Massachusetts; Urban Harvest, Texas; NCA&T Extension, North Carolina; Penn State Extension, Pennsylvania; and Virginia Tech Extension, Virginia. The university positions were in extension where prospective employees were expected to work closely with the community and fellow employees interpreting, applying and disseminating relevant research findings in soil science, horticulture and agronomy to local producers. In all cases, applicants were required to have experience in both designing educational materials as well as communicating scientific concepts to the public. The NGOs offered a range of positions for agricultural program graduates, including farm community garden managers, fruit or vegetable specialists, community organizers in food security and directors of youth programs. The abilities to “adapt” and “be flexible” were requirements for work at many of the NGO’s as were skills and experience working with ethnically and culturally diverse populations.

Our survey indicated that beyond agricultural skills gained through coursework and research projects; public-speaking, leadership, teaching, and the ability to work with diverse populations were required qualifications at more than 50% of employers surveyed. It was evident that these organizations value prior experience working in an outreach or public educational capacity and that without basic teaching and leadership and diversity skills a student would be at a disadvantage competing for a number of these positions. Research has indicated that experiential learning projects taking place beyond the classroom are effective
for student mastery of skills in social work, medicine, public health (Kaf and Strong 2011; Sadana and Petrakova 2007; Nandan and Scott 2011). Agriculture students that plan to conduct community work also need to find a means to gain experience as strong community leaders who are able to design lessons that demonstrate agricultural concepts to diverse audiences of people.

**Student Professional Skill Development**

**Survey Data**

Analysis of student survey results from the Y2 (n=6) SLE group revealed service-learning students rate themselves as having significant increases in their ability to design and teach hands-on science lessons for a diverse community (Table 1.3) when compared to pre course ratings. No student gains were reported in response to one survey question: “I am able to prepare a lesson.” However, responses to four additional survey questions that specifically queried student ability to prepare lessons “for the public”, “on soil science”, that are “hands-on”, and “for diverse audiences” showed students reporting an increase in confidence.

Differences between pre and post assessment in Y1 (n=5) SLE students however, were not statistically significant (p ≥.05). In fact, Y1 student scores were higher in pre SLE surveys than in post. A comparison of mean scores for Y1 vs. Y2 for both pre and post SLE surveys showed that the Y1 student scores were significantly higher in the pre SLE survey and significantly lower than Y2 students in the post (Fig 1.2). Community-projects immerse (p ≥.05) students in “real-life” situations that may be ‘messy’ and may place them in situations that are uncomfortable. The Y1 data suggests that students’ confidence in their own abilities and skills may have been inflated at the outset, and dropped once students were
required to utilize these skills while in their SLE. This is supported by the data showing Y1 pre scores to be higher than Y2 pre scores. This finding is not uncommon, as student self-efficacy has been found by others to decline following community work if they initially believed themselves to be better prepared than they actually were (Guthman 2008, Lichtenstein et al., 2011).

Pre-course confidence of students participating in the SLE was almost 1 point lower (on Likert scale) in Y2 compared to Y1 pre SLE, but increased dramatically following the experience. Survey scores for Y2 students suggest that this group of students developed confidence in their abilities to perform their duties as instructors in a diverse community. Service-learning has been shown to increase students’ perceived competence as instructors by improving teaching skills and instructional strategies (Kahan 1998; Watson et al., 2002; Freeman and Swick 2001; Verducci and Pope 2001; Lake and Jones 2008).

Year 1 and Year 2 control group students reported no change and in some instances, a significant decrease in their ability to prepare and teach hands-on soil science lessons to a diverse public audience, when comparing post course scores to pre course scores (Table 1.4). Year 1 control students report being less confident in their ability to teach soil science lessons to the public at the conclusion of their course than at the beginning. Such a result may be attributed to students reevaluating their ability to teach soil science after learning more about the complexity of the topic, or to specific classroom experiences. Future qualitative data collection, such as student interviews, would help to tease apart drivers for the decline in confidence within the control group. The introductory soil science course was fundamentally distinct from the SLE group course in that it was not designed to provide students with
opportunities to exercise and or develop confidence in skills necessary for community outreach and extension-based agricultural work, thus such results were somewhat expected.

Through student interviews conducted in Y1, we learned that all five SLE students were majoring in agricultural disciplines (crop science, soil science, agriculture extension education), with three graduate students and two undergraduates. Broader demographic data were only collected via surveys conducted in Y2 of this study (Table 1.5). This second year the demographic shifted to more biological-based disciplines, with three graduate students from crop science backgrounds and three undergraduates in biology, sustainable food systems, and industrial engineering. Four students were female and two were male, with ages ranging from 29 to 36. For a small class, a surprisingly wide range of ethnic diversity was represented, with two students being of Hispanic backgrounds, one Native American and three white or Caucasian. The reported grade point averages ranged from 3.8 to 4.0.

Within the Y2 control group demographic, eight were female and three were male (n=11). Ages ranged from 19 to 23 and all were white or Caucasian except two that were Asian or Mixed ethnicity. The control students were all undergraduate life science majors studying agricultural education, natural resources, environmental science, horticulture, biological engineering, plant and soil science or biology. Their reported GPAs ranged from a 2.5 to 3.9. The most obvious difference between control and SLE student demographics was age, where our SLE group was slightly older (average age 23.8 yrs) than the control group (average age = 20.3). Further, the average reported GPA of the SLE group was 3.9 whereas the control group was 3.1, showing that students opting to participate in the service-learning class, at least in this particular year the study took place, were of above average academic
abilities. It is possible that this difference in age and academic achievement between the SLE and control may have influenced the data. There is also a possible bias created by survey respondents vs. non-respondents in the control group. A response bias can occur when the population being studied differs systematically from those invited to participate in the survey, but typically a study such as this, in which the response rate is very low, includes minimal or undetectable bias (Menachemi 2011). However, due to this possible bias and the small sample sizes we are cautious about making generalizations beyond the scope of this data and instead are highlighting trends worthy of future investigation.

Field Observation Data

Field observation data (Table 1.5) support survey data results and interview data that show student improved ability and confidence in adaptability (problem-solving), diversity, leadership, and teaching skills. Students were assigned to community gardens in groups of 2-3 SLE students who jointly developed and taught lessons. Initially it was observed that three of the student groups failed to engage or lead their diverse audience. They used unexplained scientific terms and did not include the community in the learning process. Feedback from community partners involved recommendations that students perhaps simplify their lessons and instead create exercises (games and activities) in which community members learn by doing, a strategy students learned during their service-learning training, but initially failed to implement. This was most likely due to habit since many may be accustomed to learning in lecture halls where active student participation may be minimal. Over the course of their 7 weeks in the community, students adjusted their lesson designs and teaching approaches to make inclusive exercises that engaged the diverse groups of people they were teaching. Their
time in the community shifted from being primarily lecture to collaborative learning experiences where students demonstrated the importance of sustainable use of soil resources through their hands-on demonstrations and activities and tied these concepts to the community members’ quality of life. Consequently SLE students appeared more confident and had increased their ability to lead their assigned community groups through discussions and activities that connect soil science and agricultural practices to issues of nutrition, food access and availability.

**Student Interview Data**

A significant increase \( (p \geq 0.05) \) in the mean number of times students cite confidence in professional skills suggests that the SLE facilitated career-relevant gains for students (Fig 1.3 and Table 1.3). Adaptability skills (ability to adapt, be flexible, resourceful and problem-solve) was one of the areas in which we saw the greatest increase in confidence from pre to post SLE. A community-based service-learning project sometimes involves working with community members with inconsistent interest levels in subject matter. The gardens where our students taught were located in three demanding locations: a school for behaviorally challenged students, a low-income housing community, and a manufactured home community. Student teaching was often limited by factors such as a distracting environment, climate (most sites did not have an indoor classroom option), lack of community member attendance, and other disruptions that required them to adapt their lesson plan for the day to ensure community member engagement and attention. In post SLE interviews students described the importance of adaptability and problem-solving skills, for example:
Student E: “I think you really learn a lot about adapting and problem-solving and thinking on your feet when you teach.”

Student G: “We HAD to problem-solve. Things at the garden didn’t always go smoothly, so I guess it [the SLE] helped me to work well under pressure, come up with solutions when you don’t have a lot of time.”

Student B: “We had a lesson plan for every day and we had a presentation for every day and many times….every time... [laughs] that changed on the spot.”

Multi-disciplinary approaches are often used to teach students to adapt and problem-solve in real life situations. Christy and Lima (2007) describe several service-learning projects where engineering students serve a local community need by designing much needed facilities (for example a wastewater SLE plant) and simultaneously learn to troubleshoot and adapt their plans in the context of the real world. Manufacturing scenarios in which students must adapt for success, as they would at a job, are challenging to accomplish in a typical lecture. This SLE provided students with ample opportunity to develop this career-relevant skill (Fig 1.1).

An important finding of this study is that after teaching soil science in low-income and predominantly minority neighborhoods, SLE students rate themselves as significantly more confident in their ability to lead (Leadership Skills), and to work with and teach diverse populations (Diversity Skills) (Fig 1.3). Cultural competence, the awareness and knowledge of how integrated patterns of human behavior, including language, thoughts, communications, actions, beliefs, values, customs and institutions of racial, ethnic and social groups many affect one’s group identity (Cross et al., 1989) is a necessary skill for individuals working
with diverse populations. The incidence of food insecurity has been shown to be high in minority neighborhoods where education and resources are lacking (Wilson et al., 2006; Keppert et al., 2007). This finding provides evidence that the need to improve student training in this area is high if our students are going to successfully be hired into positions involving community outreach with diverse urban populations. Increased perceptions of competency to interact with diverse populations, as well as greater cultural competence and increased leadership skills are well-documented outcomes of student participation in multi-cultural service-learning projects and community work (Carter and Spotanski 1989; Mefford, et al., 1999; Ladson-Billings 1994; Flannery, and Ward 1999; Domangue and Carson 2008; Meaney et al., 2008). Students participating in our study documented their increased comfort through rich quotes and examples, such as the following:

**Student B:** “I think it [future work with diverse populations] will be a lot easier because I’ve had this experience. You can’t expect the same thing in every situation, but you know what to expect…something different than what you’re used to.”

**Student G:** [in the future] “…I’ll try and avoid making stereotypes and just ask people about themselves…I definitely learned things about how to keep groups focused and excited.”

**Student K:** “I think I’ll just try and get to know [the community members], instead of assuming I know about their life,”

**Student L:** “I feel like a leader, being able to group up the kids, like break up a classroom into smaller groups, take charge and being able to teach a group of people.”
Teaching and collaboration were two areas in which increases in student confidence were expected. Service-learning students spent seven weeks teaching soil science to their assigned community in groups of two to four students. We found that SLE students mentioned confidence in their teaching skills in post SLE interviews twice as often when compared to pre SLE interview data. Due to the high level of collaboration needed to carry out successful lessons, we expected increases in student confidence in their ability to collaborate with others, either in their group or in their community. Although students occasionally mentioned examples of collaboration skills in relation to their development as leaders within their groups, interview data did not support a significant increase in student ability to collaborate with others (Fig 1.3 and Table 1.3).

The weekly practice of developing and teaching a lesson plan appeared to be a driver in advancing student learning for a variety of reasons. Three students provided examples showing that while they previously had little teaching experience they now felt competent enough to design lesson plans and teach soil and agricultural science to a number of different audiences. One student in agricultural education was surprised by his reaction to community based-teaching, stating, “Let’s start with my major being ag education. This was kind of a big wake-up call…it was good to get that teaching experience.”

Students describe their SLE as helpful for increasing their agricultural skills (including knowledge of horticulture, food production, soil management, gardening and farming), and particularly their knowledge of soil science because the project required them to utilize and teach knowledge either gained through associated lecture material, or self-education via books or other resources. During interviews students explained that the
pressure to teach the information to others required them to have a deeper understanding of the content and simultaneously improve their public-speaking skills.

Student A: “I feel like…um we had moved beyond these basic soils science concepts in our class but going back to those was healthy, very healthy, for my understanding.”

Student L: “Academically I learned that even though I feel like I have a pretty good mastery of certain concepts, I really don’t. Because when you get in a classroom you start getting all these questions!”

Student B: “…” Example of something I learned? The refinement of my skills with soil science….there were a few things I was trying to get across and relate them to soil science and I realized that I was really not too comfortable with teaching that material, so I went back and looked at that…so in an academic sense, I got a lot more comfortable with teaching materials that I’ve spent so much time learning, but never teaching.”

Student E: And I feel like I’m a much better public speaker now. And I think it carried over to me teaching better in my biology classes…. [Re: teaching diverse communities of people as a T.A.] I do feel that I would be maybe a step ahead of somebody else who hasn’t done it before.

These findings are supported in the literature where service-learning participation has been shown to positively impact student academic goals (Serow et al., 1996; Barber and Barrisoni 1993; Eyler, and Giles, 1999; Zlotkowski 1998) by enhancing student achievement of core educational outcomes (Markus et al., 1993; Osborne et al., 1998). Consequently,
student teachers internalize the knowledge when they use it to solve “real world” problems (Phelps and Kotrlik 2008).

According to the students in this course, applying soil science concepts to solving problems of food security was not an easy task. Students found that making soil science relevant to community members was challenging, especially since the topic required an understanding of basic biology and chemistry concepts, which many students in the community did not have. Students described the problem as follows:

Student I: They didn’t see the use in it. And I think that before you can try and teach someone, you have to try and show someone the importance of it.”

Other students stated:

Student E: “Soil science is a very….ummm…I feel it’s a very integrated science that pulls a lot of different subjects into it as one, and the community members were kind of weak in the basic ones, so teaching soil science was kind of hard.”

Student D: “It’s just difficult to relate the holistic concept of ‘you wouldn’t be here if it wasn’t for soil…’ and ‘if we don’t have soil, then we don’t have plants and we don’t have health…’ It’s really hard to relate those things.”

In their core courses, agricultural students likely gain respect for the food production process, they’ve come to understand that soil is a precious resource and that scientific advancements and research are necessary to increase global food production. Their SLE required that they enter a community where urbanization, economics, and various injustices exist, and many students expected to be well-received when trying to demonstrate the benefit of sustainable urban production of food. But instead, as described in Guthman (2008),
students were met with community member indifference, reluctant participation, as well as much larger problems than they had anticipated. Faced with these challenges, they begin to question their grasp of the material as well as the purpose of their activities.

Ultimately what the students discover is that working in the community to “change mind sets” about food and the decline and destruction of natural resources like soil, requires much more than content knowledge (paraphrased from quote by Student C.). They learn that getting to know the community is the key to making any educational progress. Mentioned 21 times during interviews, the act of “building relationships” is described as an effective way to become leaders within the community.

**Student J:** “…you get to know the community, you understand how they communicate and build a relationship with them, you’re understanding their reality and their comfort zone…listening is really important skill, learning to actively listen to the community.”

Students explain during the interviews that the benefits of the SLE extended beyond just skill development. The experience provided them an opportunity to work outside of the university and offered perspective to the concepts learned in university classrooms. One student described her experience as providing her with concrete examples of things she is learning in lectures across many courses.

