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Contents

Companion Animal Nutrition Student Group Projects Lead to Development of Professional Skills

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Abstract

Applying nutrition concepts and the scientific method in a practical way can increase student learning. Group projects are a way for students to collaborate with each other on assigned projects that are more complex and challenging. University of Nebraska-Lincoln students enrolled in a Companion Animal Nutrition course were required to complete a group project designing and conducting their own research project. Upon completion of the project, students were required to complete an exit survey ranking items on a 1 (strongly disagree) to 5 (strongly agree) Likert-type scale. Students (n = 66) indicated that they had a better appreciation for nutrition research after they completed the project (mean = 3.97). Students expressed that the nutrition assignments allowed them to apply what they had learned in class to the projects they were conducting (mean = 4.09). However, groups had mixed opinions when they were asked if members from their group equally contributed to the completion of the project (mean = 3.56, SD = 1.44). Groups indicated that the completion of the projects improved their communication skills (mean = 3.20) and critical thinking skills (mean = 3.68). The group projects allowed learning activities that built upon the core objectives of the class.

Key Words: companion animal, nutrition, education, collaboration

Introduction

Group projects allow students to develop skills that they will use every day in the professional world (Mannix and Neale, 2005). By developing professional skills in the classroom, students are better prepared for the careers they are acquiring after graduation. Students can learn to break up complex tasks, manage time and develop stronger communication skills while working on group projects. These projects also allow students the opportunity to develop collaborative efforts that help students work as a unit or become team players. Collaboration skills are developed by students allowing them to tackle more complex problems than they could complete on their own, to view other group member's perspectives and to pool everyone's knowledge to make educated decisions. This allows students to become more comfortable when working with peers on projects that may be assigned to them in the future. Group projects also give students a sense of community or connectedness when taking classes online or in person (Ouzts, 2006; Rovai, 2002; Williams et al., 2012).

More complex and challenging projects can be assigned to groups than if the project was going to be completed by an individual (Carnegie Mellon, 2014). This challenges students to become critical thinkers as more than one way may be the correct way to complete the project. Students must interact and use other students within their group as a resource to complete the project. Group projects also allow professors to assign projects that encompass a majority of the learning objectives of the course. This not only allows students to apply what they have learned throughout the semester, but can be used as an indicator of student understanding.

Students may find animal nutrition concepts challenging. The goal of this project was to ask students to apply class concepts to design and conduct a small scale nutrition research project. An evaluation was done to determine if the project resulted in students applying class concepts, learning research methodology and life skills such as working as a team and communication skills.

Materials and Methods

Course Enrollment

Companion animal nutrition is an upper level course offered to undergraduate students with a prerequisite of a general animal nutrition course. The course is offered in an on campus traditional lecture format and via distance. Course enrollment was 53 for the in person section and 35 for the distance sections over the two semesters data was collected (Spring 2012 and 2013). Students enrolled in the course were primarily

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juniors and seniors. They include mostly Animal Science majors, but were also Fisheries and Wildlife, Veterinary Medicine and Biomedical Sciences, Food Science and Applied Science majors.

While enrolled, students were required to participate in a group project to design and conduct a companion animal nutrition research study. The objectives of this project were to demonstrate the steps required to conduct a nutrition experiment, identify scientific resources and define a problem or issue to be evaluated related to companion animal nutrition. After identifying the issue, they developed a plan to answer the question that they proposed. Students first turned in an initial proposal for review by the instructor before moving forward with the project. Students were required to turn in several progress reports along the way to track progress throughout the semester. Final papers were expected to be in journal article format with a title page, abstract, introduction, material and methods, results and discussion, literature cited and tables.

A group mentor was identified for each group. Mentors were identified by either the group or the instructor and included graduate students, pet food industry professionals and zoo keepers. The mentor's role was to help the group determine the best plan to answer their hypothesis and conduct their experiment. The mentor also provided additional group support such as access to animals during the duration of the project. The research project was conducted throughout the semester the students were enrolled in the class. Numerical data was collected through each project. Students were required to compare their results to published literature and to draw conclusions on the validity of their hypothesis considering their finished product. Projects were graded and students completed a survey based on the project, group members and project results.

Table 1. Effects of student participation in a group project while enrolled in companion animal nutrition.

Item	Mean	SD
I found the mentor to be helpful.	3.64	1.19
I liked having multiple checkpoints throughout the assignment.	4.32	0.99
I felt that the expectations of this assignment were clearly explained.	3.98	1.10
I applied the concepts we learned in class when completing this assignment.	4.09	0.92
The members in my group equally contributed to the completion of this project.	3.56	1.44
Having a day to meet with the instructor was helpful in completing my project.	3.92	1.18
This project was a worthwhile experience.	3.55	1.20
How many times did you meet as a group outside the class?	2.86	1.07
Approximately how much time did this project take outside of class time?	2.58	0.93

Ranked on a scale of 1-5: 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree

Table 2. Impact of group project the development of student's profession skills and future decisions.

Item	Mean	SD
I had to improve my communication skills to complete this project.	3.20	1.13
Completing the project improved my critical thinking skills.	3.68	1.11
I better understand how to support my ideas with research.	3.76	1.04
I have a better understanding of the application of the scientific method.	3.57	1.17
After completing this project, I have a better appreciation for nutrition research.	3.97	1.12
I can see how completing this project relates to my future career choices.	3.55	1.17
Completion of this project will be beneficial to my future career.	3.33	1.19
Completing this course/project changed my perception of research in the pet food industry.	3.46	1.15
I am considering graduate school after completion of this course.	2.53	1.43
I am more interested in a career with research after completing this course.	2.38	1.20

Ranked on a scale of 1-5: 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree

Project Evaluation

An evaluation tool was developed to be completed by undergraduate students at the end of the semester. The survey asked demographic information. It included semester in which students were enrolled in the class, year in school and if they were completing the class online or in-person. In addition, students were asked to respond based on the five point Likert-type scale (5 = strongly agree, 4 = agree, 3 = neither agree nor disagree, 2 = disagree, 1 = strongly disagree) to a series of questions (Table 1 and Table 2). Survey questions were designed to obtain feedback from students on how the group project was completed and how each student interacted with other members of the group, mentors and instructors to complete the project. The procedures of the survey were reviewed and approved by the University of Nebraska-Lincoln's Institutional Review Board (IBR).

Statistical Analysis

The data were analyzed using the mixed models procedure of SAS (Cary, NC). The survey was analyzed using class (in-class vs. online) as the variable. There were no differences found in student responses regarding if they took the class online or in-person, so the data for all students were combined.

Results and Discussion

There were 40 students enrolled in the course in 2012 and 30 of the 40 students (75%) returned the survey. In 2013, 47 students were enrolled in the course and 36 students (77%) returned the survey. Majors of students completing the survey were Animal Science (61%), Fisheries and Wildlife (27%), Veterinary Science and Biomedical Sciences (7.5%), Food Science (3%) and Applied Sciences (1.5%) majors. The types of projects conducted included surveys on pet food buying trends and consumer knowledge of pet foods, palatability and preference studies in dogs, cats and zoo animals.

Students indicated they found their mentor helped (mean = 3.64, SD = 1.19) with projects (Table 1). However, there was wide variation in student responses. Students were only required to meet with their mentor once during the semester. Some students indicated having difficulties contacting their mentor or setting up times that would work for both the mentor and group members to meet. After the first year, students were given additional advice on how best to communicate with their mentor. Students suggested that they

should have met with their mentor more times so they would have gotten more professional guidance on the assignment. However some groups met more frequently and developed their project more with their mentor throughout the conduct of the experiment than students who only met with their mentor a few times.

Throughout the semester, there were multiple checkpoints in which students had to turn in part of their project. Students agreed (mean = 4.32, SD = 0.99) that they liked having several checkpoints throughout the semester. They stated the checkpoints allowed them to stay on track with the group project, not fall behind and make progress throughout the semester. The checkpoints also allowed for students to get feedback on their project to improve their final submission. When asked if they felt that expectations of this assignment were clearly explained, student agreed (mean = 3.98, SD = 1.10). Students were provided a handout with the layout of each section of the paper and example citations. However, some students commented that they would have preferred there be clearer announcements about the checkpoints.

Research projects allowed students to apply what they learned in class to their nutrition project (mean = 4.09, SD = 0.92). Students commented that reading research articles that covered material discussed in class allowed them to validate lecture topics. The research project allowed students to see where information comes from.

Groups had mixed opinions (mean = 3.56, SD = 1.44) when asked if members from their group equally contributed to the project completion. Students stated it was hard to find time to meet with group members if their group was comprised of online and in-class group members. Groups composed of students enrolled in both online and in-class, said it was hard to develop working relationships with group members when not seeing them in class. Some students reported difficulty communicating with group members. Hiltz and Wellman (1997) also saw similar results when comparing virtual classrooms to traditional classrooms. They stated students were able to make friendships with students taking the class via a virtual classroom, but it was harder to establish a working relationship between students.

The instructor scheduled dates to meet with groups prior to the start of the group projects and again halfway through the semester. The instructor provided feedback on project ideas, best practices for completing the project and tips for developing the final paper. Students agreed (mean = 3.92; SD = 1.18) that meeting with the instructor was helpful in completing the project. Students felt the meeting helped them stay on task with the project. Instructors who express the value of a group project, provide insight to the group and try to limit negative aspects of group projects may positively affect students' attitudes toward group work (Chapman and Van Auken, 2001).

Students indicated the group project improved their communication skills (mean = 3.20, SD = 1.13) and critical thinking skills (mean = 3.68, SD = 1.11; Table 2). However, students commented it was hard to find time to meet or contact students not in the same section of class. This lack of communication made it difficult at times to complete the tasks with all group members present; however, it required students to assess the situation and develop a plan to make sure all group members were involved and actively participating in the project. Coers et al. (2010) indicated group communication was the foundation of a successful group. By improving group communication, students will be able to better prepare themselves for employers.

Students identified they had a better understanding of how to support their ideas with research after completion of the project (mean = 3.76, SD = 1.04). Several students commented that they liked how selection of the topic for the experiment they were going to conduct was offered. Students enjoyed the hands on research and opportunity to see how their results correlated with similar studies that were similar. Students indicated they had a better understanding of the application of the scientific method following their project (mean = 3.57, SD = 1.17). Students reported that they enjoyed completing the research while trying to support their hypothesis. This allowed students to develop a better understanding of the application of the scientific method.

Felder and Brent (1996) indicated when using cooperative (team based) learning properly in college settings enhances motivation to learn, retention of knowledge, depth of understanding and appreciation of the subject being taught. Students agreed (mean = 3.97, SD = 1.12) they had a better appreciation for nutrition research after they completed this project. It allowed them to learn about how important nutrition is to an animals and why research needs to be done in order to ensure that products developed are healthy and beneficial to our pets. Students also indicated the research project was a way to get them accustomed to research by having them come up with their own research experiment, conduct the experiment and have them write up their findings to present to their peers.

Summary

The project allowed students to see what type of research goes on in the pet industry. Being Animal Science majors, many of the students' careers could involve research within the industry. These projects gave students hands on experience of the research conducted in the pet industry. Students agreed (mean = 3.55, SD = 1.17) that the project related to their future career and stated that it was beneficial to their future (mean = 3.33, SD = 1.19). After completion of the course, a student interviewing for veterinary school indicated explaining her project was well received by the interview committee. Other students have discussed this experience in interviews as well.

Overall, students commented the project was a worthwhile experience. Several students stated they

liked the opportunity to pick the animals that they were able to do the research trial on and that this type of project helped them build upon the foundation that was developed in lecture. By being able to conduct the experiment, they were able to learn about the scientific method and develop skills to properly conduct a research trial.

Conclusions

Group projects are a great way for professors to develop learning activities that build upon the core objectives of a class. The nutrition projects allowed students to develop skills that they will continue to use throughout college and their career. These skills allow students to become more confident in themselves and in completing complex tasks within a group setting. By learning how to collaborate with each other, students were able to collaborate with each other and meet deadlines. These skills will not only be needed during their careers, but in their everyday lives. Group projects allowed students to not only grow themselves as individuals, but also as members of a group.

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Perspectives of Writing Related to Critical Thinking and Knowledge Creation

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Abstract

The purpose of this study was to use Q methodology to understand the subjective views of faculty, students and administrators about the perspectives of writing related to critical thinking and knowledge creation in the social sciences of agriculture. Writing as content development guided by feedback and the knowledge of society, writing as an application and a development of thought and writing as an advanced skill guided by complex reasoning emerged as perspectives of writing and the writing factors that augment critical thinking and create knowledge in the social sciences of agriculture. Writing is complex, but learning how to write and teaching someone how to write is even more complex. Using the three perspectives of writing to guide classroom instruction will help instructors teach students how to write and help students learn how to write. The statements that defined each perspective could be used as guides in developing writing assignments and assessments, initiating course discussion, establishing guidelines for peer review and developing supplemental course curriculum. The three perspectives of writing, backed by the statements that support them, provide faculty with a starting point for teaching writing because unprepared faculty produce unprepared college graduates.

Introduction

The writing demands of industry, the call to sort through mass amounts of relevant and irrelevant information and the need to broadly disseminate information have caused a shift in the definition of an effective and efficient writer (Hawisher et al., 2004). Reynolds (2010) claimed that writing is "central to educational and professional success in our globalized society" (p. 3). In a study conducted by Crawford et al., (2011), communication skills, including effective written communication, were ranked as an important soft skill cluster for college graduates to possess. Students can increase their job prospects by developing strong writing skills in their disciplines and gaining an understanding of communicating within their disciplines' (National Commission on Writing, 2004).

Students become more effective writers through "*deepening engagement and commitments, in lively association with other students and teachers, in fields of study they want to write about*" (Gottschalk and Hjortshoj, 2004, p. v). Runciman (1998) explained that separating writing instruction from content development is counterproductive. "*Writing in a relevant context promotes discovery of linkages among existing ideas, the reshaping and reorganization of old ideas and the creation of new ones*" (Ryan and Campa, 2000, p. 175). Writing-intensive courses offer students the opportunity to not only improve their writing skills but also their understanding of how knowledge is organized and created in their specific discipline (Strachan, 2008).

Writing instruction should no longer be taught as the different types of writing modes but as a "*complex cognitive activity, which involves solving problems and deploying strategies to achieve communicative goals*" (Deane et al., 2008, p.1). Davies and Birbili (2000) claimed people need two types of knowledge to transfer and adapt basic literacy skills, like writing, to different contexts: "*metacognitive knowledge about the best ways of solving the problems of writing [and] conceptual knowledge about the nature of writing*" (p. 441). Formal education should set the foundation for students to gain the two types of knowledge and the workplace should help employees cultivate and develop the two types of knowledge (Davies and Birbili, 2000). Short writing assignments with multiple revision points give students more opportunities to solve problems than one large assignment at the end of the semester does (George,

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1986; Grimes, 1986; Orr, 1996). The final assignment should be a culmination of shorter assignments completed throughout the semester (Grimes, 1986).

Ryan and Campa (2000) defined effective writing as the ability to make an argument, think critically, identify an audience and utilize revision and feedback. Effective writing comes from practice (Orr, 1996; Schneider and Andre, 2005). Writing is a learned behavior (Emig, 1977) developed through practice and revision opportunities (Cobia, 1986; Orr, 1996; Schneider and Andre, 2005) and guided by multiple drafts, assessments, reviews and edits (Epstein, 1999; White, 1991). "*No single course… can transform undergraduates into skillful writers. … Real proficiency … requires sustained practice*" (Bok, 2006, p. 87). To encourage students to become effective writers, writing assignments should be centered on gathering and reporting fact-based content, conducting research and drawing inferences based on the evidence provided (Schneider and Andre, 2005; Zhu, 2004). Writing is more effective when students understand the reason for the assignment, relate it back to a job-specific context and write for a specific, realistic audience (Motavalli et al., 2003).

Students in science fields should be prepared to write for two types of audiences (professional and layman; Orr, 1996) and have an understanding of how to write technical reports, research journal articles, fact sheets, project proposals and Web text for a variety of audiences (Motavalli et al., 2003; Schneider and Andre, 2005). Emphasizing grammar, spelling and punctuation over writing process is a misrepresentation of writing, thereby, limiting critical thinking and human development that occurs during key stages of the writing process (Foster, 1983). Additionally, collaborative writing assignments (Schneider and Andre, 2005) and peer review (Lopez et al., 2006; Ryan and Campa, 2000) opportunities should be implemented into writing instruction. Collaborative writing assignments help graduates develop skills needed for working as a member of a team with multiple writers and readers (Schneider and Andre, 2005). Whereas, peer review helps students improve the final product by soliciting feedback from and providing feedback to their peers (Lopez et al., 2006; Ryan and Campa, 2000).

Although the need for written communication skills has been documented throughout the literature, stakeholders (Crawford et al., 2011) have differing views of effective written communication. Therefore, the purpose of this study was to use Q methodology to understand the subjective views of faculty, students and administrators about the perspectives of writing related to critical thinking and knowledge creation in the social sciences of agriculture. Two research questions guided this study:

- What three views of writing represent the identified perspectives of faculty, students and administrators? and
- What diverse perspectives are held by the faculty, students and administrators in higher education regarding the writing factors that augment critical thinking and create knowledge in the social sciences of agriculture?

Method

The method described in this study was part of the reporting for a larger dissertation research project, A model to augment critical thinking and create knowledge through writing in the social sciences of agriculture (Leggette, 2013).

Q methodology was chosen as the research method to develop an understanding of individual points of view (Tuler et al., 2005) that represent the identified perspectives of faculty, students and administrators about writing and the writing factors that augment critical thinking and create knowledge in the social sciences of agriculture. William Stephenson developed Q methodology in 1935 to systematically study human subjectivity as it relates to communication, psychology, political science, health and environmental sciences (Brown, 1993).

Q methodology provides researchers a way to systematically analyze "*the phenomenological world of the individual (or small numbers of individuals) without sacrificing the power of statistical analysis*" (Stephen, 1985, p. 193). It is the correlation of people and not tests (Stephenson, 1935). It adds to and increases the power of qualitative data (Shemmings, 2006; Watts and Stenner, 2005) but is similar to traditional correlation research methods because it uses factor analysis techniques (Shemmings, 2006; Stephenson, 1935; Watts and Stenner, 2005). "*The method employs a by-person factor analysis in order to identify groups of participants who make sense of (who hence Q 'sort') a pool of items in comparable ways*" (Watts and Stenner, 2005, p. 68).

Participants

Members of the P set (research participants) should be selected based on the different perspectives or viewpoints they represent (Tuler et al., 2005). "*By inquiring of people with unique points of view, Q researchers can reveal patterns in how elements of perspectives are related*" (Tuler et al., 2005, p. 250). Because the factor matrix is rotated during the statistical analysis of a Q sort, the number of statements is more important than the number of participants. Unlike typical factor analysis, Q methodology is not dependent on sampling adequacy because the number in the P set can still be low and yield the same results (McKeown and Thomas, 1988).

The P set for this study included 10 individuals, four females and six males, who have or have not had a direct involvement in the writing intensive course program at Texas A&M University. All 10 participants represented the College of Agriculture and Life Sciences. The study included four students, three faculty members and three former or current administrators. P set members were purposefully chosen (Wiersma and Jurs, 2005) based on the needs of this study, their past or current

experience with the writing-intensive course program and their unique perspectives on the writing factors that augment critical thinking and create knowledge. Each participant received a unique identifying number (e.g., S01 = first student to participate in the Q sort; F01 = first faculty member to participate in the Q sort; A01 = first administrator to participate in the Q sort).

The four students included in the P set were identified using a purposive sample and were recruited using email and face-to-face methods. The student participants completed at least one writing-intensive course, graduated between May 2013 and May 2014 and were enrolled in one of three departments—agricultural economics; agricultural leadership, education and communications; and recreation, parks and tourism sciences. Students enrolled in agricultural communications and journalism were eliminated from the population because writing is the core component of their program.

The three faculty members included in the P set were purposefully chosen based on the following criteria: taught one or more writing-intensive courses since 2009, was a faculty member or graduate student in one of the three departments and was not a faculty member in agricultural communications and journalism. Because the search criteria yielded more than three participants, a simple random sample of the sub sample was selected to narrow the participant number. Of the four who replied to my email saying they would participate, three followed through and set up interview times to conduct the Q sort.

The administrators included in the P set of the study were purposively chosen because of their current or former administrative positions in the College of Agriculture and Life Sciences and their role in the planning, development, implementation, management and evaluation stages of the writing-intensive course program. Five administrators were identified and sent an email. Three agreed to participate.

Instrument Development

The concourse (Stephen, 1985), which represents the possible perceptions, opinions, or beliefs (Brown, 1993) about a topic, contains the raw data of the study. The statements used in the Q sort were mined from and modified based on the raw statements of perspectives, opinions and beliefs. The concourse was assembled using theoretical and naturalistic methods—a review and evaluation of writing theories and conceptual models as well as eight interviews and three focus groups with stakeholders in the College of Agriculture and Life Sciences at Texas A&M University.

The theories and conceptual models illustrated were models of the writing process (Hayes and Flower, 1980); cognitive process theory of writing (Flower and Hayes, 1981); writing development model (Bereiter and Scardamalia, 1987); social cognitive theory of writing (Flower, 1994); new model of the writing process, revision of Hayes and Flower's 1980 model (Hayes, 1996); model of working memory in writing (Kellogg, 1996); sociocultural theory of writing; conceptual model of writing expertise (Beaufort, 1999); and writing proficiency as a complex integrated skill model (Deane et al., 2008). Interview data were collected from eight faculty members and 15 students who were not participating in the Q sort but represented one of the three departments. Each person included in the interviews was asked to describe writing, the teaching of writing in the social sciences of agriculture and the writing factors that augment critical thinking and create knowledge.

The data collected from the review and evaluation of writing theories and conceptual models were combined with the interview data to establish the theoretical structure of writing in the social sciences of agriculture. The three groupings that emerged from the review and evaluation and the interview data were: writing process, writing instruction and the writing factors that augment critical thinking and create knowledge in the social sciences of agriculture. The statements were organized by five homogenous groups: writing process, critical thinking, context, mechanics and resources. Within each

Table 1. Q set Statements

No.	Statement
1	Help from the instructor should be available and students should take advantage of it.
2	Writing elicits emotions.
3	Strong writers should tailor what is written to their audience.
4	Strong writers should know when to write a lot and when to condense information.
5	Rubrics benefit student writers.
6	Writing is subjective and a more trial by fire approach.
7	Grammar is critically important.
8	Content is critically important.
9	Research increases challenge in a writing intensive course.
10	Students should be given real-world assignments in their disciplines because they will have the necessary topic knowledge.
11	Writing is a chore.
12	Writing should be concrete and applied.
13	Writing augments critical thinking.
14	Many short related written assignments that require data gathering and analysis improve critical thinking skills.
15	Writing intensive courses should be 200-level courses.
16	Writing intensive courses should be 400-level courses.
17	Examples of well-written work help students become better writers.
18	Well-written examples discourage student critical thinking and creativity.
19	Writing should be reflective.
20	Peer review activities promote writing and critical thinking skills.
21	Using writing to apply relevant information to evaluate a problem promotes critical thinking.
22	Writing is a product of critical thinking.
23	Critical thinking is a product of writing.
24	Good research leads to well-thought-out, well-articulated prose.
25	Writing labs support student writing efforts.
26	Lots of writing practice is what students need throughout the four years of their college education.
27	Societal knowledge is a key component of the writing process.
28	Taking a position and making an argument is critical thinking.
29	Writing is the development of clear thoughts and the window to the brain.
30	Timely instructor feedback is critical.
31	Writing is about understanding how things fit together.
32	Writing is important, but writing intensive courses are not.
33	Reading is critical to writing success.
34	Writing is a process.
35	Writing is a stream of consciousness.
36	Writing instructors are coaches and facilitators.
37	Writing instructors are critics and proofreaders.

element, heterogeneity was sought so that all beliefs and opinions about the specific category were included.

A total of 58 statements were collected from the literature, interviews and writing theories and models. One teacher and researcher of writing and two agricultural communications and journalism faculty members who did not participate in the study reviewed the 58 statements for representation of theoretical and conceptual constructs, redundant statements and full range of perspectives and viewpoints represented in the constructs. Thirty-seven statements were retained for the sort (Table 1).

Additionally, a forced-choice, Q sort distribution (Stephen, 1985; Tuler et al., 2005) form board (Figure 1) was used to assist the P set with sorting the 37 statements. The Q sort form board had nine columns and the placement of statements was 2, 3, 4, 6, 7, 6, 4, 3 and 2. Therefore, two statements were placed in the first column, three in the second column and so on. The array positions for the columns had the values of –4, –3, –2, –1, 0, +1, +2, +3 and +4 for statistical analysis. The number of statements that were placed in each column, the statistical value of each column and the sorting position of each column are displayed in Table 2.

Procedure

Each student in the P set completed a demographics questionnaire before he or she started the Q sort. Demographics data were not collected from the faculty and administrators because it could be obtained using the Texas A&M University website. Each participant completed the Q sort individually and sorted the statements based on one condition of instruction: "What writing factors do you believe augment critical thinking and create knowledge in the social sciences in the College of Agriculture and Life Sciences?" As recommended by McKeown and Thomas (1988) and Tuler et al. (2005), the participants were asked to read through the cards and become familiar with the statements and to sort the cards into three piles: (1) statements they agreed with on the right, (2) statements they disagreed with on the left and (3) statements they neither agreed nor disagreed with but felt neutral about in the middle.

After the participants sorted the cards into piles, they distributed the cards on the form board (Baker and Montgomery, 2012; Tuler et al., 2005). The participants identified the most important statements and placed them on the extreme right (+4), identified the least important statements and placed them on the extreme left (-4; Baker and Montgomery, 2012; Tuler et al., 2005; Watts and Stenner, 2005) and identified the neutral statements that they neither agreed or disagreed with and placed them in the middle (Webler et al., 2009). The participants continued the process moving back and forth from the right to the left until the distribution was completed with the middle being the last part of the distribution to complete.

Once the participants completed the form board, the responses were recorded on a response sheet for data analysis. The data collector sat with each participant while he or she sorted the statements to take notes during the sorting activity, to encourage the participant to talk about his or her experience and ideas and to observe the participant sorting the Q sample (Baker and Montgomery, 2012; Watts and Stenner, 2005).

Data analyses, using PQmethod 2.32, involved three statistical procedures: a correlation matrix of Q sorts, factor analysis of the correlation of Q sorts and the calculation of factor and difference scores (McKeown and Thomas, 1988; Shemmings, 2006). Unlike R methodologies, such as survey research, participants in the Q methodology classify themselves when expressing their viewpoints, which results in the factors rather than items or statements (Brown, 1980). The interpretation of the factors was derived from the theoretical array of statements using the comparison of consensus and distinguishing items among the factors, interview data, demographic information, previous literature and experience teaching and researching writing-intensive courses (Brown, 1980).

The most statistically common method for determining factor retention is analyzing each factor's eigenvalue, the "substantive importance of that factor" (Field, 2009, p. 639). McKeown and Thomas (1988) recommended that for an eigenvalue to be significant it should be greater than or equal to 1.00. Although eigenvalues are a preferred method of determining the statistical significant factors in a study, the statistical procedure can sometimes overlook theoretically important factors or determine significant factors that are without meaning (McKeown and Thomas, 1988). The initial analysis yielded eight factors—three of which were retained. Factors 1, 2 and 5 were retained and Factors 3, 4, 6, 7 and 8 were discarded. Although Factor 5 had an eigenvalue of 0.8662, it contained three significant loadings and a higher explanation of variance than Factors 3 and 4 did.

Because the Q sorting process is based on the respondent's internal frame of reference, the traditional valid-

Figure 1. Q sort form board

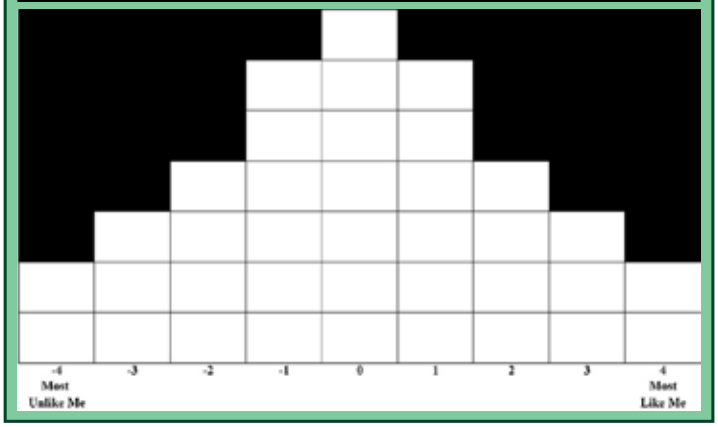


Table 2. Q sort range and distribution

Number of statements in each column	2	3	4	6	7	6	4	3	2
Statistical value of each column	–4	–3	–2	–1	0	1	2	3	4
Sorting position of each column	2	4	6	8	9	7	5	3	1

ity and reliability in R method research is nonessential in Q methodology (McKeown and Thomas, 1988). However, Brown (1980) stated test/retest is an acceptable method to measure reliability because it measures the consistency of the person with himself/herself. Brown (1980) and McKeown and Thomas (1988) said the test/retest reliability coefficient should remain stable and high at .80, which is built into the Q methodology data analysis software to calculate each factor's composite reliability (Krysher, 2010). Using replicability, the reliability coefficient for Q methodology (van Exel and de Graf, 2005), each factor was considered reliable (≥ 0.80; Thomas and Baas, 1992-1993; van Exel and de Graf, 2005): Factor 1 (0.89); Factor 2 (0.89); and Factor 3 (0.92). Because the "relationship between a variable (such as a preference or significance) and a stimulus (such as a Q statement)" (Brown, 1980, p. 174) is the focus of Q methodology, the need for validity does not exist. Q methodology is subjective and only represents the participant performing the Q sort (Brown, 1980; McKeown and Thomas, 1988).

Results

Three diverse perspectives emerged as factors from the analysis of faculty's, students' and administrators' perspectives on writing and the writing factors that augment critical thinking and create knowledge in the social sciences of agriculture. Writing theories and conceptual frameworks assisted in the interpretation of the three perspectives. The three perspectives were interpreted as writing as content development guided by feedback and the knowledge of society, writing as an application and a development of thought and writing as an advanced skill guided by complex reasoning. The findings for each perspective were reported by statement number (SN), statement position on the factor array (FA) and z score (z).

Writing as Content Development Guided by Feedback and the Knowledge of Society

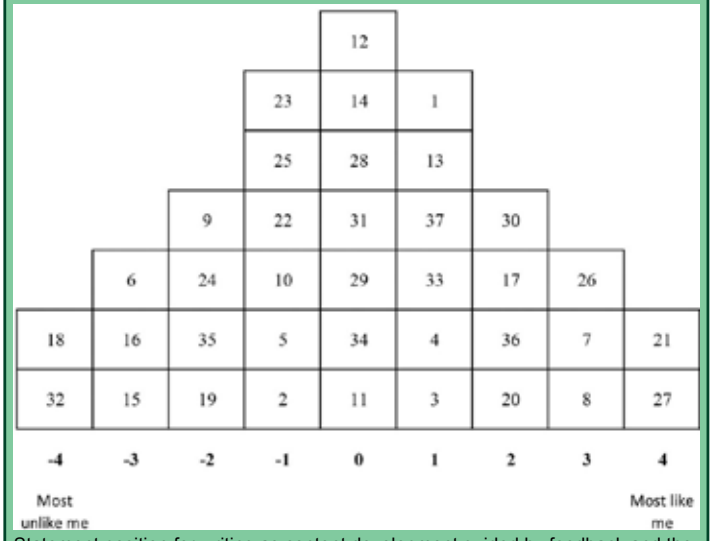
Of the 10 Q sorts, two explained the Writing as Content Development Guided by Feedback and the Knowledge of Society factor, which accounted for 17% of the variance in the analysis. This perspective had an emphasis on the statements that define writing as content development guided by feedback and the knowledge of society. Holistically, the statements represented different defining steps of writing process models (e.g., Hayes and Flower, 1980). Participants who loaded on Factor 1 believed that writing is developing content using examples and application of relevant information while receiving peer and instructor feedback and using proper grammar. The writing process should be guided by societal knowledge (Beaufort, 1999; Flower, 1994) and improved through writing practice. Unique to this factor is the inclusion of grammar in the "most like" statements. One administrator (A3) said writing-intensive courses should help students with proper grammar and mechanics of writing and provide them tips on how to avoid grammar and mechanics pitfalls.

Two of the administrators loaded on Factor 1. The primary beliefs of Writing as Content Development Guided by Feedback and the Knowledge of Society are the application of relevant information to a problem is critical thinking (SN = 21, FA = +4, z = 1.78) and applying this information requires knowledge about society (SN = 27, FA = +4, z = 1.62). Additionally, writing that is focused on students' development of content and grammar should be included in writing curriculum for all four years of students' college education (SN = 26, FA = +3, z = 1.58; SN = 7, FA = +3, z = 1.38; SN = 8, FA = +3, z = 1.26). The issue is not the level of the course—it is that students need practice writing (A2). A

Table 3. Writing as Content Development Guided by Feedback and the Knowledge of Society

No.	Statement	Array Position	z score
21	Using writing to apply relevant information to evaluate a problem promotes critical thinking	+4	1.78
27	Societal knowledge is a key component of the writing process	+4	1.62
26	Lots of writing practice is what students need throughout the four years of their college education	+3	1.58
7	Grammar is critically important	+3	1.38
8	Content is critically important	+3	1.26
30	Timely instructor feedback is critical	+2	1.22
17	Examples of well-written work help students become better writers	+2	1.10
36	Writing instructors are coaches and facilitators	+2	0.73
20	Peer review activities promote writing and critical thinking skills	+2	0.69
9	Research increases challenge in a writing-intensive course	-2	-0.89
24	Good research leads to well thought out, well-articulated prose	-2	-1.02
35	Writing is a stream of consciousness	-2	-1.09
19	Writing is reflective	-2	-1.22
6	Writing is subjective and a more trial by fire approach	-3	-1.26
16	Writing intensive courses should be 400-level courses	-3	-1.38
15	Writing intensive courses should be 200-level courses	-3	-1.58
18	Well-written examples discourage student critical thinking and creativity	-4	-1.78
32	Writing is important, but writing intensive courses are not	-4	-1.78

Figure 2.



Statement position for writing as content development guided by feedback and the knowledge of society. Most unlike statements are on the left of the factor array and the most like statements are on the right of the factor array.

Note. Numbers in array position represent the number of the statement from Table 1.

secondary belief of the Writing as Content Development Guided by Feedback and the Knowledge of Society perspective is that assistance and feedback are important writing factors. Overall, this perspective defined writing as a process that is guided by feedback and improved with practice.

Table 3 provides a tabular representation of the statements with an array position of +4 to +2 and -2 to -4, which are the top 18 statements for Factor 1. Figure 2 provides a factor array for Factor 1.

Writing as an Application and a Development of Thought

Of the 10 Q sorts, two explained the Writing as an Application and a Development of Thought factor, which accounted for 17% of the variance in the analysis. This perspective had an emphasis on the statements that defined writing as a technique to transform thought into information. Participants who loaded on Factor 2 believed that writing is using real-world scenarios to apply relevant information, solve problems, understand systems, develop clear thoughts and target specific audiences. Writing is a way for students to understand social sciences in agriculture and solve problems related to their professions. Real-world scenarios help students understand the reason behind the assignment and how it relates to projects they may be required to do in the workforce.

