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NACTA Journal

the professional journal
advancing the scholarship of
teaching and learning in
agricultural, environmental,
natural, and life sciences

Contents

Focus Groups Reveal Dietetic Students' Opinions on the Addition of Cultural Competency Training to the Dietetics Curriculum	2-6
Use of an Informal Consumer Sensory Panel in Conjunction with Discussion to Teach Students Concepts Related to Beef Palatability	7-10
An Analysis of the Spatial Effects of Population Density on the Agricultural Knowledge of College Freshmen	11-15
Concreting the Student Learning Experience in Agricultural Economics through Field Research Projects	16-23
Engaging Agriculture and Non-Agriculture Students in an Interdisciplinary Curriculum for Sustainable Agriculture	24-29
The USDA's Food and Agricultural Education Information System: FAEIS	30-34
Agriculture Courses during Summer School: Community College Students' Interests and Preferences	35-38
Do Students Have Fixed Classroom Perceptions?	39-44
Students Knowledge and Attitudes towards Agricultural Shows and Fairs in Botswana	45-48
The Impact of Agriculture Future of America (AFA) Participation on Workplace Skills	49-54
The Attributes and Attribute-Consequences of Great College Teachers	55-65
NACTA Reprint	66-69
Teaching Tips/Notes	70-71
Book Reviews	72-74
NACTA Yesterday	75-76
Teaching Award of Merit June 2009-2010 & Graduate Student Teaching Award of Merit June 2009-2010	77
Member Institutions for 2010	78
Join NACTA	79

Focus Groups Reveal Dietetic Students' Opinions on the Addition of Cultural Competency Training to the Dietetics Curriculum

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Abstract

In order to better plan a curriculum for enhancing dietetic students cultural competence with the Hispanic population, focus groups were held with dietetic majors to better understand their thoughts and concerns regarding this proposed curricular change and to assess their understanding of cultural competence. Three focus groups (n=24) were conducted with dietetic students, on campus in a classroom setting. Students expressed a strong desire for additional coursework to improve cultural competency, requested specific classes, and provided reasons supporting this proposed program, and voiced concerns. One-half of the students reported, "not feeling comfortable" interacting with a Spanish-only speaking client. Reasons given for desiring this program included improved job success and the perceived ability to function more effectively in their future jobs. There was consensus that this curriculum not be mandatory, but remain optional. Concerns were voiced about workload, course availability, and availability of competent instructors. Only 33% of the students provided an accurate definition of cultural competence. Students recognized the need for this type of curricular change. Faculty should assess and then take student concerns into account as they develop curriculum to meet the future agricultural and nutrition education needs of an increasingly diverse U.S. population.

Introduction

As this country becomes ethnically diverse (Symens-Smith et al., 2000) it is not surprising that the fields of agriculture and dietetics call for embracing cultural competence and cultural sensitivity in their initial and ongoing training of students (Cotton et al., 2006; Smedley et al., 2002; Lopez, 2008; Talbert and Edwin, 2008). Cultural competency (CC) is defined as the ability to work effectively with individuals from different cultural and ethnic backgrounds, or in a setting where several cultures coexist. It includes the ability to understand the language, culture and behavior of other individuals and groups and to make appropriate recommendations.

Moreover, it exists on a continuum from incompetence to proficiency (Department of Health and Human Services, 2001). Cultural competency legislation such as the National Standards for Culturally and Linguistically Appropriate Services in Health Care (CLAS) affecting the training of health care workers has been mandated in many states (Department of Health and Human Services, 2001). The Association of American Colleges and Universities (AACU) recommend that all college students become culturally proficient (AACU, 2005). Christiansen (2001) proposed that agricultural educators prepare students to deal appropriately with globalization and diversity.

To date, there are few published reports on the addition of a cultural component to the undergraduate dietetic curriculum (Short and Chittooran, 2004; Hansen-Petrik, 2005) and fewer that have sought student opinions in a group format on such curricular issues (Pecina, 2002; Palmer, 2008). One published study sought input for curricular review from medical students, but did not include cultural competency (Hendershott, 1993). Some attempts have been made by undergraduate dietetic programs and dietetic internship programs to integrate travel abroad study programs as a way of increasing cultural competency, but such pedagogical models can be costly and inconvenient to the student (Betterley, 2009; Anderson, 2005). Presently, agriculture and dietetic educators are contending with the need to add cultural competency training to their programs and are likewise experiencing a wide variation in the content and extent of cultural competency integrated into the curriculum (Lipson and Desantis, 2007; Donini-Lenhoof and Hedrick, 2009; Zeichner, 1995).

Calls for improving curricula to enhance cultural competency training and the fact that we are located in southern California which has a large Hispanic population, led us to consider adding an optional Spanish language and Hispanic/Latino culture tract into the dietetic curriculum.

The purpose of this qualitative study is to report student feedback and concerns regarding the initia-

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tion of a Hispanic-focused cultural competence curriculum tract, and report on student understanding of cultural competence.

Methods

The California State Polytechnic University Institutional Review Board approved this study. A convenience sample of currently enrolled Food and Nutrition majors with an option in Dietetics were recruited for the study via e-mail, faculty announcements in dietetic classes, and by word of mouth. Students received no compensation for their voluntary participation. Each student met individually with an author of their choosing to provide signed informed consent. After informed consent was obtained, demographic data were collected via written surveys. Participation inclusion criteria included being a dietetic major, being 18 years of age or older, and the ability to meet for one of three scheduled focus groups.