**Student J:** In class we talk a lot about childhood obesity or food systems research that I’m doing now and how some elementary and middle school students consume up to 80% of their calories at school…like the kids [in the community] would talk
about eating breakfast, lunch and snacks at school and you’re like “holy crap, kids really do this!”

Through the SLE, Student J was able to personally witness a food security related phenomenon that the student had learned about in lecture. These types of experiences help students to better understand the various food security-related factors that ultimately contribute to obesity and other health problems. Another student mentioned that he was “shocked” when community members refused to eat carrots harvested from the garden because at one point in the carrots lifecycle they “had dirt on them”. Witnessing this community member’s disconnect from the origin of their food made him realize that more than teaching soil science, his service-learning group was there to change preconceptions about food production. The student explains, “They had never seen dirt on their food before. You wash it off, you eat it, it’s fine. ‘The food is really good and it’s healthy and it’s what you need to be eating and all of your food had dirt on it at one point anyway,’ but they had never seen that, so it was a really difficult mentality to work with.” Both Student J and C illustrate that community based learning projects offer university students exposure to the real-life complexities and challenges of our modern food system. Our data shows that students leave the project not only more confident in professional skills and agricultural knowledge, but also having gained experience and perspective that increases their potential as future food system leaders.

Like the survey data (Table 1.3) (Fig. 1.2), our interview data (Fig 1.4) indicated that the Y1 students were initially more confident in their professional skills than the Y2 students.
While we are uncertain what caused this difference in confidence, we found no difference in the post SLE Y1 confidence vs. Y2 interview data.

Conclusions

Our survey of employers in the field of agricultural outreach and education found that organizations are interested in hiring graduates who are proficient in skills beyond knowledge of agriculture. The Service-Learning for Sustainable Soil Management in Community Gardens course exposed students to situations where they could develop their skills as educators and community leaders while simultaneously strengthening their understanding of agriculture. Through their project these students developed cultural competence skills and came face to face with the mindsets and values of persons living in culturally-diverse under-served communities. Students credit the experience as helpful preparation for their careers, but more importantly as giving them insight into the issues surrounding food security and the role relationships play in education and social change.

The Soil Science Society of America has declared “educational tools” as a means to ending food insecurity in the United States. Our study indicates that community engagement projects that expose students to real-world challenges within the context of food security and agriculture encourage the development of skills for future employment as well as give students a broad perspective of food systems. Integrating service-learning opportunities into agricultural curricula will assist land grant universities in the grooming of graduates who use knowledge to empower diverse populations to take ownership over their access to nutritious food. Graduates who have learned to first and foremost, build relationships with their target
community, will be able to communicate their scientific knowledge in a manner that is grasped by the public and ultimately changes the mindset of a growing nation. These students are the educational tools of tomorrow.
<table>
<thead>
<tr>
<th>Year</th>
<th>Community</th>
<th>Program</th>
<th>Age</th>
<th>Ethnicity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Y1 and Y2</td>
<td>High School for Behaviorally Challenged Students</td>
<td>Horticulture Class</td>
<td>Middle School-High School</td>
<td>Primarily African-American</td>
</tr>
<tr>
<td>Y1</td>
<td>Housing Authority Community</td>
<td>After-school mentoring program for low-income youth</td>
<td>Elementary-Middle School</td>
<td>African-American</td>
</tr>
<tr>
<td>Y2</td>
<td>Manufactured Home Community</td>
<td>Community garden-based after school program</td>
<td>Middle School</td>
<td>Hispanic and African-American</td>
</tr>
</tbody>
</table>
Table 1.2 Systematic Coding Framework Used to Analyze Student Interview Data

<table>
<thead>
<tr>
<th>Category</th>
<th>Code</th>
<th>Skill: &quot;Ability to:&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Adapt</strong></td>
<td>PS.a</td>
<td>adapt</td>
</tr>
<tr>
<td></td>
<td>PS.f</td>
<td>be flexible</td>
</tr>
<tr>
<td></td>
<td>PS.c</td>
<td>be creative</td>
</tr>
<tr>
<td></td>
<td>PS.ps</td>
<td>problem-solve</td>
</tr>
<tr>
<td><strong>Collaborate</strong></td>
<td>Col.</td>
<td>collaborate with group</td>
</tr>
<tr>
<td><strong>Diversity</strong></td>
<td>PS.p</td>
<td>be patient with differences</td>
</tr>
<tr>
<td></td>
<td>PS.ad</td>
<td>accept differences</td>
</tr>
<tr>
<td></td>
<td>PS.dl-DIV</td>
<td>design a lesson for diverse audiences</td>
</tr>
<tr>
<td></td>
<td>PS.t/w_DIV</td>
<td>teach/work with diverse audiences</td>
</tr>
<tr>
<td></td>
<td>PS.comf</td>
<td>feel comfort with diverse populations</td>
</tr>
<tr>
<td><strong>Leadership</strong></td>
<td>PS.l</td>
<td>lead a group of people</td>
</tr>
<tr>
<td></td>
<td>PS.mg</td>
<td>manage a group of people</td>
</tr>
<tr>
<td></td>
<td>PS.org</td>
<td>organize a group of people</td>
</tr>
<tr>
<td><strong>Teach</strong></td>
<td>PS.le</td>
<td>create learning environment</td>
</tr>
<tr>
<td></td>
<td>PS.t</td>
<td>teach</td>
</tr>
<tr>
<td></td>
<td>PS.dl</td>
<td>design a lesson</td>
</tr>
</tbody>
</table>
Table 1.2 Continued

<table>
<thead>
<tr>
<th>Category</th>
<th>Code</th>
<th>&quot;Through the project students felt that they...&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Career</td>
<td>C.RS</td>
<td>met requirements for future career</td>
</tr>
<tr>
<td>Community Relations</td>
<td>B.R.</td>
<td>learned to build relationships</td>
</tr>
<tr>
<td>Confidence</td>
<td>conf.</td>
<td>developed confidence in their ability to contribute to community outreach efforts</td>
</tr>
<tr>
<td>Content Knowledge</td>
<td>PS.ag</td>
<td>developed a greater understanding of agricultural science</td>
</tr>
<tr>
<td></td>
<td>PS.ss</td>
<td>developed a greater understanding of soil science</td>
</tr>
<tr>
<td>Experience</td>
<td>PS.e</td>
<td>benefited from experience working in Food Security, Community Outreach, Urban ag</td>
</tr>
</tbody>
</table>

*Note: PS = professional skill*
Table 1.3 A Comparison of SLE vs. Control Student Mean Self-Rated Scores of Professional Skills Pre and Post Intervention By Year

<table>
<thead>
<tr>
<th>Survey Question</th>
<th>SLE Y1 Pre</th>
<th>SLE Y1 Post</th>
<th>Control Y1 Pre</th>
<th>Control Y1 Post</th>
<th>SLE Y2 Pre</th>
<th>SLE Y2 Post</th>
<th>Control Y2 Pre</th>
<th>Control Y2 Post</th>
</tr>
</thead>
<tbody>
<tr>
<td>I am able to identify resources I need to be able to teach a hands-on science lesson to the public.</td>
<td>4.6</td>
<td>4.2</td>
<td>3</td>
<td>3.14</td>
<td>3.17</td>
<td>4.67*</td>
<td>3.73</td>
<td>3.73</td>
</tr>
<tr>
<td>I am able to confidently develop a science lesson for diverse audiences from social, economic, or cultural groups different from myself.</td>
<td>4.6</td>
<td>3.8</td>
<td>2.87</td>
<td>2.29</td>
<td>3.33</td>
<td>4.33*</td>
<td>3.27</td>
<td>3.55</td>
</tr>
<tr>
<td>I am able to confidently teach a science lesson for diverse audiences from social, economic, or cultural groups different from myself.</td>
<td>4.2</td>
<td>3.8</td>
<td>2.87</td>
<td>2.29</td>
<td>3.17</td>
<td>4.33*</td>
<td>3.36</td>
<td>3.73</td>
</tr>
<tr>
<td>I am able to work effectively with diverse populations (i.e. income, race, ethnicity, class, education or ability different from myself).</td>
<td>4.2</td>
<td>4.2</td>
<td>4.27</td>
<td>3</td>
<td>4.00</td>
<td>4.50*</td>
<td>3.91</td>
<td>3.91</td>
</tr>
<tr>
<td>I am able to prepare a lesson.</td>
<td>4.2</td>
<td>3.6</td>
<td>3.2</td>
<td>2.29</td>
<td>4.00</td>
<td>4.00</td>
<td>3.45</td>
<td>4.00</td>
</tr>
<tr>
<td>I am able to teach a lesson to the public.</td>
<td>4.2</td>
<td>3.6</td>
<td>3.2</td>
<td>2.29</td>
<td>3.67</td>
<td>4.50*</td>
<td>3.36</td>
<td>3.82</td>
</tr>
<tr>
<td>I am comfortable communicating soil science concepts to the public.</td>
<td>3.6</td>
<td>3.6</td>
<td>3.27</td>
<td>2.71*</td>
<td>2.50</td>
<td>4.00*</td>
<td>3.82</td>
<td>4.09</td>
</tr>
<tr>
<td>I am comfortable teaching diverse audiences.</td>
<td>4.2</td>
<td>4.2</td>
<td>3.27</td>
<td>2.29</td>
<td>3.50</td>
<td>4.17*</td>
<td>3.64</td>
<td>3.82</td>
</tr>
</tbody>
</table>

Note. * Significant at the .05 probability level
Y1 SLE (n=5); Y1 Control (n=7); Y2 SLE (n=6); Control (n=11)
Table 1.4 Demographic Parameters of Y2 Survey Respondents

<table>
<thead>
<tr>
<th>Grade</th>
<th>Age</th>
<th>Sex</th>
<th>Ethnicity</th>
<th>GPA</th>
<th>Major</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treatment</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sophomore</td>
<td>20</td>
<td>F</td>
<td>White</td>
<td>4</td>
<td>Biology</td>
</tr>
<tr>
<td>Grad</td>
<td>23</td>
<td>M</td>
<td>Cherokee</td>
<td>4</td>
<td>Crops/Agroecology</td>
</tr>
<tr>
<td>Grad</td>
<td>25</td>
<td>F</td>
<td>White/Hispanic</td>
<td>3.9</td>
<td>Crop Science/Food Systems</td>
</tr>
<tr>
<td>Sophomore</td>
<td>20</td>
<td>M</td>
<td>White</td>
<td>3.91</td>
<td>Industrial Engineering</td>
</tr>
<tr>
<td>Grad</td>
<td>36</td>
<td>F</td>
<td>White</td>
<td>3.8</td>
<td>Crop Science</td>
</tr>
<tr>
<td>Sophomore</td>
<td>19</td>
<td>F</td>
<td>Hispanic</td>
<td>3.8</td>
<td>Sustainable Food Systems</td>
</tr>
<tr>
<td>Control</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Junior</td>
<td>20</td>
<td>F</td>
<td>White</td>
<td>3.7</td>
<td>Agricultural Education</td>
</tr>
<tr>
<td>Junior</td>
<td>20</td>
<td>F</td>
<td>white</td>
<td>2.402</td>
<td>Natural Resources</td>
</tr>
<tr>
<td>Senior</td>
<td>21</td>
<td>F</td>
<td>White</td>
<td>3.6</td>
<td>Environmental Science</td>
</tr>
<tr>
<td>Sophomore</td>
<td>19</td>
<td>F</td>
<td>Mixed ethnicity</td>
<td>3.5</td>
<td>Natural Resources</td>
</tr>
<tr>
<td>Senior</td>
<td>21</td>
<td>M</td>
<td>White</td>
<td>2.3</td>
<td>Natural Resources</td>
</tr>
<tr>
<td>Sophomore</td>
<td>19</td>
<td>F</td>
<td>Caucasian</td>
<td>3.94</td>
<td>Horticulture- Landscaping</td>
</tr>
<tr>
<td>Junior</td>
<td>20</td>
<td>F</td>
<td>Caucasian</td>
<td>2.46</td>
<td>Agricultural education</td>
</tr>
<tr>
<td>Junior</td>
<td>23</td>
<td>F</td>
<td>Asian</td>
<td>2.5</td>
<td>Biological Engineering</td>
</tr>
<tr>
<td>Sophomore</td>
<td>19</td>
<td>M</td>
<td>White</td>
<td>3.9</td>
<td>Plant and Soil Science</td>
</tr>
<tr>
<td>Senior</td>
<td>21</td>
<td>F</td>
<td>Caucasian</td>
<td>3</td>
<td>Biological Engineering</td>
</tr>
<tr>
<td>Junior</td>
<td>20</td>
<td>M</td>
<td>White</td>
<td>n/a</td>
<td>Biology</td>
</tr>
</tbody>
</table>

*Note. SLE group (n=6), control (n=11)*
Table 1.5 Field Observations Taken During Student Teaching Days Show Improved Teaching and Leadership Skills Over the Course of Project.

<table>
<thead>
<tr>
<th></th>
<th>Y1 Group 1</th>
<th>Group 2</th>
<th>Y2 Group 1</th>
<th>Group 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preliminary</td>
<td>Students had difficulty managing and organizing group (leadership skills). Lesson did not engage community members (teaching skills)</td>
<td>Students teaching style was primarily “lecture” in style did not engage community members (teaching/diversity skills). Students used advanced science vocabulary but didn’t explain the meaning of the words.</td>
<td>Students immediately organized group of community members and asked questions to get to know their audience (leadership/diversity skills).</td>
<td>Students started with a structured lesson plan, but were forced to adapt their design due to small attendance and challenging behaviors (community members yelling, leaving, cursing) (adaptability, teaching skills).</td>
</tr>
<tr>
<td>Intermediary</td>
<td>Students adapted lessons to be shorter and more relevant/engaging (teaching/diversity skills), sometimes on the spot (adaptability/problem-solving skills)</td>
<td>Students began to simplify and explain concepts to help community members understand soil concepts and improved abilities to work with and lead the diverse group (diversity, leadership skills).</td>
<td>Students were challenged with climate (rain and wind) and disruptive people at soccer field (next door) and had adapt (adaptability skills) their lessons to maintain community member engagement.</td>
<td>Students began to ask community members about their interests and values in order to build relationships (diversity). They used group management techniques to work through attention and behavioral challenges (leadership, teaching skills).</td>
</tr>
<tr>
<td>Final</td>
<td>Students still encountered group management and organization challenges, but displayed improved (leadership) skills and had lessons and activities that engaged for their diverse community.</td>
<td>Students delivered lessons relevant and engaging to community members and included students in the learning process (teaching skills).</td>
<td>Students displayed confidence in their ability to teach concepts and work with their community (agricultural, diversity skills).</td>
<td>Students delivered lessons that related soil science and agriculture to their assigned community members’ values and interests. Lessons were both informative and engaging (leadership, diversity, teaching skills).</td>
</tr>
</tbody>
</table>
Figure 1.1 Survey of 12 employers yielded eight qualifications required for available positions.
A Comparison of Year 1 Students to Year 2 Students within Timepoints

Mean Class Survey Scores

Pre SLE  |  Post SLE

Y1      |  Y2

Y1 (n=5), Y2 (n=6)

Note. Significant difference at .05 probability level

Figure 1.2 Year 1 students were more confident in the pre survey and less confident in the post survey than Year 2 students.
A comparison of pre vs. post service-learning course students’ confidence in professional skills

Note. *Significant difference between pre and post at .05 probability level; (n=11)

Figure 1.3 Pre vs. post SLE student-reported confidence in professional skills.
Note. *Significant difference between pre and post SLE confidence at .05 probability level; Y1 (n=5), Y2 (n=6)

Figure 1.4 Pre course confidence of Y1 SLE students vs. Y2 SLE students.
References Cited


DESIGNING AND EVALUATING A TRAINING MANUAL FOR FOOD SYSTEMS AND AGRICULTURAL OUTREACH PROJECT PARTICIPANTS

Introduction

Service-Learning projects are increasingly popular in agriculture curricula. The growing emphasis on sustainability, agroecology and food systems in agronomy programs coupled with land grant universities’ mission to bring higher education to the public, has stimulated the integration of community engagement projects into courses (Grabau 2008; Bhasvar 2002; NRC 1996; LaMay 2001). These efforts include, but are not limited to, immersing students in “real-life” environments such as farms, community gardens, urban food deserts, and community education programs, where they experience the complexities and challenges of food systems (Zezza and Tasciotti 2010; Grossman et al., 2010). Due to the disproportionate incidence of food insecurity amongst minority populations (Wang and Chen 2011; Nord et al., 2009) working in many of these venues puts students in direct contact with culturally and economically diverse populations.