One student and one faculty member loaded on Factor 2. The primary beliefs of Writing as an Application and a Development of Thought are the application of relevant information to solve a problem is critical thinking (SN = 21, FA = +4, z = 1.76) and students should use writing as a way to solve problems throughout their college education (SN = 26, FA = +4, z = 1.71). One student (S3) stated that writing is a product of critical thinking. Writing is an analytical technique that writers should use to develop thought, understand systems and convey specific information (SN = 29, FA = +3, z = 1.71; SN = 31, FA = +3, z = 1.24; SN = 4, FA = +3, z = 1.19). One faculty member (F2) was intrigued by the concept of writing is the window to the brain and the mental picture portrayed by that phrase.

Secondary beliefs of this perspective are reading is an important part of writing success and using real-world scenarios and knowledge about society is important to understanding and writing to a specific audience. One student (S3) noted that societal knowledge is key because "the best writers are the smartest writers." Additionally, grammar is important but not because argument is more important (S3), which would provide some explanation of why grammar loaded as a -4. Overall, this perspective defined writing as a tool to apply and develop thought, which promotes critical thinking.

Table 4 provides a tabular representation of the statements with an array position of +4 to +2 and -2 to -4, which are the top 18 statements for Factor 2. Figure 3 provides a factor array for Factor 2.

Writing as an Advanced Skill Guided by Complex Reasoning

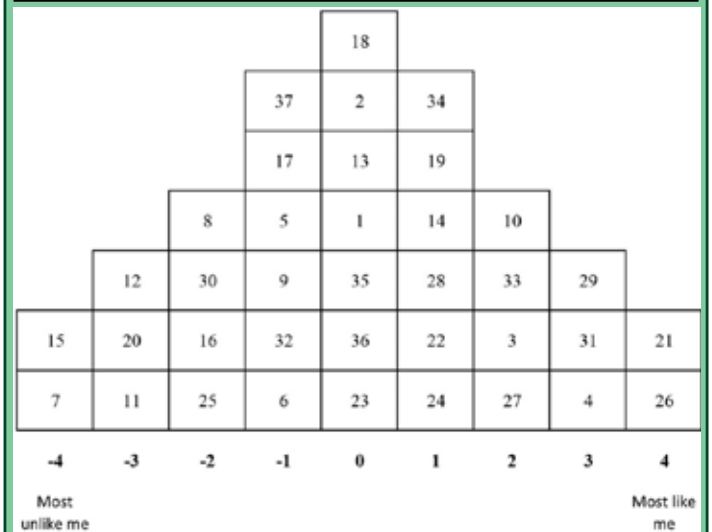
Of the 10 Q sorts, three explained the Writing as an Advanced Skill Guided by Complex Reasoning factor, which accounted for 17% of the variance in the analysis. This perspective had an emphasis on the statements that defined writing as an advanced skill guided by writers' consideration of their audience during research and content development. Participants who loaded on this factor believed that content should be developed through research and that writing, which should be taught in upper-level courses, is one way of

Table 4. Writing as an Application and a Development of Thought

No.	Statement	Array Position	z score
21	Using writing to apply relevant information to evaluate a problem promotes critical thinking	+4	1.76
26	Lots of writing practice is what students need throughout the four years of their college education.	+4	1.71
*29	Writing is the development of clear thoughts and the window to the brain.	+3	1.71
31	Writing is about understanding how things fit together.	+3	1.24
4	Strong writers should know when to write a lot and when to condense information.	+3	1.19
10	Students should be given real-world assignments in their disciplines because they will have the necessary topic knowledge.	+2	1.10
33	Reading is critical to writing success.	+2	0.91
3	Strong writers should tailor what is written to their audience.	+2	0.85
27	Societal knowledge is a key component of the writing process.	+2	0.80
8	Content is critically important.	-2	-0.66
30	Timely instructor feedback is critical.	-2	-0.66
16	Writing intensive courses should be 400-level courses.	-2	-0.85
25	Writing labs support student writing efforts.	-2	-1.38
12	Writing should be concrete and applied.	-3	-1.38
20	Peer review activities promote writing and critical thinking skills.	-3	-1.43
11	Writing is a chore.	-3	-1.76
15	Writing intensive courses should be 200-level courses.	-4	-1.90
*7	Grammar is critically important.	-4	-1.90

*Denotes a distinguishing statement; $p < .05$.

Figure 3.



Statement position for writing as an application and a development of thought. Most unlike statements are on the left of the factor array and the most like statements are on the right of the factor array.

Note. Numbers in array position represent the number of the statement from Table 1.

understanding complex information. "*Research sparks interest in thinking and background. It gives you a foundation for your own ideas. You need to know what is out there about your topic*" (S4). Further, audience is an important factor that should guide research and content development.

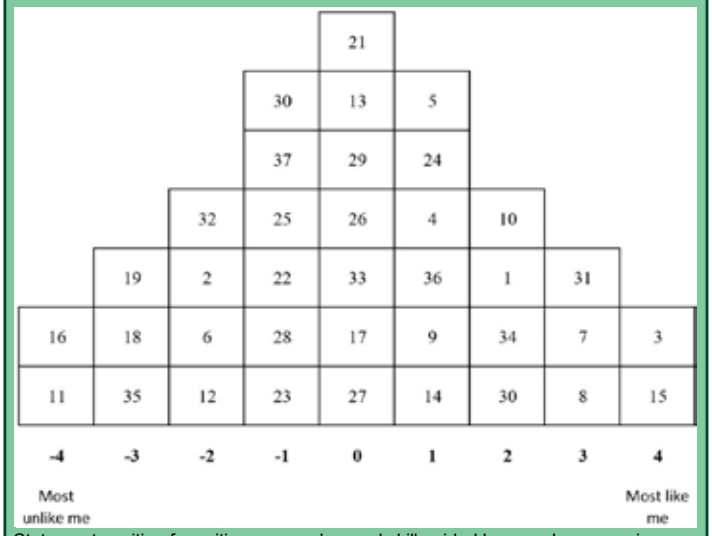
Two students and one administrator loaded on Factor 3. The primary beliefs of Writing as an Advanced Skill Guided by Complex Reasoning are the ability to understand the target audience is important (SN = 3, FA = +4, z = 2.14) and writing instruction should be in advanced, senior-level courses (SN = 15, FA = +4, z = 1.41). Writing instruction should become more advanced as students progress through their education. Although students should become effective writers as undergraduates, a master's program is when students really start learning how to write and connect concepts. Writing instruction is important, but writing-intensive courses are not important (SN = 31, FA = +3, z = 1.31). Additionally, research increases the rigor in a writing course, which contributes to the content of the course (SN = 7, FA = +3, z = 1.16; SN = 8, FA = +3, z = 1.10).

Table 5. Writing as an Advanced Skill Guided by Complex Reasoning

No.	Statement	Array Position	z score
*3	Strong writers should tailor what is written to their audience.	+4	2.14
*15	Writing intensive courses should be 400-level courses.	+4	1.41
31	Writing is important, but writing intensive courses are not.	+3	1.31
7	Content is critically important.	+3	1.16
8	Research increases challenge in a writing intensive course.	+3	1.10
10	Writing is a chore.	+2	1.10
1	Help from the instructor should be available and students should take advantage of it.	+2	0.98
34	Writing is a stream of consciousness.	+2	0.93
30	Writing is about understanding how things fit together.	+2	0.79
32	Reading is critical to writing success.	-2	-0.88
2	Writing elicits emotions.	-2	-0.93
6	Grammar is critically important.	-2	-1.10
12	Writing augments critical thinking.	-2	-1.15
19	Peer review activities promote writing and critical thinking skills.	-3	-1.31
18	Writing should be reflective.	-3	-1.37
35	Writing instructors are coaches and facilitators.	-3	-1.59
16	Examples of well-written work help students become better writers.	-4	-1.76
11	Writing should be concrete and applied.	-4	-2.14

*Denotes a distinguishing statement; $p < .05$.

Figure 4.



Statement position for writing as an advanced skill guided by complex reasoning. Most unlike statements are on the left of the factor array and the most like statements are on the right of the factor array.

Note. Numbers in array position represent the number of the statement from Table 1.

A secondary belief of the Writing as an Advanced Skill Guided by Complex Reasoning perspective is that writing can be a chore because of the complexity of understanding how things fit together. However, students can and should use instructor feedback to mitigate the complexity of writing. One student (S4) said his favorite assignment is understanding a policy and writing a paper about the policy because it fits together like a puzzle. "When you write, you can transfer the information. What is the point of knowing something if you can't convey it to someone else?" (S4). Additionally, writing is a stream of consciousness. Overall, this perspective included statements that defined writing as an advanced skill that includes research and the construction of complex content.

Table 5 provides a tabular representation of the statements with an array position of +4 to +2 and -2 to -4, which are the top 18 statements for Factor 3. Figure 4 provides a factor array for Factor 3.

Similarities among Perspectives

Although the three perspectives were different, they did have similarities, which are the consensus statements in Q methodology. Consensus statements had similar placing in each factor but are not significant statements because they do not distinguish any one factor. However, they help define the three factors.

This study had seven consensus statements that were ranked similar by participants (Table 6). The z scores of the consensus statements for each factor were reported. Statement 1 and 36 provide evidence that faculty should assist students with becoming better writers and improving their writing ability and that instructor feedback is an important component of writing in the social sciences. Also, statements 13 and 33 provide evidence that writing is a process, which should include short, related assignments that require students to gather and analyze data. However, participants rejected two statements: 16 and 23.

Table 6. Consensus Statements

No.	Consensus Statement	z score		
		Factor 1	Factor 2	Factor 3
1	Help from the instructor should be available and students should take advantage of it.	0.69	0.05	0.98
13	Many short related written assignments that require data gathering and analysis improve critical thinking skills.	0.65	0.19	0.27
14	Writing intensive courses should be 200-level courses.	0.16	0.47	0.28
16	Examples of well-written work help students become better writers.	-1.38	-0.85	-1.76
23	Good research leads to well thought out, well-articulated prose.	-0.33	-0.14	-0.72
33	Writing is a process.	0.53	0.91	0.22
36	Writing instructors are critics and proofreaders.	0.73	0.00	0.43

Discussion

The three extracted factors—Writing as Content Development Guided by Feedback and the Knowledge of Society, Writing as an Application and a Development of Thought and Writing as an Advanced Skill Guided by Complex Reasoning—represented perspectives held by stakeholders in the College of Agriculture and Life Sciences. Each factor uniquely described a different perspective and provided guidance for the interpretation because it was not highly correlated with the other factors.

Writing as Content Development Guided by Feedback and the Knowledge of Society

Participants with this perspective believed that writing promotes critical thinking when used as a tool to evaluate problems using relevant information and that societal knowledge is a key component of the writing process. Students should use writing to evaluate problems; however, they must have knowledge about society to complete the process. Having content knowledge, understanding grammar and mechanics and getting writing practice are all important parts of content development. But, students cannot increase their ability to think critically without having knowledge of society, which Beaufort (1999) also described in her writing expertise model.

Additionally, students should be exposed to writing practice, grammar techniques and content development throughout college and not just in writing-intensive courses. Writing instruction should not be confined to one or two courses on a degree plan. Therefore, all collegiate-level instructors should work to incorporate writing components into all courses. Instructors who believe strongly in writing education will implement writing into their courses and others may not, which could cause confusion between students' actual level of expertise and the level of expertise they are expected to have.

Research was not an important component of this factor, but without research, students cannot obtain relevant information to evaluate a problem. Participants who loaded on this factor may not be aware that research is an important part of the writing process and should not be overlooked if writing to increase critical thinking is about applying relevant information.

Writing as an Application and a Development of Thought

Participants with this perspective described writing as a technique to apply thought and transform thought into information. To augment critical thinking and create knowledge, students must apply relevant information to evaluate a problem, but they must engage in writing throughout their college career. Writing should not be confined to just one or two courses during a student's junior or senior year. Writing practice should be incorporated into the course curriculum throughout student's undergraduate education. Additionally, students should use real-world scenarios to apply relevant information, solve problems, develop an understanding of systems and target specific audiences.

Real-world scenarios increase students' ability to think critically because they have to apply and defend the information to a larger population, which Irani and Telg (2005) found that real-world projects were one way of integrating critical thinking into course curriculum. Writing, when viewed as the window to the brain, is a unique perspective because a student's written material is a direct reflection of what he or she is thinking. In 1983, Foster stated writing is connected to the thought process. Essentially, writing is one way to understand another's thought process; therefore, writing is unique because of its capability to explore the human mind.

Exploring the human mind includes considering others' thought processes and knowing how to connect with them. Connecting with an audience is important because some want a synopsis of the project and not an extended version. Students must analyze the audience before condensing the information. Additionally, writing is about understanding how concepts are connected and connecting additional concepts using writing. As Bereiter and Scardamalia (1987) said, the ability to connect and transform information is a trait of a knowledge transformer.

An interesting contrast from Factor 1 is that the participants in Factor 2 loaded "grammar is critically important" as a statement most unlike how they think and content also fell on the left side of the array. Therefore, the participants of Factor 2 believed writing is more about critical thinking and thought than about using correct grammar and developing content. Essentially, if students can apply and develop thought, they can think critically.

Writing as an Advanced Skill Guided by Complex Reasoning

Writing is one way to understand complex information. Participants with this perspective described writing as an advanced skill guided by complex reasoning in which the consideration of audience guides the research process and the development of content. Students must identify, understand and write to a specific audience, which is an essential step in the writing process. Because audience guides content and project development, starting a project without understanding the audience could lead to a project that lacked a solid foundation and concrete parameters.

Additionally, participants believed that writing-intensive courses should be senior-level courses. By the end of students' undergraduate program, they have learned the content and subject matter required for their program and can transform and create knowledge using writing. Therefore, students should master content before they take two writing-intensive courses, which lends well to the idea that participants think content is critically important. Participants also thought, however, that learning how to write is important but writing-intensive courses are not.

The application and use of research in the writing process increases rigor and challenge because students are required to sift through information and materials, determine what is relevant and apply it to writing assignments as a way to transform knowledge (Bereiter and Scardamalia, 1987). Because content development is a critical part of the writing process, research should be used as a method for students to develop content and build on the knowledge base through research studies. In addition to students using research to develop content, students should be taught how to conduct research and find facts and literature related the content of the course.

Recommendations

Writing is complex and learning how to write and teaching someone how to write is even more complex. Using the three perspectives of writing to guide classroom instruction will help instructors more effectively teach students how to write and help students learn how to write. The statements that comprise each perspective could be used as guides in developing writing assignments and assessments, initiating course discussion, establishing guidelines for peer review and developing supplemental course curriculum. Writing instruction often lacks consistency, perhaps because most instructors teach writing the way they were taught—right or wrong. Therefore, students may be, because of their writing instructor, completing four years of college without understanding how to write effectively. The writing factors will help provide consistency across curriculum and disciplines by establishing guidelines for incorporating writing components into a course where writing is not the content of the course. Also, the writing factors could increase the rigor of the course because faculty members can develop the courses using the statements as curriculum guides.

This study provides a research base for future studies related to writing instruction. For example, some statements are vague and need further explanation. “Strong writers should tailor what is written to their audience” could be interpreted as a vague statement that could mean a multitude of things. What does tailoring to an audience mean and how is that done? We recommend more research on how to target a specific audience. What are the best methods to reach an audience? To answer specific questions, each statement within the Q sort could be broken down and a Q sort could be conducted on the statements to determine the meaning of the statement.

Additionally, a similar study needs to be conducted in the bench sciences of agriculture to determine the writing factors that are consistent between the social sciences and the bench sciences. Similarities will exist because certain factors will remain consistent. In certain situations and under certain conditions, some factors will be more influential than others. However, it is important to create consistent statements that will guide writing instruction and education. The statements identified as part of this Q sort could be used to develop writing assessments and assignments to prescriptively address students’ writing needs.

Implications

College faculty are in a unique position because many of them are required to integrate oral and written communication concepts into their course curricula. However, many faculty do not have training in communication, which could leave them unprepared to teach students how to be effective communicators. The three perspectives of writing, backed by the statements that support them, provide faculty with a starting point of teaching writing because unprepared faculty produce unprepared college graduates. Knowing how to write cannot be mistaken as the ability to teach writing.

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The Role of Critical Reflexive Analysis in a Service-Learning Course in Agricultural Communication

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Abstract

Agricultural communication professionals today must have a continually evolving set of skills related to digital technology and media convergence, as well as a keen sense of establishing communication strategies that reach globally and demand cross-cultural engagement. The authors designed a service-learning course focused on food insecurity to examine the effects of teaching cross-cultural communication and engagement using applied ethnographic and autoethnographic methodologies. Seven students majoring in agricultural communication participated in an eight-week course that integrated volunteer activities at local food pantries, practices of critical reflexive analysis (CRA) and narrative co-construction with food pantry clients. The authors utilized grounded theory to analyze journal entries and class discussion, resulting in three emerged themes related to the process of student learning: 1) Recognizing disconnect through evaluation of self; 2) seeing complexity in the bigger picture; and 3) redefining responsibility in writing. The process of CRA challenged the students to shift their thinking from interviewing just the client to simultaneously interviewing the client and self for the purposes of developing a co-constructed story.

Keywords: agricultural communication, ethnography, autoethnography, critical reflexive analysis, grounded theory, narrative co-construction

Introduction

Food, agriculture and the environment permeate today's salient and often controversial issues. As a result, industry expectations, consumer demands and community responses contribute to a constant flow of information, ongoing debate and disparate truths. All, of which, lead to a critical need for strategic communication. Therefore, the demand of an agricultural communication professional is two-fold. First, such a professional must have a continually evolving set of skills related to digital technology and media convergence. In addition, this professional must have a keen sense of establishing communication strategies that reach globally and demand cross-cultural engagement. To achieve this, the agricultural communication student must first be challenged in education and training to understand and put into practice this often contested intersection of communication technology, cross-cultural engagement and complex issues.

The quality of student learning is a single variable among many that must be addressed and improved if higher education is going to meet the demands and complexities of this world (Kuh et al., 2005). The catalyst for student achievement in this area begins with the instructor and targeted curriculum development.

This article discusses a service learning course that was designed to examine the value of teaching cross-cultural communication and engagement using applied ethnographic and critical reflexive methodologies in classroom and community-service settings. Seven students majoring in agricultural communication at Purdue University participated in an eight-week course in the spring of 2014 that culminated in the students'

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production of two written articles and one video of local food pantry clients. These finished pieces were then provided to the local food bank for an annual fund raising event. Food insecurity, which is defined economically and socially as having limited or uncertain access to adequate food (Economic Research Service, 2014), is a reality that students are exposed to regularly through the perspectives of the agricultural industry and scientific initiatives, but rarely from perspective of those who are food insecure. Therefore, the intent for this course was to immerse the students into discussions and the lived experiences of those often identified as food insecure at the local level, ultimately creating a multi-faceted lens through which food insecurity is defined and understood.

Conceptual Framework and Review of Literature

"*The world in which today's students will make choices and compose lives is one of disruption rather than certainty and of interdependence rather than insularity. To succeed in a chaotic environment, graduates will need to be intellectually resilient, cross-culturally and scientifically literate, technologically adept, ethically anchored and fully prepared for a future of continuous and cross-disciplinary learning.*" (National Leadership Council, 2007, p. 2)

Service-learning programs in higher education are significant; and with that significance comes the debate as to what educational practices fall within the framework of service-learning (Waterman, 2013). The Commission on National and Community Service established program parameters that challenge students to critically examine the service performed, utilize new skills and knowledge, move learning outside of the classroom setting and invest themselves in an experience that meets one or more community needs (Waterman, 2013). In addition, the National Leadership Council (2007) recommends that faculty-led, field-based opportunities, such as service-learning, need to incorporate some form of reflective forum so students can learn collaboratively and systematically, specifically as it relates to varying degrees of worldviews in the classroom and in the field that are different from their own.

Many service-learning courses and programs in agriculture direct students through some form of journaling as a learning tool (Kessler and Burns-Whitmore, 2011; Morgan and King, 2013; Stephenson et al., 2012). Such practices of journaling can be advantageous in building richness of discussion, allowing students to identify questions as they thoughtfully consider what they are about to take part in, or what they recently experienced. Reflective journaling focuses attention on an external object, where students are asked to contemplate, categorize and ultimately explain the phenomena being observed (Cunliffe, 2004). This is a critical skill that students are expected to learn and master in higher education. However, Cunliffe (2004) challenges object-focused reflection and advocates for strength in critical reflexive analysis (CRA).

In CRA, the object is taken out of direct focus, where it is then transformed into an entry point by which the students can then turn and analyze their personally constructed realities. This form of analysis is derived from foundational works in critical pedagogy (Freire, 1972); and social constructionism (Goffman, 1959) related to emotional, physiological and cognitive spontaneous responses (Wittgenstein, 1980). It is within the framework of social constructionism that Cunliffe (2004) has challenged students to critically examine the impact of personal assumptions and actions in creating reality and knowledge. The process of critical examination focuses on three areas: Existential (Who am I? What kind of person do I want to be?), relational (How do I relate to others and the world around me?) and praxis (How do my assumptions effect self-conscious and ethical actions?) (Cunliffe, 2004).

To incorporate the process of critically examining self is to bring in elements of ethnographic fieldwork, specifically autoethnography. Where ethnography is the examination of the other through "direct and sustained social contact" (Willis and Trondman, 2000, p. 5), autoethnography is the practice of examining self through autobiographic practices that depict the crossroads of self and culture (Ellis and Bochner, 2003). Doloriet and Sambrook (2009) describe autoethnography as the intersection between self and research, where the researcher continually turns back to self for the purposes of ultimately constructing and giving meaning to lived experiences. In this instance, the researcher is the researched. The subsequent work, then, is an attempt to capture subjective reality for the purposes of positing it within personal epistemology.

Often associated with ethnographic fieldwork is the formulation of personal narratives. In autoethnography, the researcher is pressed to continually return to the ongoing collection of critical self-examinations for the purposes of ultimately constructing the collective whole of self (Doloriet and Sambrook, 2009), gaining a deeper understanding of subjective reality from the existential, relational and praxis points of view, leading to what Cunliffe (2004) describes as the personal aha! or struck by moment. When fieldwork involves the researcher and the researched, narrative co-construction becomes a simultaneous examination of self and other. In this case the researcher is continually pressed to place personal sovereignty and knowledge as secondary to that of the research participant (Benson and O'Neill, 2007).

Purpose

Cross-cultural communication and engagement involve complex processes of understanding other and self (Gopal, 2011). Therefore, in order to consider the applicability of ethnographic and autoethnographic methods in applied communication practices, students were introduced to CRA, challenging them to transform reality by thinking subjectively about the impact of one's actions and interactions with others (Cunliffe, 2004). The practices of CRA were ongoing throughout the course

as students worked collectively to write and produce co-constructed narratives of local food pantry clients and their lived experiences of being food insecure. The following research questions guided the course development and subsequent study:

How do modified practices of critical reflexivity, derived from ethnography, affect student learning of and practices in cross-cultural engagement?

What effect, if any, does CRA have in the students' process of co-constructing food pantry client narratives?

Methodology

The authors designed and taught the eight-week course as a preparation to a two-week service-learning study abroad program in Romania. In Romania, the students would live with and produce written and video narratives of host families who were also Heifer International beneficiaries in a dairy project. These produced materials would then be turned over to Heifer Romania for use in communication efforts with domestic and international stakeholders. As a global organization, Heifer International's primary focus is addressing hunger and poverty, starting at the local community. Therefore, in order to prepare them for the work abroad and to begin the dialogue and co-construction of stories regarding food insecurity, the preparation course included service-learning opportunities at food pantries near campus. Like the subsequent work with Heifer Romania, the students' produced materials at the local food pantries were then provided to the regional food bank for use at an annual fundraising dinner.

This preparation course had three objectives: (1) Introduce students to CRA and encourage a deeper and more critical examination of self in unfamiliar community settings; (2) provide students with the opportunity to volunteer at two local food pantries; and (3) walk students through the process of co-constructing narratives regarding the lived experiences of food pantry clients.

Students were introduced to CRA journal writing at the onset of the course. During the first few weeks, the authors held in-class discussions and exercises that differentiated the CRA style of journaling to other common forms of journaling. To complete a journal entry, students were directed to critically examine self in relation to others, specifically considering existential, relational and praxis areas of focus (Cunliffe, 2004). Journal entries were required after each of the following activities:

- Week 4 – Volunteering and interviewing clients at two local food pantries.
- Week 5 – Volunteering and interviewing clients at two local food pantries.
- Week 6 – Debriefing (in-class focus group) – guiding questions developed from CRA journal entries from Weeks 4 and 5.
- Week 8 – Final exam (final CRA journal entry) – guiding questions formulated from emerged and working themes of Weeks 4, 5 and 6.

All CRA journal entries, as well as the transcribed focus group, were collected data and, thus, were analyzed and coded using grounded theory, which requires constant comparative analysis as data is collected (Charmaz, 2006). Therefore, immediately following the first two journal entries, the authors coded and analyzed the collected data, which led to a working collection of frequent open codes. These codes directed the development of a short list of guiding questions that were brought to the focus group discussion. Data collected from the focus group discussion and the subsequent journal entry were analyzed and then compared to the first two initial journal entries. The result was a final short list of open-ended questions that would probe deeper into the preliminary themes that had emerged. This final list of questions guided students through the final journal entry for the class, which also functioned as a semi-structured written interview. This study was deemed exempt by the Purdue Institutional Review Board.

Results

Seven students, all of whom have been given pseudonyms for anonymity, took part in this eight-week preparation course, as well as the subsequent study abroad program. All students were female and either finishing their second or third year in the agricultural communication program.

Throughout the duration of this class, the students followed a series of steps that included talking about food insecurity, volunteering at local pantries, observing pantry clients and interviewing these clients regarding their personal experiences. As a result, their critical reflexive journal entries, along with the group discussion, began to reveal a critical synthesis of collected observations on their part. Through constant comparative analysis of each subsequent journal entry and the group discussion transcript, three themes emerged that addressed the students' engagement and work with food pantry clients. These themes are: (1) Recognizing disconnect through evaluation of self; (2) seeing complexity in the bigger picture; and (3) redefining responsibility in writing.

Recognizing disconnect through evaluation of self

Early on in the field visits to the pantries as volunteers and then interviewers of food pantry clients, the students revealed in their journaling a self-proclaimed disconnect between themselves and the reality of food insecurity in the local community. Through the practice of CRA, students often placed their observations back on themselves as they tried to make sense, not only of preconceived notions regarding food insecurity, but also the shifting reality that was beginning to transpire as they crossed paths with food pantry clients throughout the duration of the course. The journaling revealed the students' personal process of not only understanding food insecurity at the local level, but also realizing the existence of food insecurity. Students would often identify a disparity between themselves and the food insecure.

For example, Nora wrote, *"I was struck by the notion that there is this whole reality that I don't see, hear, know, or even think about… and it goes on every day.*"

Because all of the students come from a financially secure household, many of them shared that they seldom thought about food insecurity. For instance, Morgan said, "*Even though I had been exposed to food insecurity, I always placed the problem somewhere in the back of my mind. It was convenient for me to just pretend it wasn't a problem.*" Related to disconnect, this was a common shared perception among the students, which surfaced in many journal entries throughout the duration of the class. However, as the discussions and the experiences progressed, the entries revealed a deeper level of making sense of what was discussed as a group, what was experienced in the pantries and, ultimately, what they began to observe on their own within their own community. For instance, Rachel said in her final journal entry:

Before this course I thought of food insecurity only occurred [sic] in other places. I didn't think of Lafayette, Indiana. I never thought of even Indiana! I pictured the commercials you see on TV of the skinny children running around in dirty areas, where the commercial asks you to send money to feed them. I did not know that it just happened in my back door [sic]. One particular thing that has stuck in my head is the man that worked at Lafayette Transitional Housing that had a beard. I thought he was just a volunteer that was helping. That same week I saw him sitting on a bench at like midnight all by himself downtown [sic] Lafayette. That moment I knew he was homeless and just worked so that he could have food. I never thought about it from that standpoint.

It is unknown whether or not this man Rachel observed outside of the pantry was actually homeless, or whether he worked for his food at the local pantry. Regardless, food insecurity and, indirectly, homelessness, became a realized phenomenon in her own community. Nora shares a similar viewpoint, but draws upon a working understanding of how personal realities are shaped by active personal experiences and a dynamic social structure:

Our realities are influenced by our experiences, past and present; our thoughts, ideas, opinions; and our family and friends. And our realities are dynamic – they constantly shift when we experience or come across some new information. For me, my reality has been opened up to a larger picture with this class and our food pantry experiences thus far. I have been able to see and talk with people I normally wouldn't interact with - I don't mean this in a snobby way – it's just a fact that our paths/realities wouldn't have crossed if it hadn't been for this class. And now, I'm left wondering about the fate of the people I met and those I just saw through the window.

Nora's statement becomes a departure point for all of the students and the way in which they work to make sense of their surroundings and the lens through which they view it. Through such lenses, it was evident from each subsequent journal entry that the students wrestled with the attempt and sometimes the inability to relate to food pantry clients. Rianne wrote, "*Until I live through something, I will never fully understand… I have no idea what it's like to wonder where my next meal will come from.*" Looking further into everyday experiences, Alexis wrote, "*I do not come from a broken family. I do not wonder where my next meal is coming from or if I am even going to have a meal. I go home every day to a roof over my head and a full refrigerator and still often times ask myself 'what is there here to eat?'*"

In addition, once students had established a sense of trust with the instructor, as well as with their peers during group discussion, they would also share personal stereotypes of what they observed. For Morgan, there was an admittance to stereotyping, which was then changed through observation, leading to an unexpected ability to make food insecurity personal. She wrote, "*When I think about soup kitchens, I usually picture single mothers with a baby on their hip or scruffy Vietnam War veterans. Not teenagers. Not people who I could have easily went to school with.*"

Morgan's experience and observation was not unique. In fact, the act of volunteering and interacting with the food pantry clients challenged students' common stereotypes or preconceived notions. Like Morgan, Annie admits that the experience at the pantries created a shift in her perceptions, as well as an opportunity to critique herself more directly:

I actually saw food insecure people and saw what they look like, their moods, etc. It's like I asked 'What do you have to say for yourself' and they answered. What I saw were nice people trying to hold everything together and they really didn't look all that unhappy. Most looked pretty content… The people I saw were not unlike myself in many ways and I guess that's not what I envisioned. I expected them to all be more depressed-looking, which is probably a reflection on myself and how I would be wimpy if it came to that.

Critical reflexive analysis challenges the individual to turn the critical lens back on self for the purposes of better understanding personally held meanings. The use of a critical lens became more evident in the last two journal entries—post-group discussion journal entry and final exam—as students often turned to interviewing self when attempting to work through a complex reality. The act of volunteering became a necessary personal critique when considering individuals roles. For instance, Morgan wrote, "*I then asked myself questions, about what it meant to truly serve others.*" Rianne further explored what motivated her to volunteer:

Once I realized the uniqueness of my actions I started probing myself with questions like, 'What is it about this place that makes you excited to come back?' and my answer came a lot quicker than I thought it would: the people. I loved the people that worked at St. Ann's and wanted to go back and see them and help and be around that atmosphere. It's refreshing and rewarding. I never thought about it as being selfish of

me until someone else had mentioned something about it but even still I don't really know that I care.

Students often admitted held personal judgments. However, through the CRA process, students demonstrated an attempt to more carefully contemplate such judgments from a subjective standpoint, rather than an objective one. For example, Taylor described seeing a man with his dog asking for money. She struggled placing meaning on such a request when, perhaps his dog was requiring extra resources he did not have – "*I know that we can't understand why people place value on certain things, but it just doesn't make sense to me.*" Similarly, Alexis explained that it was sometimes frustrating to see clients in line at the food pantry with smartphones in hand. Rather than validating her judgment of their action, she actually turned the lens back on her own tendencies and subsequent thoughts:

Instead of me being so quick to accuse them of being ridiculous, (which I often feel to be honest) I need stop, step back and go through my head that everybody has a story and their story shapes the person that they are and the life that they lead day to day. That has been my biggest moment/lesson throughout this class.

Seeing Complexity in the Bigger Picture

As the course continued, the students spent more time discussing specific nuances and characteristics of food insecurity that they were not aware of prior to the class. Their journal entries suggested a complexity in food insecurity that they previously did not realize existed. Following interviews with food pantry clients, journal entries revealed the students personally challenging their pre-established objective realities, which had focused only on food insecurity. Rather, students such as Taylor began to use food insecurity as a departure point for contemplating the deeper struggles behind it, specifically the desire of some families to stay on governmental assistance programs. Following one of the client interviews, Taylor wrote:

When we were talking to [food pantry client], she mentioned that when her husband got a better paying job it actually made paying the bills harder because they could no longer rely on government assistance which helped with the groceries and also with infant care.

The interviews were open-ended, allowing the food pantry client to lead the discussion with what they felt was most important and relevant, specifically as it related to their experiences at the food pantry. For instance, one client shared her pantry experience by describing her appreciation of the lasting friendships she had established over time while waiting in line. Following this particular interview, Alexis was struck by this continual shift in the conversation from food insecurity to social ties. In her follow-up journal entry, she wrote, "*I have come to a more clear realization that food insecurity has a much greater meaning than someone just literally being food insecure.*"

Similar realizations, associated with the value of social ties, transcended into the students' volunteer efforts during the same visit. Like Alexis, Annie began to look past the act of receiving food. In her follow-up journal entry, Annie admitted she was only scratching the surface of the various realities that existed among every individual standing in line, writing, "*I saw three generations of one family there—a man and his parents and his wife and kids. What a family outing. There's just so much I don't know, I'd like to learn more.*"

This emerging theme of complexity revealed an additional held meaning on behalf of select students during the group discussion, where students shared some of their reflexive thoughts outside of the required journal entries, demonstrating a frustration between making sense of the complexity they observe and their previously held realities. For instance, Rachel said:

I think some people use the food pantries correctly. But my mom is a teacher in a town that has a lot of poverty and our tax dollars pay for their kids' lunch. And they get all these free benefits and yet their parents come in with brand new nails, brand new car, Coach Purses. But, yet, my, our tax dollars are paying for their lunch, their school books. And, then my mom has to fork out a $500 check for my brother's books.

Rachel offered her transparent thoughts during the group discussion, but her wrestling with the realities of low-income families continued. They moved beyond a blanket stereotype and extended into the individual lives she encountered. In her final journal entry for the course, Rachel described an interaction she had with a gentlemen and his grandson during the second visit and volunteer session at the pantry:

The older gentleman was decked out in older Harley gear and had all sorts of different tattoos and a lot of missing teeth. The boy had mismatched clothes on and you could just tell they did not have a lot of money. That aside they… had the most positive attitude out of all the people we helped that day. He was telling us how to make cinnamon apples and just smiled and made jokes with us the entire time he was selecting his fruits and vegetables. He was a delight to talk to… This really struck me because if I saw them at the grocery store I would make quick judgments about them and assume things about them by their outside appearance. But after talking to the older man he was just a good ol grandpa like mine.