Three focus groups were held during the first week of June 2008 each with seven to nine participants. No additional groups were held because saturation (no new ideas given). A facilitator and co-facilitator (each author served once in each role) conducted the focus groups according to standard methods set forth by Krueger and Creswell (Krueger, 1994; Creswell, 1998). The facilitators received the same training together and opened with the same scripted welcome, introduction, rules, and procedures read by the facilitator. The co-facilitator audiotaped the proceedings, and a series of ten questions (Figure 1) was asked to ascertain student interest and opinions regarding the addition of Hispanic-focused dietetic training to the existing curriculum and their current understanding of cultural competency. The focus group process lasted between 45-60 minutes.

Qualitative raw data recorded on audiotapes were transcribed verbatim. Research team members reviewed transcribed data independently and identified themes using the constant comparative method, an analytic technique first described by Glaser and Strauss (Glaser and Strauss, 1967) and later expanded on by Neuendorf (Neuendorf, 2002). After reading the students' responses to the questions, each facilitator proposed the themes that emerged. The facilitators then discussed those themes and agreed that four distinct themes (students wanting more CC classes, students wanting to encourage other students to take these CC classes, students wanting the curricular change as optional not mandatory and students concerns) emerged from the raw qualitative data (Figure 2).

The quantitative survey data was analyzed using Chi Square for comparison of sample ethnic backgrounds to the department population or the frequency procedure to determine percents of coded responses in SPSS version 16.0 (SPSS Inc, Chicago, IL, 2008). Age-related correlations were performed for cultural competence, Spanish training and Spanish-speaking ability using in SPSS version 16.0 (SPSS Inc, Chicago, IL, 2008).

1. What is your comfort level providing nutrition counseling to a Spanish-only speaker?
2. Are you interested in adding coursework to increase your comfort level with Spanish-only speakers?
3. For those with community experience, do you wish you had more skill in providing nutrition services in Spanish? Explain any experiences with this.
4. What do you know about cultural competency? Can you define it?
5. Do you think our Department should offer courses to improve students' ability to be culturally competent for the Hispanic community?
6. Would you be willing to add course units to improve cultural competency with the Hispanic culture?
7. Do you think your fellow classmates would be willing to add units to improve their cultural competency with the Hispanic culture?
8. Do you feel a curriculum like this would help you achieve cultural competency?
9. What would you say to other students about participation in such a program?
10. Do you have any additional thoughts on this subject that you would like to share?

Figure 1. Focus Group Questions.

Results and Discussion

The age, gender and ethnicity of this sample were representative of the department (not significantly different than the overall department as determined by Chi Square procedure in SPSS version 16.0, SPSS Inc, Chicago, IL, 2008). Sixteen percent of the department's dietetic students participated in the focus group. Participants were asked to report their previous Spanish language training or capacity (Table 1), and this information was collapsed into the following categories: none (no capability), high school training only, university and high school training, university training only and no formal training but fluent Spanish (learned at home).

Fourteen of the 24 students said that they did not feel comfortable counseling or performing a dieti-

Table 1. Descriptions and Characteristics of the Focus Group Sample (n=24)

	Focus group sample n = x (percent response)
Mean age	23.5 years (SD 4.74)
Age range	19-41 years
Males	2 (8.3%)
Females	22 (91.7%)
Self-reported Ethnicity	
White	9 (37.5%)
Hispanic	6 (25.0%)
Asian	9 (37.5%)
African American	0 (0%)
Academic level	Freshman 0 (0%) Sophomore 4 (16.7%) Junior 9 (37.5%) Senior 11 (45.8%)
Spanish capability	
None	7 (29.2%)
High School	6 (25.0%)
University and High school	2 (8.3%)
University only	4 (16.7%)
No formal training, but fluent	5 (21.0%)

Focus Groups

tian's duties in Spanish. The remaining 42% of the student subjects responded that they “feel comfortable” counseling in the Spanish language. Additionally, 75% (n= 18) of the students said that they had an interest in “adding coursework” to increase their comfort level with Spanish-only speakers. No students said that they “did not want this skill” and 38% of the students added that they “wished they had this skill.” In summary, approximately 60% of these students felt uncomfortable functioning in a Spanish only environment, and among this student sample there was an interest and desire to obtain a level of comfort in Spanish. Additional age-related analysis (Chi Square and correlation in SPSS version 16.0, SPSS Inc, Chicago, IL, 2008) determined that there were no correlations between age category (18-21, 22-25, 26-29, and 30+ years old), Spanish-speaking ability (P=0.126), ability to define cultural competence (P=0.672), or Spanish training (P=0.592) and responses to questions.

When asked to define/describe “cultural competency” only 38% correctly explained this concept, congruent with the definition (Department of Health and Human Services, 2001). Three (13%) students said they “don't know” and 50% did not answer. For these mid to upper level Dietetic students, their knowledge of CC may or may not reflect on the actual CC of typical dietetic students; these students that volunteered for the focus group might represent a more culturally aware sub-group of students. Therefore, ongoing assessment of CC should be done with students both during and at the end of their program to determine their understanding of and capability to be CC. Additionally, outcomes research should be designed and conducted on the effectiveness of CC education and training since there currently are no standardized assessments on CC curricula (Anderson and Nesa, 2005; Stein, 2009). Our study simply determined if the students understood the definition of CC, whether the students had an interest to become more culturally

competent and if they have concerns about additional training in CC. The students reported definite and well-developed ideas on the types of courses they would like to add to their course load in order to increase their CC of the Hispanic/Latino culture. The following courses were suggested: Hispanic culture class (n=3), study abroad (n=3), counseling (n=5), Hispanic cooking (traditional and making healthier) (n=3), service learning and volunteer opportunities in the Hispanic community (n=1) and dietetic internship in Spanish language (n=2).