Cultural competence is the awareness and knowledge of how integrated patterns of human behavior, including language, thoughts, communications, actions, beliefs, values, customs and institutions of racial, ethnic, and social groups may affect one’s group identity (Cross et al., 1989). An understanding of human behavior is necessary to effectively work with and manage demographically diverse individuals, groups, and organizations (Avery and Thomas 2004) and is the desired outcome of an effective diversity training program. Without proper training prior to engaging in community-based projects, students may lack the skills required to positively affect the community and enrich their own educational experience.
This paper describes the development and preliminary evaluation of a training manual designed to better prepare university students to connect with diverse populations and offer educational programs in urban community garden settings.

The *Service-Learning for Sustainable Soil Management in Community Gardens* course at North Carolina State University, a land grant university, has for 3 years equipped students with soil science content knowledge as well as community outreach experience to prepare them for future work in food systems and agriculture. Service-learning is an especially useful tool for addressing food and agriculture-related issues and is used in courses to successfully reinforce concepts, develop student values and skills, build student confidence, and address on-the-ground community problems (Leege and Cawthorn 2008; Flannery and Ward 1999). Through participation in a community-based service project, students apply theory and knowledge to local problems in order to direct their own learning and internalize relevant theory (Stavrianopoulous 2008; Grossman et al., 2010; Lieblein et al., 2004).

In this course, enrolled students use the information gained through lecture and reading to design tools to educate the public on topics of sustainable soil management and its relevance to human health and nutrition. The students are assigned a community in which they work in groups to design soil science lessons for urban youth at gardens located in low-income communities. Students meet once per week for 3 hours over the course of 7 weeks, providing each NC State student with over 20 hours of direct community contact. At many universities, service-learning partnerships between students and community organizations, like ours, have been shown to increase awareness of issues of social justice and societal
inequities (Einfield and Collins 2008; Hughes et al., 2009). Students that participate in a service-learning project have also been shown to gain a broader understanding of the course content than students experiencing classroom instruction alone (Mpofu 2007).

This course partners with the Inter-Faith Food Shuttle (IFFS), a local non-profit whose mission is to alleviate hunger by developing systems to recover, prepare and distribute wholesome, perishable food for North Carolina’s poor, hungry, undernourished and homeless. Community gardens started in 2009 are one of IFFS’s many efforts to combat local food insecurity by providing increased access for under-served populations to healthy local foods. Through the service-learning project, students develop a solid understanding of the challenges inherent in teaching soil science to ethnically, racially, and culturally diverse audiences, who may have little exposure to agricultural concepts. By applying soil management and sustainability concepts learned in the classroom to real-world community challenges, students are expected to have improved retention of the material, and better preparation to enter the workforce upon graduation. The *Service-Learning for Sustainable Soil Management in Community Gardens* course represents a new form of education that provides students with exposure to complex food system-related issues and opportunities to develop cultural competence and teaching skills to become future food system leaders.

Prior research (Grossman et al. 2012) suggests that students participating in community-garden based service-learning projects were unprepared to engage with and effectively instruct the diverse communities where their projects were located. In answer to this problem, we developed a training manual that would better prepare students to educate diverse populations. Students were required to complete the training *prior* to their beginning
their service-learning project.

This course seeks to work with the time constraint of rigorous course schedules and academic program requirements by offering students a small manageable semester-long project as well as prior training to encourage the development of teaching and leadership skills. Although community partners like IFFS are ultimately the best resource for learning about the demographics of communities, like many non-profit organizations they have neither the time nor resources to train a team of students for a single semester.

**Diversity Training Programs**

Diversity training programs have become an integral component of employee training at two thirds of companies and more than 60% of universities in the United States (Esen, 2005; Schneider 2000). Based on the 2000 and 2010 census, it is projected that in 2050 52.5% of the population will be White, 22.5% Hispanic, origin, 15.7% Black, 10.3% Asian and Pacific Islander, and 1.1% American Indian, Eskimo and Aleut (DeNavas-Walt et al., 2011) making it imperative for individuals to participate in diversity training to develop cross-cultural communication skills. While historically the term referred to “race” and gender it now refers to a difference in cultures, socioeconomic status, background, sexual orientation, and perspectives (Unzueta et al., 2012). Variation in philosophy and approaches of training programs is due in part to the different definitions of diversity. In this study we used the following definition of diversity: “a mosaic of people who bring a variety of ethnic and cultural backgrounds, styles, perspectives, values and beliefs as assets to the groups and organizations with which they interact” (Guion 1999). The lack of standardization of diversity training and evaluation of diversity programs requires individual organizations,
companies, and academic institutions to select programs and activities that are most appropriate for their audience (Gorski 2009; Weddington and Rhine 2006).

Research has shown that the first step in designing an effective diversity training program is to conduct a “needs analysis” survey to determine training areas relevant to the context in which employees or teachers will be working (Roberson, Kulik, and Pepper 2003; King, Gulick, and Avery 2010). Ideally diversity programs should provide more than just a surface “appreciation” of diversity (Reiter and Davis 2011) but instead encourage individuals to reflect upon and question their assumptions, biases, and cultural differences (Batchelder 2008; Giroux 1989; Heard 1999; MacLaren and Milner 2003; Wallace 2000). A 1997 survey compiled responses from 12 diversity experts and concluded that any effective diversity training by definition should include three components: 1) awareness of the concept of diversity and why it is important, 2) skill training to effectively manage and work with diverse groups of people, and 3) opportunities for application and practice of skills (Wentling and Palma-Rivas 1997).

**Student Teacher Training Programs**

Because teacher training is largely determined by subject matter, audience, and duration of teaching assignment; teacher training can vary in length, content, and philosophy, but should exist within parameters set by the field of education. Teaching standards set by the National Academy of Education Committee emphasizes that effective teacher training programs should encourage teachers to learn to do the following (Darling-Hammond et al., 2005):
1. Develop a knowledge of their audience, particularly how they learn and develop,

2. Understand of subject matter, skills, and student needs, and

3. Learn strategies for teaching diverse learners in order to manage a productive classroom.

This approach to training strongly emphasizes the role that both teacher and audience play in shaping the exercises, and dovetails nicely with our goal to improve trainees’ ability to educate diverse audiences of people.

While there are numerous resources for diversity and teacher-training program design, literature addressing professional development and cultural competence training specific to agricultural and community food systems outreach is limited. We developed a manual to impart cultural competence and basic teaching skills to students prior to their working in their assigned community in order to improve both student and community benefit. The main objectives of this study was to 1) design a training manual and associated activities that prepared students for the urban garden-based, service-learning project; 2) evaluate the design and content of the manual and improved student preparation resulting from training. In this paper the terms “student” refers to NC State students in the service-learning course and associated training. “Community member” refers to the individuals in the project communities that attended and participated in the lessons designed and delivered by NC State students.
Methods

Manual Design and Development

We created a training manual consisting of seven learning modules delivered in three training sessions each lasting 3-4 hours each. The first four modules focused on diversity awareness and cultural competence training, while the last three modules introduced basic teaching and classroom management skills. Diversity training standards by Wentling and Palma-Rivas (1997) were incorporated into modules that explore the concept of diversity, impart skills to manage and work with diverse groups of people and provided trainees with opportunities to practice such skills. Our needs analysis consisted of observations and data from past research conducted with students who were not provided any pre-service training (Grossman et al. 2012) and was used to identify appropriate exercises, activities and discussions to include in the manual. The training manual additionally met the teacher-training standards set by the National Academy of Education Committee on Teacher Education through activities that allowed the students to learn about and meet their assigned community, review subject matter, discuss the social benefits of their project, and practice teaching and class management skills appropriate for diverse audiences (Darling-Hammond et al. 2005).

We piloted the training manual in 2010 (Y1) and 2011 (Y2) in Sustainable Soil Management in Community Gardens course in the Department of Soil Science at NC State University, Raleigh North Carolina. There were five enrolled students in Y1 six in Y2. Having an experienced instructor, such as a professor, supervise a university trial of the manual and associated training in a course with actual students was critical to provide a
realistic program that is adaptable. Following the two year pilot and evaluation, the final structure of the training (Table 2.2) contained seven learning modules that met the competencies outlined in (Wentling and Palma-Rivas 1997; Darling-Hammond et al. 2005) and addressed the training needs described in (Grossman et al. 2012). An in-depth description of each module and the modules themselves are available in Appendix C.

**Evaluation**

At the completion of each training day the instructor rated the modules using a scale of 1 to 5, where 1 indicated that the module lacked flow and 5 indicated a module that was easily delivered. Additionally, the graduate student researcher made observations during Y1 and Y2 training sessions and rated modules using a scale of 1 to 5 where 1 indicated a poorly executed module that lacked flow, content and or participation on part of the trainees and a rating of 5 meant that the module was easily delivered, contained all necessary content and engaged the trainees. In addition to scoring each module we took notes on areas for improvement. Instructor and graduate student researcher observations were used to edit and improve the training modules at the completion of the Y1 and Y2 pilots.

Individual interviews were conducted by a soil science graduate student researcher and evaluated the degree to which students found the training useful in preparing them for their service-learning project. Interviews consisted of IRB-approved questions on the usefulness, design and content of the manual (Table 2.1). Questions were open-ended and permitted students to share thoughts and reflections. Student interview responses were audio-recorded, transcribed, and data was assigned anonymous numbers to ensure student anonymity.
Transcribed interviews were read through three times, and all responses were coded using an open-coding approach (Strauss 1987). Service-learning student feedback was used in addition to other evaluation data to improve manual content, adjust activities to increase student participation and benefit and to determine content to be included or eliminated. Interview data was used to edit and improve training manual content immediately after the completion of the service-learning course in Y1 and Y2.

Students were assigned to community gardens in groups of two to three SLE students that jointly developed and taught lessons. Thus, here we will refer to “groups” instead of individual students. Observations notes taken during community teaching days were used to measure student groups’ abilities to satisfy the following competencies developed as a result of their training (Wentling and Palma-Rivas 1997; Darling-Hammond et al. 2005):

1. Students’ lessons engage the audience beyond simply delivering information.
2. Students demonstrate efforts to develop mutual trust and build relationship with community members.
3. Students’ lessons indicate they are considering their audience, i.e. appropriate academic levels, topics and examples.
4. Students are able to manage and organize their group, even when confronted with challenging behaviors.

Using these competencies we measured the degree to which each group designed and delivered lessons appropriate for their community, made efforts to build relationships with community members, and how well they managed the group overall. We employed a rating scale of 1 to 5 where 1 indicated failure to meet competency and 5 indicated it was met.
Notes were taken on the specifics of the success or failures of each group to meet competencies. If a student group received a rating of 3 or lower for a certain competency, we re-visited the training and made changes to better emphasize that concept for the next round of training.

**Results and Discussion**

**Training Manual Design**

The structure of the manual evolved during the two-year pilot to incorporate edits and thus changed slightly from Y1 to Y2 based on instructor feedback, observation data from training sessions and student interview data. After Y1, the instructor gave Modules 2 and 6 a rating of 2 because they were difficult to facilitate (Table 2.3). Modules 1, 4 and 5 were slightly easier for the instructor to deliver, but received a 3 because module structure lacked sufficient opportunities for student participation. Modules 3 and 7 required only a few modifications and received a 4. Edits and changes were made to modules to make them more readable and easier to follow for Y2 of the pilot. After Y2 of the pilot, there were a few minor changes made to the modules, but instructor rated all the modules as 4’s or 5’s for ease of facilitation which ultimately lead to increased class participation (Table 2.3).

Observations collected in the classroom during the training showed student engagement in the modules to be improved by intentional design of participatory lessons. In Y1, the modules received an average rating of 3 because, although the content was relevant to the training, the modules’ design elicited little class participation. During the Y1 training sessions no more than 2 students voluntarily participated and the class appeared reticent to
discuss issues of race, ethnicity and culture. The graduate student researcher who observed each of the session ranked the modules using a scale of 1-5 based on class participation and the average participation rating for all seven modules was 2 (Table 2.3). The success of Module 7 in Y1 (rating of 4), indicated that trainees enjoyed playing a role in the learning process and if we wanted them to learn to do so, we needed to lead by example by re-designing the modules to deliberately engage trainees (Table 2.3). Taking these observations into account, edits were made following the Y1 pilot resulting in noticeable improvement in trainee participation in Y2 (Table 2.3). The average rating for participation in Y2 was 4.7 reflecting that each module had nearly full participation. While we cannot account for the underlying differences in group dynamics and personalities that exist between the Y1 and Y2 trainees, our limited observations suggest that the increased trainee participation in Y2 was at least in part a result of their having larger roles in the training modules through discussion and activities. Because the structure of the modules promoted greater involvement by the trainees, the participants appeared to take greater ownership of the training, which informed their approach to the community work (Inman 2001; Lumpkin 2007).

Evaluation

In post service interviews, all 11 students from Y1 and Y2 credited the training modules for improving their preparation for the project. Interviews were conducted in Y1 with five enrolled students and in Y2 with six enrolled students. Open coding of the transcribed interview data indicated that at least three or more of the trainees in each year credited every module of the training manual as useful in their preparation for the project (Fig 2.1). During the interviews, students did not differentiate between Module 1, What is a
Diverse Audience? and Module 2, Diversity in America, nor did they do so with Modules 5 and 6, How to Effectively Instruct a Diverse Audience and Teaching Skills and Concepts (Fig 2.1). When the instructor was teaching these modules there was no defined ending point between Module 1 and 2, or 5 and 6. This was purposeful, as we desired that training be seamless in its presentation and flow. Separation of modules for the purpose of evaluation we felt would influence student response, therefore these modules are grouped together in data presented in Figure 2.1.