Rachel contemplated these individual lives and then critically turned back on herself as she considered her flux of judgment depending on the environment and context in which she crosses paths with people. In Annie's final entry, she also acknowledged her tendency for judgment by also juxtaposing it with the complexity of the issue. She wrote that it bothered her to see overweight and obese people at the pantry. She said, "*This is hard for me to understand… I found myself judging them, which is wrong because I don't know their specific situations, but I couldn't help it. I just didn't understand.*"

Redefining Responsibility in Writing

Recognizing the existing disconnect and the complexity of issues as students uniquely immersed themselves in volunteering and co-constructing stories with food pantry clients, their final journal entry (the final exam) revealed a newly emerged theme that addressed the students' re-evaluation of themselves as writers and storytellers.

Through the acts of volunteering and interacting directly or indirectly with clientele of the pantries and then interviewing individuals for the purposes of developing a co-constructed story, the students explained that telling the story of someone they are still working to connect with is a delicate process and a large responsibility. This became evident as students wrote about how they considered the individuals with whom they worked to develop a story. Rianne wrote, "*To tell the story of someone who is food insecure is to harness their situation and portray it in a way that is not demeaning to their life.*" Morgan touched upon this same notion of "harnessing their situation" for addressing the importance of building a relationship with them. She wrote:

The only way for us to be able to tell the stories of the needy is for us to build a relationship with them. The first part in building this connection is understanding the difference between our lives and the lives of our interviewees.

As students were often challenged in their understanding of the clients with whom they interacted and worked, they were equally challenged in their story development—continually being reminded of the varying exercises of co-constructing the story, rather than simply collecting the information and imparting their own interpretation of it. As the instructors continually talked with and engaged the students about their roles as writers, it was evident that the students considered this in their own way as communicators. For instance, Alexis wrote about the importance of telling the other person's story. But, she emphasized that the story extends beyond what is seen from the outside. She wrote, "*The real story that should be told is the story that comes from the inside out. Specifically for someone who is food insecure, I believe it is important to tell their story including how they ended up in that situation...*"

To others, with story development came a heightened sense of responsibility. Annie wrote, "*Telling the story of someone who is food insecure is an honor to me.*" In addition, Morgan wrote:

… telling the story of someone who is food insecure is a process. It takes time and practice to impartially and earnestly be the voice for the hungry. To me, it's a large responsibility to speak on behalf of these people. It is our responsibilities as communicators to share an accurate message that reflects the truth of the day-to-day lives of the food insecure. It's a delicate process and it's a challenge, but it is so important…. In the grand scheme of things, people in the communication industry can get caught up sharing corporate stories. I think a lot of people forget that we can share stories for the hungry, too. It's a much more noble job.

Recognizing the responsibility and claiming the honor in story co-construction was clearly evident, but there was an additional hurdle in the story actually coming to fruition. Because the students were divided into two teams to create the written story and the video narrative of a given food pantry client, they were then placed into a situation in which they not only had to contemplate their struggles to connect with and overcome assumptions between themselves and the client, but they were also forced to deal with the unique assumptions and understandings of their respective team members. To co-construct the story of a client, it was then placed into the lenses of three or four student lenses collectively. Nora addresses this in her final journal entry:

I was critical of my group and group members when trying to create the one-pager. I felt like I could see some putting their own spin on a food pantry user's words or interpreting in a way different than what [sic] it was meant. And that bothered me, because we were supposed to be telling the food pantry user's story, not our interpretation of their story. Some parts of the story were overlooked or even tossed aside as unimportant at first. But as we progressed, I feel like I was better able to make my point of telling the user's story, personality and experience. It's okay to use a narrative form for some stories, but for me it was a better idea to use the user's quotes and details to tell the story and use less of our words.

Discussion

By the time the course concluded, the students had demonstrated the three areas of critical reflexive analysis in their journals and subsequent class discussion: existential, relational and praxis. Throughout much of the journal entries, students maintained a primary focus on relational and praxis, where they often examined personal assumptions and relations. In addition, they also began to more deliberately contemplate the depth and breadth of food insecurity, as it related to social ties, family structure and overall complexities of life circumstances. Often, such contemplation juxtaposed and challenged their previously maintained assumptions. However, it was not until the final journal entry that students began to transfer such understanding to the existential side of their professional communication responsibilities. They began to develop a deepening sense of responsibility for the development of the communication pieces.

Over the course of the eight weeks, critical reflexive analysis was not without consistent challenges. While reflexive practices are part of the natural examination and response to the observations and experiences within the surrounding environment, the shift to critical reflexivity takes significant and ongoing effort as it entails a willingness to deconstruct self. Such practice is not a natural component of reflexivity. For all of the students this was a new and challenging way to think about their

own personal lived experiences as subjective reality, specifically as it related to the intersection of the food pantry clients' subjective reality.

Through the autoethnographic lens, Doloriet and Sambrook (2009) examine the contested intersection between researcher and researched versus researcher is researched. There is a fine, but necessary, line between the two for the purposes of capturing realities and held meanings. Such an approach is also applied to the students as aspiring communication professionals for the purposes of developing a responsibility in writing and storytelling. Here, the contested intersection that is examined is that of interviewer and interviewee versus interviewer is interviewee. The process of CRA challenges the students to shift their thinking from interviewing just the participant to simultaneously interviewing the participant and self for the purposes of developing a co-constructed story.

Conclusion

While only an n of 7, this study revealed the value of CRA in teaching cross-cultural engagement in a service-learning class. Evoking the practice of CRA with students after each community-based experience created a greater self-awareness regarding personal disconnect with the food pantry clients, leading to a greater sense of responsibility in the development of a co-constructed story.

The value that this form of service-learning brings to the emerging professional in agricultural communication is critical. Cunliffe (2004), who discusses critical reflexive analysis from the perspective of educating and training management students, argues that "managers and administrators influence others – individuals, communities, societies and the environment. They find themselves dealing with accelerating rates of change, uncertainty and ambiguity and often work in politicized organizations where they have to deal with a wide variety of ethical issues" (p. 408). Such a statement becomes quite applicable as it relates to agricultural communication professionals. The field is ever dynamic, where technology and cultural intersection lead to controversial issues in agriculture, food and the environment. Layer this environment with the processes and models of communication and the result is a complex network of negotiated meanings.

Communication professionals who are tasked with creating messages, sharing information and liaising among multiple stakeholders, are faced with the same accelerating rates of change, uncertainty and ambiguity in the area of food, agriculture and the environment. In this instance, food insecurity may have been the entry point, but gaining a broader sweep of understanding the complexity of food insecurity by first examining it through the personal subjective lens is critical.

The authors recognize that a semester-long course and increased number of visits to the food pantries could more systematically instill the practice of CRA in multiple narratives. In addition, they recognize that students' learning styles are different and some students prefer reflecting with their peers in the group discussion over the written journals. In the future, researchers could compare oral and written critical reflexive analyses, as well as narrative development over a series of writing assignments. Researchers could also investigate how students would use their learned skills with international audiences where dialogue translation is required and how critical reflexive analysis could aid in co-constructing narratives with those audiences.

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The Short-Term Effectiveness of a College-Based Financial Reality Simulation in Building Financial Awareness[1]

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Abstract

Economic conditions facing recent college graduates include wage stagnation, significant student loan debt and high rates of unemployment and underemployment. These factors highlight the need to provide financial education in the college and university setting. This article examines the impact of college students' participation in a financial reality life skills simulation that measures financial knowledge and intended change in current and future financial behaviors. Using the Five-Tiered Approach as a guiding framework for the development of the financial simulation and evaluation, we found that participants experienced an improved ($p<.001$) change in financial understanding as a result of participating in the financial reality life skills simulation. Specifically, student knowledge of the costs to maintain a household and the costs to raise a child were greatly improved ($p<.001$).

Introduction

Significant student loan debt, coupled with high unemployment and underemployment rates, are major issues being faced by recent college graduates. Considerable attention has been paid to student debt since the recent economic crisis. Seventy-one percent of graduating seniors in the Class of 2012 carried student loan debt, with an average balance of $29,400 (Reed and Cochrane, 2013). In general, the long-term employment and wage forecasts for recent college graduates have been described as dim. Although unemployment and underemployment for college graduates under age 25 appeared to have peaked in 2010, unemployment remained at 9.4% and underemployment at 19.1% in 2012 (Shierholz et al., 2012). This is compared to a national average unemployment rate of 4.5% for all college graduates and a national average underemployment rate of 14.7% for all workers during the same period (Bureau of Labor Statistics, 2013). Furthermore, as a result of wage stagnation during and after the recession of 2007-2009, termed the Great Recession, it is anticipated that young college graduates will earn less for the next decade compared with those graduates entering the job market during a strong economy (Mishel and Shierholz 2013; Shierholz et al., 2012). These findings suggest a less than favorable economic climate for young college graduates.

College students encountering financial difficulties may experience increased levels of anxiety and depression, as well as declines in general health and academic performance, sometimes limiting the students' ability to complete a degree (Andrews and Wilding, 2010; Borden et al., 2008; Gutter and Copur, 2011; Lyons, 2007; Shim et al., 2009). Stress levels among college students may be further exaggerated in an economic downturn. Guo et al., (2011) found that stress resulting from the recent economic downturn increased students perceived stress levels. High stress triggers were identified as concerns about future employment opportunities and current financial burden (Guo et al., 2011).

The transition from financial dependence to financial independence typically occurs between the ages of 18 and 25 (Arnett, 2000; Gutter and Copur, 2011; Shim et al., 2012). The lack of experience in managing money, coupled with increased financial responsibilities and direct marketing tactics from financial institutions, results in the emerging adult population being financially vulnerable (Borden et al., 2008). For example, college students may give little thought to the long-term consequences of misusing credit cards (Borden et al., 2008). Young adults carrying heavy debt burdens and/or facing other difficult financial circumstances are less likely to make

[1]The University of Kentucky Institutional Review Board (IRB) approved the study protocol and all participants provided written consent prior to participating in the study.

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a successful transition to adulthood (Shim et al., 2009). The financial behaviors and habits formed during this transition period will likely influence financial decisions throughout the student's lifespan (Shim et al., 2009). The long-term consequences of high debt accumulation while in college can be significant, including limited or no savings, restricted employment mobility, delayed retirement contributions and bankruptcy (Lusardi et al., 2010; Palmer et al., 2010).

A heightened awareness of the need for financial literacy exists due to the efforts of educators, legislators and organizations such as the Jump$tart Coalition for Financial Literacy (Avard et al., 2005; Mandell, 2008). Consumer levels of financial literacy have a direct impact on financial management behaviors such as household money decisions and the ability to save for and attain financial goals (Hung et al., 2009; Perry and Morris, 2005). Furthermore, individuals possessing low levels of financial literacy are more likely to pursue or accumulate undesirable financial products, such as high interest credit card debt (Lusardi and Tufano, 2009) and have lower levels of wealth accumulation (Lusardi and Mitchell, 2007).

To date, most youth-based financial education programs are offered through the K-12 educational system. Seventeen states require a personal financial education course as part of high school graduation requirements (Council for Economic Education, 2014). However, research indicates exposure to financial education during high school does not necessarily correlate to high levels of financial literacy, nor does it have a lasting impact on financial decisions and behaviors as an adult (Avard et al., 2005; Mandell, 2008). This finding may be a result of the lack of motivation of high school-aged students, as well as the limited exposure these students have to real world financial situations directly affecting them (Mandell, 2008; McCormick, 2009).

The college setting has been identified as an effective learning environment in which to capitalize on the teachable moments of students becoming more financially aware and independent (Peng et al., 2007). Shim et al. (2009) charged educators and university administrators with providing financial education programs that improve financial literacy, promote positive financial behaviors and develop institutional support structures to improve students' financial well-being. Although many colleges and universities incorporate a variety of financial education programs into core courses and other student life programs, there is a limited body of scholarly knowledge regarding the success of financial intervention programs (Palmer et al., 2010).

The purpose of this study is to examine the impact of college students' participation in a financial life skills simulation on their financial knowledge as well as on their intended change in current and future financial behaviors. The development of the financial reality life skills simulation and the program evaluation process are explained. This study contributes to the scholarly knowledge base by expanding the research on college student financial knowledge and education programming.

Materials and Methods

Five-Tiered Approach to Program Evaluation

Program evaluations for financial education programs are limited in scope due to struggles associated with isolating program impacts, inconsistencies of program delivery methods and costs (Fox et al., 2005; Lyons, Chang and Scherpf, 2006). To mitigate these concerns, the financial life skills simulation described in this manuscript utilized Jacobs' (1988) Five-Tiered Approach for program evaluation. The Five-Tiered Approach requires the program coordinator to make a conscious commitment to the program evaluation from the point-of-program inception. The five levels of program evaluation include: (1) preimplementation, (2) accountability, (3) program clarification, (4) progress toward objectives and (5) program impact. Fox et al., (2005) highlighted the Five-Tiered Approach as a comprehensive evaluation framework for financial education programs.

Applying the Five-Tiered Approach to the It's Your Reality (IYR) Financial Life Skills Simulation

Preimplementation Tier

The preimplementation phase establishes the need for programming. A needs-based assessment can be conducted using several pieces of information including national and local statistical data, as well as interviews with community leaders who are aware of the problem (Jacobs, 1988). The initial impetus for exploring the development of a campus-wide financial education program resulted from local and national news headlines and government reports regarding the alarming trends in student loan debt and financial struggles facing recent college graduates (Bureau of Labor Statistics, 2012; Cheves, 2011; Curran, 2012; Martin and Lehren, 2012; Reed and Cochrane, 2012; Rosen, 2012). The second stage of exploration involved conducting a needs assessment, utilizing focus group interviews with current college students on our campus. The student focus groups were a convenience sample; sessions were held in conjunction with other campus events or classes. Three focus groups were conducted, with forty-seven total participants, providing student input on the program development and implementation. The student focus groups sessions were followed by one-on-one interviews with a variety of campus leaders who held university-wide positions with primary responsibilities for serving the student body. The 12 one-on-one interviews included the Associate Dean of Students, Directors of Student Relations within numerous colleges on campus and representatives from Student Affairs, Student Financial Aid and the Career Center The one-on-one interviews primarily targeted individuals who held university-wide positions with primary responsibilities to serving the student body. The preimplementation process not only allowed for the establishment of

program priorities and goals but also launched key campus relationships. As a result, a core project team was established to design and implement the program. The core project team consisted of a faculty member, a campus Extension administrator, program coordinator and three campus-teaching faculty.

Program Description

It's Your Reality (IYR) is a financial life skills simulation developed by the University of Kentucky Cooperative Extension Service designed to promote financial capability among college students. The IYR simulation introduces college students to the financial realities associated with emerging adulthood by allowing them to make the critical decisions regarding lifestyle and budget choices. The simulation was designed to help young women and men between the ages of 18 and 22 understand how the financial decisions made today, or shortly after graduation, will impact their life course.

IYR was modeled after the Kentucky 4-H Reality Store curriculum. The Kentucky 4-H Reality Store curriculum is a workforce preparation program targeting middle school youth (Blevins, 2010). The Reality Store concept was initially developed by the Indiana Federation of Business and Professional Women's Club, Inc. (O'Neill, 2008). The goals of the Kentucky 4-H Reality Store curriculum focus on school retention, encouraging post-secondary educational attainment, reducing/preventing teen pregnancy, reducing drug misuse and introducing basic financial life skills (Blevins, 2010). Although the IYR simulation exercise is similar in conceptual design to the 4-H Reality Store program, the IYR program was developed to specifically target college students and the financial situations they will likely experience following graduation. The primary goals of the IYR simulation include helping college students become aware of basic financial life skills including budgeting, weighing financial trade-offs, financial planning and goal setting, as well as helping them understand the relationship between current behavior choices and future financial implications.

Operation of Program

The IYR simulation consists of a one-day learning opportunity for college students. The campus-wide program was offered in the student center during heavy traffic times. Upon arrival to the simulation, students received the equivalent of one month's salary, based on average starting salary for their specific major. Students then selected their own family situation; however, if they were planning to have children within five years of graduation they were encouraged to incorporate the appropriate costs into their simulation experience. Participants circulated through the simulated "stores." The simulation incorporated 25 store fronts, which included transportation, insurance, housing, property taxes, communications, charitable giving, entertainment, credit card repayment, student loan repayment, groceries, supplemental income, financial distress and chance.

Volunteers staffed the store fronts and the buying process was made as realistic as possible. For example, salespeople from a local new and used car dealership staffed the transportation booth. Participants were presented with a variety of vehicle options ranging from economy, used vehicles to luxury, new vehicles. The salespeople were instructed to treat the participants as standard customers and they employed standard sales tactics.

The chance booth was designed to help students understand the need for an emergency fund and the consequences of their purchase decisions. Students randomly drew a card from the chance treasure chest. Chance cards included door prize giveaways, as well as the opportunity to receive unexpected additional income, such as a gift; however, the majority of chance cards represented unexpected negative events that might occur during any given month, such as the costs associated with a flat tire, home repair, or medical illness. The price students paid for these events was based on their prior purchase decisions. For example, a card associated with a medical illness may read: "You woke up with the flu and need to go to the doctor. If you purchased medical insurance, you owe a $20 copayment. If you purchased catastrophic medical insurance or no medical insurance, you owe $150." A Certified Financial Planner (CFP) staffed the financial distress booth to help students who were struggling to allocate their income. The CFP reviewed the lifestyle purchases made by the student and helped to identify areas in which the participant could reduce expenses, such as basic cable versus premium cable. Students were allowed to exchange any purchase decision, with the exception of the decision to have a child, to see the impact on their monthly budget. For example, a student who purchased a new Honda CRV could later go back and trade his vehicle for a used Honda Civic. The student's monthly car payment, taxes and insurance would all be adjusted accordingly.

Accountability Tier

The accountability tier is designed to collect program utilization data. Program utilization data includes number of participants reached and cost of programming (Jacobs, 1988). The IYR simulation was offered on three separate days in 2013. A total of 970 undergraduate students completed the simulation. The average time for a student to complete the simulation was 50 minutes. The total program cost was $13,650 or $14.07 per participant. Examples of program budget items included marketing materials, signage, booth development and setup, program materials and handouts, graphic design support, volunteer parking and lunch for all volunteers and the first 250 students who attended each simulation. Student lunches were provided as an incentive to participate in the event. More than thirty door prizes were given away each day as part of the chance booth. Door prizes were donated from local business and not included in the total cost of programming. Volunteers

staffed all booths and there was no cost recovery for faculty or program coordinator salary.

Program Clarification Tiers

The program clarification tier is designed to allow the program staff to reflect on the event and identify improvements for future programming efforts. This step involves reviewing and refining the program's mission, goals, objectives and strategies (Jacobs, 1988). Following the IYR event, the core project team met for a debriefing session and to process participant and volunteer feedback. Two focus group sessions with student participants were conducted the week following the event. Thirty-six students participated; 23 of them had also participated in the preimplementation focus group session. Students were asked to respond to prompts regarding the design, flow and overall event experience. One-on-one interviews were also conducted with many of the same campus leaders and administrators who participated in the needs assessment. A total of nine campus faculty and staff, representing campus-wide student services, participated in the one-on-one interviews. An additional three course instructors, who had required or incentivized student participation, were also interviewed.

Progress Toward Objectives and Short-Term Program Impact Tiers

The fourth level of the tiered program evaluation approach is assessing progress toward objectives and the fifth level is program impact (Jacobs, 1988). The student evaluation for the IYR simulation was designed to be both formative (assessing program satisfaction) and summative (measuring knowledge gained and intended behavior change) in nature (Fox et al., 2005). The data for this study were collected from participants at the exit point of the simulation event. A retrospective pretest (RPT) measure was used to assess program impact (Lyons et al., 2006; Davis 2003; Rockwell and Kohn, 1989). Specifically, the RPT survey design was used to measure self-reported understanding on eight financial practices/concepts as a result of participating in the simulation. The RPT survey instrument consisted of 28 questions and included both closed-ended and open-ended response questions. The instrument was divided into five sections, including demographics (seven questions), program satisfaction (three questions), knowledge gained (eight questions), intended behavior changes (six questions) and open-response (four questions). Participants responded to a statement that read "For each topic listed below, in the LEFT column, circle the ONE number that best reflects your LEVEL OF UNDERSTANDING before the program. Then in the RIGHT column, circle the ONE number that best reflects your LEVEL OF UNDERSTANDING after the program." Responses were presented using a Likert-scale where 1 = Poor Understanding, 2 = Average Understanding, 3 = Good Understanding and 4 = Excellent Understanding. Paired sample t-tests were conducted to compare the mean pretest and posttest scores using SPSS 21.0.

Results and Discussion

As discussed above, 970 undergraduate students completed the simulation, representing approximately 5% of the undergraduate student population. A total of 697 evaluations were collected by study personnel, a 72% response rate. As is often true of surveys, there is some missing data/skipped questions. Table 1 displays detailed demographic characteristics of the sample. The sample included seniors (29.1%), juniors (22.1%), sophomores (9.5%) and freshmen (39.3%). The majority of the sample were female (64%). Approximately 44% of the sample reported having student loan debt and 14% reported having credit card debt.

Participant satisfaction of the program was extremely high. Ninety-five percent of respondents found the simulation exercise educational. Similarly, 94% of participants found the information presented practical and 74% reported the subject matter as timely.

Table 2 displays the pre/post-course assessment of understanding including the mean, standard deviation and difference between the scores. Participants experienced a highly significant (P<.001) positive change in understanding across all eight indicators. The largest reported mean change in understanding was the costs to maintain a household followed by costs to raise a child.

One objective of the IYR simulation was to provide students with a realistic picture of cost of living once they become financially independent. Open-ended response questions identified that students had unrealistic expec-

Table 1. Respondent Demographic Characteristics

Measure and Variable	Sample	%
Grade classification (n = 694)		
Senior	n = 202	29.1
Junior	n = 153	22.1
Sophomore	n = 66	9.5
Freshman	n = 273	39.3
Sex (n = 694)		
Male	n = 250	36.0
Female	n = 444	64.0
Student loan debt (n = 695)		
Yes	n = 302	43.5
No	n = 393	56.5
Credit card debt (n = 696)		
Yes	n = 95	13.6
No	n = 601	86.4

Table 2. Paired t-Tests for Retrospective Pretest (n= 688)

Understanding Variable	Pre		Post		
	Mean	SD	Mean	SD	Difference
Costs to maintain a household	2.54	0.89	3.68	0.51	1.14***
Costs to raise a child	2.21	1.05	3.2	1.01	0.99***
How amount of money influences lifestyle	2.84	0.89	3.75	0.47	0.91***
Budgeting my money	2.76	0.84	3.62	0.52	0.86***
Link between career choice and lifestyle	2.85	0.86	3.7	0.52	0.85***
How to make wise financial choices	2.79	0.85	3.62	0.53	0.83***
Impact of student loan debt on future	2.72	1.03	3.43	0.83	0.71***
Impact of credit card debt on future	2.75	1.02	3.41	0.79	0.66***

Note: *** p < .001

tations regarding starting salary, taxes and actual costs of common household consumables such as groceries, personal products, internet and cable. Perhaps the best testimony to the success of the program is communicated directly through the words of the participants. One participant noted: "During the [It's Your Reality] simulation, I learned many things on what I should expect outside of college, in what I have to budget for with my spending. It helped me realize what is necessary versus what is unnecessary."

In addition to measuring change in understanding, participants were asked to respond to a series of six behavior statements to measure change in intentions as a result of program participation. The response matrix is presented in Table 3. The participants overwhelmingly reported positive changes in intended behaviors; most notably 97% reported the intention of "thinking more about the impact of a purchase decision on my finances." The second stated goal of the IYR program was to help college students understand the relationship between current behavior choices and future financial implications. Ninety-six percent of participants reported they were "more likely to consider the impact of a purchase decision today on my future."

It was determined the IYR simulation achieved the program mission, goals and objectives. Several strategies emerged to improve the simulation experience. Key findings and program modifications from the program clarification stage included a more targeted marketing plan, adjustments to the volunteer training and rearrangement of the store front layouts for the simulation. Several changes were made regarding specific "for sale" items at the booths. For example, the clothing booth offered several clothing packages, which included consignment, department and name-brand stores. Students suggested changing the clothing store options to name-brand stores, which may have a broader appeal to college students. As suggested by Jacobs (1988) an IYR simulation handbook was developed, which contains program process and implementation data. This handbook is a resource tool for future programming efforts that details the needs-based assessment process, program development processes and specific program components, such as timeline for program planning, contact information, volunteer training material, booth descriptions, marketing materials, notes from key conversations and program evaluations.

For future research, the project team has designed a long-term evaluation tool to measure actual change in behavior and progress toward achieving the goals outlined by the program. The team has identified an 18- and 24-month time lapse post programming to implement the long-term evaluation. These findings can be used to support program replication in other college and university settings (Jacobs, 1988).

Table 3. Intended Behavior Change as a Result of Educational Program

Behavior Change Variable	Yes (%)	No (%)
Thinking more about the impact of a purchase decision on my finances	97	3
Consider the impact of a purchase decision today on my future	96	4
Limit my use of credit cards or other forms of debt	93	7
Delay having children	87	13
Change how I purchase clothing, food, and entertainment	82	18
Consider seeking education beyond a bachelor's degree	81	19

The Five-Tiered Approach provides a holistic program evaluation. This paper details the implementation of the Five-Tiered Approach; however, only preliminary plans to implement the fifth tier are outlined as related to long-term program impact. The evaluation findings will be more robust after the long-term program impact data has been collected and analyzed. It is recognized the RPT used to measure program impact is a less rigorous evaluation tool as compared to a true experimental or quasi-experimental design; however, the RPT is a commonly accepted measurement tool utilized to document changes in knowledge and behavior within Cooperative Extension programming (Lyons et al., 2006; Davis 2003; Rockwell and Kohn, 1989). Finally, the IYR simulation was conducted at a state flagship land grant institution. Students in other college and university settings may have more or less experience in the area of family financial management based on prior experiences.

Summary

There is currently limited work specifically addressing the effectiveness of financial life skill simulations in the college environment. However, the findings presented enhance the overall body knowledge supporting the use of active learning strategies to enhance college student knowledge and understanding of a particular subject (Barkley, 2010; Curland and Fawcett, 2001; Braxton et al., 2000).

The findings from this study have important implications for educators regarding college students' financial literacy and financial security, as well as future research. As previously discussed, the college setting provides a backdrop for teachable moments. While this project used a financial simulation to provide financial education to college students, educators should be challenged to integrate financial knowledge and skills across the curriculum. To increase the likelihood of successful transition from financial dependence to financial independence students will need to be financially literate and to make wise financial decisions such as purchasing a car or home and retirement planning. This especially holds true for retirement planning as more employers are shifting the investment and saving responsibility to the worker. Consumers need education on how to become more financially savvy.

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Forestry Students' Perspectives about Participation in Leadership Development[1]

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Abstract

This study focused on forestry students' perspectives about and barrier to participation in leadership development. Data collection occurred via the descriptive, census survey research method. Study population was all undergraduate forestry students enrolled in Alabama's two nationally accredited forestry programs during the 2013 spring semester. The objectives were to describe students' level of participation in leadership development while in high school and college and describe the students' attitude toward and barriers to participation in college- and community-based leadership development. Each variable was analyzed based upon the statement's intent. Descriptive statistics of means, standard deviations and frequencies were used as the main analysis approach. Respondents reported a high level of participation in extracurricular activities while in high school and in college. Current members of organizations responded differently to the variable "I have a positive vision of my future" from students who were not current members of an organization. A t-test of that variable's means was statistically significant at the 0.002 level. The data analysis also revealed that students' mother's education level influenced the students' attitudes toward participation in extracurricular activities. As students' mother's level of education increased, the students experienced "coaching fatigue" and they reduced their participation in extracurricular activities.

Introduction

According to Boyd (2011), the need for leadership education/development exists at every level of our society, from youth to business executives. College students have many opportunities to develop and hone their leadership skills and abilities. There are many college- and extra-credit leadership development classes available to students. Other organizations and opportunities available to forestry students to develop leadership skills include: performing art, debate, student government, departmental clubs, church youth groups, fraternities and sororities, intramural and varsity sports, conclave events, Minorities in Agriculture, Natural Resources and Related Sciences (MANRRS), the Society of American Foresters (SAF), etc.

Benefits of participation in leadership development and/or extracurricular activities include: better grades, social aspects or exposure to different groups of people, positive attitudes toward school, leadership skills, teamwork, organization skills, analytical thinking, problem solving, time management, multitasking and long term commitment (Massoni, 2011; Lawhorn, 2008-2009). Other benefits include: behavior modification, school completion, positive aspects to become successful adults, better self-respect, higher self-esteem, higher self-confidence, enhanced status among peers, discovery of talents, career development, higher career aspirations and students have less conformity to gender stereotypes (Massoni, 2011). Because the list of potential benefits is comprehensive, Pracz (2011) argued that the benefits are valued more by employers than academic performance.

Participation in leadership development organizations also help to enhance participants' team spirit and

[1]The human subjects' review was approved by the IRB committees at Alabama A&M University, Auburn University and Tuskegee University. Subjects' consent was implied by completing and returning the survey.

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ability to function effectively in a team environment, two traits which are critical for success in today's work place. Students who participated in leadership development activities grew in civic responsibility, leadership skills, multiculturalism, awareness, understanding leadership theories and personal and societal values (Cress et al. 2001).

There are hundreds of definitions of leadership and no single definition is universally accepted, as the definition used depends upon the circumstance. For this paper, we will use the following definitions of leadership, development, leadership development, barriers to leadership development and membership, respectively: 1) leadership is defined as people working in a given situation (Pearce and Conger, 2003); interactions or relationships among individuals (Kouzes and Posner, 2008); a focus on the needs of the group (Greenleaf, 1977) and the result is an achieved goal; 2) development is defined "as the evolution of skills (defined broadly to include abilities, capacities, ways of understanding) over time, where early level skills are reorganized into higher-level skills that allow individuals to manage more complex units of information, perspectives and tasks" (King 2009, p. 598); 3) leadership development is defined as an activity that "involves engaging with learning opportunities in one's environment over time to build one's capacity or efficacy to engage in leadership. …moves from simple to more complex dimensions of growth" (Komives et al., 2006, p. 402); 4) barriers to leadership development are obstacles and challenges that prevent the individual from engaging in leadership development; and 5) membership is being a member in an organization.

The future of the forestry industry rests in the hands of today's forestry students. Therefore, it is imperative for young people of today to become proactive in preparing for and shaping tomorrow's world (Kleon and Rienhart 1998). Cox (1996) stated that we all face and must embrace the challenge of preparing today's youth for their role as tomorrow's leaders.

The main hypothesis is there is no difference in the responses of the male and female respondents regarding perspectives about participation in leadership development. Study objectives were to describe: 1) Alabama's undergraduate forestry students' level of participation in leadership development organizations/activities while in high school and while in college; 2) Alabama's undergraduate forestry students' attitudes toward participation in college- and community-based leadership development organizations/activities; 3) Alabama's undergraduate forestry students' perceived barriers to participation in college- and community-based leadership development organizations/activities; 4) the relationship between the overall rating of attitudes toward and barriers to participation in leadership development organizations/activities constructs and selected demographic variables; and 5) how male and female responses differ regarding leadership development.

Methods

Data collection occurred via the descriptive, census survey research method. Study population was all undergraduate forestry students, sophomores, juniors and seniors, enrolled in the Forestry, Ecology and Wildlife Program at Alabama A&M University and the Department of Forestry at Auburn University during the 2013 spring semester. The survey instrument was sub-divided into four constructs and consisted of a total of 67 variables. Construct I focused on background/demographic information, construct II covered organizations the students were members of while in high school, construct III focused on attitudes toward participation in leadership development organizations/activities and construct IV covered barriers to participation in leadership development organizations/activities.

Overall Cronbach's alpha coefficient of reliability for constructs III and IV combined was 0.92, construct III was 0.95 and construct IV was 0.82. Constructs III and IV were modified slightly after Connors and Swan (2006). Content and face validity of the instrument occurred via a panel of experts and a field test of six students. No revisions were necessary following the pilot test. Test surveys were omitted from this analysis. Eighty-six surveys were distributed to Alabama's undergraduate forestry students. Forty useable surveys were returned, yielding a response rate of 46.51%.

Data analysis occurred as follows: 1) descriptive statistics of means, standard deviations (S.D.) and frequencies were used as the main analysis approach; 2) to control for non-response error, following each solicitation, the returned questionnaires were kept separately and analyzed via t-test to measure any differences between the overall means of the early and late respondents. No differences occurred between the two groups; 3) the t-test tested the differences between the variables of students who were current members of an organization and the students who were not current members of an organization for constructs III and IV; 4) Pearson correlation analyses measured the relationship between selected demographic variables and attitudes toward participation in leadership development organizations and barriers to participation in leadership development organizations; and 5) categorical analysis of means for constructs III and IV occurred using the following scale: 1 strongly disagree (M = 1.00 – 1.74); 2 disagree (M = 1.75 – 2.49); 3 agree (M = 2.50 – 3.24); 4 strongly agree (M = 3.25 – 4.00).

Results

The majority of the respondents (77.5%) reported Caucasian as their ethnicity, 12.5% reported African American, 2.5% reported Asian or Pacific Islander and 2.5% reported Native American. Two students (5.0%) did not report an ethnicity. Respondents' indicated gender was 20.00% females and 80.00% males. Reported mean age was 22.50 years old, n=36, SD=1.65. A total of 72.50% of the respondents indicated that they were current members of an organization. Respondents'

(95%) indicated that their parents/guardian encouraged me to participate in leadership development/activities. Respondents, 42.50%, reported membership in the student chapter of SAF and 55.00% reported membership in other organizations. Sixty percent of the students indicated that they hold, plan to hold, or have held a leadership position in a student organization while in college. About one-third of the students, 32.50%, indicated that they had taken a leadership development class.

Table 1 shows the membership in organizations while in high school frequency and the students who are and are not currently participating in an organization. The three highest "yes" responses were in answer to "I participated in extracurricular activities, 97.50%", "I participated in church youth ministry, 72.50%"; "I held a leadership position while in high school, 62.50%."

Table 2 shows the attitudes toward leadership development mean variable scores of the students who are currently and are currently not participating in an organization. The table also shows n, standard deviation, t value and p-value for the variables. Overall mean score of attitudes toward participation in leadership organizations/activities (construct III) for students who currently participate in leadership development organizations/activities was M=3.19, SD=0.78 and overall mean score for students who currently do not participate in leadership development organizations/activities was M=2.68, SD=0.86.

Table 3 shows the barriers to leadership development mean variable scores of the students who are currently and are currently not participating in an organization. The table also shows n, standard deviation, t value and p-value for the variables. Overall mean score of barriers to participation in leadership organizations/activities (construct IV) for students who currently participate in an organization was M=2.16, SD=0.75 and overall mean score for students who currently do not participate in an organization was M=2.19, SD=0.88. Not one of the variables of the construct had a statistically significant t value.

Table 4 shows the Pearson correlation analyses of overall rating of attitudes toward and barriers to participation in leadership development organizations/activities constructs. We used the descriptions outlined by Hopkins (2000) to interpret the correlation coefficients. Only statistically significant moderate associations, r > 0.30, are discussed here. Students' reported a high relationship with attitudes toward participation in leadership and currently a member of an organization, r=0.43** and membership in an organizations other than SAF, r=0.42**. A moderate relationship was reported with mother's level of education and attitudes toward participation in leadership development organizations/activities, r=0.34*. Students' reported a moderate relationship with barriers to participation in leadership development organizations/activities and, mother's level of education, r=0.38** and planned highest level of education sought, r=-0.31*.