A total of 18/24 (75%) subjects reported that they felt this type of curriculum would help dietetic students achieve CC and six (25%) did not respond. When asked if they would encourage their classmates to enroll in this type of curriculum, 18 subjects said they would, one subject said they would not encourage other students, and five did not respond.

When asked to “provide any additional thoughts on this subject,” all students eagerly responded and

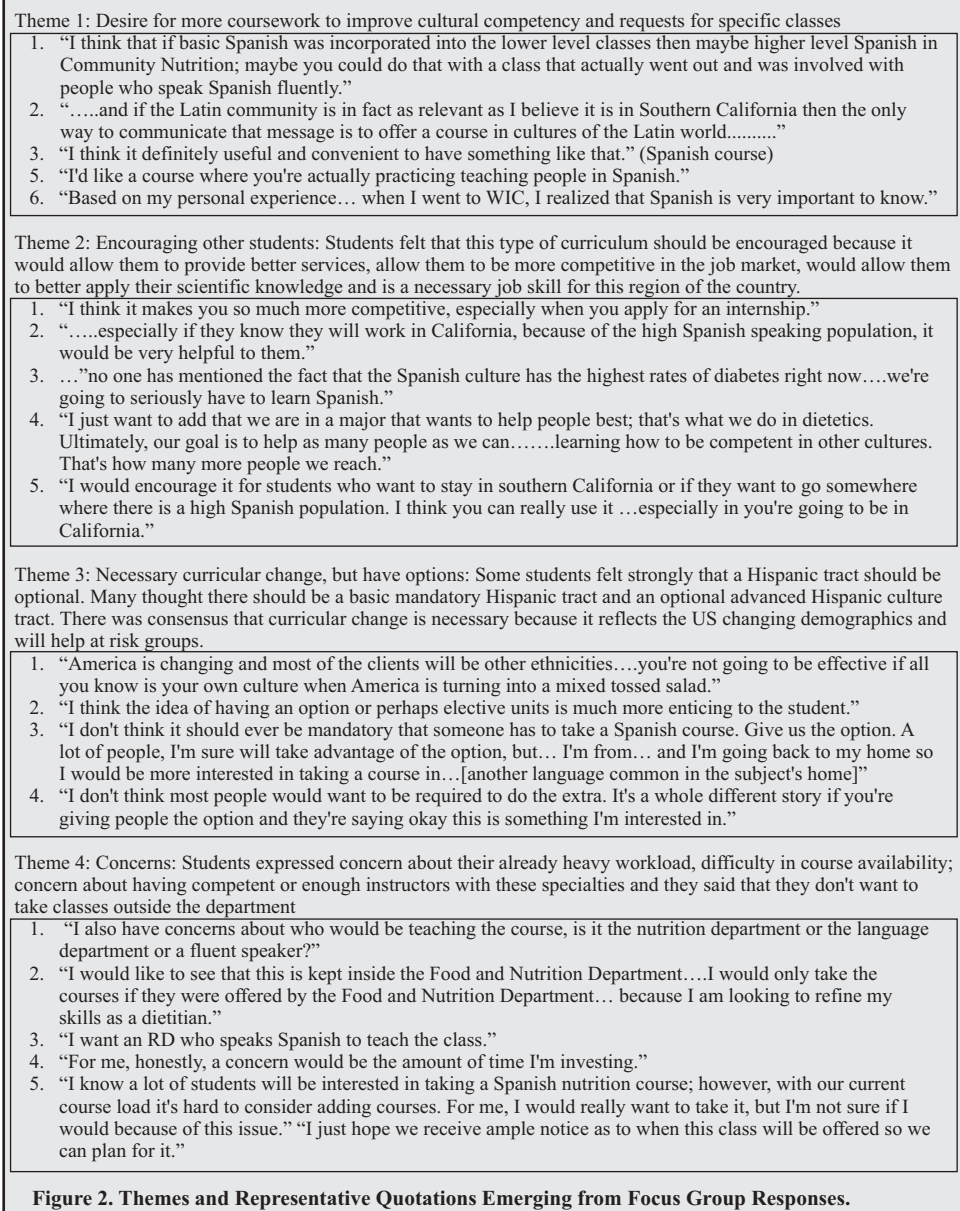


Figure 2. Themes and Representative Quotations Emerging from Focus Group Responses.

four themes emerged from their input. The first theme (Figure 2) was the students' desire and interest in coursework to improve their CC, and they suggested a variety of specific courses. The second theme to emerge was their desire to encourage other dietetic students to seek additional training in order to enhance CC. Students also commented on the value of CC in their future careers and believed that it would increase their ability to "better serve their clients." The third theme was that no student should be forced to take this new curricular track, but that this track should remain optional and elective (beyond the Commission on Accreditation for Dietetics Education requirements). Lastly, the students expressed numerous concerns and wanted the faculty to consider their workloads, and ensure the availability of the classes being taught by competent instructors.