Although most of the response to the diversity and cultural competence portion of the training were positive, students also had negative responses to the training, either not finding it useful or feeling that it was not very robust. We think that this is because students fail to see the relevance of the activities, believed that they do not need to focus on developing cultural competence skills, or did not understand the purpose of the training. The following quotes illustrate these sentiments:

Student D-“I feel like the diversity training was good, I would just like to spend more time working on the lesson planning. So I guess you know, you’re getting your mind prepared…but again I just kind of thought it was like, ‘oh we’re doing diversity training? We’re all white. What’s going on here?’”

Student J-“The part of it on diversity, I was a little frustrated with that. It was just a lot of the same stuff, like, “what is diversity?” I get frustrated with these conversations. I think it’s more of a personal thing.”
Student C-“I mean I thought it was very insightful. I thought it was a good thing to listen to, but I don’t think that it really made a huge impact. It didn’t change the way that I would have taught.”

These quotes indicate that some students failed to see the connection between the training and their project, most likely because they did not understand how their interpersonal skills and style of teaching are an extension of their own cultural identities and therefore should be examined and discussed prior to working with a diverse group of individuals (Guion et al., 2003). Overall student response to the training was positive. The eleven interviews with students contained only six negative comments about the training compared to 35 positive comments. In fact Students C and D quoted above had both negative and positive responses to the overall usefulness of the training. When broadly describing how the training affected their service-learning experience many of the students credited it for helping them understand their project in the larger context of food security and social injustices. They also claimed that it was helpful for providing background information about the communities and for ensuring that all the trainees were equally prepared for the work involved in such a project.

Student K-“Because you can talk about ‘diversity’ all you want…it just doesn’t seem important at the time…looking back I can definitely see how it shaped what we were doing with the kids.”

Student H-“I think that everything we learned out there [points outside] was more meaningful because we learned it there [points to classroom]. Some things you just cannot teach in a classroom. You just have to experience it, so it’s really good that the
instructor knew that. There were some things that we didn’t talk about…she let us go and experience it ourselves, because it’s more meaningful that way.”

Student C: “I really can’t say that anything was irrelevant because these were all important things to know and some people don’t know them…I think it was a good thing for all of us to through to get everyone to a solid place.”

Student E: “I think the trainings helped the most in kind of like getting us comfortable, just some background information of the setting we were going into…helped me feel comfortable about what I was going into.

Student I: “I think that she’s done a nice job at meeting everybody’s needs and getting everyone prepared.”

Student G: “I enjoyed learning about the larger issue, in the larger context.”

Student D: “Um there wasn’t anything I remember thinking, ‘oh brother why are we talking about this?’”

Developing Cultural Competence and Diversity Awareness

Students stated that the diversity and cultural competence portion of the training (Modules 1 through 4) helped prepare them for the project by broadening their understanding of diversity and demonstrating how this service project fit into the larger context of the high incidence of food insecurity amongst under-served minority populations. In individual interviews, 8 out of 11 students specifically credited Modules 1 (What is a Diverse Audience) and 2 (Diversity in America) for improving their preparation to work in a community of people from cultural and socioeconomic backgrounds different than their own. Three
students credited Module 3 *(Meet the Community)* and 5 students credited Module 4 *(Food Justice and Urban Food Security)* (Fig 2-1).

Many of the students expressed in the interviews that initially their concept of diversity was limited to skin color, but that these modules helped them to explore the cultural and socioeconomic differences within populations and how ultimately these factors affect quality of life for persons of different social positions. During the *Iceberg of Diversity* activity in Module 1 (Appendix C), students explored their own backgrounds and the diversity of their assigned group. Students expressed tolerance for and appreciation of differences when discussing the resilience and benefit of the diverse perspectives and experiences of their other group members. Pre teacher training that emphasizes self-awareness and understanding has been shown to help increase teacher efficacy by making trainees more insightful and consequently forthright (Moos 2002). Prior research has demonstrated that person’s ways of thinking, behaving and being is deeply connected to their cultural identity, social class and ethnicity (Banks et al. 2001; Shade 1997; Villegas and Lucas 2002). Understanding and appreciating cultural differences relative to one’s personal identities, values and beliefs develops cultural competence (Wachtler and Troein 2003). The benefits of the diversity training were described by the students in the following quotes:

**Student K**-“The iceberg exercise definitely brought up more dimensions of diversity than I would have thought of, that make people diverse. Gender, age, background, but there was a lot more. I didn’t fully understand some of the modules at first. I was like, “this is stupid” but then I saw how it helped me once I was actually out there [in the community].
Student I—“I think that was a very important point that came across that day because when you say ‘diverse’ you think ‘black’ or ‘white’ or ‘Hispanic’, let’s face it. But there’s a lot of different “white” people, so to speak…but that was really important.

Student L—“Opening up our ideas about what is encompassed by the word ‘diversity’ helped shape my ideas going into teaching.

In Module 3 *Meet the Community*, students found it helpful to meet community members and assess the setting and resources prior to beginning their service project. As Student I explained, “Going offsite, yeah I liked that a lot, because that way we could see the students, the resources and all that…I think that it’s very important to actually watch the kids interact together so we could know what we were getting into.” Additionally, discussing findings from past research on food insecurity and urban gardening projects in *Food Justice and Urban Food Security* (Module 4) prepared the students for the possibility that community members might not be interested in the project. Module 4 included an article by Julie Guthman (2008) in which she presents anecdotal evidence of community member disengagement and lack of interest when her students tried to teach urban populations about the benefits of growing their own food. Students said that the article and the ensuing discussions encouraged them to remain creative in their approaches to engage community members, but also to accept that some people would just not wish to participate and that was ok. Research has shown that since delivery of information is affected by one’s own cultural values and personal beliefs educators need to vary the way in which they deliver information in order to appeal to diverse audiences (Allison 2003; Villegas and Lucas 2002; McCarthy 1994; Shade 1997; Sleeter 1992; Sparks 2001). For example, to alternative food
activists gardening and farming is seen as esteemed activities, but globally, many individuals have worked to distance themselves from such work after being robbed of their land or abused in their work (Guthman 2004; Romm 2001). Being exposed to the potential negative reactions of community members helped the students to remain sensitive to cultural differences, resilient to some negativity, and innovative creating lessons.

**Student B**-“One of the readings particularly stuck out. It was one that we read that kind of talked about research with working in urban gardens, stuff like that. You know it’s something to think about. A lot of the students are African American, one of the reasons they might not necessarily want to do this is that their ancestors did this for many years, but not by choice. So that’s something to think about when working with some minority populations. Some of our students didn’t even want to be in the [horticulture] class, and it [Module 4] let me know that’s ok.”

**Student K**-“The discussion prepared us for challenges too. When we were working in the garden if the kids didn’t want to participate we could kind of understand that it wasn’t because they were being disrespectful…there’s probably another reason. So we wouldn’t get as upset if they weren’t listening. I think that after reading the Guthman paper I think I knew that the kids weren’t doing it [not working] to hurt us or because they’re mad at us or something.”

**Student A**-“It’s good to know that we’re not…I guess if you feel like your case is unique, a lot of times you get discouraged, if you understand that this just the way it is, you need to stop complaining and work on this. It’s going on all over the country, look it’s in this paper, you knew this was going to happen then instead of complaining
about it, you fix it. Figure it out. I think that helps you dwell on solutions, instead of problems.”

**Developing Strategies for Teaching and Classroom Management**

When asked to comment on the teaching and classroom management portion of the manual, seven students credited *How to Effectively Instruct a Diverse Audience* (Module 5) and *Teaching Skills and Concepts* (Module 6) for improving their ability to teach a diverse audience of people (Fig 2.1). Six students credited *Challenging Classroom Behaviors….and How to Handle Them* (Module 7) for providing them with strategies to manage their assigned community group (Fig 2.1). Overall students described the Modules 5, 6, and 7 as useful for proving them with skills to educate a diverse group of individuals in a culturally competent manner.

In post service interviews we found that most of the students initially had no experience designing lesson plans or delivering complex scientific information to any audience, particularly urban and diverse populations. Through the training students were able to first learn about their audience in Modules 1 through 4 and then applied that knowledge of their audience to their teaching approaches exercised in Modules 5 and 6. Our students became aware of how their own life experiences and privilege might affect the manner in which they relay information and therefore set out to create learning experiences that invited community members to contribute their perspectives, ideas and experiences. Students also mentioned that being forced to quickly design lessons during the training helped them later on in the field when instant adaptation or innovation was required to maintain community member engagement. Individual learning style is influenced by culture, and people
consequently teach the way they learn (Banks et al. 2001). Our students learned to invite community members to participate in all learning activities, allowing their particular audience to ultimately shape the lesson being taught (Guion et al. 2003). Quotes from student interviews illustrate their perceived benefits of the teaching portion of the training.

**Student K:** “The designing lessons for diverse backgrounds was helpful . . . it was helpful to think of how diversity played into it…so I think that prepared us as we were making our lessons. It made us aware that people would be different. So I think having that in mind while we prepared our lessons helped things run smoothly once we got to the garden.

**Student K:** “I think it was the 5 minutes [From How to Effectively Instruct a Diverse Audience], just like feeling that pressure, realizing that this is what I needed to be doing and I just remember seeing [another group] up there with the worm lesson and I was like, ‘Oh my gosh, that was brilliant and it just gave me some energy and inspiration.’”

**Student L:** “The design a 5 minute lesson [How to Effectively Instruct a Diverse Audience] showed what we could pull together in short time, what we could teach someone else. So it was a good activity. What we did with that worm on the board, having people come up [and participate]…if you didn’t know something about the worm before you that, you did afterwards. So they were good classes and activities.”

**Student G:** “So I think that our approach to writing lessons was definitely informed by this because I think we learned during this, we talked about making it interactive and fun. During the [Teaching Skills and Concepts] module it was definitely
emphasized to us to make lessons interactive. Um how to engage the audience and
that stuff is something we thought about because we did incorporate a lot of games or
more interactive activities into our lessons.”

**Student H**—“I thought I knew how to do lesson plans, but once we had 5 minutes to
teach I was like, “oh my gosh, I don’t know how to do this.” It was just really
interesting to see how our group worked together and was able to do it.

**Student K**—“The module where we had to come up with a lesson really quick was
helpful because there were times in the garden that we had to come up with
something really quick to do.”

In order for the trainees to successfully deliver information, develop relationships and foster
feeling of mutual respect between student-teacher and community member, it was imperative
that they learn behavioral management techniques that would allow them to establish
themselves as educational leaders within the community. Regardless of how much work the
student groups put into designing garden lessons that would engage and interest the
community, if they were not able to effectively organize and manage the group, then there
would be little opportunity for learning. In *Challenging Classroom Behaviors…and How to
Handle Them* (Module 7) students assumed the role of teacher and employed strategies to
address common classroom behaviors. By actually role-playing the parts of teacher and
student, students felt they retained the information and were able to utilize these strategies
when confronted with challenges in the community. This supports others’ findings that
effective behavior management is one of the most valuable teaching skills that student
teachers need to acquire (Woodcock and Reupert 2012). By having effective group
management skills, teachers are better able to educate their students and also find teaching to be less stressful and or demanding (Ormrod 2006). This module was particularly important for student preparation because of the role that sound classroom management skills play in one’s ability to support the educational needs of the community. A survey of graduate and student teachers found that 80% felt only moderately prepared to deal with challenging behaviors and indicated that they needed more training (Giallo and Little 2003). Teachers with the ability to lead a group of individuals through exercises amongst disruptions and common classroom antics, tend to feel less stressed and more confident in their ability to teach (Rogers 2006).

**Student J**-“Having that little workshop we did at the beginning, having something written, I feel like I knew a lot of those strategies, but having it written down and being able to look at this and kind of memorize it…or just like seeing them all there and looking at it every once in a while I could be like, “oh yeah, good idea.” And watching other people try it out in their own way was good. I feel a little bit better about that, just having experience.

**Student B**-“Well that training session we did for the classroom management in one of the trainings, that helped a lot. I found myself, with not even realizing it, using the strategies.”

**Student K**-“I definitely used some of the tips, reactions or tried to use them. It was good to have ideas of how to handle a situation going into it. I think that was really helpful and that one should be used again.”
Student J: “I think the challenging behaviors, like how to handle them…it was cheesy, I’ll admit, but I think it did affect me…having the handout, I retained it better because we acted the whole thing out. So I think that was good.”

Student E: “Ohhhh yeah. I learned that when you walk up to the person like when [community member] was really acting up a lot, and we talked about this in one of the training, if someone is acting up you just go walk right next to them and sooner or later they’re going to realize that ‘the teacher’s right next to you.’ And they stop talking and we did it and it was a success. I learned that in the training and I’ve used it and it works and it’s great.”

Field Observations

Field observations varied amongst Groups 1 and 2 (Y1) and Groups 3 and 4 (Y2). We observed that three out of the four groups initially failed to take their audience into account when designing and delivering garden lessons (Table 2.5) suggesting that greater emphasis on community member engagement was perhaps necessary. Groups 1, 2 and 3 received low ratings of 1’s and 2’s for failure to meet competencies based on standards set by and Palmas Rivas (1997) and Darling-Hammond et al., (2005) (Table 2.5). Despite being taught to prioritize building relationships and designing lessons that engage their audience these groups initially resorted to lecture styles of teaching that relied upon their talking at their audience. Mid-way through the project, all three groups received higher ratings of 3’s 4’s and 5’s in the four competencies because they changed their teaching approaches to include more opportunities for community members to participate in the learning process (Table 2.5). Many of the group members became better acquainted with their assigned community by
visiting and talking with individuals. In the second half of the project Groups 1, 2, and 3 catered their lesson plans to the interests and values of the community and consequently were better able to manage and engage community members. These students were able to recognize strategies that were not working with their community and adopt more appropriate ones. For example, Group 3 recognized that the community was primarily interested in potential careers in agriculture, therefore, they began to incorporate information about possible future job opportunities and salary scales in the garden lessons they were teaching. They identified the needs and interests of the community members and adapted their lessons to include topics that would spark interest. Improved teaching skills and the ability to utilize varied instructional approaches are common results of participation in service-learning projects (Kahan 1998; Watson et al. 2002; Verducci and Pope 2001; Lake and Jones 2008).

Group 4 utilized skills and strategies they learned during the training and received ratings of 5’s for meeting most of the competencies (Table 2.5). Starting on their first community teaching day, all of their lesson plans included icebreakers and group activities that fostered the development of relationships amongst community members and between the student-teachers and community members as well. Every lesson included hands-on activities that promoted active learning and opportunities for each community member to assume and leadership roles in which they were teaching others. Through lesson plan design and group management techniques Group 4 avoided disruptive behaviors and disengaged community members. By becoming acquainted with their community member’s interests, backgrounds and perspectives, this group was able to deliver audience-appropriate lessons that imparted knowledge and were fun. A documented result of participation in service-learning is
increased perceptions of competency to work with diverse populations as well as increased
leadership and organizational abilities (Lake and Jones 2008; Lai 2009).