Table 1. Membership in organizations while in high school frequency and the students who are and are not currently participating in an organization (n=40).

Organization	Frequency "Yes"	Currently a member of an organization (currently not a member of an organization)
Future Farmer of America	35.0	25.0 (10.0)
Distributive Education Clubs of America	5.0	0.0 (5.0)
Business Professionals of America	5.0	2.5 (2.5)
Future Business Leaders of America	12.5	7.5 (5.0)
Future Career and Community Leaders of America	7.5	5.0 (2.5)
4-H	22.5	20.0 (2.5)
Skills USA-VICA	10.0	10.0 (0)
Extracurricular Activities	97.5	70.0 (27.5)
Held Leadership Position	62.5	52.5 (10.0)
Scouting	25.0	15.0 (10.0)
Held Leadership Position in Scouting	15.0	7.5 (7.5)
Church Youth Ministry	72.5	57.5 (15.0)
Leadership Position in Your Church's Youth Ministry	30.0	27.5 (2.5)

Table 2. Attitudes toward participation in leadership development organizations mean variable scores, n, standard deviation (SD), t value, and p value of the students who are and are not currently participating in an organization. () represent n, mean, and standard deviation of the students who are not currently participating in an organization. Students who are current members of an organization n, mean, and standard deviation are without ().

I participated in activities because:	n(n)	mean(mean)	SD(SD)	t-value	|p-value|
Activities will be fun.	29(11)	3.24(2.91)	0.74(1.04)	1.13	0.2657
I have a positive vision of my future.	29(11)	3.62(2.73)	0.49(1.01)	3.77*	0.0006
I want to be a leader in my future career.	29(11)	3.48(3.00)	0.69(0.77)	1.92	0.629
I can clearly see the benefits to participating in leadership activities.	29(11)	3.48(2.91)	0.51(0.83)	2.65	0.0115
I have a positive view of the organization.	29(11)	3.31(2.73)	0.54(0.90)	2.51	0.0166
Activities benefit my future career.	29(11)	3.48(3.09)	0.51(0.94)	1.70	0.0978
Activities are a good use of my time.	29(11)	3.55(2.91)	0.51(0.83)	2.98	0.0050
They provide opportunities for me to assume leadership responsibilities.	29(11)	3.38(2.82)	0.49(0.75)	2.77	0.0087
They helped me set goals for my future.	29(11)	3.34(2.73)	0.61(0.79)	2.63	0.0123
They have improved my inter-personal skills.	29(11)	3.45(2.73)	0.63(0.79)	3.01	0.0046
They will help me in my future academic studies.	29(11)	3.28(2.73)	0.59(1.01)	2.14	0.0391
They help me achieve my personal goals.	29(11)	3.28(2.91)	0.75(0.83)	1.34	0.1882
They help achieve my professional goals.	29(11)	3.31(2.91)	0.76(0.94)	1.39	0.1715
The leader of the organization/activity motivates me to participate.	29(11)	3.07(2.55)	0.75(0.69)	2.01	0.0517
They have made me more concerned for my school, home, and community.	29(11)	3.07(2.27)	0.80(0.90)	2.72	0.0099
They have made me a better public speaker.	29(11)	3.28(2.64)	0.65(0.92)	2.47	0.0182
I want to be a leader in my community.	29(11)	3.21(2.82)	0.82(0.87)	1.32	0.1957
Leadership activities have helped me improve my grades in college.	28(11)	3.07(2.27)	0.81(0.65)	2.91	0.0061
My friends influenced me to participate.	29(11)	2.76(2.45)	0.83(0.69)	1.08	0.2871
I have not been motivated to participate in any leadership development organizations.	29(11)	2.97(2.27)	0.80(0.90)	-0.70	0.4912
My boy or girlfriend influenced me to participate.	28(11)	2.14(1.91)	0.93(0.54)	0.78	0.4411
Overall mean score		3.19(2.68)	0.78(0.86)		

*Bonferroni significant (0.05/21 = 0.002)

Discussions

The number, 7, of minority students who participated in this study are too small to make a meaningful interpretation about their views on leadership development and barriers to leadership development. However, NCES (1995) reported that minority and low income high school students participate in extracurricular activities at a much lower rate than majority students. In spite of low level participation, Everson and Millsap (2005) stated that these groups, low income and minority students, tend to benefit from extracurricular activities as much or more than their more advantaged peers.

Table 3. Barriers to participation in leadership development organizations mean variable scores, n, standard deviation (SD), t value, and p value of the students who are and are not currently participating in an organization. () represent n, mean, and standard deviation of the students who are not currently participating in an organization. Students who are current members of an organization n, mean, and standard deviation are without ().

I have not gotten more involved with organizations/activities because:	n(n)	mean(mean)	SD(SD)	t-value	|p-value|
I am getting ready for graduate school after college.	29(11)	1.90(1.91)	0.72(0.83)	-0.05	0.9628
I would rather spend my time and/or money on other things.	28(11)	2.32(2.64)	0.77(1.03)	-1.04	0.3038
I have hobbies that keep me too busy.	28(11)	2.54(2.73)	0.64(0.90)	-0.75	0.4590
I focus my time on sports.	28(11)	2.11(2.09	0.74(0.54)	0.07	0.9476
I am too busy working at my job after classes.	28(11)	2.50(2.45)	0.96(0.93)	0.13	0.8943
I am too busy with homework.	28(11)	2.71(2.64)	0.71(1.03)	0.27	0.7883
The membership costs are too expensive.	28(11)	2.07(2.27)	0.66(1.01)	-0.73	0.4682
I can not afford to go on outings and trips.	28(11)	2.25(2.18)	0.70(0.87)	0.26	0.8001
None of my close friends participate.	28(11)	2.18(2.27)	0.55(0.79)	-0.43	0.6727
Getting to activities is difficult.	28(11)	2.00(2.09)	0.38(0.54)	-0.59	0.5580
I focus my time on band/choir activities.	28(11)	1.61(1.36)	0.57(0.50)	1.24	0.2219
I live too far from school to attend activities.	28(11)	1.82(1.64)	0.72(0.67)	0.73	0.4685
Overall mean score		2.16(2.19)	0.75(0.88)		

*Bonferroni significant (0.05/12 = 0.0042)

Table 4. Pearson correlations between selected demographic variables, attitudes toward participation in leadership development organizations, and barriers to participation in leadership development organizations.

Variables	Attitudes toward participation in leadership (n=40)		Barriers to participation in leadership (n=40)	
	Coefficient	Description	Coefficient	Description
Attitudes toward participation in leadership (n=40)			0.12	Low
Age (n=36)	0.17	Low	0.13	Low
College GPA (n=40)	0.13	Low	-0.23	Low
Currently a member in an organization (n=40)	0.43**	Moderate	0.03	Trivial
Mother's education (n=40)	0.34*	Moderate	0.38**	Moderate
Father's education (n=40)	0.18	Low	0.21	Low
Membership in SAF (n=40)	-0.11	Low	0.03	Trivial
Membership in other organizations (n=40)	0.42**	Moderate	0.16	Low
Hold, plan to hold, or have a leadership position in a student organization (n=40)	-0.19	Low	-0.02	Trivial
Taken a leadership class (n=40)	0.02	Trivial	0.02	Trivial
Planned highest level of education (n=40)	-0.25	Low	-0.31*	Moderate
While in high school, did you participate in extra-curricular activities (n=40)	0.08	Trivial	0.20	Low
While in high school, did you hold a leadership position in one or more organizations (n=40)	-0.29	Low	-0.05	Trivial

*Correlation is significant at the 0.05 level

**Correlation is significant at the 0.01 level

The three highest "yes" responses of membership while in high school are in answer to: 'I participated in extracurricular activities'; 'I participated in church youth ministry'; and 'I held a leadership position while in high school.' The high participation in church youth groups may be unique to Alabama simply because a large percentage of families in Southeastern U.S. are active in the church. The above all relate to the students being steered toward participation in extracurricular and/or leadership development activities. Existences of close adult relationships and/or mentoring increased the students' participation in leadership development activities (Komives et al., 2006).

The variable 'I have a positive vision of my future' was the only statistically significant variable via the t-test of construct III, between current members of an organization and students who are not current members of an organization. The variable is statistically significant at the 0.002 level (0.05/21). The level is based upon Bonferroni's correction for multiple t-test comparisons. This finding is not surprising as positive aspects to become successful adults, higher self-confidence and a positive attitude toward school were some of the benefits of participation in leadership development activities (Massoni, 2011; Park and Dyer, 2003).

Not one of the variables of construct IV had a statistically significant t value. The above finding is surprising as only 15.20% of the upper division courses of a typical forestry curriculum required social science and humanity classes (Vonhof, 2010). Fuertes and Sedlacek (1993) reported that barriers to Hispanic students' leadership development included institutional racism, assimilation vs. integration and differences in socialization.

The Pearson correlation analyses examined the relationship between the overall rating of attitudes toward and barriers to participation in leadership development organizations/activities constructs. As attitudes toward participation in leadership development/activities go up, membership in an organization also goes up and membership in an organization other than SAF goes up. These findings agree with those of Park and Dyer (2003) and Smart et al. (2002). When students' mother's level of education goes up, the students' attitudes toward participation in leadership development/activities go up and barriers to participation in leadership development go up. This finding, mother's level of education affecting barriers to participation in leadership development, was unexpected. One interpretation of this is that the mother's level of education is a "double edged sword." The student feels compelled to participate in leadership development organizations/activities even more than he/she would otherwise.

The result is that the student experiences "coaching fatigue." Students find barriers or reasons to preclude their participation in extracurricular activities. The involvement of adults, especially parents, in shaping a student's leadership development is not surprising as this finding mirrors the finding of Komives et al. (2006). As the students' planned highest level of education sought goes up, perceived barriers to leadership development/activities go down. Students who come to college with leadership development values tend to display those behaviors while in college (Smart et al., 2002).

Summary

Parents or guardians influenced the students to participate in leadership development/activities. While in high school and college, the students reported a high level of participation in extracurricular activities. The students had a positive vision of their future. Regardless to whether the students participated in extracurricular activities or not, they reported a low level of barriers that precluded them from participating in extracurricular activities. As the students' attitudes toward participation in leadership development/activities go up, the students' membership in organizations also go up. As the students' mother's level of education increased, the students experienced "coaching fatigue" and they reduced their level of participation in extracurricular activities. And as the students' planned highest level of education sought goes up, perceived barriers to leadership development/activities go down.

Recommendations

Thus, forestry administrators, advisors and instructors should: 1) become proactive in encouraging students to participate in leadership development/activities, particularly the low income and minority students; 2) encourage students who are capable of completing advanced degrees to pursue them. As students plan to pursue advanced degrees, they also seek leadership development/activities; 3) communicate the importance of high school students' participation in extracurricular activities to high school administrators, counselors and teachers. Students who participate in high school extracurricular activities also tend to do so while in college; and 4) push and promote the competitive edge students can gain from participation in leadership development organizations/activities. The future of forestry education and the forestry industry is strongly related to the promotion, student acquisition and development of leadership skills and/or abilities.

Study Limitations

Due to distributing and collecting the survey in a classroom setting caused the following: 1) the fraction of responses was not randomly selected; 2) some students may have felt forced to take a survey, complete it and return it; and 3) assumed all units would be present on the day the survey was distributed. Due to a host of reasons, students may have refused to participate in the survey and caused self-selection bias. Due to a small response number, the survey results are subject to unit non-response bias. Due to the limited number of unit responses, the survey results can only be generalized to Alabama's forestry students.

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Factors Influencing Enrollment in Colleges of Agriculture: Perspectives of Students in 1862 Land Grant Institutions

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Abstract

The purpose of this study was to describe and identify factors that influence enrollment in colleges of agriculture at 1862 land grant institutions. The population of the study included students who were currently enrolled as students in the southern Cooperative Extension System region. A five-part instrument was developed to collect the data. The survey collected data regarding demographics and influencers on one's decisions to enroll in a college of agriculture or choose a career related to agriculture. Usable responses yielded a return rate of 76.2% respondents. Both descriptive and inferential statistics were used to analyze the data. Seventy-two percent of the respondents were females and 83.6% self-identified as white. A majority of total respondents grew up in suburban areas. Both males and females indicated that personal influences such as a parent, close relative or friends had a low influence on their decision to enroll in a college of agriculture. School related influences such as a high school counselor or an agriculture science teacher also had no or very low influence on their decision to enroll in a college of agriculture. Respondents who indicated having a family member involved in an agriculture career or lifestyle were most likely to be influenced by those closest to them when choosing to enroll in a college of agriculture. Given the findings from this study, it is recommended that administrators in colleges of agriculture focus on educating prospective students, parents and high school personnel about the vast career opportunities available in agriculture and related fields. Future research should focus on identifying best practices and appropriate strategies for the recruitment and retention of students in colleges of agriculture in an effort to increase enrollment and eliminate perceived barriers to enrollment in a college of agriculture.

Introduction

Land grant colleges of agriculture have problems recruiting and retaining students for their programs. According to the Association of Public and Land Grant Universities (2014), enrollment in public universities has increased by 23 percent in the past decade. In the past, undergraduate and graduate students' enrollment in colleges of agriculture and related programs were declining (Gwynn and Thompson, 1990; Nichols et.al, 1993; Scott and LaVergne, 2004). However, according to (U.S. Department of Education, National Center for Education Statistics, 2014), degrees conferred in the colleges of agriculture have been on a steady increase. Although enrollment has continued to increase, there remains a strain to meet the demands from industry for students in agricultural related fields.

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Land Grant colleges were established to teach agriculture and mechanical arts to "common" people. Justin Morrill was instrumental in the passage of the first Land Grant Act of 1862 which provided land for the establishment of colleges and universities to educate all of the American people (Molnar et al., 1981). Prior to the passage of the first Land Grant Act of 1862, higher education was limited to elite class individuals and traditionally only taught classical education. While this new legislation did not exclude the teachings of classical studies, it was heavily concentrated on agriculture and industrial type courses for skill development. University faculty and administrators were charged with identifying ways to increase the number of students enrolled in colleges of agriculture.

Hicks and Bruening (1991) stated that a shift in the workforce is calling for colleges to recruit a "new type of student" to their agricultural related programs. These new students are more likely to come from an urban area. The number of people residing in urban areas is increasing. This increase has impacted the type of student who currently enrolls in colleges of agriculture (Esters, 2007). Unlike the traditional college student, these students will come from a culturally diverse background, may not have grown up on a farm and furthermore, may have limited experience with agriculture (Esters, 2007).

Several researchers have identified factors that relate to students' choice to enroll in colleges of agriculture (Jones and Larke, 2001; Robinson et al., 2007; Scanlon et al., 1989; Talbert and Larke, 1995; Wildman and Torres, 2001). The factors found in these studies include: influential people, images of agriculture and exposure to agriculture as children. While a plethora of research has focused on why students enroll in colleges of agriculture, more research is needed on the factors that influence enrollment.

Agricultural education is only one segment of the big picture in terms of agriculture and related programs-only about six percent of the student population is being served by this area (FFA Advisors, 2007). Many argue that a strong agriculture industry is pivotal to this country's survival (FFA Advisors, 2007). Additionally, FFA Advisors (2007) stated, "a strong U.S. agriculture industry is vital to the health, safety and prosperity of this country" (p.7).

The conceptual model identified in this study is a model of student college choice (Chapman, 1981). This model specifies imperative variable sets and their interrelationships. This model suggests that to understand the choice of a potential student, it is imperative that background and current characteristics of the student, family characteristics and characteristics of the college should be taken into consideration. According to Chapman (1981) the external influences can be grouped into (1) the influence of significant persons, (2) the fixed characteristics of the institutions and (3) the institutions' own efforts to communicate with prospective students. Chapman (1981) further contends that external influences are generalized by the expectations of college life.

Purpose and Objectives

The purpose of this study was to identify and describe factors that influence enrollment in colleges of agriculture by currently enrolled students in colleges of agriculture at 1862 Land Grant institutions.

The specific research questions guiding this study were:

- To identify the demographic characteristics of students enrolled in colleges of agriculture at 1862 Land Grant institutions
- To determine who influences a student's decision to enroll in a college of agriculture or choose a career related to agriculture

Procedures

The research questions were addressed using a descriptive correlation design. According to Radhakrishna et al. (2007), the goal of a descriptive correlation research study is to explain and/or predict relationships. The population for this study consisted of currently enrolled undergraduate and graduate students in 1862 Land Grant institutions during the fall semester of 2008. The sample for this study was selected using both cluster sampling and simple random sampling techniques. The researchers used the Cooperative Extension System's regions as a means to identify an appropriate sample size. One institution was removed from the possible sample list because there was no active college/division/program of agriculture. After identifying all eligible institutions, the total number of 1862 Land Grant institutions was 14 with colleges of agriculture in the Southern region. All enrollees in the college of agriculture at these institutions were randomly selected and surveyed. A questionnaire was developed and reviewed by a panel of experts that consisted of five faculty members and two graduate students in the Department of Agricultural and Extension Education at The Pennsylvania State University. This panel established content and face validity. The initial instrument was revised based upon the comments and suggestions of the panel members. The final survey instrument and cover letters were reviewed and approved by the Office of Research Protections prior to the collection of data.

According to Dillman (2007), data should be collected in several phases. Data collection began with a pre-notice email to selected institutions requesting help with the study. This email also described the study and detailed the usefulness of the study as a means to provide a positive impression of the research (Dillman, 2007). Dillman also stated that pre-notification will help to increase response rate for surveys. Consequently, the initial contact requested that an email be sent to the researcher with an agreement to participate in the study. The second contact was approximately one week later in the form of an email to the institutions that

agreed to participate. The text for the email sent to their students included a URL link to the questionnaire. This URL link was included in the follow-up contact. Another follow-up email, with a URL link, was sent to cooperating institutions 7-10 days later requesting that an email reminder be sent to students as well as thanking those students who had already completed the questionnaire. The fourth contact was an email sent with the URL link to the survey requesting that institutions send the email and survey information to their students.

Data Analysis

The completed questionnaires were coded, entered and analyzed using the Statistical Package for the Social Sciences (SPSS version 16.0) for Windows. Because the participants were selected at random, both descriptive and inferential statics were used to analyze the data. Descriptive statistics included frequency distributions, means and standard deviations. The research questions were further analyzed by employing independent samples t-tests for the independent variables gender, race/ethnicity and family involvement in agriculture. One-way analysis of variance (ANOVA) was used to compare mean scores of scales computed by factor analysis for residence before college (rural/farm; rural/non-farm; suburban; urban). A rural area is an area that has citizens fewer than 2,500 and an urban area is comprised of 50,000 or more people (U.S. Census Bureau). A suburban area is a community that can be considered a distance that a person is able to commute from a larger city or town.

The Cronbach's alpha for the major subsections of the instrument was acceptable. The Chronbach's alpha for the Knowledge of agriculture related programs was 0.90. The usable response rate for this study was 76.2%. To address non-response bias, a comparison was made between early and late respondents (Miller and Smith, 1983) on the dependent variables. Early respondents were defined as those respondents who responded within the first contact and late respondents were classified as those who responded after the first contact. There were no significant differences on the variables tested.

Results

The majority of the respondents for the study were female (72.2%), white (83.6%) and from a suburban background. These particular demographic characteristics were similar to what other research studies found with regards to survey respondents currently enrolled in colleges of agriculture across the United States (Dyer et al., 1999; Williams, 2007). Family involvement in agriculture was about even for the respondents with 52.8% responding "no" that they did not have family members involved in an agriculture career or lifestyle and 47.2% indicating "yes" that they did have someone in their family involved in agriculture. The majority of respondents reported being 18-22 years old (67.1%). Most of the respondents reported being upper level undergraduates (juniors and seniors) or graduate students, 50.5% and 20.6% respectively.

Students responded to variables about degree of influence various individuals had on their decision to enroll in a college of agriculture. A factor analysis was run to identify scales for both influencers on enrollment and influencers on career choice. Exploratory factor analysis (EPA) was used (Darlington, 2009). This factor analysis allows for more workable subset of scales to use for data analysis purposes in addition to the ability to describe a larger number of variables in smaller sets.

Individuals who influence decision to enroll in a college of agriculture were subdivided into two scales based on the results of the factor analysis statistical test. Results from the factor analysis were "Personal Influencers" and "School Related Influencers." The variable "other" was eliminated for the purposes of data analysis because of the large number of missing data for that variable. A Cronbach's alpha was conducted on the scales; the alpha levels were: 0.77 for Personal Influencers and 0.67 for School Related Influencers.

Influences on decision to enroll in a college of agriculture or choose a career related to agriculture were analyzed using independent samples t-tests. The demographic characteristics used for analyses were: gender, race/ethnicity, family involvement in agriculture and residence before college.

Gender

Significant differences were found among males and females on personal influences ($t = 2.04$, $p < 0.042$) on one's decision to choose a career related to agriculture. The mean score for males was significantly higher ($M = 2.76$, $SD = 1.22$) than females ($M = 2.60$, $SD = 1.19$) on decision to choose a career related to agriculture from personal influences. However, there were no significant differences found between males ($M = 1.73$, $SD = 0.95$) and females ($M = 1.62$, $SD = 0.88$) for career choice related to agriculture upon school related influences.

Race/Ethnicity

There were significant differences found between whites and non-whites ($t = 4.36$, $p < 0.001$) for the decision to choose a career related to agriculture from personal influences. The mean score for whites was significantly higher ($M = 2.71$, $SD = 1.20$) than for non-whites ($M = 2.29$, $SD = 1.17$) regarding the respondents' decision to choose a career related to agriculture based upon personal influences. There were no differences in the mean scores for whites ($M = 1.65$, $SD = 0.90$) and non-whites ($M = 1.65$, $SD = 0.97$) regarding school related influences affecting their decision to choose a career related to agriculture.

Family Involvement in Agriculture

As shown in Table 1, significant differences were found on personal influences ($t = 11.61$, $p < 0.001$)

and school related influences (t = 4.69, p < 0.001) between those who indicated they had family involved in agriculture and those who responded "no" when asked if they had family members involved in agriculture. The mean score for "yes" respondents was significantly higher (M = 3.04, SD = 1.16) than "no" respondents (M = 2.29, SD = 1.06) for personal influences on decision to enroll in agriculture. Furthermore, the mean score for "yes" respondents was significantly higher (M = 1.85, SD = 0.97) than "no" respondents (M = 1.60, SD = 0.83) for school related influences on decision to enroll in agriculture.

Table 1. Independent t Test Results for Influences on Enrollment in the College of Agriculture by Gender, Race/Ethnicity, and Family Involvement in Agriculture

Influence on Enrollment	n	Mean	SD	t	p
Gender:					
Personal Influences					
Male	319	2.78	1.17	2.20	.028*
Female	829	2.61	1.16		
Total	1,148				
School Related Influences					
Male	314	1.79	.96	1.56	.118
Female	817	1.69	.89		
Total	1,131				
Race/Ethnicity:					
Personal Influences					
White	953	2.73	1.17	4.96	.000**
Non-White	188	2.27	1.10		
Total	1,141				
School Related Influences					
White	939	1.72	.92	.216	.829
Non-White	185	1.70	.87		
Total	1,124				
Family Involvement in Agriculture:					
Personal Influences					
Yes	562	3.04	1.16	11.61	.000**
No	588	2.29	1.06		
Total	1,150				
School Related Influences					
Yes	550	1.85	.97	4.69	.000**
No	583	1.60	.83		
Total	1,133				

Note. Scale: 1= No Influence, 2= Very Low Influence, 3= Low Influence, 4= High Influence, and 5= Very High Influence. *p < .01, two tailed. **p < .001, two tailed.

Table 2. Means, Standard Deviations and ANOVA Results for Influences on Enrollment in Agriculture

Influences on Enrollment	Residence prior to college	n	*Mean	SD	F	p
Personal Influences						
	Rural/Farm	236	3.50ab	1.14	65.65	.000
	Rural/Non-Farm	244	2.64ab	1.13		
	Suburban	467	2.36a	1.02		
	Urban	197	2.34a	1.09		
	Total	1,144	2.65	1.17		
School Related Influences						
	Rural/Farm	227	2.14a	1.07	23.83	.000
	Rural/Non-Farm	242	1.71a	.90		
	Suburban	462	1.55a	.78		
	Urban	197	1.62a	.83		
	Total	1,128	1.72	.91		

Note. *Means followed by the same letter differ significantly from each other as identified by the Scheffé post hoc analysis technique. Mean values Scale: 1= No Influence, 2= Very Low Influence, 3=Low Influence, 4= High Influence, and 5= Very High Influence.

Residence before College

One-way analysis of variance (ANOVA) to determine if there were differences in influencers on the decisions to enroll by residence before college is shown in Table 2. The ANOVA results for residence before college differed significantly for personal influences as well as school related influences on the decision to enroll in agriculture. A significant difference was found between rural/farm and the other the residences (F = 65.65, p < 0.001) on personal influences on enrollment. Rural/farm residence was also significantly different from each of the other groups (F = 23.83, p < 0.001) on school related influences on decision to enroll. The Scheffé post hoc analysis test was used to determine the nature of the differences. Rural/farm residence (M = 2.14, SD = 1.07)

Table 3. Reliability for Factor Analysis of Individuals who influence a student's decision to select a career related to agriculture

Factors	Items on Questionnaire	Number of Items	Alpha
Personal Influencers	Parent, Other Family Member (Sibling, Aunt/Uncle, etc.), Friend	3	.808
School Related Influencers	High School Ag Teacher, High School Guidance Counselor, College Recruiter	3	.727

Table 4. Independent t Test Results for Influences on Career Choice in Agriculture by Gender, Race/Ethnicity and Family Involvement in Agriculture

Influence on Career Choice	n	Mean	SD	t	p
Gender:					
Personal Influences					
Male	321	2.76	1.22	2.04	.042*
Female	830	2.60	1.19		
Total	1,151				
School Related Influences					
Male	317	1.73	.95	1.74	.083
Female	820	1.62	.88		
Total	1,137				
Race/Ethnicity:					
Personal Influences					
White	958	2.71	1.20	4.36	.000**
Non-White	186	2.29	1.17		
Total	1,144				
School Related Influences					
White	943	1.65	.90	.06	.955
Non-White	187	1.65	.87		
Total	1,130				
Family Involvement in Agriculture:					
Personal Influences					
Yes	565	3.01	1.20	10.67	.000**
No	588	2.29	1.09		
Total	1,153				
School Related Influences					
Yes	556	1.79	.99	5.07	.000**
No	583	1.52	.79		
Total	1,139				

Note. Scale: 1= No Influence, 2= Very Low Influence, 3= Low Influence, 4= High Influence, and 5= Very High Influence. *p < .01, two tailed. **p < .001, two tailed.

Table 5. Means, Standard Deviations and ANOVA Results for Influences on Career Decision Related to Agriculture

Influences on Career Choice	Residence prior to college	n	*Mean	SD	F	p
Personal Influences						
	Rural/Farm	237	3.41ab	1.16	51.43	.000
	Rural/Non-Farm	245	2.65ab	1.12		
	Suburban	468	2.35ab	1.10		
	Urban	198	2.38a	1.16		
	Total	1,148	2.64	1.20		
School Related Influences						
	Rural/Farm	232	2.07a	1.09	25.56	.000
	Rural/Non-Farm	241	1.66a	.87		
	Suburban	466	1.47a	.72		
	Urban	195	1.57a	.88		
	Total	1,134	1.65a	.90		

Note. *Means followed by the same letter differ significantly from each other as identified by the Scheffé post hoc analysis technique.
Mean values Scale: 1= No Influence, 2= Very Low Influence, 3=Low Influence, 4= High Influence, and 5= Very High Influence.

differed significantly from rural/non-farm residence (M = 2.64, SD = 1.13), suburban residence (M = 2.36, SD = 1.02) and urban residence (M = 2.34, SD = 1.09).

The individuals Influencing Decision to Choose a Career Related to Agriculture is shown in Table 3. Students were asked to respond to variables about degree of influence various individuals had upon their decision to choose a career related to agriculture. A factor analysis was run to reduce the data to two scales: Personal and School Related. The same scales created for individuals who influence a students' decision to enroll in a college of agriculture were also identified for use on the influence of one's decision to choose a career related to agriculture. A Cronbach's alpha was run for this set of scales; the alpha level was acceptable at 0.81.

Table 5 indicates that significant differences were found between rural/farm and each of the other groups ($F = 25.56$, $p < 0.001$) on school related influences on one's decision to choose a career related to agriculture. The Scheffé post hoc analysis test was used to determine the nature of the differences among the groups. Rural/farm residence differed significantly (M = 2.07, SD = 1.09) from rural/non-farm residence (M = 1.66, SD = 0.87), suburban residence (M = 1.47, SD = 0.72) and urban residence (M = 1.57, SD = 0.88) on the decision to choose a career related to agriculture from school related influences.

Conclusions, Discussions and Implications

Findings revealed that students from 1862 Land Grant institutions in the Southern Cooperative Extension Region were primarily white and female, from suburban areas. This study revealed that, in fact, there are not a lot of "traditional" students (farm background) enrolling in colleges of agriculture, but there is an increase in the number of female students from non-farm backgrounds enrolling in colleges of agriculture. Family involvement in agriculture surprisingly did not have a huge impact on the way students perceived agriculture and the barriers associated with enrollment.

The level of influence certain individuals have on a student's decisions related to agriculture is not as pronounced in this study as in others. Esters (2003) found that parents had a high influence on a student's decision to choose a career/enroll in an agriculture related program. While respondents to this study indicated those individuals had either no or low influence on their decisions related to agriculture, whites were typically more influenced by personal influences than non-whites. Contrary to other studies, school related influences had little to no impact on decisions to enroll or choose a career related to agriculture for students in this study. Robinson et al. (2007) found that individuals were influenced quite a bit by school related things such as websites and graduates from the college. This conclusion supports the influence of significant persons as described by Chapman in the Model of Student College Choice (1981).

Additionally, the factors included in personal influences listed on the questionnaire were: parent, other family member (sibling, aunt/uncle, etc.), or friends. The factors related to school related influencers from the questionnaire were: high school agriculture teacher, high school guidance counselor and college recruiter. These findings are contrary to what Robinson et al. (2007) found. Their study found that a parent or guardian was most influential in a students' college decision process. Findings from this study revealed that males and females differed significantly on the level of influence personal influences had on their decision making process, while they agreed on the amount of influence school related influences had on their decision to enroll in a college of agriculture. This conclusion supports the influence of the fixed characteristics of the institution as described by Chapman in the Model of Student College Choice (1981).

Personal and school related influence factors were also compared by race/ethnicity, family involvement in agriculture and residence prior to college. Significant differences were found between white and non-whites ($t = 4.96$, $p < 0.001$) on personal influences, but there were no differences between the two on school related influences. Currently, enrolled students who indicated they had a family member involved in agriculture differed significantly from those who said they did not have a family member involved in agriculture on both personal and school related influences factors. Significant differences were also found on personal and school related influences for respondents' residence prior to college.

Students enrolled in colleges of agriculture at 1862 land grant institutions indicated that there decision to choose a career related to agriculture was impacted by several individuals. On the personal influence factor scale, males differed significantly from females ($t = 2.04$, $p < 0.042$), while males (M = 1.73) and females (M = 1.62) did not differ significantly on their influence to choose a career based on school related influences factor. This finding is supported by Esters and Bowen

in a study conducted in 2005 found that parents and guardians were the most influential in their decision making to enroll in colleges of agriculture in an urban agricultural education program.

Respondents were compared based on race/ethnicity, family involvement in agriculture and residence prior to college. Whites and non-whites differed significantly on personal influences factor related to their decision to choose a career related to agriculture ($t= 4.36$, $p < 0.001$). Surprisingly, the findings suggest that whites ($M = 1.65$) and non-whites ($M = 1.65$) rated the level of influence of school related influences factor the same, "no influence" on their decision to choose a career related to agriculture. Significant differences were found between those indicating "yes" and "no" on whether or not they have a relative involved in agriculture on personal and school related influences. A one-way ANOVA found that students differed significantly by residence prior to college for both personal and school related influences factor. This conclusion supports the influence of significant persons and the fixed characteristics of the institution as described in the Model of Student College Choice by Chapman (1981).

The results of this study were unique to students enrolled in 1862 institutions from the southern region these findings present implications for all 1862 Land Grant institutions with colleges of agriculture. If colleges of agriculture are interested in increased enrollment, care should be taken to inform students, high school counselors and other people involved in students' decisions to choose a career related to agriculture about the vast career and educational opportunities in the field. Recommendations for those concerned with increasing enrollment and stabilizing enrollment in colleges of agriculture include educating parents, other family members and friends, of potential students about the benefits of involvement in agriculture. If utilized, this proactive approach will support institutions' own efforts to communicate with prospective students as described in the Model of Student College Choice by Chapman (1981).

Future research should include a qualitative approach to identify additional influencers as well as an in depth look to increase enrollment in agricultural programs.

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Developing Communication Skills of Undergraduate Students through Innovative Teaching Approaches

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Abstract

Strong oral communication skills are consistently rated of high importance for job applicants. Seventy-five percent of employers want colleges to place more emphasis on developing written and oral communication skills, particularly at the undergraduate level. Despite the recognized importance of strong discipline-specific oral communication skills, providing practice opportunities in real-life settings can be challenging for programs. This is particularly the case in dietetics programs training their students in counseling skills. A Counseling and Communication: Theory and Practice course was re-designed based on student focus group and internship preceptor input. The revamped course included counseling sessions with paid actors simulating real-life scenarios; actors were trained on their particular medical condition and life circumstances prior to the small-group session. Of students completing the course with actor-simulated sessions (n=13), 100% felt confident in their counseling skills three months after completing the course. Students responded to the question "This course stimulated my interest in the topic," as 3.6 on a 4 point scale, higher than the 2.5 and 3.2 in the previous years of the course. This innovative teaching and learning approach supports the benefit of creative methods of teaching to foster oral communication skills, thus better preparing students for future employment and success.

Introduction

Employers expect that prospective hires with an undergraduate college degree not only have expertise in their discipline, but strong communication skills as well. Behind integrity, executives rank communication skills as the second most important soft skill desired for job applicants (Robles, 2012). Currently, new employees' communication skills often do not meet the standards of employers (Leggette et al., 2011; Yale, 2014); more than 60% of employers report applicants lack "communication and interpersonal communication skills," an increase of about 10% in two years (Workforce Solutions Group, 2013). A nationwide survey of more than 700 employers determined that the deficit between job candidates' required and actual skills was greatest for communication abilities (Yale, 2014). According to the annual Talent Shortage Survey (ManpowerGroup, 2013), one in five employers worldwide cannot fill positions because candidates lack soft skills including motivation, appearance, punctuality, flexibility and interpersonal communication skills.