This study had several limitations. The study had a small sample size, a typical limitation in qualitative focus groups. Although the questions asked were not theory driven, their validity was agreed upon by not only the three authors, but two additional professionals (a Ph.D. and a Masters R.D.) and a dietetic graduate student. It is not certain that the findings can be nationally generalized, as they are likely to be regionally specific. The findings may not represent all student opinions, especially those that did not participate or answer questions, but might likely represent those who feel particularly strong about the Hispanic culture or cultural diversity in general. It is possible that the focus group setting may have discouraged some of the subjects from speaking freely, or at all, especially if they had a dissenting opinion from the majority of the group. The largest numbers of students were senior-standing students (n=11), who will never participate in the proposed curriculum; however they are also the group of students that have the most experience with the present curriculum, therefore their input was particularly important. The authors were unable to pre-test the questions, because of the small population size, which may have compromised the ability to obtain a sample from the dietetic student population. Each facilitator made an effort to keep a pleasant and accepting atmosphere while encouraging participation of all focus group members by making eye contact with each member and looking around the room with interest. However, even though not all participants responded to all questions, all participants responded to some of the questions. The facilitators felt it inappropriate to require participants to respond, given that some of the participants were prior students of the facilitators, and could possibly contribute to a perceived power relationship difference. Additionally, since the focus groups were faculty facilitated, participant responses may have been inhibited or participants may have been more likely to respond positively due to the perceived power relationships between faculty and students.

Conclusions

When agriculture and dietetic educators develop new curriculum designed to increase cultural competence, they need to consider and address student concerns such as class overload and class availability, which may affect student's ability to graduate in a timely manner. They also need to ensure sufficient courses taught by well-trained professionals are offered and that faculty have cultural competency in one or more cultures. The students' concern over lack of faculty trained to teach Spanish nutrition is a legitimate one, the entire allied health care workforce, teachers of agriculture and the present field of dietetics is lacking in diversity (Camp et al., 2002; Donini-Lenhoff and Hedrick, 2002). Adding a CC curriculum may have an additional benefit by attracting underrepresented students to the dietetic and agricultural professions. The use of focus groups obtains meaningful student feedback (Rapp, 2006), and we suggest that Colleges of Agriculture and dietetic departments assess their students' perceived and real needs, using focus group feedback for the curriculum planning process.

These results indicate that students want to become more CC, and they recognize the value that CC adds to their ability to perform as a dietitian. Since 76% of the dietetic students in this program are non-Latino, and plan to practice in Latino communities, it is especially important for this and all dietetic programs to seriously address the issue of cultural competency in the dietetic curriculum while taking student needs into consideration.

Literature Cited

- Anderson, E. and N. Nesa, 2005. Community nutrition: Spanish language and cultural competence. *Dietetic Educators of Practitioners-Line 27(1):* 12-16.
- Betterley, C. 2009. Increasing cultural competency of nutrition educators through travel study programs. http://www.extension.iastate.edu/families/mexio/Cultural_Competency.doc. Iowa State University Extension. Accessed September 15, 2009.
- Camp, W.G., T. Broyles, and N.S. Skelton. 2002. A national study of the supply and demand of teachers of agricultural education in 1999-2001. <http://teacherinduction.cfans.umn.edu/pdfs/resources>. University of Minnesota Accessed February 2, 2010.
- Christiansen J.E. 2001. Looking down the road ahead: The view from the corner office. *Journal of Agricultural Education* 42(1): 1-10.
- Cotton, P, P. Achari, B. Dykes, G. Patel, K. Shadix, J. Shyu, and M. Stokes. 2006. Diversity and practice sub-committee spring 2006 report. http://www.eatright.org/cps/rde/xchg/ada/hs.xsl/governance_8146_ENU_HTML.htm. Journal American Dietetic Association. Accessed September 2, 2009.

Focus Groups

- Creswell, J.W. 1998. *Qualitative inquiry and research design: Choosing among five traditions*. Thousand Oaks, CA: Sage Publications.
- Donini-Lenhoff, F.G. and H.L. Hedrick. 2000. Increasing awareness and implementation of cultural competence principles in health professions education. *Journal Allied Health* 29: 241-245.
- Glaser, B.G. and A.L. Strauss. 1967. *The discovery of grounded theory: Strategies for qualitative research*. New York: Aldine Publishing Co.
- Hansen-Petrik, M. 2005. Enhancing the undergraduate curriculum to expand enrollment and prepare for the diverse needs of dietetics professionals of the future. *Journal American Dietetic Association* 105: Supp 1, 45-49.
- Harris-Davis, E. and B. Haughton. 2000. Model for multicultural nutrition counseling competencies. *Journal American Dietetic Association* 100: 1178-1185.
- Hendershott, A. and S. Wright. 1993. Student focus groups and curricular review. *Teaching Sociology* 21: 154-159.
- Krueger, R.A. 1994. *Focus groups: A practical guide for applied research*. Thousand Oaks, CA: Sage Publications.
- Lipson, J.G. and L.A. Desantis. 2007. Current approaches to integrating elements of cultural competence in nursing education. *Journal Transcultural Nursing* 18: 10S-20S.
- Lopez, H. and J. Rodriguez. 2008. Transforming the face of health professions through cultural and linguistic competence: The role of the HRSA centers of excellence. <http://www.hrsa.gov/culturalcompetence/curriculumguide/default.htm>. U.S. Department of Health and Human Services, Health Resources and Services Administration. Accessed September 4, 2009.
- Neuendorf, K.A. 2002. *The content analysis guidebook*. Thousand Oaks, CA: Sage Publications.
- Palmer, S. 2008. Where's the diversity? <http://www.minoritynurse.com/diversity-multiculturalism/wheres-diversity>. Accessed September 11, 2009.
- Pecina, G. 2002. A model for increasing bilingual and culturally competent registered dietitians. *Dietetic Educators of Practitioners-Line* 23(1): 1-9.
- Rapp, D.E. 2006. Integrating cultural competency into the undergraduate medical curriculum. *Medical Education* 40: 704-710.
- Short, J. and M. Chittooran. 2004. Nutrition Education: A survey of practices and perceptions in undergraduate dietetics education. *Journal American Dietetic Association* 104: 1601-1604.
- Smedley, B.D., A.Y. Stith, A.R. Nelson. 2002. *Unequal treatment: Confronting racial and ethnic disparities in health care*. Committee on Understanding and Eliminating Racial and Ethnic Disparities in Health Care. (eds.). Board on Health Sciences Policy, Institute of Medicine. Washington, DC: National Academies Press.
- Stein, K. 2009. Cultural competency: Where is it and where is it headed? *Journal American Dietetic Association* 109: 388-394.
- Symens-Smith A., B. Ahmed, and L. Sink. 2000. An analysis of state and county population changes by characteristics: 1990-1999. Working Paper Series No. 45. U.S. Census Bureau, Washington, D.C.: November 2000. <http://www.census.gov/population/www/documentation/twps0045/twps0045.html>. Accessed September 2, 2009.
- Talbert, B.E. and J. Edwin. 2008. Preparation of agricultural education students to work with diverse populations. *Journal of Agricultural Education* 49(1): 51-60.
- U.S. Department of Health and Human Services, Office of Minority Health. 2001. *National standards for culturally and linguistically appropriate services in health care: Final report*. <http://www.omhrc.gov/templates/browse.aspx?lvl=2&lvlid=15>. Accessed September 1, 2009.
- Zeichner, K.M. 1995. Preparing educators for cross-cultural teaching. In: W.D. Hawley and A.W. Jackson (eds.). *Toward a common destiny: Improving race and ethnic relations in America*. San Francisco, CA: Jossey-Bass.