Conclusions

The seven modules in this training manual successfully introduced the students to the
socioeconomic and cultural differences that exist between university students and the food
insecure community members and provided them with cultural competence and teaching
skills to help them become effective educators and leaders in the community. The eleven
students in the course credit the training modules for providing them with background and
useful strategies for delivering soil science lessons to a diverse community of under-served
individuals. While initially some students failed to utilize the strategies learned in training,
our interview data and field observation data show that when the students heeded the advice
given to them during training and prioritized building relationships with community
members, they delivered audience-appropriate lessons that engaged the whole community in
the learning process.

Implications and Future Work

This training manual was specifically designed to meet the needs of individuals
preparing to work food security-related community outreach. At the conclusion of the two-
year pilot and evaluation of the modules, the complete manual was submitted to 4-H for
review and publication. Our findings here as well as those in Grossman et al.,(2012) illustrate
the immediate need for training materials specific to service-learning projects in community
food security and agricultural outreach. The 4-H program is dedicated to using the “learn-by
“doing” approach to train participants to respond to the everyday challenges faced by urban, suburban and rural communities as future leaders and innovators (4-H). The youth development program of land grant universities and cooperative extension programs, 4-H’s mission and philosophy is consistent with that of most service-learning courses and the design and purpose of this training. Once published the manual will be available via an NC State University website that records traffic and use and will request feedback from users of the training.

As courses in agroecology and sustainable agriculture become more prevalent (Sriskandarajah et al., 2005; Bhasvar 2002) and more instructors adopt service-learning projects as a means to addressing the social justice issues of our current food systems (Einfield and Collins 2008; Hughes et al. 2009), the need for relevant training materials will also increase. The manual described in this study is an efficient set of learning modules that can be used together or separately by instructors, non-government organizations and other food systems and agricultural outreach organizations that wish to train individuals to operate as food system leaders within diverse communities.
Table 2.1 Post-Interview Questions to Evaluate Usefulness of Training Manual in Preparing Students for Service-Learning Project

<table>
<thead>
<tr>
<th>Interview Questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q1</td>
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<tr>
<td>Q2</td>
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<tr>
<td>Q3</td>
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<tr>
<td>Q4</td>
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<tr>
<td>Q5</td>
</tr>
</tbody>
</table>
Table 2.2 Organization of the Training Manual

<table>
<thead>
<tr>
<th>Module</th>
<th>Title</th>
<th>Summary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Module 1</td>
<td>What is a Diverse Audience?</td>
<td>An exploration of the concept of “diversity” and the need for cultural competence training when working with diverse audiences</td>
</tr>
<tr>
<td>Module 2</td>
<td>Diversity in America</td>
<td>A discussion of US demographical data, food security and agriculture</td>
</tr>
<tr>
<td>Module 3</td>
<td>Meet the Community</td>
<td>A guide to introducing the students to their assigned community and community members’ needs</td>
</tr>
<tr>
<td>Module 4</td>
<td>Food Justice and Urban Food Security:</td>
<td>A discussion of the challenges encountered in urban food insecurity projects</td>
</tr>
<tr>
<td>Module 5</td>
<td>How to Effectively Instruct a Diverse Audience</td>
<td>Instructions and activities on how to design lessons that intentionally engage students from diverse backgrounds</td>
</tr>
<tr>
<td>Module 6</td>
<td>Teaching Skills and Concepts</td>
<td>An introduction to basic teaching skills that emphasizes the importance of time management, preparation, and student engagement in the learning process.</td>
</tr>
<tr>
<td>Module 7</td>
<td>Challenging Classroom Behaviors…and How to Handle Them</td>
<td>A role-playing exercise that allows students to familiarize themselves with strategies to manage 8 common classroom behavioral challenges.</td>
</tr>
<tr>
<td>Module</td>
<td>Title</td>
<td>Y1 Rating</td>
</tr>
<tr>
<td>--------</td>
<td>----------------------------------------------------</td>
<td>-----------</td>
</tr>
<tr>
<td>1</td>
<td>What is a Diverse Audience?</td>
<td>3</td>
</tr>
<tr>
<td>2</td>
<td>Diversity in America</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>Meet the Community</td>
<td>4</td>
</tr>
<tr>
<td>4</td>
<td>Food Justice and Urban Food Security</td>
<td>3</td>
</tr>
<tr>
<td>5</td>
<td>How to Effectively Instruct a Diverse Audience</td>
<td>3</td>
</tr>
<tr>
<td>6</td>
<td>Teaching Skills and Concepts</td>
<td>2</td>
</tr>
<tr>
<td>7</td>
<td>Challenging Classroom Behaviors…and How to Handle Them</td>
<td>4</td>
</tr>
</tbody>
</table>
Table 2.4 Summary of Year 1 and Year 2 Observations of Student Participation by Module

<table>
<thead>
<tr>
<th>Module</th>
<th>Title</th>
<th>Class Participation Rating Y1</th>
<th>Y1 Comments</th>
<th>Class Participation Rating Y2</th>
<th>Y2 Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Module 1</td>
<td>What is a Diverse Audience?</td>
<td>2</td>
<td>Students were hesitant to engage in discussions of race, ethnicity and culture; overall lack of participation</td>
<td>5</td>
<td>Every trainee participated in the discussion; students readily offered their thoughts and opinions</td>
</tr>
<tr>
<td>Module 2</td>
<td>Diversity in America</td>
<td>2</td>
<td>Module lacked opportunities for Students to participate in the learning process, lots of good statistics and facts, not enough opportunity for discussion</td>
<td>5</td>
<td>Students were assigned tasks (reading statements and statistics aloud), and pursued discussions and group reflections on the information presented.</td>
</tr>
<tr>
<td>Module 3</td>
<td>Meet the Community</td>
<td>3</td>
<td>Students displayed eagerness to learn about assigned communities but the module lacked direction</td>
<td>5</td>
<td>Students were eager to learn about their assigned communities and explore the strengths and challenges of their assigned community space</td>
</tr>
<tr>
<td>Module 4</td>
<td>Food Justice and Urban Food Security:</td>
<td>2</td>
<td>Minimal student discussion, it appeared that some students did not read the paper and therefore had little to add</td>
<td>5</td>
<td>Students read aloud and answered assigned discussion questions, and offered additional reflections and project-related expectations.</td>
</tr>
<tr>
<td>Module 5</td>
<td>How to Effectively Instruct a Diverse Audience</td>
<td>3</td>
<td>Training involved too much lecture and not enough opportunities for Students to practice and reflect on what they are learning</td>
<td>5</td>
<td>Students were eager to offer thoughts on past course experiences, i.e. effective teaching vs. ineffective</td>
</tr>
<tr>
<td>Module 6</td>
<td>Teaching Skills and Concepts</td>
<td>2</td>
<td>Students should have been taking notes but did not appear to be engaged; 5 minute lesson lacked substance and did not employ recently discussed strategies</td>
<td>5</td>
<td>Students took notes, 5 minutes lesson included strategies and components learned during the training</td>
</tr>
<tr>
<td>Module 7</td>
<td>Challenging Classroom Behaviors…and How to Handle Them</td>
<td>4</td>
<td>Full student participation but module would have benefit from being more structured</td>
<td>5</td>
<td>Full participation by all students; some approached the role-playing in a comical manner while others were more serious</td>
</tr>
<tr>
<td>Competencies</td>
<td>Rating</td>
<td>Comment</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>--------------</td>
<td>--------</td>
<td>---------</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Engage audience in the learning process</td>
<td>1</td>
<td>Students are lecture style with little audience participation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Develop mutual trust and relationship with community</td>
<td>1</td>
<td>Students' lessons primarily focus on content</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Deliver audience-appropriate lessons</td>
<td>4</td>
<td>Students use scientific terms that do not define them, students minimally engage community members in the learning process</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maintain organization through effective leadership and group management</td>
<td>2</td>
<td>Students manage group well and use classroom management skills from training to address disruptive behavior</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Rating</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>After 3 weeks, the community students began to change their lesson format to engage audience at an appropriate academic level</td>
</tr>
<tr>
<td>5</td>
<td>Students talk with community members attempting to build relationships</td>
</tr>
<tr>
<td>2</td>
<td>Students use audience-appropriate games and lots of games to illustrate concepts and teach community members</td>
</tr>
<tr>
<td>5</td>
<td>Community members not engaged and leave after 10 minutes in first class</td>
</tr>
<tr>
<td>4</td>
<td>Students adapt lessons to engage community members and deliver content in a way that is relevant and interesting to community members</td>
</tr>
<tr>
<td>5</td>
<td>Students continue to engage community members in learning process and even assign them tasks, allowing them to contribute</td>
</tr>
<tr>
<td>5</td>
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<td>Students continue to engage community members in learning process and even assign them tasks, allowing them to contribute</td>
</tr>
<tr>
<td>4</td>
<td>Students continue to engage community members in learning process and even assign them tasks, allowing them to contribute</td>
</tr>
</tbody>
</table>

Table 2.5 Field Observations and Ratings of Students' Satisfaction of Competencies While Teaching in Their Assigned Community
The Number of Students that Credit Each Module as Improving Preparation

Note. n=11

Figure 2.1 Post-service-learning project interview data.
References Cited

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APPENDIX
Appendix A

Professional Skills Survey Questions

1. I am able to identify resources I need to be able to teach a hands-on science lesson to the public.

2. I am able to confidently develop a science lesson for diverse audiences from social, economic, or cultural groups different from myself.

3. I am able to confidently teach a science lesson for diverse audiences from social, economic, or cultural groups different from myself.

4. I am able to work effectively with diverse populations (i.e. income, race, ethnicity, class, education or ability different from myself).

5. I am able to prepare a lesson.

6. I am able to teach a lesson to the public.

7. I am comfortable communicating soil science concepts to the public.

8. I am comfortable teaching diverse audiences.

Possible responses to all of the above questions:

1. Strongly Disagree
2. Disagree
3. Neither Agree nor Disagree
4. Agree
5. Strongly Agree

Demographics Questions

9. I am currently a ________________
   Freshman
   Sophomore
   Junior
   Senior
   Graduate Student

10. What is your major? (please type your major's name; for example Natural Resources, Horticultural Science or Biological Sciences)
11. What is your current age?

12. Sex?

13. Please write below the race/ethnicity with which you most identify

14. What is your current overall GPA (Grade Point Average)? Please respond with a number between 0.00 & 4.00
Appendix B

Interview Script-Office of Extension, Engagement and Economic Development Grant: Community Gardens Pre-Service-Learning Experience

Today you are going to be interviewed about the service-learning activity in which you participated this semester. I will ask you questions about your service learning experiences. You will neither be graded on your answers nor will you be penalized for not participating. However, if you do choose to participate, we will use your answers to try to better prepare you for your Service-learning assignments. So please be honest and open.

And remember, your responses will remain anonymous. This means you’re your name will never be linked, in written reports or in transcriptions, to your response. This also means that your primary class instructor will not know your answers to doubly assure that this will not affect the relationship between you and your professor nor will it affect your course grades. Also keep in mind that everything said in this room is confidential. Please do not discuss what is said today with anyone outside of this meeting.

Finally, you should know that we are audio recording the session so that we can refer back to the discussion when we write the report. If you are uncomfortable with being recorded please say so and, of course, you are free to leave. This audio recording and transcription of the recording will be destroyed at a future date to assure your anonymity. Otherwise, please talk clearly and with a moderate to loud speaking voice so you will be clearly recorded.

Do you have any questions before we begin? If no, please sign the consent form presented in front of you. Remember, we're here to exchange opinions and have fun while we do it. Time management is very important. If we are spending a long time on one area, I may have to ask that we move to a different question. Please understand that everything you say is important to us.

Let’s start:
1. What is your intended career path?
   a. Probe: Do you believe that this experience is relevant to that?

2. Students gain different things from different experiences in courses. What do you expect to gain from this Service-Learning experience, if anything? How do you expect to learn this? (7-8 minutes)
   
   Probe: Can you give me an example of something that you think you will learn from this experience? Think academic, personal, civic (which is anything that pertains to your role in society, politics, or your community), or any skills?
3. In your service-learning experience you may have to solve problems or adapt for success. How do you currently assess your ability to adapt and problem solve?

4. In completing this Service-learning project, you will be working with people who are different than you. They may be of a different ethnicity or cultural background than you. They might have less education or income, and they may be older or younger than you. How prepared do you feel you are to work with people who are different than you? Please give examples of why you feel this way.

5. During this service-learning project, you will be working in groups with your classmates. How prepared do you feel you are to work closely with a group to solve problems? Please give examples of why you feel this way. (7-8 minutes)

6. No matter what your role in the Service-Learning project, you will likely be asked to be a leader for the community or your group somehow. How prepared do you feel you are to lead a group of people from the community who are different than you? Please give examples of why you feel this way.

7. In your project you will be asked to create and/or deliver course-specific content to a group of individuals. At this point, how prepared do you feel to prepare and teach soil science and agricultural lessons? Why?

8. Currently, do you feel you have skills and can apply strategies to effectively design agricultural lesson plans and teach concepts from this field? Can you provide me with examples of some of these strategies?

9. Do you have strategies for classroom management? Why do you think this?

10. Managing a group of individuals in an educational setting can often involve encountering “challenging classroom behaviors”. How confident are you that you are prepared to handle this? Can you provide examples of some challenging classroom behaviors, and examples of responses one might take?

11. When teaching course-specific information to a number of individuals, how confident are you that you will be able to create an environment that is conducive to learning? Why do you feel this way?

12. We have all experienced classes and lessons that are boring and ineffective. What steps will you take to make your lessons interesting and engaging to the group of individuals?

13. Do you feel that you understand challenges one can face when teaching a community of people of various ethnic, cultural and economic backgrounds? Why? Can you provide examples of some of these challenges?
14. Do you feel comfortable when interacting with people from these backgrounds?

15. What do you think some of the challenges will be to teaching agricultural concepts to youth from diverse cultural and economic backgrounds? Name a few of these challenges.

16. Do you think you might have assumptions, biases and values that will affect your working with a community comprised of people from different ethnic and economic background? What evidence do you have of this?

17. How do you think that your perspective and the ways in which you view the world will influence your interactions with members of the community?

18. How do you predict working with a community of people from different ethnic, cultural and economic backgrounds might shape your teaching approaches?

19. Are there any other skills that you predict you will learn through this experience? What are these skills?

**Interview Script-Office of Extension, Engagement and Economic Development Grant: Community Gardens Pre-Service-Learning Experience**

Today you are going to be interviewed about the service-learning activity in which you participated this semester. I will ask you questions about your service learning experiences. You will neither be graded on your answers nor will you be penalized for not participating. However, if you do choose to participate, we will use your answers to try to better prepare you for your Service-Learning assignments. So please be honest and open.