In a recent survey, 75% of employers stated that they want colleges to place more emphasis on helping students develop written and oral communication skills (Association of American Colleges and Universities, 2013). Colleges must teach life and work skills necessary for students to obtain and maintain employment after graduation, particularly in agriculture, environmental and health-related disciplines (Evans et al., 2009; Leggette et al., 2011). According to the Association of American Colleges and Universities (2011), "Written and oral communication should be practiced extensively, across the curriculum, in the context of progressively more challenging problems, projects and standards for performance." Employers want to hire applicants with strong interpersonal communication skills appropriate for the discipline. To that end, there is a need for undergraduate degree programs to develop courses, assignments and experiential learning opportunities for students to learn and practice their communication skills in innovative, engaging and real-life practical scenarios (Robles, 2012).

University instructors and administrators are using creative and innovative teaching methods to improve communication skills of students (Aschenbrener et al., 2010; Holston and O'Neil, 2008). At certain colleges, courses can earn a "communication-intensive" designation if they meet rigorous criteria for teaching multimodal communication skills. In addition, many colleges now offer

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and sometimes require new student orientation courses that include professional communication skills development (Ewing-Cooper and Parker, 2013). Service-learning courses, internships and training courses are examples of other opportunities where students can develop communication skills in a practical setting (Evans et al., 2009; Holston and O'Neil, 2008; Peffer, 2012; Stephenson et al., 2013). Student leadership programs, including student organizations and ambassador programs, also enable students to develop personal and professional leadership skills (Haber and Komives, 2009; Arnold, 2012). In 2012, Arnold evaluated 31 College of Agriculture student ambassador programs and found that every program offered a leadership retreat for ambassadors where students learned how to speak confidently. Participation in Agriculture Future of America (AFA) enhances a variety of work-life skills including interpersonal communication skills, writing skills and oral presentation skills (Svacina and Barkley, 2010).

Effective communication and counseling skills are essential for health care professionals to guide patients toward healthy lifestyles. Research illustrates that interpersonal communication plays a major role in a patient's health, including increased emotional well-being, satisfaction and improved chronic disease and physiological outcomes (Hancock et al, 2012; Puri et al., 2010). Dietitians translate biochemistry, physiology, anatomy and food science into practical recommendations for patients by employing a variety of verbal and nonverbal communication skills (Power and Lennie, 2012). A cross-sectional study of practicing dietitians found that 98% reported communication skills as being either very important or extremely important to working with patients (Whitehead et al., 2009). Per the Accreditation Council for Education in Nutrition and Dietetics (ACEND), Academy of Nutrition and Dietetics, dietetics educational programming must teach and develop student communication skills (Accreditation Council for Education in Nutrition and Dietetics, 2013).

Dietetics educators are developing innovative learning opportunities to promote communication skills. Computer-assisted instruction (CAI) is one tool being used to teaching counseling skills to dietetics students. In CAI, students work through online modules developed by experienced dietitians to instruct on theory and provide real-life examples of counseling sessions. A study of 452 undergraduate students from eleven different dietetics programs found that the use of CAI can improve communication and counseling skills in these students (Puri et al., 2010).

Service-learning activities are another tool being utilized to teach communication skills to dietetics and other healthcare discipline students (Stephenson et al., 2013). One such example is a mixed-discipline aged-care student clinic where dietetics students worked with other healthcare professionals to evaluate recently discharged patients and to establish health care needs (Kent et al., 2014). Through this activity, both students and faculty reported enhanced inter-professional communication skills. To better meet the communication needs of their dietetics students, a Medical Nutrition Therapy course was redesigned as a communication-intensive, service-learning course. Students designed educational nutrition modules on cardiovascular disease, cancer, diabetes and obesity for use by Cooperative Extension agents. Then, students presented these modules at professional meetings, conferences and seminars. Students reported that the revamped course improved their communication skills and ability to work as a team with other students and community professionals (Holston and O'Neil, 2008).

Despite the employer and faculty recognition of the importance of communication skills to professional achievements, student attitudes towards learning communication skills are varied. Interestingly, in dietetics students, students in earlier years of undergraduate training have more positive attitudes towards learning communication skills than students approaching graduation (Ahn et al., 2009; Khashab, 2006; Power and Lennie, 2012).

The use of improvisational actors to teach communication skills has recently been explored as an effective way to educate students from a variety of disciplines (Anderson et al., 2014; Bell et al., 2014; Webster, 2013). The purpose of this study was to (1.) explore student attitudes towards the use of actors and (2.) evaluate student-rated confidence in communication skills as measured through counseling in an upper-level dietetics course.

Methods

Course Design

Counseling and Communication: Theory and Practice is a senior-level course required for dietetics students in the accredited dietetics program at the University of Kentucky (UK). The course is taught every fall in tandem with an advanced medical nutrition therapy course. In 2010, the counseling course was offered as a 75-minute lecture meeting twice weekly. In 2011, the same course was offered as a 75-minute lecture two days per week, but also included a one-time practice counseling session for each student. The patient role was played by the teaching assistant for the course. In 2012, the course was revamped as a 50-minute lecture two days per week and a two hour lab one day per week. The patient role in 2012 was played by paid theater students from the university's theater department. Two sections of the lab were offered weekly to provide students with a smaller learning environment and more opportunities to practice their counseling skills. All students in the class completed a case study about a patient prior to lab each week and four students in each lab prepared to be the counselor for the week. The four students in each lab counseled the actor/actress and then peers and the instructor provided constructive feedback.

Focus Group, Course and Preceptor Evaluation

Focus groups were conducted with students who completed the senior level dietetics counseling class in

2010 (Cohort 1, n=7), 2011 (Cohort 2, n=12), or 2012 (Cohort 3, n=13). Focus group participants were recruited via email from the director of undergraduate studies for the dietetics and human nutrition program. All students who had completed the course in Fall 2010, 2011 and 2012 were invited to participate in the focus groups, which were held in April 2011, 2012 and 2013. Some students were unable to participate in the focus group discussions because they had graduated in December (immediately following completion of the counseling class) and were completing an internship, or had started a job, away from Lexington, KY. The focus group discussions were led by the academic coordinator and the director of undergraduate studies for the Department of Dietetics and Human Nutrition. Students were asked about the importance of counseling and communication skills, their confidence in counseling and communicating with future patients and how they thought they may best learn counseling and communication skills.

Dietetic internship preceptors were also surveyed to assess student communication skills. Preceptors specifically addressed questions about student competency and confidence in counseling during the internship rotation. The communication specific survey questions were included in the annual online program evaluation completed by preceptors.

Lastly, formal university course evaluations for Fall 2010, Fall 2011 and Fall 2012 were accessed and evaluated as quantitative and qualitative measures of course satisfaction and student learning.

The University of Kentucky Institutional Review Board approved the study protocol and all participants provided written informed consent prior to participation in the study.

Results and Discussion

The communication-intensive Counseling and Communication: Theory and Practice course was offered as a traditional lecture to 44 students in Fall 2010, as a lecture with lab and peer-counseling experiences to 51 students in Fall 2011 and as a lecture with lab and actor-counseling experiences to 41 students in Fall 2012. All students enrolled in the course were upper-level dietetics students.

Student Focus Groups

Table 1 summarizes the characteristics of the three focus groups. Cohort 1 (n=7) was predominately female (86%) and Caucasian (86%). Cohort 2 (n=12) was also predominately female (92%) and Caucasian (100%). Cohort 3 (n=13) had a slightly lower percentage of female participants (77%) and, again, all were Caucasian (100%). The cumulative GPA of Cohort 2 was significantly (p=0.003) higher than that of Cohort 3. The demographics of focus group participants closely matched the demographics of the students enrolled in the courses each year.

Focus group participants provided a comprehensive list of characteristics associated with a good counselor.

Table 1. Characteristics of Focus Group Participants (n=32)

	Age (years)	Gender	Race	Cumulative GPA
Cohort 1 n=7	24.2 ± 1.80	1 male 6 female	6 Caucasian 1 African-American	3.37 ± 0.31
Cohort 2 n=12	22.4 ± 0.79	1 male 11 female	12 Caucasian	3.62 ± 0.22
Cohort 3 n=13	22.8 ± 2.30	3 male 10 females	13 Caucasian	3.25 ± 0.32*

*p=0.003 vs cumulative GPA in Cohort 2

Table 2. Focus group responses (n=32) to the question "What do you feel are the most important characteristics of a good counselor?"

Cohort 1 (n=7)	Cohort 2 (n=12)	Cohort 3 (n=13)
Active listener	Active listener	Active listener
Relatable	Good communication skills	Critical thinker
Inspiring	Provides support	Patient-centered
Sympathetic	Genuine	Good communication skills
Patient-centered	Relatable	Motivator
	Understanding	Leads by example
	Asks open-ended questions	Genuine
	Confident	Patient
		Relatable
		Adaptable

Table 2 summarizes these characteristics by cohort. All cohorts spoke of the importance of being an active listener and being relatable. Cohorts 2 and 3 were able to provide more characteristics than Cohort 1, indicating a better understanding of motivational interviewing and counseling in a healthcare setting. These two cohorts specifically addressed the importance of good communication skills in a counseling setting. Similar to this finding, Whitehead et al. (2009) found that 98% of dietitians thought communication skills were either very important or extremely important in patient consultations.

When responding to the question "I felt prepared to counsel a patient," none of the seven students in Cohort 1 (0%) and only five of 12 students (42%) in Cohort 2 felt prepared to counsel patients at the start of their supervised internship. In comparison, 13 of 13 students (100%) in Cohort 3 reported feeling prepared to counsel after taking the counseling course. For those in Cohorts 1 and 2, the reasons given for not feeling prepared to counsel patients included: lack of practice, only one semester of a counseling course, no realistic examples given in the course and lack of real world skills.

These results are similar to those found in other disciplines; students report difficulty in transferring classroom-based knowledge of "good" communication skills to their own professional interactions (Aled, 2007). Providing guided communication and activities in coursework can promote student confidence in their communication skills (Wagner et al., 2002). Individuals who lack confidence experience problems when communicating with others (Erozkan, 2013); therefore, it is vital to ensure students are adequately prepared to counsel patients upon graduation.

Focus group participants were asked to provide specific examples of how the course could be enhanced to better prepare them for counseling and communication in a real-world setting. Students in Cohorts 1 and 2 suggested showing more realistic counseling videos as

examples and providing more in-class time to practice counseling. Students in Cohort 2 responded favorably when asked about the possibility of using paid actors to role play as patients during counseling sessions for future offerings of the course. These students indicated the real-life application and feedback from the instructor, peers and actor would be beneficial. They also felt that utilizing outside actors would provide more realistic examples of scenarios they may encounter in the future as dietitians and would motivate them to be better prepared for the counseling session.

Cohort 3 students who took the course with actor-stimulated counseling sessions reported that they specifically gained interviewing and probing skills after working with the actors. Through mock counseling sessions with actors, students learned about setting attainable goals with clients, focusing on small changes one at a time and meeting patients "where they are." According to the work of Bell et al. (2014), realism, actor feedback, layperson perspective, depth of emotion and improvisation skills are most important for realistic and effective simulations using actors. The scenarios with actors should not be overly scripted to more closely mirror a counseling session.

Students reported several strengths of the new course structure. To start, students valued the small group setting of the lab where they received feedback from several classmates in a supportive setting. Hampl et al. (1999) also reported that dietetics students found feedback to be helpful, informative and encouraging after working with standardized patients during classroom counseling sessions.

When asked how students felt about practicing their counseling skills in front of classmates, responses included "nerve racking, but something we will have to do; it was a good place to start and the experience was positive; and, classmates provided constructive feedback." According to research by Laidlaw (2009), students with a higher level of social anxiety have more negative attitudes towards learning communication skills. Students who experience severe anxiety and nervousness in communication-intensive courses report less enjoyment of such experiences, with a subsequent negative impact on student learning and skill mastery (Stein and Stein, 2008).

Internship Preceptor Feedback

Internship preceptors provided feedback on the communication and counseling skills of interns from the UK undergraduate dietetics program. Seventy-eight percent of preceptors rated the counseling skills of the program's interns as "good" or "excellent." When asked about the counseling skills of UK interns compared to the counseling skills of interns from other universities, 62% of preceptors reported that the counseling skills of UK interns were "up to par" or "above" those of students from other dietetics programs. Preceptors ranked the top three strengths of UK students as (1.) knowledge base, (2.) confidence in ability and (3.) preparedness to counsel. The most common weakness reported by the preceptors was lack of experience. Preceptors suggested that students receive more practice and formal training, consistent with the changes that were made to the course between Fall 2010 and Fall 2012.

Table 3. Course and teaching evaluations for counseling course taught in Fall 2010 (n=44), Fall 2011 (n=51), and Fall 2012 (n= 42). Scores based on a 4 point Likert scale.

	Overall Value of the Course *1=poor 4=excellent*	Overall Value of the Teaching *1=poor 4=excellent*	"This course stimulated my interest in the topic." *1=Completely disagree 4=Completely agree*
Fall 2010	2.6	2.8	2.5
Fall 2011	3.3	3.3	3.2
Fall 2012	3.6	3.7	3.6

Evaluating Changes to Course

Students completed formal course evaluations during the final week of class in Fall 2010, Fall 2011 and Fall 2012. Results from the course evaluations were available to the instructor of the course approximately eight weeks following the completion of the semester. Students were asked to rate the overall value of the course and overall value of the teaching on a Likert-type scale where 1 is poor and 4 is excellent. Students also responded to the statement, "This course stimulated my interest in the topic." Table 3 provides a summary of the responses from Fall 2010, Fall 2011 and Fall 2012. All parameters received below-average scores in Fall 2010; by Fall 2011 all scores had increased significantly from baseline (Fall 2010). Of particular importance was the fact that students taking the course with actor-stimulated counseling sessions (Fall 2012), reported being more interested in the topic of the course, counseling and communication skills.

Actor-Based Simulations: Two years later

The counseling in dietetics course continues to be offered as a lecture with embedded lab design, with lab time dedicated to practicing counseling skills. Students practice their counseling skills through actor-simulated sessions where actors are paid and trained on their specific scenario. Scenarios are developed by the course instructor, with input from faculty, internship directors, preceptors and students. Then, actors are trained by the course instructor and teaching assistant with emphasis placed on matching actors who can best role-play certain scenarios. Several actors return year-to-year to participate in the simulated sessions.

Based on focus group and preceptor feedback, faculty continue to develop a variety of real-life scenarios students are likely to see during their internship experience. These scenarios have evolved based on student feedback, preceptor feedback and trends in the field. One specific trend is providing students with more experience in working with patients from a variety of cultures, consuming predominately ethnic foods. In a study of third-year undergraduate students, nearly half preferred to counsel clients from their own cultural (McArthur et al., 2011). For dietetics students, developing

cultural competency and confidence in communicating with those of different cultures is important to counseling success and effectiveness. Kessler et al. (2010) reported through focus group findings that one-half of dietetics students at The California State Polytechnic University did not feel comfortable interacting with a Spanish-only speaking client. As the counseling course continues to evolve, one area of focus for the future is allowing students the opportunity to work with interpreters as part of the actor-simulated counseling sessions. Others have used interactive, Web-based learning modules to allow students to practice communicating through interpreters (Kalet et al., 2002).

Summary

According to hiring managers, only 44% of new college graduates are very or completely prepared to communicate with authority figures and clients and 44% are very or completely prepared for public speaking (Chegg and Harris Interactive, 2013). Educators are challenged with developing innovative and engaging discipline-specific courses and learning experiences to promote oral communication skills. In dietetics and related healthcare disciplines, communication is considered a core skill and professional competency; indeed, patients recognize good communication skills as an important skill for a positive counseling experience (Hancock et al., 2012; Stenner et al., 2011). Interprofessional student clinics (Kent et al., 2014), web-based simulations (Cant and Cooper, 2014; Litchfield et al., 2000; Turner et al., 2000) and clinical simulations (Krautscheid, 2008) are examples of innovative techniques to promote communication skills of undergraduate students.

Students value creative teaching, particularly those approaches that promote applied learning (Aschenbrener et al., 2010). The use of trained improvisational actors to simulate real-life counseling scenarios offers students the opportunity to practice their communication skills in a controlled and safe environment. Preliminary evidence from nursing education supports the use of trained actors to promote student learning and student confidence in their communication skills (Webster et al., 2012). This project also supports the value of actor-simulated counseling sessions to develop communication skills and confidence in counseling in upper-level dietetics students. Through focus groups, it was found that 100% of students who completed the course when actor-simulated counseling sessions were required reported feeling prepared to counsel clients during their internship. Students were also able to provide a more comprehensive list of characteristics of a good counselor, providing evidence of improved knowledge through the course.

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The Impact of Two Experiential Learning Programs: The Graduates' Perspective

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Abstract

The purpose of this descriptive census survey was to explore the impact of participation in two integrated, experiential learning programs in a College of Agriculture and Life Sciences. Specific objectives were to determine the influence of these programs on graduates' (a) decisions to enter careers and graduate school, (b) level of skill improvement, (c) career development and decidedness and (d) preparation for careers and graduate school. Graduates believe their experience positively affected development of their skills and abilities and had a positive influence on their career and graduate school aspirations. Graduates report that the programs enhanced their preparation for careers and graduate school by helping them transition from the role of undergraduate student to that of employee or graduate student. Though both programs had positive impacts, there were some significant differences between the two programs, which have different purposes and outcomes. These findings provide further confirmation that experiential learning is an effective way to meet outcomes while using the real-world, hands-on, experiential learning methods that students often prefer.

Introduction and Review of Literature

Until somewhat recently, the instructional approach to student learning was focused on teacher-centered strategies (Spring, 2005). A transformation to student-centered learning was needed to increase student learning (Huba and Freed, 2000). In the learner-centered paradigm, "students construct knowledge through gathering and synthesizing information and integrating it with the general skill of inquiry, communication, critical thinking and problem-solving" (Huba and Freed, 2000, p. 5). The teacher and student learn and evaluate the learning together and the emphasis is on generating better questions while learning from errors rather than on getting the correct answer (Huba and Freed, 2000). A well-known example of student-centered learning, and one that is used frequently in higher education, is experiential learning.

Experiential learning is broadly defined as "the process by which a learner creates meaning from direct experience" (Bohn and Schmidt, 2008, p. 5). Experiential learning includes a variety of strategies that engross students in learning opportunities that go beyond traditional lectures and reading and writing assignments (Shapiro and Levine, 1999) and when implemented in a classroom setting, students participate in real-life activities, reflect on those activities and incorporate their new understanding of that activity into their lives (Bohn and Schmidt, 2008).

The idea of experiential education is certainly not new in the field of agricultural education (Wulff-Risner and Stewart, 1997). In fact, several prominent scholars—including John Dewey, Kurt Lewin, Jean Piaget, William James, Carl Jung, Paulo Freire, Carl Rogers and many others—were helping to mold experiential learning theory in the early 20th century, a time when U.S. agricultural education was organized in both formal and non-formal settings (Knobloch, 2003; Kolb and Kolb, 2005). Experiential learning has long been valued in the field of agricultural education and is recognized as an integral part of the educational process (Cheek et al., 1993), in part because research has shown that the metacognitive skills students employ while participating in experiential learning activities permit them to assess their highest level of understanding and mastery of the area under discussion (Bohn and Schmidt, 2008).

Experiential learning theory suggests that learning occurs as a result of a specific experience or many experiences (Roberts and Harlin, 2007). Kolb espoused that experiential learning theory is "a holistic integrative

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perspective on learning that combines experience, perception, cognition and behavior" (Wulff-Risner and Stewart, 1997, p. 43). And Kolb and Kolb (2005) stated that "*learning is the major determinant of human development and how individuals learn shapes the course of their personal development*" (p.195).

Learning experientially, in genuine contexts, has been a foundational model for student learning in agricultural education (Knobloch, 2003). Parcell and Franken (2009) studied a commodity trading course built on the principles of experiential learning that has shown successful results. Students who participated in an actual trading pool investment became more actively involved in their own learning process. Experiential learning was able to help students take an interest in their own learning and get involved with their course. Another outcome of experiential learning is that learners are able to identify specific parts of their experience upon which they can reflect (Roberts and Harlin, 2007).

In secondary agricultural education, experiential learning takes many forms, including laboratory work, field trips, problem-solving and active observations. Many educators like to call this "learning by doing." In university agricultural programs, experiential learning is often a focus of curricula (Roberts, 2006)

The College of Agriculture and Life Sciences (CALS) at Iowa State University offers two programs that reflect principles of experiential and student-centered learning: Agriculture Students Providing Integrated Solutions for Agronomy and Farm Business Management Questions (AgPAQ) and Science with Practice (SWP).

"*Agron 356/Engl 309 was the original start of ISU's agronomy department's course cluster learning environments. Agronomy 356 and English 309 were initially linked and integrated*" (Barnett, et al., 2009, p.5). Later, Agron 356/Engl 309 evolved into the program currently known as AgPAQ and was delivered as a learning community for upper-class agriculture students at ISU where students enrolled concurrently in a cluster of courses and completed coursework in teams. The cluster consists of an English course, an agricultural economics course and two agronomy courses (Barnett et al., 2009). Each learning community team worked with real clients and precision agriculture tools to address the client's needs by preparing a complete crop and soil management plan. The management plans addressed soil loss and residue management, planting dates and rates, profitability and costs and benefits and recommendations for clients in a real-world setting.

The purpose of AgPAQ was to provide students the opportunity to successfully solve professional, real-world, work-based, agricultural problems by integrating skills from the linked courses. "*A major aspect of the AgPAQ learning community was the consultant relationship students developed with identifying problems and opportunities and recommending improvements for a local farmer*" (Barnett et al., 2009, p.4). A main goal of AgPAQ was to create a student learning experience that reflected the realities of the workplace. Student learning outcomes for AgPAQ included understanding specific principles, being able to apply those principles to solve problems in a professional setting, synthesizing and integrating knowledge from multiple disciplines, solving and analyzing difficult problems in a professional setting and being able to professionally and effectively communicate solutions to a client.

In the SWP program, students worked one-on-one with faculty and staff on a detailed research project or other work assignment. The purpose of SWP was to provide opportunities for agriculture students to learn while working with faculty and staff mentors in university research laboratories, farms, greenhouses and other units through a planned education and work experience program (Retallick and Steiner, 2009). Students who participated in the semester-long SWP program earn money for working on their project and can earn three academic credits for fulfilling all course requirements. Student learning outcomes for SWP included acquiring technical agricultural skill; developing organizational and planning skills related to research and other experiences; developing skills related to data collection, research procedures, written and oral communication, human resources management, teaching and critical analysis of data. Increased understanding of research activities, linkages to higher level course work and gaining an understanding of the connection between research and practical, real work situations/problems are also learning outcomes of SWP.

Although there has been movement in higher education toward student-centered learning and increased focus on student learning outcomes, there has been little research on specific impacts of experiential learning programs on participants. The same is true at ISU. Program organizers and administrators assume the experiential learning portion of AgPAQ and SWP programs benefit students in their future careers and endeavors, but this assumption has not been researched. For CALS to continue promoting its experiential learning programs, it is important to determine the impact of these programs on graduates, specifically with regard to educational and career advancement. Such research could also help improve the quality of or identify areas for improvement in AgPAQ, SWP, or other experiential learning programs at ISU. Nationally, this study can provide imperial data that not only supports the goal of career readiness by providing meaningful and engaged learning, but also validates experiential learning as a means of accomplishing that goal.

Purpose and Objectives

The purpose of this descriptive census survey was to explore the impact of participation in AgPAQ or SWP, as reported by graduates (former participants). The study had four specific objectives:

- Determine the programs' impact on graduates' decisions to enter careers and graduate school.
- Determine the level of skill improvement graduates attribute to their participation in the programs.

- Determine the programs' influence on graduates' career development and decidedness.
- Determine the extent to which the programs enhanced graduates' preparation for careers and graduate school.

Conceptual Framework

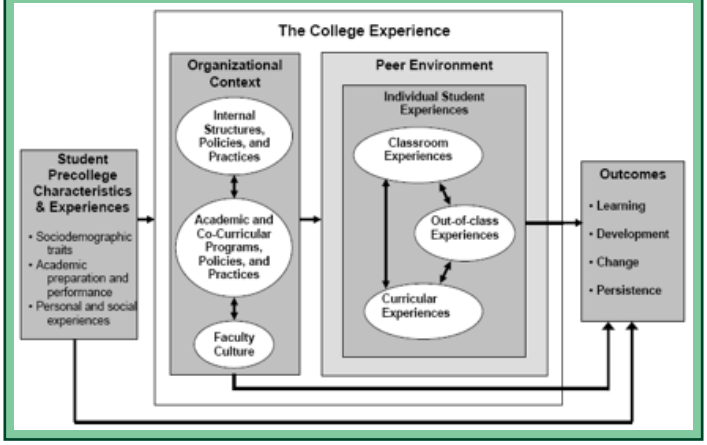
The conceptual framework for this research is based on the work of Terenzini and Reason (2005), who developed a model that explains how the college experience influences student learning and persistence (Figure 1). The model illustrates the influence of (a) precollege characteristics and experiences and (b) college experiences, including organizational context and peer environment, on student outcomes such as learning, personal development, social change and persistence. We used Terenzini and Reason's model, specifically the student outcomes portion, to help develop the objectives and survey for this study. The survey asked graduates about their individual experiences in AgPAQ or SWP and the impact of these programs on specific aspects of their lives.

Methods and Procedures

We chose to use a web-based survey and email notifications for this descriptive survey research because the study's population was located throughout the United States and an electronic instrument would increase the speed of results (Dillman, 2007) and was most cost effective (Ary et al., 2010). The researcher-developed instrument was adapted from the "Summer Undergraduate Research Experiences (SURE)" survey (Taraban and Blanton, 2008) and previous end-of-year evaluations from AgPAQ and SWP. The survey had five sections: (a) program participation and after graduation; (b) skills, abilities and career impact; (c) career/education influence, overall impact, mentoring and career benefits; (d) education and recommendation; and (e) demographics.

To assess internal validity, six experts (some who were associated with and familiar with the programs in the study and others who were not) viewed the instrument and provided comments. External validity was not a threat as the survey included the entire population and no generalization to a larger population was needed. According to Goodwin (2010), face validity addresses whether the measure seems to be applicable to those who are taking the survey and content validity ensures the survey or questionnaire makes sense to the reader in terms of the construct being addressed. If a question did not fit an objective, it was omitted. The panel of experts reviewed the final survey, in its electronic form and we addressed all questions and issues before sending the survey to graduates. The project underwent IRB review and was declared exempt under federal regulation 45 CFR 46.101(b).

Figure 1. A comprehensive model of influences on student learning and persistence. (Terenzini and Reason, 2005)



The population for this census study was all graduates (N = 123) of Iowa State University's College of Ag and Life Sciences who participated in one of the two programs. We compiled a list of participants from course lists and obtained current email addresses for graduates from the ISU Foundation, which maintains up-to-date alumni lists. The ISU Institutional Review Board approved the final draft of the survey, letters to graduates and study procedures.

Data collection followed Dillman's (2007) tailored design method and was conducted using SurveyMonkey (SurveyMonkey Corporation, 2009). We contacted graduates five times via e-mail over a 2-week period. The first contact was a pre-notice with information about the purpose of the study and confidentiality, an invitation to participate and an announcement that the survey would soon be arriving via email. The second contact, sent 3 days after the initial email, provided detailed information and a link to the online survey. The third and fourth contacts were brief thank you/reminder e-mails sent to non-respondents. The fifth and final contact was another reminder e-mail sent to non-respondents; it included a link to the survey and a notice that this was the final contact.

Of the 123 graduates contacted, 62 responded for an overall response rate of 50.41%. Some graduates did not complete the entire survey and the usable response rate was 43.90% (n = 54). To control for nonresponse error, we compared early and late respondents (Linder, et al., 2001). There were no differences between early and late respondents.

We recorded, calculated and analyzed data using Excel and SPSS. We calculated descriptive statistics including frequencies, means and standard deviations for the first four objectives and conducted independent t tests to address the fifth objective (differences between programs). We calculated effect sizes to measure magnitude and used Cohen's (1992) definitions of small (0.20), medium (0.50) and large (0.80) to describe the effect size.

Results

Just over half of the responding graduates participated in AgPAQ (n = 28, 51.9%); the rest participated in

SWP (n = 26, 48.1%). Upon graduation, most (51.9%) graduates entered the workforce (Table 1). AgPAQ students were more likely to enter the workforce (64.3% versus 38.5% for SWP students), whereas SWP students were more likely to enter graduate school (57.7% versus 10.7% for AgPAQ students). Similarly, AgPAQ students aspired to complete professional development and certifications, whereas SWP students aspired to complete more advanced degrees (Table 2).

Table 1. Graduates' entry decision (n = 54)

	AgPAQ		SWP		Total	
Decision	n	%	n	%	n	%
Entered the workforce	18	64.3	10	38.5	28	51.9
Entered graduate school	3	10.7	15	57.7	18	33.3
Returned to family business/farm	5	17.9	0	0.0	5	9.3
Entered the military	0	0.0	0	0.0	0	0.0
Other	2	7.1	1	3.8	3	5.5

Table 2. Graduates' aspired highest level of education (n = 54)

	AgPAQ		SWP		Total	
Level of education	n	%	n	%	n	%
Professional development courses/workshops/ seminars required of my position/employer	9	32.1	1	3.8	10	18.5
Professional certification (i.e., CCA, CPAg, etc.)	7	25.0	1	3.8	8	14.8
Master's degree focused on professional development	5	17.9	5	19.2	10	18.5
Master's degree focused on science/research	4	14.3	7	26.9	11	20.4
Professional degree (i.e., Ph.D., DVM, MD, JD, etc.)	1	3.6	12	46.2	13	24.1
Other	2	7.1	0	0.0	2	3.7

Impact on Career and Graduate School

Graduates from both programs reported that their experience had a significant impact on their career or advanced education (Table 3).

Table 3. Impact of AgPAQ /SWP experience on graduates' career/advanced education (n = 54)

	AgPAQ		SWP		Total	
Impact	n	%	n	%	n	%
No impact	4	14.3	6	23.0	10	18.6
Significant impact early but has since diminished as I gain more experience	10	35.7	10	38.5	20	37.0
Significant impact throughout, thus far	14	50.0	10	38.5	24	44.4

Graduates who reported no impact on their career or graduate school explained that the program was not beneficial because of their individual situations and not because of the program:

At the time of enrollment in AgPAQ, I thought the program would have a great impact on my future career, but now looking back I can say that it was just a group of classes no different than any other. I am not degrading the program; it just wasn't a program for me.

When I was participating in Science With Practice, my goal was to go to graduate school. However, I decided to take time off from school and work. In my current job, I might be able to use some of the knowledge from my project, but it does not relate well to my current job. If my current job was more research based, it might be more relevant. Nevertheless, I still believe that it was a great experience and I would encourage all students to participate in a project.

Graduates who reported that the programs had an impact early in their career or advanced education provided explanations such as the following:

I feel that the lessons learned in careers stretch way beyond what could even have been reached in SWP, but it definitely eases the transition into the workforce at the beginning. I have to do weekly reporting for my job, so SWP influences that a lot. (And overall, my SWP job does not relate to my current career so most of the knowledge doesn't transition).

As I gain more experience, I find that I am building my own way of doing things and handling customer relations. The experience I gained in AgPAQ significantly helped me in finding a job and having early confidence to deal with growers in the first year of so of my career.

Graduates who reported continued significant impact on their career or graduate school explained the benefits that they attribute to the programs:

In Science With Practice, I learned to design, execute and analyze experiments independently, which, I believe, put me ahead of other students entering graduate school. Additionally, I got the opportunity to create and present a poster. It is rare to give poster presentations in undergraduate studies so this was very helpful, especially since I now do at least one per year as a graduate student.

AgPAQ was a great program that was kind of the capstone to a college education. It tied a lot of different areas of education together and put it into real life scenarios. Farming back at home, it is on a much lesser scale in regards to client-based communication and help. I still utilize communication skills I learned with the partners on the farm and bring the knowledge I gained on our agronomy and economics side towards making our operation more profitable. I think a lot of people may think it is not useful if you are not going into agronomy/ sales/service, but it is something I use every day.

Graduates also responded to five specific questions related to how their experience made an impact on them (Table 4). The categories with the highest means for

Table 4. Impact of the AgPAQ or SWP experience on graduates' personal development (n = 54)

	AgPAQ		SWP		Total		T-statistics			
Impact	M	SD	M	SD	M	SD	T	df	Sig.	d
Helping me become a more active learner	3.79	1.031	3.85	0.834	3.81	0.933	-0.236	52	0.815	.064
Helping me become a more motivated learner	3.79	0.995	3.81	0.801	3.80	0.898	-0.089	52	0.929	.022
Assisting me in the transition from an undergraduate student to employee/ graduate student	3.79	0.917	3.65	0.846	3.72	0.878	0.548	52	0.586	.159
Influencing my career plans for after my bachelor's degree	3.43	1.069	3.38	0.852	3.41	0.962	0.166	52	0.869	.052
Influencing my plan for postgraduate education (either right after graduation or in the future)	3.29	1.049	3.27	0.919	3.28	0.979	0.061	52	0.951	.020

Note. Scale: 1 = strongly disagree, 2 = disagree, 3 = neither disagree or agree, 4 = agree, 5 = strongly agree.

* $p < .05$.

both programs were helping me become a more active learner and helping me become a more motivated learner. There were no significant differences between programs.

Level of Skill Improvement

In the next set of questions, graduates were asked to report, based upon what they know now, the extent to which they improved their skills and abilities as a result of their experience (Table 5). The category with the highest overall combined (SWP and AgPAQ) mean was research skills, with a mean of 3.57. The category with the next highest mean was other and graduates who selected other mentioned skills such as attention to detail, taking constructive criticism, cultural awareness, ability to work in new settings and group work. Graduates reported moderate improvement in all categories except research skills and other. There was a significant difference between programs only in the writing skills category; AgPAQ students reported greater improvement than SWP students.

Influence on Career and Graduate School Decidedness

Graduates were also asked to report the extent to which their experience in AgPAQ or SWP influenced their view of the workplace or graduate school (Table 6). The category with the highest overall combined (SWP and AgPAQ) mean was better prepared me for workplace/graduate school. The next highest category was better able to solve problems that I faced as a new employee/graduate student. Graduates indicated moderate improvement for four of the five categories. There was a significant difference between programs in the fifth category, helped to transition to workplace/graduate school; AgPAQ students rated this category higher than SWP students.

Graduates were asked to share a specific example of how their experience impacted, if at all, their transition to the workplace or graduate school and their career or educational advancement. Some of the common themes were transition to the workplace or graduate school, problem-solving abilities, improvement of skills, pursuing careers/educational decisions, teamwork and career/graduate school expectations.

Enhancement of Career and Graduate School Preparation

To investigate the extent to which the AgPAQ and SWP programs enhance career and graduate school preparation, graduates were asked if they were better able to do certain tasks (Table 7). The category with the highest overall combined (SWP and AgPAQ) mean was communicate more effectively and professionally with

Table 5. Improvement of graduates' skills and abilities as a result of their AgPAQ or SWP experience (n = 54)

	AgPAQ		SWP		Total		T-statistics			
Skills and abilities	M	SD	M	SD	M	SD	t	df	Sig.	d
Research skills	3.70	1.171	3.42	1.323	3.57	1.264	0.806	51	0.424	.224
Communication	3.57	1.069	3.23	1.210	3.41	1.141	1.098	52	0.277	.298
Self-confidence	3.48	1.312	3.08	1.412	3.28	1.364	1.081	51	0.285	.293
Technical skills	3.46	1.105	3.08	1.468	3.28	1.295	1.101	52	0.276	.292
Organization	3.50	1.202	2.92	1.017	3.22	1.144	1.897	52	0.063	.521
Writing skills	3.50	1.232	2.85	1.156	3.19	1.230	2.007	52	0.050*	.544
Responsibility	3.18	1.219	2.96	1.183	3.07	1.195	0.663	52	0.510	.183
Listening skills	3.32	1.278	2.69	1.011	3.02	1.189	1.996	52	0.051	.545
Time management	3.11	1.197	2.84	1.179	2.98	1.185	0.817	51	0.418	.227

Note. Scale: 1 = no improvement/very small improvement, 2 = small improvement, 3 = moderate improvement, 4 = large improvement, 5 = very large improvement.