Use of an Informal Consumer Sensory Panel in Conjunction with Discussion to Teach Students Concepts Related to Beef Palatability

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Abstract

Students enrolled in a general education science course at Berry College participated in an informal consumer sensory panel. Students received no prior classroom instruction in beef palatability. At the beginning of lab, students completed a pre-quiz. Questions were designed to test knowledge of beef quality attributes and to assess students' steak preferences. A rating sheet was distributed and students were presented with bite-sized steak samples (approximately 2×2×2 cm cubes). Students were asked to take a bite of cracker and drink of apple juice between each sample. After completion of the panel, results and beef palatability attributes were discussed. Students then completed the previously mentioned quiz (post-quiz). The class experience was repeated over multiple semesters and with separate instructors. Scores on questions designed to test students' knowledge of different attributes of beef quality were improved ($P < 0.01$). Questions assessing students' steak preferences addressed preferred degree of doneness and asked students to choose a steak based on USDA Quality Grade, weight, cut, aging, and degree of doneness. Eighty-five of 127 students changed one or more of their answers for these questions. These results suggest an informal consumer sensory panel in conjunction with discussion is effective to teach students beef palatability attributes.

Introduction

Consumer sensory panels are widely used in research and industry to assess consumer preference (Keliza and Gloria, 2008). However, research and industry use of consumer sensory panels is focused on determining consumer perception of the product being evaluated, and the consumer is often unaware of the quality attributes being tested. For example, in a study to test if a marinade improved tenderness, the consumer panel would not be informed of the enhancement techniques used or even that assessing tenderness is the primary objective. There are a few

reports of using sensory panels as a teaching tool. Fraser (1977) recommended sensory panels be included in home economic classes primarily based on the consideration that students in home economics could likely enter careers using and evaluating the results of these sensory panels. McClelland and Broder (1982) reported successful use of sensory panels to teach concepts of consumer preference theory in an agricultural economics course. Kauffman et al. (1999) reported the use of a sensory panel as a component of a lab to teach students concepts of "meat quality" and measurement of meat quality using pork. However, there are no reports in the literature using a consumer sensory panel to teach concepts of meat quality as it relates to beef palatability.

Therefore, the objective of this project was to determine if an informal consumer sensory panel in conjunction with discussion could be used to teach students concepts related to beef palatability.

Methods

Multiple class experiences were performed over several semesters and by two different instructors. This study was determined to be exempt by the IRB at Berry College.

Class experience

All students who participated in this class experience were enrolled in ANS 105, Introduction to Agricultural Sciences, at Berry College. This course counts as a general education laboratory science elective at Berry College, and is primarily taken by non-science majors. Students were informed that steak would be consumed prior to the lab, and any students who did not eat meat for any reason were excused from the lab activity. At the beginning of the lab, students completed a quiz (pre-quiz; Figure 1) consisting of 12 questions. Ten of the questions were designed to test the students' knowledge of different attributes of beef quality, and two of the questions were designed to assess students' steak preferences.

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Use of

A rating sheet was then distributed to the students. Students were briefly instructed on the use of the rating sheet (i.e. use of the scale on the rating sheet, the meaning of terms such as “off-flavor” or “overall desirability”), and told not to discuss their opinions of the samples until all sampling was completed. Students then moved to a desk with apple juice and crackers, and were presented with bite sized steak samples (approximately 2×2×2 cm cubes) for evaluation. Students rated the steaks for juiciness, tenderness, beef flavor intensity, off flavor, and overall desirability on a scale of one to seven with seven being the most desirable. Students were not provided with any information about the sample until after all samples had been evaluated. Students were asked to take a bite of cracker and drink of apple juice between each sample. After completion of the sensory panel, evaluation sheets were collected, and the results were graphed. The results and beef palatability attributes such as quality grade, cut, or aging and the impact on palatability were discussed with the class. Students then completed the previously mentioned quiz (post-quiz).