And remember, your responses will remain anonymous. This means you’re your name will never be linked, in written reports or in transcriptions, to your response. This also means that your primary class instructor will not know your answers to doubly assure that this will not affect the relationship between you and your professor nor will it affect your course grades. Also keep in mind that everything said in this room is confidential. Please do not discuss what is said today with anyone outside of this meeting.

Finally, you should know that we are audio recording the session so that we can refer back to the discussion when we write the report. If you are uncomfortable with being recorded please say so and, of course, you are free to leave. This audio recording and transcription of the recording will be destroyed at a future date to assure your anonymity. Otherwise, please talk clearly and with a moderate to loud speaking voice so you will be clearly recorded.

Do you have any questions before we begin? If no, please sign the consent form presented in front of you. Remember, we're here to exchange opinions and have fun while we do it. Time
management is very important. If we are spending a long time on one area, I may have to ask that we move to a different question. Please understand that everything you say is important to us.

Let’s start:

In this context 'diverse' or 'diverse populations/audiences' refers to incomes, races, ethnicities, classes, educational attainment or abilities that may be different from yours

1. Can you give me an example of something that you think you learned from this Service-Learning experience? Think academic, personal or civic

2. In your service-learning experience did you have to solve problems or adapt for success? How do you assess your ability to adapt and problem solve after this semester? Do you feel that your ability to adapt or problem solve has changed? Please give examples of why you feel this way. (7-8 minutes)

3. After this service learning experience how do you assess yourself as leader of a group? Are you a different leader now than you were at the beginning of the service-learning project?
   a. **Probe:** With your NC State class group?
   b. With the people in the community?

4. Do you feel as though you had assumptions, biases and values that affected your working with a community comprised of people from different ethnic, cultural and economic backgrounds? Can you name examples?

5. In your project you were asked to create and deliver course-specific content to a group of individuals. At this point, how prepared do you now feel to prepare such lessons and teach soil and agricultural science at an audience-appropriate level? Why or why not?

6. Have you learned strategies for classroom management? How did you learn these strategies?

7. When teaching course-specific information to a number of individuals, how confident are you now that you are able to create an environment that is conducive to learning? Why do you feel this way?

8. How did working with this community of people from different ethnic, cultural and economic backgrounds shape your teaching approaches?
9. You interacted with diverse individuals and communities, is there anything you learned or learned about yourself from working with or leading people different from yourself? How will you interact with diverse groups in the future?

10. Managing a group of individuals in an educational setting can often involve encountering challenging “classroom behaviors” how confident are you now that you can effectively deal with challenging behaviors in a sensitive yet stern manner?

11. Can you provide examples of some challenging classroom behaviors, and examples of how you handled them?

12. Over the course of your service-learning project did you become more comfortable working with your assigned community of people from ethnic, cultural and economic backgrounds different than yours?

13. How do you predict that this experience will affect possible future work with a diverse community?

14. What were some of the challenges in teaching soil science and other agricultural lesson to the youth in your assigned community?

15. During this service-learning experience do you feel that you developed skills relevant to your future career plans?

   a. Have your career plans changed based on your experiences in this course?

16. Prior to starting your project in the community you participated in 3 days of training involving the following activities (provide student with list/synopsis of activities). How much do you credit the training program for changes in your preparation to prepare lesson plans and teach? For example, on a scale of 1-10. Please be as specific about certain exercises if you can.

17. How much do you credit the training program for changes in your preparation to work with a diverse group of people? For example, on a scale of 1-10.

18. Were there aspects of the training that you found most applicable to your service learning experience?

19. Were there portions of the training that seemed irrelevant to your service learning experience?

20. Are there additional areas that you would like to see addressed during the training sessions?

21. Throughout this discussion I’ve asked questions and facilitated the direction of the conversation, but now I would like to use this opportunity for you to speak
candidly about anything regarding your service learning experience. Insights, thoughts, recommendations, etc.

(Use the last few minutes of the focus group for allowing the students to reflect on anything that they want to, anything they want to say, to get off their chests, to ponder etc. Just leave this part open but keep the audio recording device on)

22. What would you change about this service-learning experience? What would you improve? Why? How could you make the service learning project better for the community? Better for you?
Appendix C

Module Descriptions, Implementations and Strategies

The modules were delivered in one 3 hour training session. The session began by broadly introducing the concept of diversity and gradually shifted to emphasis of food security issues, their assigned communities and the service-learning project. The first module, *What is a Diverse Audience?* was designed to introduce the training group to the concept of diversity. The module opened with a commonly used diversity-training activity, the *Iceberg model of Diversity*. Trainees explored the many dimensions of identity that make individuals different, both visibly and not. They also discussed how interactions based purely on visible aspects of one’s perceived culture or identity can lead to negative stereotypes and inaccurate presumptions about individuals. A reflection exercise has trainees reflect on their definition of diversity, share with others and then with the group. In closing, the instructor provided a definition of diversity that will be used throughout the training and explained diversity to be an asset that strengthens a group of individuals and that each person in the room will bring their unique experiences, perspectives and educational approaches to the group and the community.

Module 2, *Diversity in America* consisted of a series of group reflections and discussion centered on changing ethnic demographics of the US, food security and poverty statistics. Module 2 was designed to help trainees understand their service-learning project in the larger of context of current social justice issues that exist in this country. The module concluded with students sharing ideas on factors that contribute to the high incidence of food
insecurity within minority groups, the roles that minorities and immigrants play in facilitating modern food production systems and ultimately why community engagement projects, such as theirs, have come about.

Module 2 helped students transition to Module 3, an introduction to the assigned project communities and the community partner’s mission. A community representative and employee of IFFS, Gloria Turner, was familiar with community demographics, needs, challenges and strengths, and had vast experience working with a diversity of cultures, classes and ethnic groups. Gloria gave the students some practical advice and suggested strategies on how to be culturally competent educators that engaged in a shared learning experience with the community. Module 3 also included a site visit where the trainees traveled to their assigned community to meet community members and become acquainted with the venue and available resources. Meet the Community was in many ways a “nuts and bolts” type module that would vary depending on the specifics of the community project and the supporting organization.

The concluding module to the diversity and cultural competence section, Module 4 was entitled Food Justice and Urban Food Security. This module featured discussion questions based on an assigned reading, Bringing Good Food to Others, Investigating the Subjects of Alternative Food Practice by Julie Guthman (2008). The paper is a synopsis of Dr. Julie Guthman’s of UC Santa Cruz’s research on her students’ participation in food security-related urban community garden work. Guthman explores the privilege and the “whiteness” of the alternative food movement and argues that while participatory action by the privileged white class is an integral component of change, culturally competent and
sustainable solutions involve working with, not for, underserved minority populations to create a system that works for them. In her paper, the author explained that service projects should be a mission of collaboration not conversion. This discussion served as a bridge between the trainee’s exploration of diversity and their action plan for teaching in their assigned communities. The paper included anecdotal evidence of student struggles and discouragement when working on food systems service projects. These examples were emphasized to prepare students for the possible challenges of their project. Ultimately Module 4 linked the philosophical discussions of Modules 1 and 2, the logistical information of Module 3 with the practical teaching applications that were going to be introduced in Modules 5, 6, and 7.

Modules 5, 6 and 7 introduced trainees to cultural competence teaching skills and behavioral management strategies. *How to Effectively Instruct a Diverse Audience*, Module 5, consisted of activities and exercises designed to illustrate the difference between *talking at* or *lecturing* one’s audience and *engaging* them. Trainees shared their experiences in courses in which they were invited to participate in the learning process. The instructor emphasized the need for lesson plans that treat community members as integral components of the learning experience as opposed to simply the recipients of information. Module 5 gave students practical suggestions for making their community education an exercise in mutual benefit as opposed to a form of teaching often times interpreted as “preaching or judgment”. While it was important for students to operate as leaders within the community, particularly due to community members’ age, the greater emphasis was placed on the importance of
developing mutual trust which facilitates shared knowledge. The trainees are expected to not only serve as teachers to the community, but as students too.

Module 6, entitled *Teaching Skills and Concepts* opened with suggested strategies for designing and delivering lessons and closed with an exercise where trainees had 30 minutes to prepare a 5 minute lesson which they then delivered to the other trainees. This provided the trainees with their first opportunity to collaborate with the group they would be working with all semester and also a chance to put two days of training into action. Following the 5 minute lessons each group gave feedback and suggestions.

The concluding module for the training was a role-playing exercise called *Challenging Classroom Behaviors…and How to Handle Them*, Module 7. It was an excerpt from Clauss-Ehlers, 2006 that contains recommended strategies and approaches for dealing with common challenging classroom behaviors in a sensitive and positive, yet stern manner that allows teachers to remain in control of the group. Trainees acting as students acted out typical challenging classroom behaviors while another trainee assumed the role of the teacher and practiced using some of the suggested strategies to confront the behavior. Although a somewhat comical exercise, it provided the students with the chance to try some skills useful for managing a diverse group of individuals. The module had a dual purpose in that it briefly exposed the students to some of the inattention, antics and disruptions they should expect while teaching and provided them with, albeit an artificial experience, a chance to practice appropriate responses. The manual in its entirety is included below.
Training Manual

For

Community Food Systems Outreach and Education

Authors
Sarah Smith
Julie Grossman
Lisa Guion
Liz Driscoll
Lucy Bradley
And
Dean Hesterberg
Introduction

This manual consists of 7 modules designed to increase participant confidence and improve skills to work alongside the diversity of individuals who make up today’s society. Through group activities, role-playing exercises and discussions, students will explore the concepts of diversity, discuss cultural differences, national and local demographics and practice community education engagement strategies. Although originally designed to prepare university students to work in food systems and agriculture, the exercises and information in these modules are applicable to any group preparing to work with a community of diverse individuals.

The entire program can be completed, in four hours in addition to a site visit to the project location. The modules are versatile and therefore can be used together or separately, depending on the training needs of the group. Each module contains a list of required materials, time required, preparation instructions, a brief background of the overall module concept and any accompanying handouts.

The goal of the manual is to provide course instructors and community organizations with materials that inspire students for the challenges and enrichment that come with engaging a community. Throughout the training students will discover the strength that comes with the diversity of their community, their project team, and their society. With a greater understanding of the many ways in which everyone is different, students can approach community-based projects with strategies that are inclusive and seek to encourage and utilize the many different strengths of the group.
Module 1
Title: What is a Diverse Audience?
Goal: To illustrate the concept of diversity and the need for cultural competence training when working with diverse audiences.
Time: 30 minutes
Materials: Flip chart, poster board or white board, markers, handouts 1.1 and 1.2
Prep: Distribute handout 1.2 (required reading) prior to class


Background: The instructor will introduce the topic of diversity and explore the diversity of the group.

Breaking the Diversity Iceberg
Sketch Figure 1 on the white board or a poster board large enough for the class to see

Read aloud to participants: Becoming acquainted with the individual characteristics and culture of our group members and community is an important foundation for beginning of any project. Each person in this room has attributes, beliefs and experiences that make them unique and give them strengths. We often overlook these differences when we discuss diversity, oversimplifying the concept as something strictly surface or physical. Learning to identify and appreciate these differences can make us a stronger team.
Quickly divide the class into 2 groups (or more if necessary) and ask the participants to brainstorm different characteristics that make
people different from one another. Participants will name characteristics in two categories: things you can see, and things you cannot see.

Select a volunteer to write the answers on the board. The volunteer should write the things that we can see (e.g. race, hair, color, size, etc.) above the water line and the things that we cannot see (religion, beliefs, cultural identity, etc.) below the water line.

Distribute Handout 1.1 and discuss with class where these categories belong on Figure 1.

Reflection:

Once students have sufficiently filled in the iceberg, the instructor should explain the drawing: The sketch represents an iceberg. All of the characteristics that are above the line are physical attributes. Everything below the surface is what we cannot see, but still equally important components of our individual identities and culture. Notice that the iceberg is much larger below the water line, than it appears from the surface. A person’s individuality, their passions, beliefs, and life experiences are attributes that are not necessarily visible to the human eye. In order to work together and within the community, it is necessary to build relationship first and foremost. Only then can we understand the values and strengths that we have in common and the diverse people contributing to the project.

Encourage the participants to examine their own “iceberg.” You can use the following questions for discussion:

Is the tip of the iceberg an adequate demonstration of yourselves as individuals or do the traits and characteristics beneath the surface truly assist in defining you as an individual?

How does it affect you when your interactions with others are based solely on visible aspects of your “perceived” culture or identity?
Think about how you describe people. Which of the two categories of characteristics do you use most? Why?

Following this discussion and reflection re-focus the participants by asking the question, “What is ‘diversity’ in general?”

Allow the participants to volunteer answers before providing them with the following definition: Diversity is a mosaic of people who bring a variety of ethnic and cultural backgrounds, styles, perspectives, values and beliefs as assets to the groups and organizations with which they interact” (Guion 1999 p1). *

In closing, explain that in order to effectively instruct and or work with any group of individuals one must understand and appreciate that diversity, both above and below the surface, that exist in every group of people. There may be many differences and commonalities that exist below the surface. Diversity is an asset. It strengthens the group, making it more resilient. Each of you will bring your diversity of ideas, teaching styles and interpersonal skills that have developed as a result of your unique experiences. Recognize and appreciate these differences within this room and then seek to do the same with your community.

*Delineates a definition that might be best presented by writing it on a piece(s) of flip chart paper that is taped up so that the participants cannot see it until you are ready to introduce the information
Group Identification Categories
Age
Body Size
Class or Socio-economic status
History of abuse
Education
Food security/Insecurity
Gender
Immigration status
Language or accent
Behavioral challenges
Physical disability of impairment
Race and or ethnicity
Sexual orientation
Spiritual beliefs or religion
Neighborhood, state or country of origin
Family structure, i.e. adopted, single parent home, blended family
Health
Literacy
Module 1 Handout 1.2
Module 2

Title: Diversity in America

Goal: To discuss US demographical data, food security and explore its relevance to agriculture

Time: 25 minutes

Materials: Poster paper, masking tape, markers, index cards, handout 2.1, PowerPoint

Prep: There are a number of statistics in this lesson. Share them by writing them out on large pieces of flip chart paper or as part of a PowerPoint slideshow, prior to class. If you choose to use flip chart paper then tape the sheets around the room and use a small piece of tape to tape the bottom to the top so as not to reveal the info until you are ready to discuss it. Some of the statistics, section should be written on index cards for students to read aloud.


Background: The instructor will introduce the changing demographics in the US and lead a discussion on how they relate to community gardens and agriculture. Our definition of diversity encompasses a focus on ethnicity and culture and the interaction of the two for a given group of people. It also focuses on diversity as an asset. Use these themes as you guide participants through Lesson 2.

There is some preparation necessary for this lesson therefore reading through the exercise prior to the session is encouraged.

Changing Demographics

Immigration

Documented Immigration rates are above 1.1 million people annually with only 330,000 emigrants per year (U.S. Dept. of Homeland Security, 2009).