* p < .05.

Table 6. Influence of the AgPAQ or SWP experience on graduates' views of the workplace and graduate school (n = 54)

	AgPAQ		SWP		Total		T-statistics*			
Influence	M	SD	M	SD	M	SD	T	df	Sig.	d
Better prepared me for workplace/graduate school	3.39	1.100	3.04	1.241	3.23	1.171	1.097	51	0.278	.298
Better able to solve problems that I faced as a new employee/graduate student	3.43	1.136	2.88	1.211	3.17	1.194	1.703	52	0.095	.468
Helped me transition to workplace/graduate school	3.32	1.249	2.46	1.334	2.91	1.350	2.447	52	0.018*	.666
Influenced my career/educational advancement	2.86	1.458	2.72	1.370	2.79	1.405	0.352	51	0.727	.099
Helped me to clarify career/education goals	2.85	1.292	2.50	1.393	2.68	1.341	0.954	51	0.345	.261

Note. Scale: 1 = none/very little extent, 2 = small extent, 3 = moderate extent, 4 = large extent, 5 = very large extent.

* p < .05.

Table 7. Graduates' skill enhancement as a result of their AgPAQ or SWP experience (n = 54)

	AgPAQ		SWP		Total		T-statistics			
Better able to	M	SD	M	SD	M	SD	t	df	Sig.	d
Communicate more effectively and professionally with clients/mentors	4.26	0.764	4.12	0.653	4.19	0.709	0.736	51	0.465	.197
Communicate more effectively and professionally with co-workers	4.04	0.744	4.04	0.774	4.04	0.751	-0.013	52	0.989	.000
Integrate and synthesize knowledge from multiple disciplines	4.07	0.900	3.88	0.766	3.98	0.835	0.819	52	0.417	.227
Think independently and formulate my own ideas	4.00	0.903	3.92	0.845	3.96	0.868	0.323	52	0.748	.091
Understand discipline specific principles at the beginning of my career (or graduate program) to the point that I was better able to understand and solve the problems I faced then	3.96	0.808	3.85	0.784	3.91	0.791	0.534	51	0.596	.138
Analyze and solve problems	3.96	0.693	3.81	0.694	3.89	0.691	0.829	52	0.411	.216

Note. Scale: 1 = strongly disagree, 2 = disagree, 3 = neither disagree or agree, 4 = agree, 5 = strongly agree

* p < .05

clients/mentors. The category with the next highest mean was communicate more effectively and professionally with co-workers. There were no significant differences between programs.

Conclusions and Recommendations

We drew the following conclusions from this study:

AgPAQ and SWP have a positive impact on graduates' plans for careers and graduate school. In addition, the programs help graduates prepare for the workplace or graduate school by providing real-world, hands-on experiences that allow them to transition from the role of undergraduate student to that of employee or graduate student.

AgPAQ and SWP improved graduates skills and abilities in several areas as well as helped clarify their career and educational goals.

A concerted effort to integrate writing into an experiential learning program, such as integration of the English 309 course in the AgPAQ program, does have a significant impact on writing skill development. English was intentionally developed in AgPAQ. Whereas, writing was required but not formally incorporated in SWP.

The extent to which AgPAQ and SWP affect graduates' career decidedness aligns with the specific outcomes and purposes of each program. For example, AgPAQ focuses on applying skills in a professional setting and AgPAQ graduates reported they would continue to participate in ongoing professional development required by their profession. The SWP program focuses on completing a research project or other work with a faculty mentor and SWP graduates aspired to complete advanced degrees (e.g., Ph.D., DVM, MD, JD, etc.).

There is value in offering experiential learning programs in ISU's CALS. And, as evidenced by comments from graduates in this study, past participants do not hesitate to recommend that other students participate in these programs.

Experiential learning opportunities, such as AgPAQ and SWP, enhance student learning by having students use real-world life skills that will transfer into their future careers and education. Students who participate in experiential learning courses are more comfortable and confident as they enter the workplace or graduate school. The ISU CALS and higher education in general, should continue to encourage student-centered, high-impact teaching methods like those associated with experiential learning. For any such endeavors, we recommend that educators provide experiences that conform to the eight principles of good practice recommended by the National Society for Experiential Education (2011): (a) intention, (b) preparedness and planning, (c) authenticity, (d) reflection, (e) orientation and training, (f) monitoring and continuous improvement, (g) assessment and evolution and (h) acknowledgment.

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How Does 4-H and FFA Involvement Impact Freshmen Enrollment in a College of Agriculture?

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Abstract

This study focused on entering freshmen attending a collage of agriculture at a Southern Land-grant university and the primary purpose was to determine the impact that prior involvement in 4-H and FFA had on the freshmen's decision to attend the college. Of the participants who indicated prior 4-H involvement, a family member was ranked as the highest influencer with 4-H Camp Experience ranked as the second most influential factor. Those previously involved in FFA reported that an agricultural education teacher was the most significant influencer in their decision to attend college. Furthermore, a friend was the second greatest source of influence; guidance counselor was the least influential.

Introduction

The agricultural industry is one that is constantly evolving. According to the Food and Agriculture Organization of the United Nations (2009), agriculture productivity will have to increase by 70% by 2050 to feed the world's constantly growing population. In turn, agricultural industries are increasing their workforce to accommodate the food and fiber needs of today's society (Krogstad, 2012). According to a study by the USDA National Institute of Food and Agriculture, the U.S. economy will produce approximately 54,400 jobs between 2010-2015 (Goecker, et al., 2010). To address the fact that the agriculture industry is seeking a substantial number of new hires to meet global workforce needs, the number of students matriculating to agricultural colleges should be studied. Specifically, the need to better understand factors influencing student interest and enrollment in colleges of agriculture warranted this study.

This study focused on entering freshmen attending the University of Georgia's College of Agricultural and Environmental Sciences (CAES) and their reasoning for attending CAES. Previous research has shown that prior agricultural experiences play a role in the decision-making process students undertake when determining whether to attend an agricultural college (Christmas, 1989; Donnermeyer and Kreps, 1994; Esters and Bowen, 2005; Wildman and Torres, 2001). Studies have further shown that prior involvement in agriculturally related youth organizations, such as 4-H and FFA, results in higher retention rates among students enrolling in agricultural colleges (Dyer et al., 1996; Dyer and Breja, 1999; Dyer et al., 2000). However, little research has been conducted addressing the role prior involvement in these organizations has played on student enrollment in colleges of agriculture.

Youth across Georgia contribute significantly to the enrollment numbers within both 4-H and FFA. Georgia FFA's membership consists of 37, 684 students ("Georgia FFA Organization," 2015) and ranks third in the nation in terms of FFA membership ("National FFA Organization," 2012). Furthermore, Georgia 4-H programming serves more than 175,372 youth across the state ("Georgia Cloverleaf 4-H," 2015).

Determining the impact prior agricultural experiences (4-H and FFA) have on an individual's decision to enroll in colleges of agriculture and specifically, the University of Georgia's CAES is of upmost importance for college recruiters. By defining the connection between prior 4-H and FFA experiences, recruitment strategies can be developed that addresses the interests and needs of those with involvement in these organizations. Adjusting current recruitment strategies could lead to a larger

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number of individuals receiving a bachelor's degree from CAES and could help develop a recruitment model useful to other colleges of agriculture.

Theoretical/Conceptual Framework

The theoretical framework for this study was rooted in the work of the Social Learning Theory of Career Decision-Making. This theory addresses how educational and occupational decisions are made. More specifically, the Social Learning Theory of Career Decision-Making is divided into four areas that influence career decisions. These areas include: (1) genetic endowments and special abilities (gender, race, characteristics, etc.); (2) environmental conditions and events (social, cultural and economic forces); (3) instrumental and associative learning experiences; (preceding circumstances/ stimulus, consequences, etc.) and (4) task approach skills [personal standards of performance, work habits, etc.] (Mitchell and Krumboltz, 1990). Before students can pursue a particular career path, they must first decide on an area of study in college. The four components of this theory guided the data collection efforts of this study, which sought to understand the elements of 4-H and FFA that influenced students' academic career decisions.

Previous research posits that youth involvement in 4-H and FFA does influence students' choice to enroll in an agricultural college. Russell (1993) stated: "*To expand the pool of youth seeking undergraduate and graduate degrees in Colleges of Agriculture, it makes sense to give top priority to reaching youth who have already received positive pre-college experiences in youth programs addressing agricultural and environmental topics*" (p. 14). Prior experience with agriculture was ranked as the second most influential factor in terms of agricultural college enrollment (Donnermeyer and Kreps, 1994). Students that received a large number of awards and recognition in organizations such as FFA and 4-H were more likely to major in agriculture (Tarpley and Miller, 2004). Additionally, 59% of an entering freshmen class at Montana State University had participated in 4-H, while 45% had prior experience with FFA (Koon, et al, 2009).

Agricultural experiences with direct ties to 4-H and FFA have also influenced student decisions to enroll in colleges of agriculture. FFA participation, in particular, positively influenced 61% of those studied. Conversely, the same study revealed that the work of the Cooperative Extension Service was unable to influence more than 25% of those surveyed to pursue enrollment in an agricultural college. Thirty percent of the evaluated students were influenced by their 4-H club experience (Christmas, 1989). In terms of retention, freshmen who participated in 4-H and FFA are more likely to complete a degree in agriculture than those who did not (Dyer, et al., 2000).

While secondary education experiences influence the likelihood of students pursuing a major in an agricultural college, friends and family also play an important role. According to Chapman (1981); Esters and Bowen (2005), students are strongly influenced by the comments of friends and families in deciding where to attend college and choice of career path. Esters and Bowen (2005) reported that parents and friends were the greatest influencer on urban high school students' decision to pursue a career in agriculture.

Researchers have also conducted studies to address the impact of significant persons encountered throughout one's tenure in the FFA and/or 4-H organizations on their agriculture enrollment. Results indicate that the types of individuals one can encounter within these youth development organizations are varied and only a few have been analyzed in previous research. However, agricultural education teachers associated with FFA involvement rank higher in importance when compared to their counterparts (4-H agents) in the 4-H organization. In a study of 14 "significant persons" elements, "high school agriculture teacher" ranked fourth compared to "agriculture or 4-H extension Educator" which ranked seventh (Herren, et al., 2011). Donnermeyer and Kreps (1994) reported similar findings.

It is important to understand the factors influencing a student's decision to enroll in a college of agriculture. Understanding the influence of these individuals within 4-H and FFA agricultural colleges can build better bridges to these potential students via these individuals, while 4-H and FFA professionals can discover how best to promote college enrollment to their students.

Methods

The purpose of this study was to determine the impact that prior involvement in 4-H and FFA had on an incoming CAES freshmen's decision to attend the college. The following objectives guided this study:

- Identify demographic characteristics of entering CAES freshmen;
- Determine the impact prior 4-H involvement had on the students' decision to attend CAES; and
- Determine the impact prior FFA involvement had on the students' decision to attend CAES.

The population for this study (purposive sample) was all first semester freshmen students enrolled at the University of Georgia's CAES who had earned a maximum of 30 college credit hours (N=355). Participation was completely voluntary and students were contacted based on their identification as a CAES freshmen student. The University of Georgia Institutional Review Board approved the study protocol and all participants were informed of their rights prior to participation in the study.

Using SurveyMonkey® and Dillman's (2000) suggestions for online survey development and distribution, emails were sent out on a weekly basis beginning with an introductory email, sent two days prior to distribution of the actual survey link explaining the voluntary nature of the survey and participation requirements. At the conclusion of data collection, 105 (30%) of the population completed the instrument. A comparison of early and late responders was conducted

based on recommendations from Linder, Murphy and Biers (2001) and no significant differences were found.

The online survey instrument was adapted from an instrument developed by Ester and Bowen in their 2005 study of "Factors Influencing Career Choices of Urban Agricultural Education Students." The modified survey contained the basic elements of Ester and Bowen's (2005) instrument with slight alterations to address specific elements potentially impacting enrollment within CAES at the University of Georgia. Additionally, the researcher adjusted the demographics section to meet the research objectives.

The final version consisted of four constructs: individuals, 4-H involvement, FFA involvement and CAES recruitment with six, eight, nine and eight items in each construct respectively. Each item utilized a five point Likert-type scale (0 = no influence; 4 = very high influence). Participants were asked to indicate the influence of varying individuals and/or experiences and their impact on the participant's decision to attend the college of agriculture. The results section only represents the 4-H and FFA constructs of this study. Additionally, the researcher chose to report the percentage of students who indicated that each item had either a "high" or "very high" impact on their decision making process.

Table 1. Impact of Prior 4-H Involvement (Cronbach's alpha = 0.825)

Item	f/p
Family member	12/75
4-H Camp Experience	7/44
4-H Alumni	6/38
4-H Agent	6/38
4-H Club Leader	5/31
State Congress participation	4/19

Note. f=frequency, p= %; n=16. Data represents individuals and experiences that had either a "high" or "very high" impact on the students' decision making process.

Table 2. Impact of Prior FFA Involvement (Cronbach's alpha = 0.926)

Item	f/p
An agriculture teacher(s)	17/94
A friend	14/78
FFA State Convention	14/78
Family Member	13/72
Non-agriculture teacher	13/72
FFA Alumni	13/72
Regional FFA Contest	12/67
Guidance counselor	8/44

Note. f=frequency; p=%; n=18. Data represents individuals and experiences that had either a "high" or "very high" impact on the students' decision making process.

Results

Objective 1: Identify demographic characteristics of entering CAES freshmen

Of the total respondents (n = 105), there were 85 females (81%) and 16 males (19%) and 82% (n = 86) indicated their race as white. In terms of grade point average (GPA), the majority of students (91%) indicated having a high school GPA of 3.51-4.00. Sixty-four percent of the students described their community environment while attending high school as urban (population of 10,000 or greater), whereas 29% specified living in a rural area (population of less than 10,000) and 7% were from a farm environment. Of the respondents, 16% were previously involved in 4-H, while 17% indicated prior FFA participation. Considering the educational background of the respondents' parents/guardians, the highest level of education completed by their fathers/male guardians, in descending order, was a bachelor's degree (31%), master's degree (19%) and doctoral degree (13%). The highest level of education completed by the respondents' mothers/female guardians, in descending order, was a bachelor's degree (38%), master's degree (22%) and doctoral degree (9%). Most incoming freshmen were majoring in Biological Sciences (42%), followed by Animal Science (25%) and Animal Health (13%).

Objective 2: Determine the impact prior 4-H involvement had on the students' decision to attend CAES

As presented in Table 1, of the participants who indicated prior 4-H involvement, 75% (n=12) indicated that a family member had a "high" or "very high" impact on their decision to attend CAES followed by 4-H Camp Experience (n=7; 44%), 4-H alumni (n=6; 38%) and 4-H Agent (n=6; 38%). However, after analyzing the distribution of responses, the modal response within this construct was "no influence."

Objective 3: Determine the impact prior FFA involvement had on the students' decision to attend CAES

As reported in Table 2, 94% (n=17) of participants who were previously involved in FFA reported that their agricultural education teacher had a "high" or "very high" impact on their decision to attend CAES followed by a friend (n=14; 78%) and participation at the State FFA Convention (n=14; 78%). Only eight (44%) participants indicated that their school guidance counselor had a "high" or "very high" impact on their decision to attend CAES. As with Objective 2, after analyzing the distribution of responses, the modal response within this construct was also "no influence."

Summary

One may conclude from this data that "one-on-one" relationships played the largest role in terms of motivation for these students to attend CAES. This concept of mentorship aligns with Donnermeyer and Krep's (1994) research, naming the agricultural education teacher as the most significant non-personal relationship impacting college choice. Agricultural education teachers should be informed of this trend and identify ways to further encourage their students to attend a college of agriculture. Additionally, pre-service educators need to be informed of the possible impact(s) they could have on a students' college choice during their college/university training. Lastly, college recruiters need to share recruitment materials with agricultural education teachers and make classroom visits.

As represented in the data, the influence of a family member seems to be the overlapping element in the comparison between 4-H and FFA participant groups. This conclusion aligned with a significant number of studies (Donnermeyer and Krep, 1994; Ester and Bowen, 2005; Herren, et al., 2011). The family member influence was ranked at the top for former 4-H members; more than 31% of respondents ranked this option above the second most popular option (4-H camp experience). College recruitment strategies should be developed that target family members of college bound students so as

to broaden their knowledge of college majors, internship opportunities and career options. This is particularly important for first generation college students and their families.

This study supports the research of Christmas (1989), Donnermeyer and Krep (1994) and Herren,et al., (2011), which determined that significant individuals associated with the FFA organization provided a stronger influence over student college choice than the influence of 4-H professionals. The 4-H agent's lack of presence in a 4-H'ers decision to attend CAES is one of top priority. These individuals are a 4-H'ers main contact in terms of managing their 4-H participation. They are a resource that is not being utilized in terms of promoting enrollment in an agricultural college among their 4-H participants. Cooperative Extension organizations should consider highlighting in their in-service trainings how to promote interest in attending a college of agriculture among youth participants. Many 4-H agents hold degrees from colleges of agriculture themselves and would make a relevant and personal college ambassador for their 4-H participants.

Next, this data showed that guidance counselors are not harnessing their potential in providing agricultural students with the necessary information regarding agricultural colleges. Prior research supports the lack of influence guidance counselors are providing (Johnson, et al., 2009; Herren, et al., 2011). Within the FFA construct, the guidance counselor influence ranked lowest. These professionals should be trained to address the needs of all students and promote a higher education route that suits student interests. Additionally, college recruiters may need to educate guidance counselors on the cadre of curricular options in colleges of agriculture and the plethora of career possibilities in agriculture.

In terms of further research, it would be beneficial to conduct an analysis of motivational factors impacting college choice for females with the University of Georgia due to the large percentage of females currently enrolled in CAES. A second study could address major choice and the role it plays in college choice. This need was presented through the uneven distribution in major choice from the participants. Further recommendations include re-administering the current study, but with survey instrument alterations that would enable the researcher to determine with more accuracy other external variables that have an impact on a student's college choice. Also, the current study did not measure negative influences on college choice and more information is needed in this area. In addition, given the frequency of "no influence" responses reported in this study for both 4-H and FFA, additional response options should be added to the current instrument to enhance the sensitivity of the instrument to other influencers on freshmen college choice.

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Student Reflection of Blogging in a Turfgrass Weed Management Course[1]

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Abstract

A blog, which contains periodic, reverse chronologically ordered posts on a common webpage, is a tool that is popular among all ages and for many different uses. Blogging in the turfgrass industry is prevalent, regardless of the industry sector. It is vital that students in the Golf and Sports Turf Management (GSTM) program at Mississippi State University (MSU) are well versed in using blogging technology in a professional environment upon graduation. Therefore, the objective of this research was to determine if blogging was an effective educational delivery method for GSTM students enrolled in a Turfgrass Weed Management course at MSU. Students were randomly assigned into groups of three to research, write and publish a blog post on an assigned weed species. Students were given three instruments at the beginning (PRE), middle (MID) and end (POST) of the semester to determine the impact of incorporating the blog into this course. Of the 14 students in the course, 12 had never followed or contributed to a blog. Of the students who completed the MID instrument (n = 12), 11 students indicated their ability to find and understand new information was improved through participating in this blog. Overall, the blogging component of this course significantly improved student connection with the turfgrass industry and students indicated a blogging assignment should be included into future turfgrass weed management courses. Also, the majority of students indicated they would be willing to contribute or start a blog upon entering the workplace after graduation.

Introduction

Social media is a powerful tool widely used throughout many parts of the world. This technology is unique because it provides an alternative from the traditional one-way message by enabling communication between individuals or groups who are located a great distance apart. Social media's ease of use has allowed widespread adoption in personal, business and educational settings (Bosman and Zagenczyk, 2011). The rapid rise in popularity of social media has challenged educators in many ways; in particular, how to incorporate social media technology into the classroom to enhance the learning environment.

Several recent studies have examined the role of various social media outlets in a classroom environment. Regarding Twitter, et al., (2010) reported students were familiar with this technology, but were hesitant to use Twitter in a classroom environment. In a more recent report, Ingwers et al. (2014) noted similar dissatisfaction and lack of student enthusiasm when Twitter was incorporated into classroom assignments. However, Henry and Hock (2014) reported positive student reaction when summarizing industry related articles into tweets in an Agricultural course, but students in their study did not actually use Twitter to write the tweet. In a recent study examining the use of Facebook, McCole et al. (2014) noted incorporating Facebook into an Introduction to Travel and Tourism course increased student engagement with the course material and enhanced interaction with the instructor and other students.

While Facebook and Twitter are currently very popular social media outlets, blogging is a tool that is popular among all ages and for many different uses. In a survey of nearly 37,000 students in Canada and the United States, 37% of students agreed contributing content to blogs was an effective tool for learning (Smith and Caruso, 2010). A web-log, commonly referred to as a blog, was introduced in 1997 and is a web application which contains periodic, reverse chronologically ordered posts on a common webpage (Blood, 2000). Although blogging is one of the oldest forms of social media, its use is prevalent in all sectors of the turfgrass industry, including golf courses management, lawn care services,

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university extension agents, athletic field managers and turfgrass print publication magazines. Jones et al. (2011) examined two blogs in the turfgrass industry to determine the effectiveness of reaching a broad audience. The authors concluded both blogs reached an average of 34.9 to 148.4 people per day at the time of their publication.

Williams and Jacobs (2004) published one of the earliest reports determining student response to incorporating blogs into a classroom environment. The authors noted that students were in favor of blogs as an effective aid in teaching and learning. The authors also stated the blogging technology enabled greater student interaction with peers. Platt (2011) noted improved student writing, increased student engagement inside and outside the classroom and improved ability in producing appropriate material in blogs. Avci and Askar (2012) also noted blogs increased student performance and productivity.

Although several studies have examined the use of various technologies in the classroom to enhance student learning and engagement (Platt, 2011; Shultz and Doerfert, 2010), continued examination is required in order to assess the effectiveness of technology across multiple disciplines. Information about the impact of blogging on enhancing the classroom learning environment is limited in plant science related courses, in particular, turfgrass specific courses. Therefore, the objective of this study was to determine if blogging is an effective educational delivery method by accessing student writing skills, improving technology literacy in a professional environment and developing a positive connection with turfgrass industry professionals.

Methods

This research was conducted at MSU in the Plant and Soil Science Department for students in the GSTM program. A total of 14 students were enrolled in a Turfgrass Weed Management course (PSS 4823) in the spring, 2014 semester. For this semester-long project, students who were enrolled in PSS 4823 created content for the blog page (http://blogs.msucares.com/turfgrass/) utilized by the GSTM professors to disseminate information to clientele. At the beginning of the semester, the first class period was spent reviewing general information regarding blogs, importance of blogs in the turfgrass industry and professionalism in blogging. The second class period was spent reviewing the goals of the project, student expectations and fielding any questions from students regarding the blogging project.

The blogging assignment consisted of students compiling information about a specific problematic weed in turfgrass management (i.e., “weed of the week”). In general, students had a lot of freedom regarding content of information presented in the blog. However, items such as key identification traits, germination characteristics and control measures were required to be part of each blog post. Each week, a group of three students were randomly assigned into groups to research, write and publish a blog post on an assigned weed species. These groups of students changed to ensure all students were able to work together over the course of the semester. The students had one week to complete the writing assignment. Once they completed the assignment, each group met with the professor to review editorial and content quality of the writing assignment. Following revisions, the professor and students would publish the blog post together. A total of eight blog posts were generated over the course of the spring semester.

For data collection, students completed three instruments over the course of the semester. The first (PRE) was given at the start of the semester. A second (MID) was given at the halfway point of the semester. A final (POST) instrument was administered at the end of the semester. Due to student absences, not all 14 students completed each instrument. Aside from yes/no, open-ended and demographic type questions, all other questions had a scale of 1 to 5, with 1 = poor, 2 = fair, 3 = good, 4 = very good and 5 = excellent. Paired Samples t-tests were conducted to determine if there was a significant difference ($p \leq 0.10$) in mean scores comparing PRE to POST and MID to POST.

Results

A total of 13 students completed the PRE survey instrument. Students in this course were between the ages of 20 and 24 (M = 22.3) and all with prior experience working in the turfgrass industry. In relation to their previous experience working with blogs, the majority of students (n = 12) had never followed a turfgrass industry-related blog or contributed to any blog (turfgrass-related or not). Three students reported they had followed a blog not related to turfgrass. A total of 12 students completed the MID survey questions. When asked if their ability to find and understand new information was improved through participation in this blog, 11 students indicated an improvement. A total of 12 students completed the POST survey questions. Of the 12 questions asked, two related to potential blog participation post-graduation. Students were asked if they would feel comfortable contributing to an employer-established blog and would they consider creating a blog if an employer did not have an existing blog. Regarding willingness to contribute to an established blog, 11 students indicated yes, while one student indicated maybe. Regarding starting a new blog, seven students indicated yes, one student indicated no and four students indicated maybe. Therefore, the majority of students would feel comfortable contributing and/or starting a blog once they find employment.

Students were asked to describe their writing skills PRE and POST completion of the blogging assignment (Table 1). There was slight improvement from PRE (M = 3.64, SD = 0.81) to POST (M = 3.91, SD = 0.83), but the improvement was not statistically significant ($p = 0.43$). Students were asked to rate their level of comfort with the use of the blogging technology. Again, there was a

slight increase from PRE (M = 3.55, SD = 1.13) to POST (M = 4.09, SD = 0.70); however, this change was not statistically significant (p = 0.24).

A paired samples t-test was also conducted to determine if there was a significant difference in mean scores from the MID to POST on four questions (Table 1). Students were asked to rate the writing assignment (the weed species description blog post). There was a numerical improvement from MID (M = 3.50, SD = 1.68) to POST (M = 4.33, SD = 0.78), but significance was not noted (p = 0.20). Regarding students sense of connection with the turfgrass industry through the blogging assignment, there was a significant (p = 0.07) 1.08 unit increase from MID (M = 3.00, SD = 1.60) to POST (M = 4.08, SD = 0.79). Students were also asked to rate their satisfaction with the blogging assignment. There was a significant (p = 0.10) improvement from MID (M = 3.17, SD = 1.53) to POST (M = 4.17, SD = 0.58), which indicates students would recommend this assignment for future classes. Finally, students rated their experience working in groups to complete the blog assignment. While there was a 0.66 unit increase from MID (M = 3.67, SD = 1.92) to POST (M = 4.33, SD = 0.78), this increase was not significant (p = 0.33).

Discussion

Students have become active participants in gaining knowledge through various social media outlets and online sites. This is also changing the role of the professor since he/she is no longer the sole creator and distributor of educational content. Therefore, incorporating various forms of technology in the classroom environment is important to ensure students can obtain and process quality information through various online sources. While numerous technology mediums exist for students to use, this project focused on blogging, perhaps one of the oldest forms of social media dating back to the mid 1990's. Blogging was chosen for this project since its use is prevalent in the turfgrass industry, regardless of which sector of the industry a student enters upon graduation. Also, only three students had previously contributed content to a blog, which indicates a lack of previous experience with this teaching methodology and lack of experience generating content for a blog in a professional setting. In a recent study about blogging use in turfgrass extension, Jones et al. (2011) indicated that two blogs targeting the turfgrass industry reached an average of 34.9 to 148.4 people per day. During the spring, 2014, the turf team's blog at MSU received 2,414 visitors during the study period. While not every visitor views each individual weed post, many are able to see a link to weed posts and therefore are aware of student activities. One of the objectives of initiating this assignment was to provide an avenue for students to connect with turfgrass industry professionals. Networking via attending conferences, participating in field day events and building an online presence are vital when it comes time for job placement. Results from this study indicate students felt a stronger connection with the turfgrass industry in association with this assignment. This stems from students who interview for internships and receive positive comments about the blog and from general positive feedback sent to students regarding their weed species posts. Students were also satisfied with the blog being incorporated into the course. A similar response was noted in a communication technologies course (Platt, 2011) and an MBA course (Williams and Jacobs, 2004) regarding positive student feedback with a blogging assignment. This supports the addition of a blogging assignment into other turfgrass weed management courses.

Summary

Overall, students responded favorably to the blogging assignment. This type of project gave the students a purpose for writing that goes beyond simply receiving a grade. Students indicated favorite aspects of the blog were "collaborating with other turf managers", "learning how to form a blog and being able to apply that skill to future jobs" and "it was a good learning tool in addition to lecture." While our students leave MSU with a solid scientific foundation regarding turfgrass management, building and maintaining an online presence is also equally important. Of the six questions answered, two significant increases were noted from the MID to POST instrument. There was a significant improvement in student connection to the turfgrass industry and their level of satisfaction with the blogging assignment. Although research incorporating technology in the classroom is still relatively new, future research should focus on incorporating multiple social media platforms, such as Twitter and Facebook, in addition to blogging. The majority of the literature focuses on one platform, when in reality; a single user typically utilizes multiple social media outlets.

Table 1. Paired samples t-test for students' PRE-, MID-, and POST- completion of the blogging assignment for Golf and Sports Turf Management majors at Mississippi State University in Spring, 2014 (n = 12).

Question	Instrument	Mean	Standard deviation	t	df	P-value[z]
Writing skills[y]	PRE	3.64	1.10	-0.82	10	0.43
	POST	3.91				
Comfort level[x]	PRE	3.55	1.44	-1.26	10	0.24
	POST	4.09				
Writing assignment[w]	MID	3.55	2.12	-1.36	11	0.20
	POST	4.33				
Industry connection[v]	MID	3.00	1.88	-2.00	11	0.07
	POST	4.08				
Satisfaction[u]	MID	3.17	1.91	-1.82	11	0.10
	POST	4.17				
Group work[t]	MID	3.67	2.27	-1.02	11	0.33
	POST	4.33				

[z] Mean separation within each question, P ≤ 0.10.

[y] How would you describe your writing skills after completing the blog assignments?

[x] How would you describe your comfort level with blogging after completing the blog assignments this semester?

[w] How would you rate the writing assignments for the blog?

[v] How much has your level of connection to the turf industry increased due to your participation in this blog?

[u] What is your level of satisfaction with the blogging component of this course?

[t] How was your experience in groups researching and summarizing information for the blog?

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How We Flipped: Student and Instructor Reflections of a Flipped-Class Model in a Sensory Evaluation Laboratory Course[1]

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Abstract

The flipped class model was explored in a Food Science and Human Nutrition course on the Sensory Evaluation of Foods. The laboratory associated with this course was changed to fit the new lecture structure. In the laboratory, nine groups of students (n=54) were given different food categories and scenarios that guided them through three categories of sensory testing. Students designed, executed and analyzed their own sensory tests to reinforce lecture concepts. Upon course completion, students completed confidential instructional surveys related to the course. Student surveys indicated that the laboratory directly reflected lecture content, allowed for a majority of group project to be completed within the class setting and enhanced student learning through the integration of lecture knowledge with hands-on experience. Instructor reflections revealed that the active learning fostered in the laboratory contributed to the positive student experiences. Instructor reflections on course design, teaching approaches and challenges faced in the development of course materials were explored, resulting in further proposed improvements to the course by reorganizing selected content and optimizing group structures to better suit student needs. Principles of the flipped class model were demonstrated to successfully be used to redesign a corresponding laboratory section to increase student engagement and active learning.

Introduction

Despite pedagogical innovations, traditional lectures that remain focused on lecturer-delivered facts rather than student-focused understanding continue to dominate the educational system (Bligh, 2000; Butt, 2014). Blended learning, one of the pedagogical innovations, is broadly defined in the literature as learning that incorporate the use of online materials to enhance or partially replace traditional in-classroom lectures (Baker, 2000; Garrison and Kanuka, 2004; Picciano, 2006; Graham, 2006; Allen et al., 2007; McGee and Reis, 2012).

The flipped or inverted classroom is a form of blended learning (Garrison and Kanuka, 2004). First explored by Baker (2000) and Lange et al. (2000), this model focuses on in-class discussions and activities that create active learning environments, where students engage in higher order thinking processes (Garrison and Kanuka, 2004; Prince, 2004; Roehl et al., 2013). The flipped classroom accomplishes this by placing traditional lecture notes and information outside of the classroom, typically online, in the form of videos or other supplemental material. Students are then free to review online lecture videos to grasp foundational concepts before attending lecture. By doing this, classroom time becomes dedicated to group work, discussion and problem-solving activities related to the content students previously viewed (Tucker, 2012; Herreid and Schiller, 2013).

Research concerning the benefits to student learning by the flipped classroom model has been shown in various disciplines such as nutrition/dietetics (Gilboy et al., 2015), engineering (Warter-Perez and Dong 2012), microbiology (Lage et al., 2000), business (Butt, 2014), architecture (Zappe et al., 2009) and others (Herreid and Schiller, 2013; Roehl et al., 2013; Hawks, 2014). Specifically, the benefits associated with active learning in science, technology, engineering and mathematic (STEM) courses include increased examination scores and decreased likelihood of course failure (Freeman et al., 2014). Fostering active engagement, a cornerstone of the flipped classroom model, in clinical settings where competency in skill application is required, has improved standardized test scores and student content understanding (Everly, 2013). The creation of settings, such as laboratories, where students further utilize the knowledge gained in a flipped classroom can help to supplement the topics explored during lecture.

A traditional undergraduate course in the Food Science and Human Nutrition department was restructured to fit the flipped classroom model. With the

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classroom flip, a need arose to completely restructure the course's corresponding laboratory section. The laboratory flip involved an emphasis on student-directed laboratory process that aligned with the group project assignments occurring in the classroom, rather than instructor-directed laboratory exercises. The two primary objectives of this study were to (1) assess student perceptions of a restructured laboratory that built upon the concepts learned in the flipped classroom and (2) reflect on instructor perceptions related to the course redesign, restructure and implementation of the flipped laboratory.

Methods and Materials

Course Background

Sensory Evaluation of Foods (FSHN 302) is a required course for all undergraduate students majoring in Food Science and Human Nutrition (FSHN) at the University of Illinois at Urbana-Champaign (UIUC). This course consisted of 50 undergraduate juniors and seniors who participated in online (two, 10-minute lecture videos), in class (one hour, lecture/discussion twice a week) and laboratory (two hours, once a week) activities. The students were divided among the three laboratory sections with a maximum of 18 students per section.

Laboratory Structure

The focus of the flipped classroom and laboratory was a semester-long group project. Within each lab, students were divided into three groups of six and were assigned a given product category and initial scenario. These product categories and scenarios covered topics and challenges pertinent to the food industry. Students remained within the same product category throughout the semester; however, the scenarios they were presented with were dynamic. The scenarios changed to fit each section of the course as the semester progressed. The products and scenarios can be found in Table 1.