Name _____

Meat Quality Lab Quiz
ANS 105

True/False:

- ___ 1. The USDA Quality grade of a steak predicts its eating quality.
- ___ 2. Cuts from different parts of the beef carcass differ in eating quality.
- ___ 3. Steaks with more intramuscular fat are less palatable than steaks with less intramuscular fat.
- ___ 4. A “Flat Iron steak” is a steak that has been prepared using a newly-developed, rapid-cook technology that improves tenderness.
- ___ 5. All the steaks that are sold in restaurants come from carcasses that graded Choice or Prime.
- ___ 6. The eating quality of a steak is determined solely by the genetics/breeding of the animal from which it originated.
- ___ 7. Steaks cooked to a higher temperature are
 - a. Tougher
 - b. More tender
 - c. Temperature does not effect tenderness
- ___ 8. The meat trait most related to overall palatability is
 - a. Juiciness
 - b. Tenderness
 - c. Beef flavor
 - d. Off flavor
- ___ 9. Steaks aged for ___ days are more tender
 - a. 7
 - b. 21
 - c. Aging does not effect tenderness
- ___ 10. If you ordered a steak at a restaurant, how would you order the steak to be cooked?
 - a. Rare
 - b. Medium-rare
 - c. Medium
 - d. Medium-well
 - e. Well-done
- ___ 11. What are four quality grades of young beef?
- ___ 12. If you wanted to have the best eating experience possible and money was not an object, which of the following steaks would you be more inclined to purchase
 - a. A Choice, 16 oz. round steak, aged 3 days and cooked to medium
 - b. A Select 12 oz. ribeye steak, aged 30 days and cooked to medium-rare
 - c. A Prime 10 oz. top sirloin steak, aged 10 days and cooked to well
 - d. A Choice 12 oz. Flat Iron steak, aged 5 days and cooked to medium-well

Why?

Figure 1. Quiz administered to students prior to (pre-quiz) and following (post-quiz) the informal consumer sensory panel and discussion. Questions 1-9 and 11 were designed to test the students knowledge of factors associated with beef palatability. Questions 10 and 12 were designed to assess students' steak preferences.

Class experience one was performed over two semesters for a total of four lab sections and 57 students. This experience was the initial experience and designed to test the effectiveness of the use of an informal consumer sensory panel in conjunction with discussion to teach concepts related to beef palatability. This experience included steaks from different muscles that also differed in quality, cooking temperature, and aging.

Class experience two was performed for one lab section of the class for a total of 14 students. This experience was designed to test the effectiveness of the use of an informal consumer sensory panel in conjunction with discussion to teach concepts related to beef palatability using only steaks purchased at a local grocery store.

For class experience three, the students were enrolled in two separate sections of the class and had two different instructors. Each class section had two lab sections for a total of four lab sections and 56 students. This experience was designed to test the effectiveness of the use of an informal consumer sensory panel in conjunction with discussion to teach concepts related to beef palatability with two separate instructors.

Steak samples

Steak samples were from infraspinatus (flat iron) or longissimus (strip) muscle. For class experience one, the following samples (n = 9) were presented to the students: an infraspinatus steak cooked to an internal temperature of 66°C, 71°C, or 82°C, a longissimus steak aged for 1, 7, or 21 days, and a low, medium, and high Choice longissimus steak. All longissimus steaks were cooked to 71°C. The longissimus steaks aged for 1, 7, or 21 days were obtained from the same animal. Choice infraspinatus steaks were purchased from a local grocery store. All steaks were stored frozen until the day prior to the class experience. Longissimus steaks were obtained from the University of Georgia Meat Science and Technology Center and originated from cattle that were harvested under inspection at the facility. For class experiences two and three, the following samples (n = 5) were presented to the students: an infraspinatus steak cooked to 66°C, 71°C, or 82°C, and a low and high Choice longissimus steak. All longissimus steaks were cooked to 71°C. All steaks were purchased from a local grocery store and were stored frozen until the day prior to the experience. All steaks were cooked on a clam-shell electric grill with no seasonings applied.

Statistics Four replications of the class experience one were completed. Lab A had 14 students, Lab B had 17 students, Lab C had 14 students, and Lab D had 12 students. Fourteen students from one lab section participated in class experience two. Fifty-six students from four lab sections participated in the class experience three. Lab A had 16 students, Lab B had 15 students, Lab C had 11 students, and Lab D

had 14 students. For class experience one and three, scores on the ten questions from the pre and post-quiz designed to test student's knowledge of different attributes of beef quality were tested for effect of lab section, pre or post-quiz, and the interaction using the univariate split-plot method for repeated measures analysis with JMP Software (version six, SAS Institute Inc., Cary, NC). For class experience two, lab section was not included in the statistical model as there was only one lab section. In the event of a significant main effect or interaction, mean separation was performed by student's T test.