Current U.S. policy on permanent immigration is based on four principles:

- Reunification of families,
- Admission of immigrants with special skills
- Protection of refugees
Diversity of admissions from countries with historically low US immigration rates (Waseem 2012)

The leading regions of origin of legal immigrants in 2009 were North America and Asia. These regions accounted for 36% and 33%, respectively, of all legal immigrants in 2009 (U.S. Dept. of Homeland Security, 2009).

<table>
<thead>
<tr>
<th>Percent of Legal Immigrants by Region of the World</th>
</tr>
</thead>
<tbody>
<tr>
<td>North America</td>
</tr>
</tbody>
</table>

The leading source countries (of birth) for legal immigrants in 2009 were Mexico (14.6%), followed by China (6.0%), the Philippines (5.3%), India (5.1%), Dominican Republic (4.4%), Cuba (3.4%), and Vietnam (2.6%) (Shrestha and Heisler 2011). The number of foreign-born people residing in the United States is higher now (12.5%) than any point in History (Kandel 2011).
Minority Population Growth

The 2010 US Census included 15 separate questions on race and 3 areas where respondents could write in detailed information about their race.

From 2000 to 2010 the White non-Hispanic population decreased from 75.7 to 71.6%, while the Black, Hispanic, American Indian and Asian and Pacific Islander populations increased.

Based on the 2000 and 2010 census, it is projected that in 2050 50.5% of the population will be White, 22.5% Hispanic, origin, 15.7% Black, 10.3% Asian and Pacific Islander, and 1.1% American Indian, Eskimo and Aleut.

Present the following question to the class:

How do you and or your home community (where you live now or your place of origin) fit into the changing demographics that have been discussed?
You can use the following probes as well:

Do you see yourselves better represented among this change or do you see that the group to which you belong has become less homogenous?

Have the class discuss their feelings on the changing demographics that you shared as well as the changes they see (or do not see) in their communities.

Now relate these current or impending changes in demographics to issues of food insecurity

In 2010 17.2 Million households, approximately 1 in 7, were food insecure, the highest ever recorded in the US (Coleman-Jensen 2011).

The 2010 poverty rate for Hispanics was 26.6 percent, for Blacks 27.4 percent, 12.1% for Asians and 9.9% for non-Hispanic whites (US. Census 2010).

In 2010, the poverty rate increased for children under age 18 from 20.7 percent to 22.0 percent. (DeNavas-Walt 2010 p.14).

You could ask

How could someone who chooses to work in extension and or in an agriculture-related urban non-profit be affected by increased diversity?

You might also wish to add specific demographical data from your project community.

End this discussion by addressing the necessity to improve levels of understanding of varying groups, and also the tendency of people who belong to a majority group to believe that the individuals in a minority group should change to reflect the cultural norms of the majority.
Ask the class:

How would you relate this to community garden projects that teach agriculture or soil science to diverse populations in underserved communities?

Diversity within Diverse Audiences

Shift the discussion to the topic of ethnicity, diversity terms, and the diversity within ethnic groups.

Distribute index cards that feature the list below to the members of the class.

Read aloud to the participants:

We often use broad labels to refer to a group of people with the same ethnic origins, but these “categories” lump large populations of people together, irrespective of different cultural practices and norms.

Have the students read (in order) their index cards aloud.

(1) The following race categories were featured in the 2010 US Census:

“White” refers to a person having origins in any of the original peoples of Europe, the Middle East, or North Africa. It includes people who indicated their race(s) as “White” or reported entries such as Irish, German, Italian, Lebanese, Arab, Moroccan, or Caucasian.

(2) “Black or African American” refers to a person having origins in any of the Black racial groups of Africa. It includes people who indicated their race(s) as “Black, African Am., or Negro” or reported entries such as African American, Kenyan, Nigerian, or Haitian.

(3) “American Indian or Alaska Native” refers to a person having origins in any of the original peoples of North and South America (including Central America) and who maintains tribal affiliation or community attachment. This category includes people who indicated their race(s) as “American Indian or Alaska Native” or reported their enrolled or principal tribe, such as Navajo, Blackfeet, Inupiat, Yup’ik, or Central American Indian groups or South American Indian groups.

(4) “Native Hawaiian or Other Pacific Islander” refers to a person having origins in any of the original peoples of Hawaii, Guam, Samoa, or other Pacific Islands. It includes people who indicated their race(s) as “Pacific Islander” or reported entries such as “Native Hawaiian,” “Guamanian or Chamorro,” “Samoan,” and “Other Pacific Islander” or provided other detailed Pacific Islander responses.

(5) “Hispanic or Latino” refers to a person of Cuban, Mexican, Puerto Rican, South or Central American, or other Spanish culture or origin regardless of race.
(6) “Some Other Race” includes all other responses not included in the White, Black or African American, American Indian or Alaska Native, Asian, and Native Hawaiian or Other Pacific Islander race categories described above.

(7) The term **diversity** is used frequently in a variety of contexts in the United States, often synonymously with race. The biological, genetic and anthropological fields have taught us much about race as a category for classifying individuals into distinct groups. Advancements in those three fields have shown that the category of race is arbitrary for the most part. For example, human genome research suggests that there is no biological basis for racial categories (Graves, 2002), and it is widely reported by geneticists that all humans are 99.9 percent genetically alike. Therefore, in the scientific world, race is a social construct that is not sufficient to classify groups of people. While race is still commonly used in our society, it will not be used in this training.

(8) **Ethnicity** is a term that is rapidly being used to replace race. Unlike race, ethnicity classifies individuals into groups based on cultural characteristics. Culture encompasses the values, beliefs, practices, norms and languages of a group that have been learned, shared, and transmitted inter-generationally; it influences a person’s feelings, thinking, and behavior (Hogan-Garcia, 2003 and Pedersen, 2000). This training focuses on ethnicity as a basis of diversity.

Revisit the idea that there are other factors that create diversity among individuals within a certain ethnic group, such as level of education, income/social status, and level of ethnic identification (recall the iceberg activity from Module 1). Emphasize the fact that these “terms” barely scratch the surface of what it means to be an individual within these ethnic and cultural groups.

Ask the participants if there are any questions before moving on.

At this point you can either choose to close this activity or proceed to Diversity Bingo, handout 2.1
Module 2 Handout 2.1
Directions for Diversity Bingo
Exercise - Diversity Bingo adapted from Guion, L.A; Chattaraj, S., Goddard, H.W.; & Lytle, S.S. 2003 and Mercer University’s Activities for Appreciating Differences.

Background:
To help participants see how much (or how little) diversity is in their group. To assist participants in examining elements of diversity that are obvious (e.g., red hair) or not obvious (e.g. socio-economic status, life experience, personal values and beliefs). This can be a fun and enlightening activity to do in the group and is also an excellent one to do paired with another small group.

Facilitator Instructions: Diversity Bingo is a fun and nonthreatening way for participants to begin understanding the many facets of diversity. Each participant receives a Diversity Bingo Card (Attachment 1.3). The goal is to let participants interact with each other by collecting the signatures of people who fit the descriptions in the boxes. Each box has different characteristics. Only one signature or set of initials per box is required. Participants should try to complete a vertical, diagonal or horizontal line (five signed boxes in a line). The first player to achieve this goal shouts “Bingo!” and is the winner. Depending upon the comfort level of your participants, you may want to use color-coded dots instead of signatures/initials. Simply distribute 5 to 10 dots (depending on the size of the group) to each person. Smaller groups will require that each person have more dots. The participants should then place a dot on the square that corresponds to an attribute that they have, rather than using their signature/initials.

Note: A longer variation of this game is to let everyone completely fill his or her bingo card with signatures.
Reflection

Address the class: Diversity Bingo identifies the ways that we value diversity within our project group and community. BINGO is an acronym which can stand for:

B – Be aware. Broaden your general knowledge of ethnic groups and cultures.
I – Include others. Have a variety of people involved in your programs from all groups and activities.
G – Give respect. Treat all people fairly, honestly, and with positive regard.
O – Openly communicate. Share information, expectations, and unwritten rules with everyone.

Discussion Questions
1. How did it feel when you found individuals with similar backgrounds? Why do you think you felt that particular way?
2. How did you determine which individual to ask about a certain attribute?
3. Were there any topics that you felt uncomfortable discussing? Why or why not?
4. Did you observe people who seemed to engage in more conversation after they obtained signatures? Why do you think this occurred?
5. What did this exercise help you to better understand?

Diversity Bingo Card (copy and distribute one per participant)
### Diversity Bingo

<table>
<thead>
<tr>
<th>A person who is older than 50 years</th>
<th>A person with native American heritage</th>
<th>A person who did not graduate from college</th>
<th>A person who was born outside of the United States</th>
<th>A person with African heritage</th>
</tr>
</thead>
<tbody>
<tr>
<td>A person who is left-handed</td>
<td>A person who is or has been a single parent</td>
<td>A person raised by a single parent</td>
<td>A person with a physical disability</td>
<td>Someone raised in a wealthy household</td>
</tr>
<tr>
<td>A person with Asian heritage</td>
<td>A person with Hispanic/Latino heritage</td>
<td>Free</td>
<td>Knows someone personally who is or has been homeless</td>
<td>A person raised by grandparents</td>
</tr>
<tr>
<td>A person who is vegetarian</td>
<td>Someone who lived outside of the United States for more than one year</td>
<td>Someone who received Public Assistance</td>
<td>A person who is the first college graduate in the family</td>
<td>Someone who lives in a rural community</td>
</tr>
<tr>
<td>Someone raised in the inner city</td>
<td>Someone who speaks more than one language fluently</td>
<td>Someone who has lived in public housing</td>
<td>A person with bi-racial heritage</td>
<td>A person who has dated or married interracial</td>
</tr>
</tbody>
</table>
Module 3

Title: Meet the Community

Goal: Introduce project participants to the community of interest

Time: Varies

Prep: Recruit guest speaker/s from community in which projects will take place and participants from prior community engagement projects. Participants should prepare in advance one question to ask the guest speaker/s about their community.

Background: The purpose of this exercise is to give the project participants information about the community in which they will be working and about their specific project site. This exercise will vary depending on the resources, guest speakers and time available to you. This lesson is a sample of how one might carry out such an exercise.

Learning about the community a presentation-by a guest speaker

Recruit a guest speaker who works in the community where students will be engaged. Request that they provide the students with the following information as well as any other information they think will help the students be successful in their outreach efforts in the community.

- The name, purpose and mission of their organization
- The justification for and development of community engagement projects
- The key players in the project:
- Relationship between various community engagement project participants (i.e. university course, course instructor, course participants, governmental bodies, NGO employees, community members)
- The community demographics, i.e.
  - Ethnicity
  - Socio-economic status of community members
  - Family structure (i.e. single parent households)
  - Challenges faced by this community (i.e. food insecurity, poverty)
• Languages spoken
• Strengths of community

Introduce the guest speaker to the students

**Question and Answer session**

Following the presentation, project participants should ask the presenter their (prepared in advance) questions about the community and any other questions that arose during the presentation.

**Site Visit**

It is helpful for the project participants to visit the project site prior to beginning their project. This allows the participants to become familiar with the location, meet key on-site persons involved with the project and resources available to them as they prepare for their community engagement project. Depending on the project and its infrastructure it may or not make sense for this entire lesson to take place at the project site. You will have to determine what works best for the project and participants. In addition to visiting the site where the students will visiting, if possible, recruit someone from the community to take the students on a walking tour of the neighborhood. Visit stores and parks, introduce the students to community members they meet along the way.
Module 4
Title: Food Justice and Urban Food Security
Goal: To inform participants about the challenges of working in community gardens and other urban agriculture outreach projects using examples from published literature.
Time: 35 minutes
Materials: Handout 4.1 (Guthman article is one useful example), handout 4.2, markers, whiteboard or flipchart paper

Background: Lesson 4 is a discussion centering on the topics presented in Dr. Julie Guthman’s article entitled Bringing good food to others: investigating the subjects of alternative food practice”. Participants should receive and read the Guthman article and take notes prior to this lesson. As the instructor you should emphasize the importance of reading this article prior to this lesson, as this lesson is a discussion that requires participation of all project participants.

About Dr. Julie Guthman
Dr. Guthman is an Assistant Professor of Community Studies at UC Santa Cruz, where she teaches courses in global political economy and the politics of food and agriculture. At its core, her research is about various efforts and social movements to change the way food is produced, distributed, and consumed. The majority of her research and publications have focused on organic agriculture, as both a form of agrarian change and prototype of neoliberal agro-food regulation.

There are questions included here to help you the instructor facilitate this discussion.

Discussion
In order to promote full class participation discussion questions should be written on flip chart paper (or PowerPoint slides) and only revealed when the group is ready for that question. You might even wish to assign each question to one of the group participants. This person will pose the question to the group and
then record responses and key points on a whiteboard or flipchart at the front of the room. If using flipchart paper simply write the questions on the paper ahead of time, tape them up around the room and tape the bottom of the paper to the top so that the question cannot be seen. The following discussion questions should be used as a guide and you the instructor should omit or add questions that are deemed applicable to the project. The discussion will vary depending on the project and participants; therefore you may not need to use all of the questions.

Discussion Questions

• In this article Guthman states that there is a “a lack of attention to questions of privilege” and this has given rise to critiques of the contemporary US alternative food movement.
  o What does the author mean by this?
  o What is “privilege”? How does this word relate to most current alternative food practices?

• On pg. 433 Guthman states that these projects appear to lack resonance in communities in which they are located.
  o To what projects and communities is she referring?
    What explanations does she give for this? Do you think this is or could be true? Explain.

• On pg. 435 the quote “…black nationalist groups have worked to distance themselves from racist-imposed idioms of dirt, filth, and backwardness associated with the ‘slave diet’…” means what for community garden and urban agriculture projects?
  Why would it be important for a project participant to be aware of this statement?
  Could this affect how you work with community members in your project?
• On page 437 Guthman mentions that students are asked to find field placements that address inequity of some sort of another. See **Handout 4.2**

• On pg. 438 Guthman includes quotes from her students, passionate about educating people about food. Read some of these quotes aloud.
  
  Can you relate to these quotes?
  What do you think of the author’s tone when addressing these statements?

• Read aloud the two paragraphs on pg. 439 under the heading **Findings**.
  
  What are your initial responses?
  Do you or would you find this discouraging?
  Today, what do you think is the benefit of teaching farming and gardening to under-served urban populations?

• Some of the recorded responses to the urban gardening programs include the following:
  
  Resentment on the part of African American individuals to be expected to get their hands dirty and work for free
  Reports that the kids involved in the community gardens do not like to garden
  In response to a question of why this woman did not shop from the neighborhood fruit and vegetable truck, “Because they don’t sell no food! All they got is birdseed....Who are they to tell me how to eat? I don’t want that stuff. It’s not food. I need to be able to feed my family... You know what normal grocery stores have.
Community members communicate that what they really want is a Safeway in their neighborhood.

- What is a food desert? Do you think of having a grocery store as a form of privilege? How does your project relate to this issue?