In this flipped classroom, online lectures and in-class discussions directly related to laboratory activities. For example, as shown in Table 2, lab six was focused on reference generation and refinement for the descriptive analysis method of sensory testing. At the same time in the online lectures, students watched videos highlighting the methods of descriptive analysis used in the industry and how each of these methods generate and refine references. In-class activities focused on generating attributes, references and definitions in their respective groups so the students could get accustomed to this process. This general design was followed for all lectures and laboratories throughout the semester.

At the start of each laboratory, learning objectives directed students to complete a set of activities. The laboratory manual used by students provided a general framework and guidance for students on how to complete the main objectives of each lab. These activities led students to design, conduct and analyze three major classifications of sensory tests: discrimination testing, descriptive analysis and consumer testing. The activities associated with each laboratory session are listed in Table 2.

During laboratory lessons, teaching assistants (TAs) assumed the role of a "guide on the side" (King, 1993). The TAs' job during the laboratory was to facilitate stu-

Table 1: Product categories and scenarios presented to groups based on the type of sensory test being conducted

Product category	Scenario 1: Discrimination testing	Scenario 2: Descriptive analysis	Scenario 3: Consumer testing
Ketchup	Due to an effort to reduce sodium across products, your company has produced a reduced sodium ketchup. Investigate if sensory differences between the original and variant product exist.	Investigate all sensory modalities that distinguish your original and variant product	With an improved product based off of difference and descriptive data examine consumer perceptions between your original, variant, improved, and a competitor's product
Vegetable juice	With a desire to improve fiber content, your company has developed a high fiber tomato juice. Investigate if sensory differences between the original and variant product exist.	Same as above	Same as above
Cookies	Your company is interested in developing a reduced fat cookie. Investigate if sensory differences between the original and variant product exist.	Same as above	Same as above
Gum	To keep up with current health trends, your company wishes to develop a nutrient enhanced gum. Investigate if sensory differences between the original and variant product exist.	Same as above	Same as above
Ice cream	In an effort to reduce fat content across your portfolio, your company has developed a fat free ice cream. Investigate if sensory differences between the original and variant product exist.	Same as above	Same as above
Canned peaches	Due to the high sugar content of your products, your company has altered the sugar content of their canned peaches. Investigate if sensory differences between the original and variant product exist.	Same as above	Same as above
Gluten free bread	In response to market trends, your company has developed a gluten free bread. Investigate if sensory differences between the original and variant product exist.	Same as above	Same as above
Granola bars	To increase protein content of their granola bars, your company has produced a high protein granola bar. Investigate if sensory differences between the original and variant product exist.	Same as above	Same as above
Chips	In response to a concerns regarding fat content, your company has developed a fat free chip. Investigate if sensory differences between the original and variant product exist.	Same as above	Same as above

Table 2: Laboratory weekly objectives based on course section and example activities performed in each laboratory

Laboratory session	Section of course	Laboratory objective	Example activities
1	Introduction	Getting to know the course	Course expectations; using course website; lab report formatting; library resources tutorial; self-questionnaire
2	Discrimination testing	Design and plan discrimination test	Introduction to discrimination testing; develop rinse protocol; choose testing method; ballot design; organizing applicable materials
3		Conducting the discrimination test	Sample preparation; test set-up; panelist briefing; cleanup
4		Statistical methods and results analysis	Brief lecture on statistical analysis using Excel; example exercises; group work to analyze data
5	Descriptive analysis	Panel introduction and screening	Introduction to descriptive analysis methods; roles of panel leader and panelist; panelist screening demonstration
6		Reference generation and refinement	Initial generation of sample terms, definitions, and references as an individual and a group; refinement of terms, definitions, and references
7		Attribute scaling and intensity rating	Reference scaling individually and as a group; final choice for attribute intensity scores
8		Statistical methods and results analysis	Brief lecture on statistical analysis using Excel; group work to analyze data
9	Consumer testing	Design and plan consumer test	Introduction to consumer test methods (acceptance, preference); choosing test questions and design; ballot design; creating recruitment materials; choosing test location
10		Consumer test preparation	Preparing testing materials (ballots, cups, labels, etc.); solidifying test logistics
11		Conducting the consumer test	Conducting test in public location
12		Statistical methods and results analysis	Brief lecture on statistical analysis using Excel; group work to analyze data
13		Additional statistical analysis	Brief lecture on statistical analysis using Excel; group work to analyze data

dents' interaction with the course material; guiding them to utilize what they learned through lectures and online videos to complete the tasks associated with the laboratory. For example, as shown in Table 2, laboratory session 2, students were required to choose a discrimination testing method to use. Students previously watched online videos and participated in lecture discussions about the many types of discrimination tests. It was their choice, not the TAs, to decide what type of test was most appropriate for their sample. They then went on to develop ballots to use, sample rinse protocols and later conducted their selected discrimination test (lab 3), analyzed their results (lab 4) and presented their findings during the in-class lecture. Despite the great amount of work associated with each laboratory, sessions were designed to not occupy the entire two hour time frame. Instead, students were encouraged to use the remaining time to complete upcoming assignments that were due such as lab reports, group assignments and presentations.

Student assessment in this course was done through the completion of group project questionnaires that were designed with three major goals in mind: synergizing information presented during in-class and online lectures with the laboratory at hand, preparing students for the test occurring and probing students to investigate further into their area of investigation using scientific literature.

Students also prepared a single written lab report and PowerPoint presentation based on their findings for each sensory test category section of the course.

Student Course Evaluations

The UIUC institutional review board (IRB) reviewed the study protocol and materials used in the assessment of this course and deemed it exempt under 45 CFR 46.101(b) (1). All participants provided written informed consent prior to any participation in course evaluations. Informed consent was collected without the presence of the instructor TAs. This was done so that instructional staff had no knowledge of the students who would participate in the survey. Instructors and TAs were not granted access to these consent forms until final grades were submitted.

A confidential (no registration required) online survey developed by the course instructor was administered to all students via Survey Monkey at the completion of the course. The survey consisted of multiple choice and open-ended comments covering the laboratory and lecture. Of all the students registered for the course (n=54), fifty total students provided informed consent and completed the online survey.

Results

Online Survey Multiple Choice Responses

Survey questions pertaining directly to the laboratory section of the course are the only discussed in this publication. Responses were tallied and percentages calculated from responses to individual questions downloaded directly from the online survey. These tallies and percentages are presented in the Tables 3 and 4. Using Microsoft® Excel® 2013 (Version 15.0: Redmond, WA) the one-way chi-squared test was conducted on tallied student responses for the two investigated questions to determine significant differences. Significant differences ($p<0.05$) among the student responses were observed for the question, "how much do you agree with the statement: the material covered in lab directly reflects what is taught in lecture?" Response tallies in Table 3 indicated that a majority of students (n=45) strongly agreed that the course materials covered in lab directly reflected the materials covered in lecture. Significant differences ($p<0.05$) among the student responses were observed for the question, "on average, how much of the group project do you feel your group is able to complete during lecture and lab time." Response tallies in Table 4 indicated that a majority of students (n=29) completed 60% or more of the group project work for the class during lecture and lab.

Table 3. Student Responses Regarding the Value of Equine the Industry Internships (n=13)[z]

Possible responses	Tallied responses	Response percentage (%)
Strongly disagree or disagree	4	8
Neither agree or disagree	1	2
Strongly agree or agree	45	90

Table 4: Student responses to the online survey question, "On average, how much of the group project do you feel your group is able to complete during lecture and lab time?" (n=50)

Possible responses	Tallied responses	Response percentage (%)
100-80%	10	20
79-60%	19	38
59-40%	14	28
39-20%	7	14
20-0%	0	0

Online Survey Open-ended Student Responses

One open-ended survey question pertaining directly to the laboratory was incorporated as part of the online survey. Student responses were collected directly from the online survey and are shown in Table 5. Comments are presented as students reported them, however, some were edited for grammatical mistakes. In an effort to more succinctly visualize student comments, each comment was summarized into key phrases that described the comments content. Summarized key phrases can be found in Table 5. These key phrases were also visually represented in a word cloud (www.wordle.net) in Figure 1. In this qualitative, visual representation of data, key phrases more frequently reported are represented by larger font sizes. Based on observed trends in Table 5, these key phrases were, then, placed into one of four categories: (1) time allocation, (2) general impressions, (3) general learning, (4) active learning and (5) general structure. The comments falling into each of these categories were then tallied. These categories, examples of the key phrases that went into each category and the tallies for each category are presented in Table 6.

Discussion

Student Reflections

The online survey probed many questions surrounding the lecture and laboratory sections of this course, however, asked far more questions regarding the material developed for the lecture (videos, quizzes, etc.). Despite the limited amount of questions asked regarding the laboratory, much information regarding the course can be devised from the valuable student comments and answers to the two multiple choice questions addressed in Tables 3 and 4.

In regards to Table 3, the question addressing if laboratory material directly reflected lecture content, a majority of students (90%) strongly agreed with the statement that it did. This indicated that students saw a strong connection between the content addressed in the lecture and the practical applications incorporated in the laboratory. This was seen as a positive outcome as the utilization of learned content in the form of active learning has led to improved scores in the classroom and on standardized tests (Everly, 2013; Freeman et al., 2014). This course was purposefully designed by the instructor and TAs to allow students to see the connection and

Table 5: Student survey responses to the open-ended question, "please provide any general feedback in relation to the laboratory sessions not covered in the survey"

	Key phrases
Some labs are too long.	Too long
Some labs we had less things to do and others we couldn't finish.	Uneven workload
Sometimes too long.	Too long
Labs were good except when we were crammed on time (DA lab).	Good; too short
Some lab sessions felt rushed and others too slow	Uneven workload
Laboratory sessions were good, fun and educational.	Fun; educational; good
I really enjoyed the lab sessions. They taught most of what I learned. I like doing the tests and felt that helped my understanding.	Enjoyed; learned most in lab; helped understand
Lab was rushed some days and made it challenging.	Rushed
I got the most out of this class from my lab experiences. They were a hands on approach that explained things more in depth.	Hands-on; in-depth; got a lot out of lab
The laboratory sessions were organized and enjoyable, however, some were crunched for time.	Organized; enjoyable; too short; uneven workload
I was able to apply what we were doing in class and experience how hard it actually is to be a panelist and a scientist.	Apply knowledge; real world experience
They were fun, interesting, and very helpful.	Fun; interesting; helpful
If you want to do more work in lab to include the lab itself as well as group work, I would suggest making lab an hour longer.	Too short
I really liked being able to conduct actual tests on one product throughout the entire semester. I feel that I learned a lot more by actually conducting the test than if we had only learned in lecture.	Enjoyed; conduct actual tests; learned more than lecture alone
Wish to have more time to work on group project.	Not enough project time
Sometimes we did not get enough time to work on group projects.	Not enough project time
Lab was fine, very helpful for learning about the specific test and analyzing our product. Some lab sessions could have been shorter.	Fine; helpful for learning; make shorter
I applied my knowledge and I got a better understanding of what I learned.	Applied knowledge; better understanding
The labs were interesting and going through similar processes and protocols as sensory scientists gave a new view on sensory science.	Interesting; real-life experience; new perspective
Some labs were far too rushed. Many times it was great to work on the project and be able to ask questions to the helpful TA's.	Too rushed; worked on project; helpful TA's
I liked running our own sensory tests but there was too much group work involved. Sometimes people don't participate and it makes the project stressful. We didn't have enough time to work on lab reports and presentations in lab.	Enjoyed tests; too much group work; unmotivated group members; not enough project time
More time on group work and less on reviewing lecture topics	Not enough project time; excess lecture review
They are helpful because we apply what we learn, making it easier to understand the material. My group got a lot of work done in lab	Apply knowledge; easier understand; productive lab
I wish we had more time to work on lab reports in lab.	Not enough project time
Lab was very helpful in understanding the hands-on portions of the class and getting a deeper knowledge of in class topics.	Helpful in understanding; hands-on; deeper knowledge
Labs are fun and a great way to learn class material.	Fun; great way to learn
Almost too much time was given. Lab can be shorter.	Too long

Table 6: Category tallies of key phrases derived from open-ended student comments to the question, "please provide any general feedback in relation to the laboratory sessions not covered in the survey"

Comment category	Time allocation	Positive impressions	Learning based	Active learning	General structure
Key phrases	Too long; too short; rushed;	Good; fun; enjoyable; interesting	Helped understanding; learned most in lab; in-depth; deeper knowledge	Hands-on; apply knowledge; conducted own tests	Organized; uneven workload; not enough time for project
Number of comments	9	14	11	9	13

Figure 1: Word cloud consisting of key phrases summarized from student comments from the open-ended question, "please provide any general feedback in relation to the laboratory sessions not covered in the survey"

application of lecture content in the form of a laboratory. The significant difference in student responses, with a majority strongly agreeing, indicates a successful design and application of the flipped classroom in the laboratory setting was achieved. Here, students used their knowledge gained in lecture to design, conduct and analyze their own sensory tests during the laboratory.

One of the goals of the flipped classroom was to reserve in-classroom sessions for discussions, practice problems and activities (including group work). Out of class time is then reserved for reviewing content and lecture material. The researchers designed the lecture and laboratory activities so that the students' completed a majority of their group assignments during lecture and laboratory periods. The question addressed in Table 4, asking how much of the group project was completed during lecture and lab time, was, thus, an important metric to measure the success of the implemented flipped model. When significant differences in student responses, more than half (n=29, 58%) of the students indicated they completed more than 60% of the project within both lecture and lab. The remaining 40% of the project that students completed outside the lecture and lab most likely revolved around preparing PowerPoint presentations and lab reports. These were two assignments that the TAs for the course noticed students did not have much time to work on during laboratory sessions. While the instructor and TAs hoped that the students would have all of the group project work completed during lecture, the results presented in Table 4 illustrate an area for course improvement.

Creating additional time in the laboratory for group work is a challenge for the instructor and TAs, as the addition of one activity often includes the need to eliminate or shorten the time required on another task. Changes such as these require a careful examination of lectures and activities performed to determine what content is pertinent to the student's success. While sacrificing essential course content is not required in a flipped classroom (Lage et al., 2000), decisions reevaluating course content were made in the redesigning this course. For example, considerable time in lecture and lab was previously spent on learning how to determine the statistical probability of events occurring using z-scores. While this is an important statistical concept to grasp, it is most likely addressed during introductory statistics classes prerequisite to this course. It is also not used in the analysis of any collected data for student projects in the flipped laboratory. Because of these reasons, the decision was made to eliminate this lesson from the course. Class time was better spent on activities and discussions that furthered the progress of the group assignments. Other non-essential lecture topics were generally provided as supplemental texts available online. A thorough understanding of the course structure and pertinent content was necessary to correctly adjust topics in the course.

Student open-ended comments offered interesting perspectives related to the course that is otherwise difficult for the instructor and TAs to observe. As shown in Table 5, summarized in Table 6 and visually represented in Figure 1, student comments focused on time allocation of course activities, how the course contributed to their learning, the active learning components of the course and the overall structure of the course. Based on comments, it is clear that students have a great deal to share on the general structure and allocation of time for activities in the course. In this category, comments such as, "the labs were enjoyable and organized, however, some labs were far too rushed" or, "labs were good except when we were crammed on time" directly relate to the time allotted in each lab for activities. These comments on the "uneven workload" in laboratory sessions, also prominently displayed in Figure 1, alerts the course instructors that the allocation of time on certain activities needs to be adjusted. This is an unfavorable, but almost inevitable, consequence of a complete course overhaul. While the instructors designed activities to be completed in the time allotted, the actual time required to complete all activities by students was unknown. With experience, changes for subsequent years will be implemented to allow students' additional time on activities they struggled with and quicker movement through those they found easier to grasp. This should hopefully remedy the frequent "too long" and "too short" comments mentioned at higher frequency in Figure 1 and listed in Table 5. The challenge with these changes is the need to keep laboratory activities aligned with the flipped classroom lecture. Changes in the structure of activities in the laboratory will also require an evaluation of the lecture structure. Therefore, close collaboration with instructors on both ends of the course can make these type of adjustments work in the best interests of the students.

Since the flipped classroom is so different from other course structures, it is important for instructors to properly communicate the motivations behind its use to students (Hawks, 2014; Gilboy et al., 2015). When students understand the motivations of the flipped model, they will hopefully embrace and utilize their laboratory and in-class time effectively. While comments from students such as, "I got the most out of this class during my lab experiences, because they were a hands-on approach that explained things…" were a straightforward example of students seeing the benefits of the flipped classroom, other comments such as, "sometimes we did not get enough time to work on group projects" also illustrated a student who embraced the flipped model. The desire for additional time in lab is also shown in the Figure 1, with the key phrase "not enough project time" appearing as the largest phrase. With a changed mindset that laboratory and in-class time was a place to complete group work instead of a place to just absorb material, they wanted more time to complete their own work. With an understanding of the structure, students can embrace and rely on a structure where course time is designed to involve collaboration and completion of their group work (Hawks, 2014).

The flipped classroom and laboratory was designed to foster active engagement with the course material. Comments received from students reflected that laboratory activities did this effectively. Students commented on how they applied their knowledge in the classroom during hands-on activities conducted in class which lead to students commenting on how the laboratory helped in their understanding of the course material. The students had varying ways to express these comments, as shown by the wide variety of unique phrases visually represented in Figure 1. The researchers are unable to examine if student reported perceptions of increased understanding translates to better examination scores. While this may be a limitation to these research findings, other research has shown that students in active learning classrooms that self-reported having a better understanding of course material performed better on examinations (Everly, 2013).

Instructor Perceptions

Many of the positive outcomes seen in the laboratory regarding self-reported improved content understanding can be attributed to the active learning methods used. By providing students with a framework to design their own research instead of prescribed experiments, they were able to actively engage with the knowledge gained outside the laboratory to solve problems. Active learning techniques that promote student engagement have resulted in improved recall of information, student retention and academic achievement (Prince, 2004). The instructor and TAs of this course saw how active learning sparked interest and excitement, creating an environment where students created their own content instead of following a prescribed laboratory manual. It is believed that the use of group work, a cornerstone of this course, further aids in the students' learning process. As discussed by Prince (2004), collaborative learning surrounding group work can improve academic achievement, self-esteem, student attitudes and content retention (Johnson et al., 1998; Springer et al., 1999).

Two major concerns were expressed by students regarding group work. The first was being assigned a particular food product category for the entire semester. While the instructor and TAs thought this would help students become "experts" and take ownership of their project, it instead made many groups dislike their product. Along the same line, students also expressed concerns with having to work with the same individuals the entire semester. While the millennial student prefers group work and the social interaction that comes with it (Roehl et al., 2013), they also embrace changes and challenges. Due to this feedback, a rotation of food products and group members for each section of the course is now in place and has worked quite well for subsequent years.

In order to have students more comfortable regarding the amount of group work in this course, a lesson regarding group work has been implemented. A university faculty member specializing in group dynamics and leadership now presents on the benefits, challenges and foundations of group collaboration with each group creating a group contract. These contracts consist of rules that all group members must abide by. Many students opted to include deadlines for when assignments should be shared with the group, guidelines for communications and the role that each group member plays. We have found this exercise to be very beneficial and it was specifically mentioned by students as a component of the course they now find helpful.

Developing the laboratory manual for a flipped classroom was a challenge. For many courses, pre-designed or commercially available laboratory manuals and exercises may be currently in use. Due to the extensive integration with the course material, such a manual was not available for this course. So, the manual had to be developed by the instructor and TAs. While this required a considerable amount of time from the instructional staff, it was a necessity for the course to function properly and a worthwhile investment of resources. The newly developed manual utilizes exercises that not only advance the development of the students' own sensory test, but also draw upon topics covered in lecture. Laboratory sessions, instead of being seen as separate entities, have become extensions of the classroom. The flipped classroom and laboratory work as one team-drawing upon knowledge and experience gained separately to create an effective learning environment. It is, therefore, important a laboratory manual that corresponds with the lecture content is created when implementing the flipped classroom in a laboratory.

While resources are required to develop exercises, lab materials and revised lesson plans for instructional staff; utilizing public, departmental, campus and university resources can ease the process. Techniques such as

bringing in staff from other university departments to give guest lectures, leveraging skills from students interested in course development and close collaboration with instructors and instructional staff can help ease the process of a major course overhaul. As a bonus, dedicating time and energy to the development of these resources can free up time later in the semester. Teaching assistants in this course remarked that before-class preparation for these newly designed labs often required less time. Since students were in charge of designing, setting up and executing their own research, the TAs were no longer required to spend a great deal of time performing these preparatory activities. Additionally, the time freed up during laboratory sessions allowed for increased interaction with students. This allowed TAs to directly interact with and form connections with students creating a more welcoming and inclusive learning environment.

It is important to note that instructors take the role of a "guide on the side" in the flipped laboratory to allow students to have extensive engagement with the course material (King, 1993). Only by staying in this role will students be able to construct their own solutions to the problems they are presented with. Providing answers to problems may be satisfying for students in the moment, but ultimately will not benefit them. When confronted with real-world problems such as the ones presented in this course (i.e. in a job, internship, or other classes) these future scientists will be the ones others look to for answers. When at these times in their careers, they will be required to make decisions, produce results and solve complicated problems without the direct input from an expert (King, 1993). Traditional laboratories where manuals and instructors provide all the answers will not prepare students for the future. It is for this reason why structuring the laboratory the way it was in this course will better serve students. While initial frustrations and "growing pains" may ensure when adopting the flipped classroom, for students and instructors, transparency and clarity in the classroom is essential to its success. Providing clear lesson plans with outlines of laboratory objectives, goals, activities and probing questions to the instructors can help make the transition to instructor facilitated teaching easier for the instructional staff working in the flipped classroom.

Summary

Active learning exercises in the flipped classroom allowed students to become directly involved with the learning process. Combined with a laboratory that reflected on lecture material and focused on a semester-long group project, an environment where students had the maximum potential to engage and interact with course material was created. A newly developed laboratory section of this course, where students explored the topics of the course to design, conduct and analyze their own experiments was far more engaging and useful for student understanding. While the development and implementation of a flipped classroom can be a challenge, the benefits seen by instructors and students shown here make a strong argument for the utilization of these teaching methods. Leveraging public, departmental, campus and university wide resources helped in the creation of this course structure. It is encouraged that others wishing to make changes such as these use the resources they have available at their institutions. While every course redevelopment may encounter some "growing pains", it is important as educators remain focused on creating the optimal learning environment for their students. Staying in touch with students' perceptions through the use of surveys and informal feedback at different points in the semester is an excellent way to ensure you are creating an effective learning environment for the students.

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A Case Study in Do-It-Yourself Projects: Utilizing Learning Contracts to Facilitate Global Learning in Agriculture[1]

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Abstract

Agriculture graduates must have the knowledge, skills and dispositions to meet the complex needs and pressing challenges in the global agriculture system. Differentiation of instruction through learning contracts is one method to encourage students to self-direct and further their global learning. Individualized learning contracts allowed students in three different agriculture courses to customize class assignments to develop global knowledge, skills and dispositions. The individualized approach allowed students a space to explore their own interests, preferred modes of learning and development of learning artifacts. Data for this study were obtained through student focus groups, instructor observation, a survey of students and through an analysis of the learning artifacts produced. The data were analyzed using a grounded theory approach. Four themes that emerged from this study were: 1) engagement and motivation, 2) frustration with ambiguity, 3) student choice and creativity and 4) skill development. The individualized learning contracts did contribute to development of student learning experiences that address the skills and competencies required for meeting the needs of a changing agriculture industry. Instructors utilizing this method of differentiation are advised to provide clarity in the scope of the assignment and support students as the project progresses.

Introduction

Students of agriculture must have the knowledge, skills and dispositions to meaningfully operate in an increasingly complex and interconnected global food economy (National Research Council, 2009). Pressing global challenges, such as climate change and food security, rely on agriculture for innovative and sustainable solutions. Higher education has a responsibility to further global learning and prepare globally competent agriculture graduates in order to adequately address the key issues facing the global agriculture industry.

Global competence is "the capacity and disposition to understand and act on issues of global significance" (Mansilla and Jackson, 2011; p. xiii). In order to address the world's most pressing challenges, students must be open-minded, informed and understand how their actions have an effect on both local and global levels (Association of American Colleges and Universities, 2010).

Knowing that global learning does not take place in a single unit, course or in the content of a single experience (Association of American Colleges and Universities, 2010), students must direct and further their own global learning. Students must be motivated, confident and ready to face difficult challenges. In short, a "growth mindset" (Dweck, 2006) is vital to students aspiring to high levels of global competency and encouraging them to persist through difficulty.

One method to encourage students to take the helm in their global learning is to differentiate classroom instruction. Differentiation is regarded not as a specific set of pre-defined strategies, but rather a framework for thinking about teaching and learning (Sousa and Tomlinson, 2011). The principle function of differentiation is that it is not the instructor's role to plow through the course content, but rather to maximize learning by

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creating a flexible learning environment and allowing for more than one mode of learning (Sousa and Tomlinson, 2011). The underlying teaching and learning foundation to differentiation is rooted in the "zone of proximal development" seminal work of Vygotsky (1978) that essentially states learners have different capacities with a zone or a difference between what a learner can do without help and can do with help.

In global learning, students enter the classroom with varying levels of knowledge, skills and dispositions related to global competency. Some students may have extensive travel experience or well developed language skills, while other students have never traveled from their home country or have any experience with a course focused on global issues. Differentiation takes into account diversity in student backgrounds and allows for instruction to challenge students on an individual basis rather than a one-size-fits-all learning format (Tomlinson, 2014), which aligns with Vygotsky's (2012) work on addressing learners' levels of readiness.

Differentiation allows learners the opportunity to have a hand in defining their learning; thus, allow the student to pursue a topic of particular interest. Allowing students to connect new content with their own interests can lead to greater student engagement, productivity and achievement (Amabile, 1996; Csikszentmihaly, 1990; Torrance, 1995). Students are supported in meeting the learning challenges they set for themselves and are held accountable for the learning outcomes. The entire process promotes the development of a "growth mindset" by demonstrating that learning can be cultivated through effort by setting appropriate learning goals and following through with them (Dweck 2006; Souza and Tomlinson, 2011).

Differentiation of instruction addresses the strategic points of action put forth by the National Research Council (2009) related to the transformation of undergraduate agricultural education to meet the demands of a changing world including: working in diverse teams and communities, working across disciplines, communication, critical thinking and analysis, ethical decision making and leadership. Differentiation of learning is a pathway to give students the opportunity to develop these skills in agriculture courses.

Heutagogy, the putting of students at the center of their own learning or self-determined learning, was a term developed by Hase and Kenyon in 2000. Since 2000, the term has been found to be particularly usable in e-learning environments (Chapnick and Meloy, 2005). Student learning contracts are the specific application for high education (Laycock and Stephenson, 2013). While the utilization of learning contracts in higher education is found in the literature (Anderson et al., 1996; Knowles, 1986; Coulson and Harvey, 2013; Wade, et al., 2013), literature on use specifically in colleges of agriculture or to determine global learning advancement is limited.

Theoretical Foundation

Grounded theory, while one of the more popular research designs in the world, is a complex, iterative process (Creswell, 2009). Researchers develop questions which guide the research, but are not limiting. As the data is gathered, themes or linkages are identified between core questions and data (Charmaz, 2006).

Conceptual Framework

Self-directed learning is "a process in which individuals take the initiative, with, or without the help of others, in diagnosing their learning needs, formulating learning goals, identifying human and material resources for learning, choosing and implementing appropriate learning strategies and evaluating learning outcomes" (Knowles, 1975, p. 18). When working with self-directed learning, motivation of the learner is critical and two motivational theories were utilized in this study: Expectancy x Value Theory (Wigfield and Eccles, 2000) and Self-De-

Figure 1: Grounded Theory Approach as adapted from Young, 1996

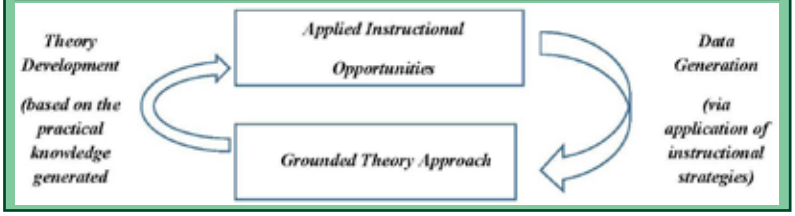
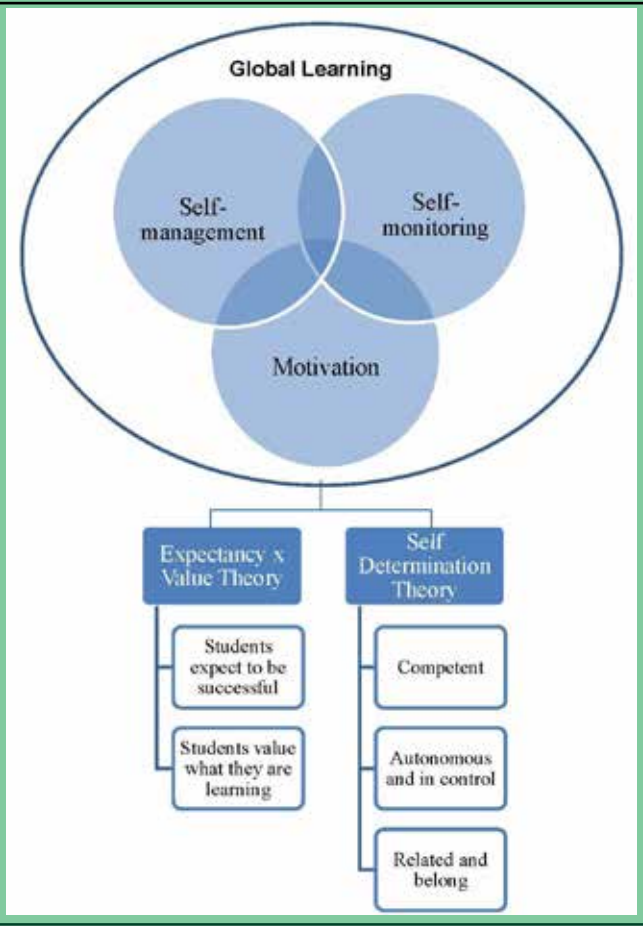


Figure 2: Conceptual Framework of Self Directed Learning to Encourage Motivation for Global Learning



termination Theory (Deci et al., 1991). The integration of these theories was inspired by Ramsay et al., (2015).

With Expectancy x Value motivation theory, motivation is increased when students expect to be successful and value what they are learning (Wigfield and Eccles). Motivation increases in self-determination theory when students feel competent, autonomous and in control and related or belonging to the effort (Deci et al.)

Purpose and Objectives

While conducting critical reflection and review to identify the most effective instructional strategies to develop global learning that promote self-directed learning, grounded theory (Glaser and Strauss, 1967; Charmaz, 2006; Creswell, 2009) was utilized in an iterative and inductive process; retroactively researchers developed the following objectives:

- Determine effectiveness of differentiation with utilization of learner contracts through instructor satisfaction with learning.
- Identify themes of student perceptions in utilizing learning contracts for global learning.

Methods

Differentiation of instruction in this study took the form of individual learning contracts, also referred to as Do-It-Yourself (DIY) Projects. The DIY Projects were included as mandatory graded assignments in three different courses in the College of Agricultural Sciences at Pennsylvania State University. One course focused on global learning in a resident education course, the second was a preparation course for a summer immersion experience and the third was a month-long study abroad experience in Costa Rica. All researchers were instructors for a minimum of one of the courses. One researcher involved in the project was an instructor for all three courses. All three courses included graduate students and undergraduate students of various academic ranks. The learning contract had a similar format for each course. As the first step of the project students identified areas of interest, possible methods of learning and useful resources. Students were tasked with clearly identifying a learning artifact that would evidence learning. After selecting the learning artifact and to promote metacognition, the students were asked to determine how the artifact would be assessed both by themselves and the instructor. The learning contract also defined a method to evidence progress on the project by sharing weekly updates, often taking the form of a social media interaction or email. All of this information was formulated into a contract. The contract was then discussed at an individual consultation between the student and the instructor. Upon completion of the consultation, students revised the contract to take into account instructor feedback. The learning contract was finalized and considered a binding agreement between student and instructor.

An important consideration for implementation was instructor flexibility in the output product or "learning artifact." The learning artifact was not limited to standard forms of output products such as research papers or multimedia presentations. Rather, the instructors stressed creativity as students designed their output products; underscoring the cultivation of personal development skills such as creativity (Crawford et al., 2011).

The learning contract aligns with differentiation because it empowers students to select three important considerations: 1) choose a meaningful topic, 2) the methods of learning about that topic and 3) the parameters of the output product. Throughout the learning process, students are assisted by the instructor in meeting the learning goals and held accountable for meeting the mutually agreed upon targeted outcomes.

Data for this study were obtained through student focus groups facilitated by instructors, instructor observation, a survey of students and a thorough analysis of the learning artifacts produced. The data were analyzed using a grounded theory approach as described by Corbin and Strauss (2008) which emphasizes ongoing reflection and analysis to determine categories and themes. Researchers merged the data and categorized them into emergent themes. The four themes identified were engagement and motivation, frustration with ambiguity, student choice and creativity and skill development. This study was deemed exempt by the Pennsylvania State University Institutional Review Board.

Results

A description of how the DIY Project functioned in the context of each course, as well as several examples of DIY Projects, is included here.

Resident Course

Individualized learning contracts were utilized in the Agricultural and Extension Education resident course titled "Educational Programs in Agriculture in Developing Countries" to encourage students to pursue a project related to their particular interests in global agriculture education.

Instructors observed that students were creative in overlapping the DIY Project with other learning goals related to their major or future careers. For example, one pre-service agriculture educator created a lesson on international agriculture geared toward secondary students and presented it at the school where she planned to complete her student teaching internship the following year. Observing the secondary student reactions to her lesson, she determined that she needed to provide more background material to allow the students to grasp the fundamental concepts that she had targeted as her learning objectives for this lesson. The teacher educators involved in the project found this level of instructional reflection on scaffolding required at this point of teacher development to be very beneficial for a teacher candidate to realize prior to the student teaching internship.

Another example included a group of five students that self-selected to collaborate in pursuit of an agri-

culture innovation prize offered by the College of Agricultural Sciences. Working in partnership with a local non-governmental organization, the student group designed an agricultural education program for youth in Haiti. The instructors observed meaningful difference in student motivation and disposition to the project. The student group was motivated by the idea that if funded, the project could come to fruition as a reality and not just a concept. Presenting to a panel of potential investors was a meaningful experience that compelled students to be meticulous and thoughtful in all aspects of their work. When the student group advanced to the final round of the competition, the entire class celebrated in acknowledgement of the amount of work that the group had put into the project. A group member noted that the most rewarding aspect of the DIY was "seeing a project turn into something that we cared so much about." Another group member commented that "the most rewarding aspect is how this initiative is going to change people's lives."

Preparation for Immersion Experience

At Pennsylvania State University, many short-term study abroad opportunities in the College of Agricultural Sciences take the form of an embedded course, which have both a resident education and a travel component. Individualized learning contracts were employed during the resident portion of the Agricultural & Extension Education embedded course "School-Based Agricultural Education across the Globe" with a one-month travel component to Korea.