Results and Discussion

Class experience one was designed to test whether an informal consumer sensory panel in conjunction with discussion could be used to increase student's ability to understand concepts related to beef palatability. Scores on the 10 questions designed to test students' knowledge of different attributes of beef quality were improved (Figure 2; $P < 0.01$). Based on the number of incorrect answers, students were not familiar with the USDA quality grade system prior to the class experience (20 and 57 incorrect answers on pre-quiz questions 1 and 11, respectively). However, after completion of the class experience, the students had better knowledge of the USDA quality grade system (4 and 5 incorrect answers on post-quiz questions 1 and 11, respectively). Prior to the class experience, students were aware that cut, genetics and cooking temperature can impact eating quality (2, 13, and 11 incorrect answers on pre-quiz questions 2, 6, and 7, respectively). However, the class experience appeared to improve the students' knowledge of the impact of cut, genetics and cooking temperature on eating quality (1, 6, and 5 incorrect answers on post-quiz questions 2, 6 and 7,

respectively). Thus, the class experience improved the students' knowledge of beef quality attributes.

Class experience two was designed to determine whether a similar improvement in student knowledge of beef palatability concepts could be obtained using an informal consumer sensory panel that evaluated steaks purchased solely at a local grocery store in conjunction with discussion. This eliminated the concept of aging from the samples evaluated since the harvest time of the purchased steaks was not known. Scores on the 10 questions designed to test students' knowledge of different attributes of beef quality were improved ($62.1 \pm 3.4\%$ vs. $88.6 \pm 3.4\%$ pre-quiz vs. post-quiz, respectively; $P < 0.01$). The number of incorrect answers on the various questions followed the pattern observed in class experience one. As class experience two did not include steaks aged for different periods of times, students might have been expected to show less improvement on question nine, which specifically addressed the impact of aging on tenderness. However, in class experience two, no student missed question nine on the post-quiz despite seven incorrect answers for question nine on the pre-quiz. Although this study did not compare the effect of discussion of beef quality attributes alone to the effect of using informal consumer sensory panel in conjunction with discussion, the improvement on question nine in class experience two suggests discussion alone would have resulted in improved quiz scores. Nonetheless, based on class experience two, an informal consumer sensory panel using only steaks purchased at a local grocery store in conjunction with discussion appeared to effectively teach students concepts related to beef palatability.

Since all the steaks and other expendable supplies for class experience two were purchased from the local grocery store, class experience two also afforded the opportunity to easily assess some of the cost associated with this activity. Class experience two was performed in the summer of 2008. All expendable supplies purchased for the class experience cost a total of \$43.10. Obviously, the cost will vary with time and location, but a cost of \$3.08 per student for expendable supplies for this activity is surprisingly affordable.

Class experience three was designed to test the effectiveness of using an informal consumer sensory panel in conjunction with discussion to teach concepts related to beef palatability by two separate instructors. All prior class experiences had been performed by a single instructor. For class experience three, four separate labs with two separate instructors performed the informal consumer sensory panel (two labs per instructor). Scores on the 10 questions designed to test students'

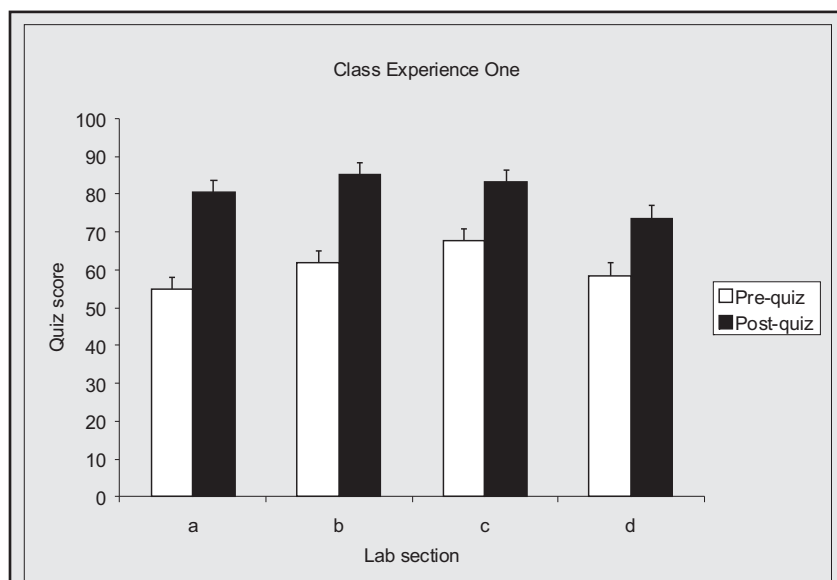


Figure 2. Scores on questions 1-9 and 11 on the pre- and post-quiz for class experience one. Values are LS-Means of percent correct answers on the quiz. Pre- and post-quiz scores were significantly different ($P < 0.01$). There was also a significant effect of lab section ($P = 0.03$).