- After reading this article, what is your overall response to the information and the author’s tone? What about your own projects?
Module 5
Title: How to Effectively Instruct a Diverse Audience
Goal: Learning to design a lesson that intentionally engages students from diverse backgrounds
Time: 30 minutes
Materials: Whiteboard or flipchart paper, markers
Prep: Prior to coming to class, students should take learning style quiz available at http://www.engr.ncsu.edu/learningstyles/ilsweb.html and print their results and descriptions of their various learning styles. The instructor should become familiar with the concepts in this exercise; decide how you will divide your students into small discussion groups. Write the bolded statements in part C either on a white board or on flipchart paper. Flipchart paper is sometimes best, as you can wait to reveal what you have already written until the appropriate time.

Section B is adapted from exercises by Guion, L.A; Chattaraj, S., Goddard, H.W.; & Lytle, S.S., (2003)

Background: Instructor will take the participants through a series of activities to discuss and demonstrate the difference between “talking” at one’s audience and “engaging” the audience.

Ineffective and boring lessons

Divide participants into two discussion groups.
Read aloud to participants:
Everyone one in this group has experienced lessons that were interesting and engaging as well as ones that were boring and ineffective. Discuss with your group the common characteristics of engaging vs. boring and ineffective instructors.
You might prompt them as follows: I know you can think of a class that you especially enjoyed. What was it about that class that made it engaging?
Give the students 5-10 minutes to discuss their answers within their discussion group. Each group should elect one person to record and report for their group.
Ask the reporters to share their group’s ideas. Group 1 should share one point, then group 2. Write down a key word from each answer on the board and promote discussion about these points.

**Engaging your audience**

Read aloud: *The best teaching draws on experiences of both the teacher and the students. The teacher is supposed to be an expert on the subject matter. What do the students bring to the learning experience?*

Allow participants to once again discuss their answers within their groups before reporting to the larger group. Here are some suggested answers:

- People are experts on their own lives and know how to apply any idea to their own lives and families.
- People know how to adapt principles to their culture and situation.
- Even students who know very little about the subject matter being studied are experts in their own experience.
- Students who think about how a topic applies to their own life are more likely to engage in discussion, understand the concept and remember the information.

Following the group discussion, reiterate the following:

*The best teaching draws on the ideas and experiences of BOTH the teacher and the students. Effective teaching cannot happen unless the students are fully engaged. What can a teacher do to increase the productive involvement of students?*

Encourage individuals to answer and you the instructor should write a key word from each answer on the board.

Ask the group:

*Why might it be important to avoid talking “at” your audience, particularly when teaching a diverse (comprised of individuals with backgrounds of which you are unfamiliar) audience?*
Allow a few more minutes of discussion before moving on.

Designing your lesson for a diverse audience

Read aloud:

Anytime you are beginning to teach a new group of individuals there is a lot you do not know about them, i.e. their level of interest in the subject, how familiar they are with the subject, their academic abilities, the life challenges they are facing currently, their life at home, whether their family supports their academic pursuits, etc. Despite your lack of information, there is a way to help shape the learning experience and make it specific to the needs of the group.

Refer to PowerPoint, whiteboard or flipchart paper printed with bold statements below.

Create a plan for the time you have together.

Even though your plan will evolve as you involve the students, having a structured time with your students will mean less downtime for classroom behavior challenges.

As the teacher you bring experience and leadership to the lesson and the best way to do so is to have a solid focus for your time together.

Create opportunities for student participation in your lesson plan by introducing a concept and then inviting students to relate their own experiences and interpretations.

Include as many of your students in the learning process as is possible. The class members bring their life experiences and knowledge of their culture.
Ask the students:

*How can these 2 simple steps help you to create a lesson for a diverse group of people?*

*What did you learn from taking the learning styles quiz?*

*What are some specific strategies you can include in your lessons that will engage the diversity of learning types in a classroom? Strategies should include lessons that involve visual, auditory and “hands-on” demonstrations of the skills and concepts to be taught.*

Read aloud:

*Engaged students will learn new ideas to apply to their lives. Since everyone in this class is a teacher, let’s list some of the things we can do to build these learning partnerships. Write down any ideas that you would like to remember and apply to your teaching.*
Module 6
Title: Teaching Skills and Concepts
Goal: An Introduction to Teaching
Time: 30-45 minutes
Materials: Handout 6.1, markers, flipchart paper
Prep: Select topics relevant to agriculture and soil science, these will be used when student are designing a real lesson.

Background: The instructor will guide participants through group discussions and exercises on how to teach skills and concepts. This lesson will conclude with participants using what they learn to design and teach their own lesson. The five basic steps for teaching skills were taken from (Merrill 2007, Guion, Broadwater, Caldwell, Chattaraj, Goddard, Lytle, 2003)

Teaching and Creating a Learning Experience

Read aloud:
Teaching is not “telling”, but rather an invitation to students to journey through the learning process to a place of knowledge and understanding. The key to effective teaching is “getting into the shoes” of learners so that you can better understand where they are and what they need from you.

Divide participants into groups that are no larger than 4 people. If possible these groups should be the teams that will be working together in the community. Every member of the group should record their answers on their copy of handout 6.1, but only one reporter should answer for the group.
Give the participants 5-7 minutes to answer the first question on their handout.

Question 1. What specific attributes of your target community will shape your teaching approach and how? Be specific and provide examples

Give each group a few minutes to share their answers
Read aloud:

Another important aspect of teaching is experience. A learning experience is an event that provides students with the opportunity to absorb and exercise the insights and or skills you have taught them. This will lead to a greater understanding on the part of the student as well as an internalization of the newly learned concept.

Give 5-7 minutes for the groups to discuss the second question.

**Question 2.** How will you incorporate “learning experience” into each of your lessons? As a group decide on a concept or lesson that you will teach and then think of an example of a “learning experience” that will provide the opportunity to demonstrate or use the new knowledge.

At the end of this 5-7 minute discussion participants will not report back to the group. They will be using their answers to **Question 2** later on in the lesson.

**How to Teach a Skill**

Read aloud while writing on a flipchart or whiteboard:

A skill is different from a concept. A **skill** is the learned power of doing something competently, while a **concept** is an abstract or generic idea generalized from particular instances. You will likely use both in your community-based teaching.

The 5 Basic Steps of Teaching a Skill are as follows:

- **Preparation** - includes designing and practicing your lesson plan. Explanation more than just reading a definition or “telling” your audience facts. Demonstration - showing your students how to “do” or “use” the skill. Practice - encourage your students to practice their new skills now during the lesson you are teaching. Application - practicing the skill they have just learned beyond the classroom.
When asking the following questions pick one person in the group to answer. When the first participant is finished answering their question they should read the next question aloud (questions are on their handout) and select the next participant who will answer. Because these questions require some thought, provide the students with time to reflect on the questions in pairs before sharing with the class.

Select student pairs to their questions and answers aloud.

- How do you prepare to teach a skill and why do you think adequate preparation is necessary?

- What steps will you take to make sure you “explain” skills to your students instead of just “telling” them facts?

- What would be a good demonstration for teaching a soil science skill?

- How do you structure a lesson in way that promotes “practice” of the skill you are trying to teach?

- Give an example of how your students can apply a new soil science skill in their life outside of the classroom.

How to Teach a Concept

Read aloud:

As a teacher you want to provide a clear statement of the concept and also have a practical and memorable story to help illustrate the concept. Now you want class members to translate the lesson to their own lives. After you share the concept and provide an example, invite your class to think of their own way to express the concept, i.e. repeat it in their own words or provide their own example to illustrate the principle.

Instructors reads aloud from PowerPoint, handout or flipchart:

These are the 4 key elements of teaching a concept:

- A clear statement of the concept by the teacher –
  - concept=rule or idea, it is simply some statement of truth
An engaging real-life example to illustrate the idea:
  - stories are not only interesting; they can help us figure out how to apply the concept to our own lives
  - Class members’ own expressions of the concept—
    - when participants put the concept in their own words, they are more likely to understand and remember the principle.
  - Class members’ own stories
    - helps translate the principle into their own culture and experience

Time Management

Read aloud:
It is critical for teachers to manage their time as when they are delivering a lesson. Be sure to have lesson plan that includes how long you will spend on each component. The bulk of your lesson should involve demonstration and practice. When teaching youth, keep lecture to a minimum and explain concepts and skills as you demonstrate them. Now It’s Your Turn! Participants should work in their groups to design and teach a lesson. You will assign each group a topic. They will then have 30 minutes to design a lesson and create/gather the simple materials they will use, including only items available in the classroom that day. Each group will teach the class their lesson just as they would teach it to their assigned community.

Determine ahead of time how long you want the lessons to be. The amount of time that you devote to this exercise will vary depending on the number of participants in your class.

Student interviews have shown that prior to working in the community, students want more class time to “practice” designing and teaching lessons with their peers.
Module 6 Handout 6.1

Teaching and the Learning Experience

**Question 1.** What specific attributes of your community will shape your teaching approach, and how? Be specific and provide examples.

**Question 2.** How will you incorporate “learning experience” into each of your lessons? As a group decide on a concept or lesson that you will teach and create the learning experience that you will use in this lesson.

How to Teach a Skill
The 5 Basic Steps of Teaching
- Preparation
- Explanation
- Demonstration
- Practice
- Application

How to Teach a Concept
The 4 Key elements of teaching a concept are the following:
- A Clear statement of the concept by the teacher
- An engaging real-life example to illustrate the idea
- Class member’s own expressions of the concept
- Class members’ own stories

Questions

*How do you prepare to teach a lesson and why do you think adequate preparation is necessary?*

*What steps will you take to make sure you “explain” concepts to your students instead of just “telling” them facts?*

*What would be a good demonstration for teaching a soil science concept?*
How do you structure a lesson in a way that promotes “practice” of the skill you are trying to teach?

Give an example of how your students can apply a new soil science concept in their life outside of the classroom.
Module 7
Title: Challenging Classroom Behaviors
Goal: To familiarize students with eight common behavioral problems
Time: 20-45 minutes
Materials: Handout 7.1

Background: The instructor will guide participants through a role-playing exercise and participants will practice handling challenging classroom behaviors.

Role-Playing
Divide participants into two groups, one group will start out role playing students, the other will begin role playing as teachers and later they will switch. The student group will take turns acting out various challenging classroom behaviors while the teachers model strategies for managing the behaviors. The teacher group will select one of their members to be the first teacher. This teacher will be asked to role-play teaching a simple concept or skill.

Assign teaching topic(s) to the teaching group. Allow the group a few minutes to plan how they will teach their topic. Common skills such as shoe tying, frying an egg, or concepts such as more vs. less, old vs. young and hot vs. cold are least threatening and allow the teacher to focus on the behavior management aspect of the exercise.

Members of the other group will be the students. Unbeknownst to the teacher group, the students decide on a challenging behavior to model. During the role playing session, the student group acts out a challenging behavior from Handout 7.1 “Challenging Classroom Behaviors”

The teacher will use one of the “Strategic Responses” to correct/handle the challenging behavior. After attempting to handle the behavior the class can chime in with comments and suggestions.
A new teacher in the teaching group is selected and the students select a different behavior to exhibit and the process is repeated. When each of the members of the teacher group has had a turn teaching, switch groups and repeat exercise so that everyone has the opportunity to role-play the teacher.

Discussion Questions
The instructor will pose the following questions to the participants as a way to conclude this exercise.
Read Aloud:

- What did you learn about the importance of classroom management through this exercise?

- What did you learn about your ability to effectively manage a classroom?

- How do you describe your behavioral management style?

- What was the most challenging part of this task?

- How could dealing with these challenging behaviors be different in your service-learning community setting?
**Module 7 Handout 7.1**  
**Source:** Caroline S. Clauss-Ehlers 2006  
“Eight Challenging Classroom Behaviors”

<table>
<thead>
<tr>
<th>Challenging Behavior</th>
<th>Strategic Response</th>
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| **Talking While You Are Teaching** | Don’t single out the students who are talking.  
Move towards them.  
Call on them to share their opinions about the lesson.  
If necessary, talk to them privately after class. |
| **Angry Behavior Directed Towards You** | Try not to react in front of the class.  
Acknowledge the comment and take it to a class level, asking if others feel the same way.  
Rephrase the comment and ask the class their opinion. For instance, “So you think the homework assignment is stupid, how do others feel about this?”  
Recognize there may be a larger issue going on for the student such as family problems or academic pressure.  
Talk to the student in a calm way after class to determine what is going on. |
| **Lack of Participation** | Be sensitive about not embarrassing the shy student as you try to encourage participation.  
Give the student a leadership role such as being responsible to report small group work to the larger class.  
Praise the student for comments made in class.  
Make all participants responsible for presenting at least one aspect of a group assignment. |
| **Dominating Class Time With Extensive Participation** | Acknowledge the student’s comment and quickly move away from it. One possible response is: “That’s an interesting idea, what do others think?”  
Set limits and move on when needed. One possible response is: “I hear your comment, now we need to move on.”  
Elicit participation from other students. One possible response is: “I’d like to hear from those of you who haven’t shared your opinions yet today.”  
If necessary, talk with the student privately to set limits and determine what is going on. |
<table>
<thead>
<tr>
<th>Behavior</th>
<th>Recommendation</th>
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<tr>
<td>Inattentiveness</td>
<td>Break down assignments into smaller tasks.</td>
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<td>Have the student complete a daily progress report that spells out her accomplishments.</td>
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<td>Have the student sit at the front of the room to avoid additional distractions that can arise without your proximity.</td>
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<td>Refer the student for evaluation if you expect an attention problem.</td>
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<td></td>
<td>Do not lose your patience.</td>
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<td></td>
<td>Do not publicly embarrass the student.</td>
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<tr>
<td>Complaining in Class</td>
<td>Do not get defensive.</td>
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<td></td>
<td>Hear the student’s point.</td>
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<td>If appropriate, show your understanding about the difficulty presented.</td>
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<td>Depending upon the complaint at hand, ask others if they feel the same way or move on to your lesson plan.</td>
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<td>Tell the student you can talk with him privately. One possible response is: “I hear what you’re saying. We need to continue with the lesson plan so let’s talk during the break.”</td>
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<td>Not taking Responsibility for Classwork</td>
<td>Keep to your agenda and set appropriate limits.</td>
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<td></td>
<td>Set clear expectations.</td>
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<td></td>
<td>Explain the importance of class participation and attendance and create incentives.</td>
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<tr>
<td>Challenging You in Class</td>
<td>Do not get defensive in front of the class.</td>
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<td>Recognize that it is fine not to know everything. If you do not have the answer to a question, one possible response is, “That’s an interesting question, how would others respond to that?” or “I’m not certain about the answer to that question but I will look it up and get back to you.</td>
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<td>Do not acknowledge the behavior and move on.</td>
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<td>If you feel physically challenged or that your safety or the safety of any of your students is at risk contact one of the staff of the hosting organization and your professor.</td>
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References


Gorski, Paul, [http://www.edchange.org/who.html](http://www.edchange.org/who.html)


http://www.census.gov/population/www/pop-profile/natproj.html