While the embedded course as a whole was focused on school-based agricultural education in Korea, the aim of using the contracts was to facilitate learning about Korea such as culture, geography, politics and history. While it is very important to have background knowledge about the destination country, the instructors wished to use the limited available class time to focus on Korean agriculture and agricultural education. Through the use of individualized learning contracts, students were afforded opportunities outside of class to explore some aspect of Korea or Korean culture to which they were particularly drawn and they shared their findings with the rest of the class at the end of the semester.

One of the most interesting learning artifacts developed was from a project focused on Korean art. After analyzing surviving images of tigers throughout the history of Korean art, the student created her own depiction of two tigers representing current events in Korea (see Figure 3). In her painting, two tigers bear their teeth at each other across a dividing line created by the yin and yang of the Korean flag and a magpie (symbolizing hope) flies in the distance. The learning artifact demonstrates not only knowledge of the use and importance of tiger symbolism in Korean art, but also an understanding of the relationship between North and South Korea.

Another example of a DIY Project consisted of spending time with a Pennsylvania State University student from Korea who was not affiliated with the agricultural teacher education program and course experience. The students met each other during a class session in which Penn State Korean students were invited into the classroom to share their culture and perspective with the Penn State agricultural educations students participating in the immersion experience. One agricultural education student chose to design their DIY Project around the new friendship and chronicled the experience of cooking and sharing a meal. The students shopped at the market together and then taught each other to create a dish from their respective regions of the world. In this particular case, global learning was advanced as the student learned intercultural communication skills and recognized her personal and social responsibility to create a welcoming environment for international students on campus.

During Study Abroad

Pennsylvania State University is home to the Spanish for the Agricultural Sciences program, a three-course sequence culminating in a one-month immersion experience in Costa Rica. During the one month experience, students lived with host families, attended Spanish language classes, participated in agriculture tours and activities and engaged in service-learning. Individualized learning contracts were utilized as a method to encourage student engagement with the host culture. Learning contracts were drafted pre-departure. The learning artifact was created in-country where most of the information was gathered.

The role and form of individualized learning contracts took on a unique role during the study abroad experience. Rather than passive consumers of the international experience, students became active

Figure 3. Learning Artifact from Student DIY Project on Symbolism in Korean Art

seekers of information relevant to their projects. The instructor maintained flexibility in the projects and was open to amending contracts if unique and previously unknown opportunities became available.

One example of a student project took the form of a video, which the student produced, edited and uploaded to YouTube. The video showcased the student and her host mother cooking a traditional Costa Rican meal together. Cooking was one way the student was able to integrate herself into the family. She wanted to record the process of making a traditional Costa Rican meal from start to finish to evidence her progress with the Spanish language made during the immersion experience. Through an entry on the course blog, the student shared her experience with program stakeholders, documented the recipe and shared details of connecting with the host family through food preparation and sharing meals.

Another DIY Project focused on learning agricultural vocabulary in Spanish. The student's goal was to chronicle fifty agriculturally-related Spanish vocabulary words and create a mini-dictionary as a reference for future students in the program. The student noted agricultural vocabulary words on agriculture tours that were new to the student. The student then engaged farmers and other experts to ask for further clarification. The list of Spanish agriculture words was shared online with stakeholders and passed on to students in subsequent cohorts.

During study abroad travel experiences, student feedback on the DIY Projects centered on the pedagogical notion that the contracts encouraged students to remain focused on their learning goals. Students shared that "a month is a long time" and "there will be time for the project later." The DIY Project gave students "an excuse" to further engage in the experience. Several students cooked meals with their host families as noted in the example above, which required them to plan ahead and set aside a dedicated time with the family. Some students felt that completing the projects in-country was "frustrating" because they could be "doing something else", but many acknowledged that they provided structure to help them maximize their learning experience.

Discussion

Four major themes emerged across all three courses through interpretive analysis: 1) engagement and motivation, 2) frustration with ambiguity, 3) student choice and creativity and 4) new skill development.

Engagement and Motivation

The reaction to the DIY Projects was the opposite of what instructors normally witness with a large project: students wanted to "make the project longer term" so they could "read more books" and "find more resources." In many cases, students were highly self-motivated and often wanted to work more on the project than what was outlined in the contract.

In terms of sharing learning artifacts, students wanted "to spend more time presenting" because "everyone found such interesting things and it would be nice to have more time to listen and discuss as a group." These comments evidenced the desire and enthusiasm shared by individual students as they presented their projects to their fellow students. In addition, the students who served as the audience for learning contract presentation shared that they found the learning outcomes of their peers interesting and enjoyable.

Frustration with Ambiguity

Not all students found the DIY Project to be a joyful experience. Some students struggled to design individual projects as in each class there were many possible topics to pursue and the output product was intentionally undefined. Several students noted the absence of a rubric. Others expressed confusion on what the instructors wanted from them.

DIY Projects did not engage and motivate all learners. Students in each of the classes used the ambiguity of the assignment as an excuse for a haphazard project that lacked the breadth and depth of the project outlined in the individualized learning contract formulated at the beginning of the semester. Some students failed to adequately self-monitor their progress during the semester. Others remained frustrated with the ambiguity of the assignment.

Potential less than optimal results are among the reasons that some instructors hesitate to utilize individualized learning contracts (Caffarella and Caffarella, 1986); however, the instructors involved with this project saw evidence of more "successful" projects than projects that floundered. Clarity in the scope of the assignment and differentiated levels of support for the project to individual students are critical factors in optimizing learning.

Student Choice and Creativity

A positive reaction to the assignment was that students were excited by the freedom to choose their own topic and be creative in defining the learning artifact. An example of a student statement that reflected observations of many students was "*it was hard to narrow down what to do for the project because there were so many interesting things you could do*."

Several students embraced the call for creativity. Several unique output products emerged, such as the painting, meals, videos and a submission in a college-wide "business pitch contest". Other students expanded their individual conception of instructional "resource," such as those who met with international students and discovered a wealth of diverse cultural perspectives right on campus, or the students who accessed campus multimedia and computing resources for the first time.

Other students seemed to not take up the challenge to be creative and innovative with resources or output products. Some students stayed in comfort zone of familiarity with slide presentations and research papers

utilized as learning artifacts. In addition, many students utilized "traditional resources" such as internet sources, books and research articles.

New Skill Development

Several students developed new global skills as a result of their DIY Project. Some students practiced highly coveted "soft skills" (USDE, 2012; Soria and Troisi, 2013) such as intercultural communication and the ability to work on a diverse team. Others utilized the experience to gain new multimedia skills and leadership of a multi-disciplinary team.

Several students practiced the skills required for their discipline as a type of early field experience, such as the pre-service teacher who utilized the opportunity to teach an international agriculture lesson in a high school classroom. She realized that her lessons on international agriculture lacked clarity and needed to be reformulated before her student teaching experience.

Other students utilized the DIY Project as an opportunity to practice professionalism skills, such as the students who gave the business pitch to investors. Dressing professionally, maintaining a professional demeanor while under pressure and the acceptance of mentoring advice were professional skills practiced in this particular case.

Summary

Differentiation of instruction is one method to encourage lifelong global learning. In this study, the DIY Project assignment allowed students to develop individualized projects designed specifically to promote global learning. The individualized approach allowed students a space to explore their own interests, modes of learning and learning artifacts. The variation in quality and complexity of the DIY Projects could be due to differing levels of learner readiness as put forth by Vygotsky (2012). The DIY Projects allowed for learners to continue to develop their capacity for self-directed learning (Knowles, 1975), self-management, self-monitoring and an increased motivation improved by an increased value in learning tasks (Wigfield and Eccles, J., 2000) and a sense of individual autonomy (Deci, et al., 1991) in the learning process.

The four themes that emerged from this study of individualized learning contracts as a method of differentiation of instruction were: engagement and motivation, frustration with ambiguity, student choice and creativity and new skill development. The emergent themes connect to the charge of the National Resource Council (2009) to create a student experience that addresses the skills and competencies required for meeting the needs of a changing agriculture industry.

Of particular note, an emergent theme that arose during the study was the development of new skills. The DIY Project seemed to be an effective gateway that invited learners to develop select personal skills that are highly coveted by employers in agriculture and natural resources (Crawford et al., 2011).

From the perspective of an instructor, utilizing individualized learning contracts may seem like extra work that could be avoided. However, the instructors of the three courses in this study were enthusiastic about the change in their role from enforcer to mentor as learning became more student-centered.

Specific Recommendations for Practice

Instructors seeking to include learning contracts in their agricultural courses for global learning should:

- Clearly determine what learning outcomes are being addressed.
- Provide time for a submission and revision process. This could include student to student as well as student to teacher. Time for support and guidance is critical.
- Ensure that there are clear measures of evaluations and scope of assignment are mutually agreed upon between the instructor and the learner.
- Provide in course time for sharing of findings and reflections on learning processes. Metacognition can be the most powerful aspect of self-directed learning that is achieved through the utilization of learning contracts.

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Developing Portfolios to Document Student Performance and Accompishements

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Abstract

Portfolio assessment was introduced as a pilot assignment during a senior-level departmental capstone course in winter quarters 1994 and 1995. Student and instructor response was very positive toward the development of a portfolio. The portfolio process encouraged students to continually improve the materials to be included in their portfolios, to select the materials that best documented their accomplishments and achievements, and to develop competence in self and peer assessment. This paper describes the requirements for the capstone course, student and faculty perspectives toward the portfolio assignment, and recommendations for improving the process.

Introduction

Assessment reform encourages the educational community to focus on the context within which learning occurs and to address the broad scope of student capabilities (Vavrus, 1990; Wolf, 1989). Authentic assessment transpires when educators use more than one method to evaluate student learning. Multiple assessment methods are required to secure a more distinct portrait of student growth and achievement (Matthews, 1990). Student assessment should consider the multiple effects of education and should not focus exclusively on traditional testing methods (Simmons, 1990). Portfolios are a form of authentic assessment that is continuous, multidimensional, knowledge-based, and genuine (Valencia, McGinley, & Pearson, 1990).

Portfolios are developed to display materials that represent the abilities and accomplishments of a student during a specified time period. The presentation of materials over an extended time helps to chronicle student improvement and competence that cannot be measured by paper and pencil tests. One of the primary purposes of a portfolio is to provide a more reliable and comprehensive picture of student growth and achievement. When students reflect on their professional goals and accomplishments, assess their strengths and weaknesses, and investigate ways to present their materials, the process of developing an individual portfolio becomes more valuable than the final product.

The use of portfolios to document student achievement and growth was incorporated into a senior-level capstone course in the Department of Agricultural Education in the College of Food, Agricultural, and Environmental Sciences at the Ohio State University during winter quarters 1994 and 1995. One of the main goals of the capstone course is to provide an opportunity for students to reflect on their undergraduate experience and to refine their philosophy of the teaching and learning process. The portfolio allowed students to present a cross section of their achievements during their undergraduate education and to display a representative sample of their writing abilities. The main purposes of including a portfolio assignment in the course were to document growth, demonstrate competence, and illustrate individuality.

Capstone Course Description

Contemporary World Issues in Agricultural Education focuses on the debate, consideration, and integration of agricultural education from a wider agricultural perspective. The course is required of all departmental majors in their senior year and is designed to fulfill the third writing course requirement in the major. Students typically enroll in the course after completing a 10-15 week internship in either the public schools, an agribusiness, or a county Extension office. The course includes topics on international awareness, the history, philosophy, and future of the agricultural education profession, and ethical decision making. Development of analytical thinking skills is also emphasized.

The specific objectives of the course include:

a) identify the components of effective writing in agricultural education,
b) develop and defend a personal philosophy of agricultural education,
c) critically analyze the impact of selected events on the future of the profession,
d) discuss ethical issues in agricultural education,

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e) compare and contrast agricultural education systems worldwide, and
f) compose written materials used in the agricultural education profession.

Four assignments are required in the course:

1. An editorial news release with an accompanying radio program discussing an ethical issue facing agricultural educators.
2. A formal business letter and a written agenda for an advisory committee meeting discussing the student's philosophy of agricultural education.
3. A multi-page newsletter that introduces the student to the community, outlines goals and expectations for the coming year, and provides general agricultural information.
4. A portfolio that includes the final versions of the three writing assignments plus other materials that document the students' abilities and accomplishments. These additional items could consist of: resumes, career goal statements, self assessments of strengths and areas for improvement, letters of recommendation, awards and honors, teaching plans, news articles, evaluations, and course outlines. As a part of the fourth assignment, students present their portfolio during a formal interview session during finals week to either a school administrator, an agribusiness representative, or a state-level Extension administrator. The course objectives and assignments are process oriented rather than content oriented. Students are encouraged to incorporate their existing knowledge and skills into the class discussions and during the development of their portfolio.

Faculty Perspective

The portfolio/interview assignment helped students develop and strengthen the characteristics of an effective educator: a) **the ability to work alone**—the students were responsible for producing their own portfolios; they had to select the type of information and documents to include in the portfolio and they had to decide on the format and presentation of the portfolio, b) **the ability to work in groups**—when completing the writing assignments for the portfolio, students worked together; throughout the quarter, the students had the opportunity to work with all members of the class, c) **the ability to listen**—when preparing and presenting their portfolios, the students had to listen and attend to other people's opinions and reactions, d) **the ability to speak**—the students had to express and defend their views in both formal and informal settings, and e) **the ability to learn**—the students had the opportunity to demonstrate their accomplishments and abilities in a non-traditional manner; they learned that knowledge and success can be measured in different ways.

Figure 1. Writing Assessment Sheet

PEER, SELF, AND INSTRUCTOR ASSESSMENT OF WRITTEN DOCUMENTS

Student's Name _____ Reviewer's Name _____

Assignment (Please circle one)
a. Editorial
b. Business Letter
c. Newsletter

	3 To a Great Extent	2 Some-what	1 Very Little	0 Not at All
I. CONTENT—24 pts.				
Information is accurate.	___	___	___	___
Writer is aware of audience.	___	___	___	___
Sufficient details are provided.	___	___	___	___
Analytical thinking is evident.	___	___	___	___
The content is....				
Timely	___	___	___	___
Relevant	___	___	___	___
Interesting	___	___	___	___
Creative	___	___	___	___
____ Total Pts. / 24 = ____%				
II. STRUCTURE—15 pts.				
The writing style is....				
Clear	___	___	___	___
Concise and to the point	___	___	___	___
Focused	___	___	___	___
Flows in a logical order	___	___	___	___
Organized	___	___	___	___
____ Total Pts. / 15 = ____%				
III. GRAMMAR/SPELLING—6 pts.				
Words are spelled correctly.	___	___	___	___
Correct grammar is evident.	___	___	___	___
____ Total Pts. / 6 = ____%				

____ TOTAL POINTS OUT OF 45 ____ % OVERALL PERCENTAGE

Strengths:

Suggestions for Improvement:

Figure 2. Portfolio/Interview Assessment Form

PORTFOLIO/INTERVIEW ASSESSMENT

Student Name _____

Portfolio

Strengths— _____

_____

_____

Areas to Improve— _____

_____

_____

Interview

Strengths— _____

_____

_____

Areas to Improve— _____

_____

_____

_____ _____

Interviewer Signature Date

Figure 3. Letter Grade Recommendation Guidelines

PORTFOLIO/INTERVIEW LETTER GRADE RECOMMENDATION

Directions: Based upon the portfolio and interview, please circle the letter grade category that best describes the student's performance.

A, A–

Outstanding Performance. Superior in all aspects. Unusual ability, exceptionally impressive. Recommended without reservations.

B+, B

Good Performance. Possesses a number of outstanding qualities. Impressive. Needs improvement in selected areas. Recommended with minor reservations.

B–, C+

Questionable Performance. Neither conspicuously impressive or unimpressive. Cannot predict excellent or good success. Possesses as many strengths as weaknesses. Needs considerable improvement in selected areas. Recommended with major reservations.

C, C–

Poor Performance. Some major weaknesses. More weaknesses than strengths. Serious risk. Recommended with hesitancy.

D+, D

Unacceptable Performance. Definitely unimpressive. Little, if any, effort demonstrated. Not recommended.

One of the most challenging aspects of the course from a professor's perspective was evaluating student performance. To assess written documents, the students and the professor developed an evaluation matrix (See Figure 1). Students identified three major components of effective writing and provided descriptors for each component. Differential weights were assigned to the three components with content receiving the highest percentage of the total points possible. In addition to the numerical scale, the students requested an opportunity to provide and receive written feedback on their assignments. Peer review was an important aspect of each assignment. The assignments, including the portfolio, could be "recycled" throughout the quarter with final versions due one week prior to the formal interview. The three writing assignments were worth 45% of the total grade with the portfolio and interview contributing the remaining 55%. An assessment sheet (See Figure 2) was developed for the formal interview to provide written comments regarding the student's portfolio and performance by the designated interviewer. Upon completion of the formal interview, the interviewer discussed the strengths of the student and made suggestions for improvement. Each student received a letter grade recommendation from the interviewer (See Figure 3). Using administrators from actual schools, businesses, and Extension provided an authentic environment for the students to present their portfolios and demonstrate their abilities.

Student Perspectives

When students were asked to evaluate the effectiveness of developing portfolios as part of an undergraduate course they identified several benefits: a) **closure**—the portfolio brought closure to the undergraduate program. The portfolio helped the students summarize their educational career and provided a tangible means of documenting accomplishments. Upon completion of the portfolio, the students were able to reflect on their total educational experience. The collection and organization of materials to be included in the portfolio helped students to interrelate the various components of their undergraduate education, b) **student to professional**—the portfolio helped transform the student to a professional. The compilation of written work, letters of recommendation, awards, internship accomplishments, resumes, and transcripts portrayed the student as a professional educator. By including a career statement, a philosophy of education, and a self assessment in the portfolio, many students were forced to re-evaluate their position in life; their time as a student was coming to a close. The preparation of the portfolio laid the ground work for making the transition to a professional. In addition, the portfolio was an excellent marketing tool to give students a competitive advantage in their job search, c) **collaboration**—the portfolio process encouraged peer interaction. Group work allowed opportunities for the students to share experiences, express opinions, receive constructive criti-

cism, and deal with differences. By combining efforts, students learned from each other and depended upon each other's strengths. Peer feedback provided students with varying viewpoints which uncovered alternative possibilities for improving the portfolios. d) **self-evaluation**—the portfolio process fostered self-assessment. The portfolio highlighted and documented student strengths and also identified areas that needed improvement. Selecting and compiling the materials to be included in the portfolio compelled students to focus on their future goals and past accomplishments. An unexpected outcome of developing the portfolio was an increased awareness of and appreciation for each student's individuality, and e) **self-expression**—the portfolio provided an avenue for the students to express their creativity. Within general guidelines, each student developed a unique set of materials illustrating his or her own philosophy, values, and beliefs regarding agricultural education. The portfolios depicted a distinctive image of the student as a professional educator. An important component of the process encouraged students to continually improve the materials to be included in their portfolios; they appreciated being able to re-submit written documents and to establish their own standards for quality.

Recommendations

Several suggestions for improving the portfolio process were offered by the students and instructor. Students expressed the need to learn how to present their portfolio during an interview. The students were reluctant to refer to the portfolio unless the interviewer specifically requested to see the contents. An in-class practice session was suggested to demonstrate ways to incorporate the portfolio into the interview process. The students also advised the instructor to consider having the portfolios on display in the department for all faculty and students to observe and examine. The public presentation of the portfolios would add credibility to the assignment and encourage students to concentrate on displaying their best work. The students appreciated the opportunity to interview with genuine administrators. However, the students suggested locating people with vacant positions to serve as interviewers to provide an even more realistic environment for the interviews. The portfolio was developed as part of a senior-level capstone course in the major. Both the students and the instructor believed that the process needs to begin much earlier in the student's undergraduate experience. Since recording student growth is a primary purpose of portfolio assessment, the students should be gathering materials to document their progress and performance throughout their entire university education. Of special interest to the instructor is the documentation of each student's transformation into a professional educator as reflected in a more realistic philosophy of teaching and learning. Similarly, the students recommended incorporating the portfolio assignment into the other courses in the major. By introducing the concept of authentic assessment early in their undergraduate experience and developing the portfolio throughout coursework in the major, the students will have the opportunity to reflect on their education, to become more active participants in their own learning, and to expand their concept of assessment.

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A Novel Approach to Learning Base Knowledge

Many students in an introductory science class are consumed with learning facts and base knowledge that will be useful to them once they take advanced courses in their major. Base knowledge learning can seem like a tedious task and often students lack the motivation to fully learn required information and therefore struggle in more advanced courses. This teaching tip describes a novel approach to teaching and learning base knowledge for a science curriculum that has been implemented for several semesters in an introductory equine science class. This project allows students some flexibility and control over their learning.

In an attempt to excite students about basic equine science knowledge, a project was designed that required each student to work independently to create a one or two page educational bulletin for each of eight main topics studied during a semester long course. The main topics were related to basic horse management and science identified by the instructor as the most important topics to learn in an introductory horse science class. Educational bulletin topics included: identification, behavior, health, nutrition, activity, hoof care, parasite/disease, and reproduction. Students are allowed to pick the specific area the bulletin attempts to educate about within those eight main topics. This allows the students some flexibility and ownership over their projects.

Instructions for the bulletin are as follows: Each student will prepare 8 bulletins in PDF format suitable for publication and distribution that can be used as a tool for educating horse enthusiasts about a topic covered in class. The flyer should be easy to read and understand, contain important take home messages about the topic, have quality and relevant graphics, consist of 1 or 2 regular (8½ by 11) sheet(s) of paper, and contain verbiage that is concise, pertinent, and to the point. The flyer should be flat, not brochure style.

Students are provided with a grading rubric to improve their bulletins (Table 1). Grading categories on the rubric are horse-themed for fun. Students have access to the rubric prior to making their bulletin and after turned in; the instructor grades the bulletin using the rubric and gives the completed rubric and bulletin back to the student.

A crucial component to student success is to provide examples of "good," "bad" and "average" bulletins. It is not enough to show students a graded bulletin, but rather a bulletin and the associated rubric with notes so they have an idea of the positive and negative portions of each bulletin and specifically what the instructor is looking for. Additionally, several of the "best" bulletins from each topic are selected by the instructor and displayed in the equine hallway of the animal science building each semester. Those bulletins are also shared on the equine webpage to help educate real horse owners. Both of these instances allow students a competitive incentive to work hard and create an outstanding bulletin.

The Equine Educational Bulletin cultivates basic equine knowledge that is essential to success in advanced equine courses. Students are given ownership over their learning and grade, which has been well received by students for three semesters. Anecdotally,

Table 1. Equine themed Introductory Equine Science Educational Bulletin Rubric

Points:	Rookie 0-7	Novice 8-15	Apprentice 16-21	Non-Pro 22-24	Professional 25	Total Points
Educational Component	No evidence that the flyers purpose is to educate; or very minimal evidence	Flyer tries to educate, but contains major errors	Flyer is suitable for educating horse enthusiasts about a topic covered in class, but contains some errors	Flyer is suitable for educating horse enthusiasts about a topic covered in class	The flyer clearly demonstrates thoughtful consideration and does an outstanding job educating about the topic	
Verbiage	Verbiage on the flyer is either not concise, pertinent or to the point	Verbiage attempts to be concise and pertinent, but contains major errors	Verbiage on flyer is concise, pertinent, and to the point, but contains some errors	Verbiage on flyer is concise, pertinent, and to the point	Verbiage on flyer includes noticeable depth while being succinct and has supporting evidence	
Readability	The flyer is not easy to read or understand at all	The flyer is somewhat easy to read, but contains major errors	The flyer is easy to read and understand, but contains some errors	The flyer is easy to read and understand	The flyer is inviting to read and exceptionally easy to understand	
Graphics	The flyer does not contain graphics, or extremely poor graphics	Graphics are present but may not be quality or relevant	The flyer contains quality and relevant graphics, but contains some errors	The flyer contains quality and relevant graphics	The flyer contains excellent graphics that are thoughtful and relevant	
Final Score						

students taking advanced equine courses report that they have learned and retained the specific information from their bulletins, even several semesters removed from the project.

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Using a Video Response Tool for Course Assignments

Introduction

Educational practices theory suggests that student engagement and learning impacts increase when teachers "meet students where they are." Educators have recently applied this theory to technology by incorporating social media and other technologies used by students into the classroom. For several years, I've questioned whether and how to "meet students" in their technology spaces and most importantly, whether this "meeting up" could generate positive impacts on student learning. My research led me to the use of video recording, a technology students increasingly employ in their social lives. Video recording tools offer a simple step toward meeting students in their technology spaces with the potential of increasing student engagement and learning through familiar technology practices.

Flipgrid is a tool that generates video recordings. Through the Flipgrid application, a teacher poses a question on his or her Flipgrid account and invites students to respond verbally with a video recording. A student uses a device equipped with a camera, such as a smartphone, laptop or tablet, to record his or her video response to the question. The Flipgrid application compiles the video responses into a "grid" that contains videos of all student responses and the teacher and students may view the videos. A teacher must obtain a Flipgrid license, offered at different pricing levels, but there is no account, log-in, registration or fee required for students to record a video response.

Procedure

I incorporated Flipgrid video recordings into my Agribusiness Law course, an undergraduate course of sixty students. I created three graded assignments using the Flipgrid application, each with a different approach. For the first assignment of the semester, I required students to introduce themselves and provide information about their majors, academic interests, familiarity with agriculture and legal topics of personal interest. I designed the introduction assignment to accomplish several purposes: to create a visual record that could help me learn and recall student names, to gauge whether explanatory information might be necessary for students with little or no familiarity with agriculture, and to generate a list of topics students could select from for an independent study project later in the semester.

A second assignment required each student to explain a property rights conflict identified through research. My purposes for this assignment were to focus on current events and reinforce research and verbal presentation skills. For the third assignment, students viewed other students' property rights conflict videos and completed a series of questions about the videos in writing. This assignment encouraged students to analyze current events and legal issues and reinforce writing skills.

Assessment

My first attempt to incorporate the video response tool into the curriculum was fairly successful based upon end-of-semester student evaluations and my observations during classroom discussions about the tool. Of the sixty students enrolled in the course, only one student did not have technological capability to complete the video assignments. No students raised questions or required my assistance with the Flipgrid application.

Students were most receptive to the first introduction assignment. They indicated that the assignment was enjoyable, demonstrated my interest in them and helped them meet other students. The introduction assignment proved very useful to me, as I referred to the videos many times throughout the semester to recall student names and used the videos to develop a list of legal issues of interest to the class for a later assignment. Additionally, the videos were an efficient "icebreaker" mechanism that established a positive tone for beginning the semester.

The second video response assignment was less popular with students, who reported that it was more difficult and uncomfortable than the first assignment. Some were frustrated by the three-minute limit established by Flipgrid, which required a few to remake their videos to fit within the time allotment. Several students stated that they would prefer to respond in writing rather than making a video response. Despite these comments, the second assignment responses were of consistently medium-to-high quality. Students appeared adequately prepared for the assignment and only a few students showed signs of discomfort while making their video responses.

Reactions were favorable for the third assignment, which required students to view and comment in writing on one other student's video. Data available on Flipgrid showed that students viewed an average of fifteen videos for this assignment, suggesting a high level of interest in other students' videos. The quality of written responses ranged more widely than the quality of the videos, however. Some written responses were lacking in substantive content but others exhibited inquiry, analysis and insight. Students reported that they enjoyed

viewing the videos, but some admitted that their interest was for social rather than academic reasons.

Generally, I observed that these students appeared more comfortable giving video responses compared to students in previous classes which required in-class verbal presentations. A majority of the students confirmed this observation in their evaluations, but a handful of students reported that they were comfortable with both in-class and video presentations.

A few adjustments may improve the impact of the video response tool on student engagement and learning. The documented interest in viewing other students' videos suggests that I should explore more ways to use the video grid as a discussion board. Several students proposed employing the tool to stage a debate on a particular issue, an exercise that could challenge students to sharpen skills in organization, analysis and persuasion. I will also be prepared to provide the technology for students who do not have video recording capabilities, rather than allowing those students to replace the video response with a written response. Future plans include continued use, refinement and evaluation of the tool.

Submitted by:
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Connecting Undergraduates to Dairy Farm to Fork

Introduction

It is no surprise that people have become disconnected from the origins of food as the number of farms in the United States has steadily declined for almost a century and significantly declined since 2007. As the number of farms decreased, options for food prepared outside of the home have dramatically increased including an abundance of fast-food restaurants, take-out options from restaurants, convenience foods, and commercially prepared frozen meals. These options have consequently displaced home prepared meals using locally produced whole foods. As a result we live in society lacking basic food literacy and some believe this change has contributed to the obesity epidemic. One of the learning outcomes of the undergraduate course Food Literacy at Utah State University is for students to define food systems and sustainability. The goal is to give students the opportunity to reconnect with the origins of the food they consume, while aiming to dispel myths about food from farm to fork.

Procedure

Collaborations were made with a representative from the Dairy Council of Utah/Nevada to arrange a fieldtrip for undergraduates enrolled in Food Literacy. The fieldtrip includes a bus ride to tour one of the largest local dairy farms in Cache County, Utah, followed by a presentation and sampling of dairy products at the dairy processing plant Gossner Foods in Logan, Utah. The farm tour is scheduled as one of the weekly three-hour labs as part of the Food Literacy course.

On the bus ride to the dairy farm, the representative from the Dairy Council educates the students on the dairy farm's background, practices and owners. She then allows students to ask any questions they have about dairy farming and milk such as the benefits and drawbacks of pasteurized milk versus raw milk consumption and hormones in milk. At the dairy farm, students tour a carousel milk parlor, view milk tanks and cooling systems, interact with calves, and take a hayride viewing different barns housing various age-groups and stages (pregnant and not milking) of dairy cows. Students learn about how the dairy cows are tracked digitally, which assists with peak nutrition from their nutritionist allowing for optimal milk production, prevention of antibiotics in the milk supply, and monitoring of the health status of each individual dairy cow. Students are given time to ask any questions they have about the dairy farm and processing procedures to the dairy farmers guiding the tour.

After the dairy farm tour, students ride the bus to the same processing plant the milk goes to from the farm visited. At Gossner Foods' dairy processing plant, students watch a video presentation highlighting the history of the plant and the many local farmers that supply the milk to produce their high-quality cheese, ultra-high temperature processed milk, and delicious ice cream. Students are then given time to ask a Gossener employee any questions they may have. If the processing plant is running, the students are able to watch workers on the cheese production lines. At the conclusion of the processing plant visit students enjoy sampling a variety of Gossner milk products.

Assessment

The Food Literacy course has now participated in the dairy farm tour for four semesters. Each semester students are surveyed on whether they would recommend the tour for future students and nearly the entire class responds in agreement. One student said, "Being able to see the process of farm to fork is extremely eye opening" and another student, "I knew farming was a lot of work, but there is a lot I never thought of." The majority of students indicated that the dairy farm tour gave them a more positive perception of dairy foods and farming as shown by this students' comment of surprise by the "strict process to ensure safety and quality."

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Peer Pressure to Encourage Attendance in a Non-Majors Science Class

Many universities offer science courses taken by non-majors, satisfying a science core requirement. This kind of course provides a broad introduction to a discipline and, for many students, such a course may be the only science course taken. As a result, the role of these courses is to introduce the students to science and the scientific process, through a course both broad in scope and shallow in depth.

Because core courses can be broad in scope and shallow in depth, finding textbooks can be difficult. Some instructors rely only on class lectures, often made available electronically after the lecture. Without a textbook, class lectures assume a greater role, as does the importance of class attendance. Students miss class for many reasons (Van Blerkom 1992) and attendance may be correlated with course grades. A number of class structures, in-class activities, teaching strategies and institutional policies are used to enhance attendance (Sleigh and Ritzer 2001, Schreyer Institute for Teaching Excellence 2007), including penalizing non-attendance.

In Spring 2015, I taught a 1000-level Entomology science core course, entitled "Insects, Science and Society," to 122 undergraduates. The students were distributed among class levels (freshman to senior) from more than 30 different non-science majors. I used an entomology textbook for background material in the first few weeks, but the last ten weeks of lectures were on topics not often found in textbooks, e.g., – "Insects as Weapons," "Insects in Music and Insects as Musicians," "Insects and Disease," and "Invasive Insects and Supply Chain Management," among others. The lack of a textbook to supplement lectures made it important that students attend lectures.

Although attendance was strongly encouraged, I did not require it. I used "clickers" (Turning Technologies, Youngstown, OH) for students to answer non-credit questions given during the lectures. Questions were given to help break up the monotony of a 75-minute class and to gauge whether key points were understood. Use of clickers also told me student attendance, without actually "taking attendance."

All students want extra credit; mine were no different. Some instructors use extra credit to encourage attendance by calling a student's name and asking a question, giving that student an extra-credit point for a correct answer. I tried something similar, to encourage attendance, albeit with a twist -- I used peer pressure. At the end of every class period, I called a randomly selected name. Rather than giving credit to one student, I rewarded everyone in attendance that day. If I called a name and that student was present, everyone present received one point (I knew who was there from their use of clickers). I then asked that student a multiple-choice question from the day's lecture. If she answered correctly, everyone in attendance received another point. Asking a question 25 times over a 15-week semester (two lectures per week) meant there were potentially 50 points, or 10% of the course's possible 500 points.

Assessment

Did it work? First, attendance average 84%, which is enviable for an entry-level, non-majors class. Second, of the 25 students whose names I called, only once was the student absent – on a day when inclement weather had closed the university for half a day and I had already decided to give credit to everyone who braved the weather. Third, for the 24 questions I asked, the correct answer was given 20 times. Of the four questions missed, three occurred in the first two weeks of the course, and only one during the remainder of the semester. Apparently, the students realized I would continue the exercise, so they paid attention.

Although not tested, my observations of student behavior indicated the effort worked. I had several students tell me that a friend planned to skip a class, but the students each basically said, "You better not! If he calls your name and you're not there, you cost me points!" – peer pressure. Second, during the first few weeks when a student whose name was called raised her hand, I would tell the class, "Jane Doe just earned you a point. You really ought to thank her," at which time they would collectively say, "Thank you, Jane." After about three weeks, when Jane Doe raised her hand, the class as a group, unprompted, said, "Thank you, Jane." And third, when Jane Doe answered the multiple-choice question, I would ask her to tell the class which answer she chose. I didn't need to tell the class if she was right – if they thought she was right, they applauded her answer. The one time later in the semester when she answered wrong, there was a class-wide groan. So, as a group, they were in attendance and they were paying attention.

Summary

Using extra-credit questions that rewarded all attendees appeared to enhance attendance in the entry-level, non-majors entomology class. Even more than encouraging attendance and ensuring that students were getting key information, extra-credit questions produced a sense of camaraderie in the class, not easily done in a large non-majors class. The questions and accompanying hype took on somewhat of a game-show feeling and students left class still talking about the questions. Did the students learn or retain the information? Maybe. But they were definitely in attendance and that had to enhance their performance on exams. Did I give away too many points for attendance? Maybe. But doing so also allowed me to ask test questions that were a little tougher.

Rather than requiring attendance (and penalizing non-attendance) or rewarding only one student per class period, rewarding all attendees and adding "peer pressure" to the process seemed to encourage attendance. Students benefited not only by attending class, but also by their friends and fellow students attending

class. Positive reinforcement and peer pressure. As the entomological saying goes, "You can catch more flies with honey than you can with vinegar."

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