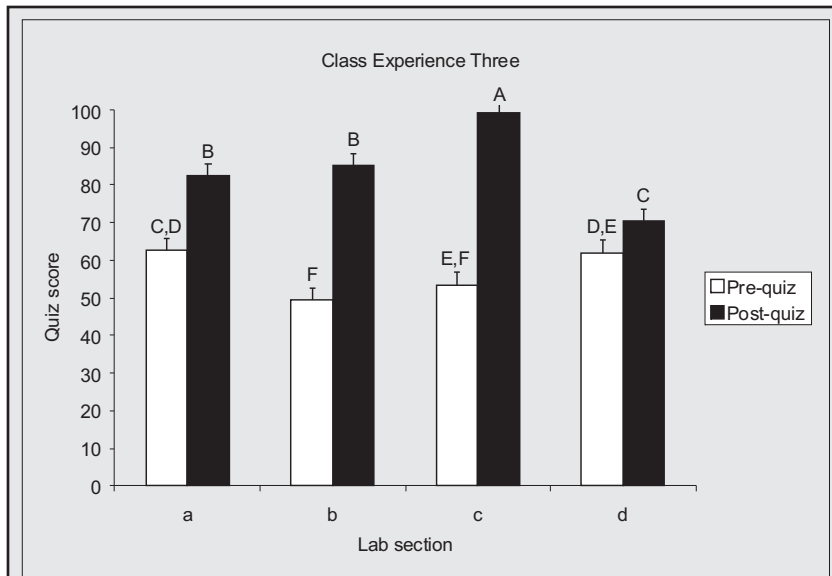


Figure 3. Scores on questions 1-9 and 11 on the pre- and post-quiz for class experience three. Values are LS-Means of percent correct answers on the quiz. Pre- and post-quiz scores were significantly different ($P < 0.01$). There was also a significant effect of lab section ($P = 0.02$), and a significant lab*time interaction ($P < 0.01$). Bars which do not share a common letter are significantly different. Lab sections A and B were taught by one instructor, and Lab sections C and D were taught by another instructor.

knowledge of different attributes of beef quality were improved (Figure 3; $P < 0.01$). Although there were significant differences in scores between lab sections, the differences did not appear to be due to instructor, as instructor one taught both the lab with the highest post-quiz score (Lab C) and the lab with the lowest post-quiz score (Lab D), and instructor two taught labs with intermediate post-quiz scores (Labs A and B). Also, the post-quiz score was improved relative to the pre-quiz score for each lab section, indicating use of an informal consumer sensory panel in conjunction with discussion to teach concepts related to beef palatability is effective with different instructors.

Over the three class experiences, two quiz questions assessed students' steak preference. One addressed preferred degree of doneness and the second asked students to choose a steak based on USDA Quality Grade, weight, cut, aging, and degree of doneness. Interestingly, 85 of the total 127 students who participated in one of the class experiences changed one or more answers. Twenty-four students changed their preferred degree of doneness following the consumer sensory panel. Of the 24 students who changed their preferred degree of doneness, 21 shifted in the direction of preferring their steak cooked to a lower degree of doneness. Regarding the question asking students to choose a steak based on USDA Quality Grade, weight, cut, aging, and degree of doneness, 74 of the students changed their answer

from the pre-quiz to the post-quiz. In response to the "why" on question 12 on the pre-quiz, some students indicated they did not know why or left the answer blank. On the post-quiz, no student indicated not knowing why and only four students in all of the class experiences chose to leave the answer blank. This shift in the students' preference suggests learning, and the students should be able to make more informed beef purchasing and preparation decisions after the class experience. Although it was not tested in this study, it would be interesting to determine if discussion alone could have the same impact on students' preference.

Summary

In every repetition of the informal consumer sensory panel in conjunction with discussion, students performed better on the post-quiz than the pre-quiz. The increase in performance occurred for different instructors, suggesting this technique for teaching beef palatability concepts could be effectively adopted by other instructors. Most encouraging, many students changed their answers to the preference questions which suggests application of the new information. Thus, use of an informal consumer sensory panel in conjunction with discussion is an effective way to teach beef palatability concepts to students.

Literature Cited

- Fraser, M. 1977. The place of sensory evaluation studies in the home economics syllabus. *Jour. of Consumer Studies and Home Economics* 1:247-252.
- Kauffman, R.C., R.L. Russell, M.L. Greaser, and the UW-AS-305 Class. 1999. Using pork to teach students quality variations and how they are measured. *Jour. Animal Science* 77: 2574-2577.
- Keliza, R. and M.B.A. Gloria. 2008. Sensory preception. In: Nollet, L.M.L and F Toldrá (eds.). *Handbook of Muscle Foods Analysis*. Boca Raton, FL: CRC Press.
- McClelland, J.W. and J.M. Broder. 1982. Teaching consumer economics using taste panels. *Southern Jour. of Agricultural Economics* 14: 91-96.

An Analysis of the Spatial Effects of Population Density on the Agricultural Knowledge of College Freshmen

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Abstract

The purpose of this study was to evaluate the agricultural knowledge of college freshmen based on the spatial density of population in which they were raised. Each college freshman who responded indicated his/her location of their home as urban, suburban, or rural. Respondents then completed a multiple choice exam to test their knowledge of agriculture in five thematic areas. Overall, suburban students earned the highest scores ($M = 52.4\%$) followed by rural students ($M = 50.1\%$) and urban students ($M = 46.8\%$). A statistically significant difference ($p = 0.007$) existed between the suburban and urban students. Suburban students also scored the highest in each of the five thematic areas of the agricultural literacy examination. Statistically significant differences were found between the suburban and urban students in Theme 1 (Understanding Agriculture) ($p = 0.002$) and Theme 2 (History, Geography, and Culture) ($p = 0.012$).

Introduction

Since undergoing a structural change in the last century, American society has moved from an industrial based entity to a more technologically advanced organization. The agriculture discipline has been extensively affected by these changes. Many citizens are choosing off-farm employment in urban settings thus losing sight of the importance of agriculture due to lack of exposure to it on a daily basis (Reidel, 2007; Bellah and Dyer, 2007; Moore, 2000; Smith et al., 2009).

Roughly 81% of the current United States population is located in an urban setting (United Nations Population Division, 2008). The remaining 19% of the population is located in rural settings, including both farming and non-farming citizens. In Texas, the total population in 2008 was 24.3 million, with roughly 21.3 million (87.8%) of the population living in urban areas (USDA-ERS, 2009). With the majority of the population living in urban areas and being so far removed from the farming or agricultural industry, it is important to consider agricultural literacy programs to educate the general population. Many people question this importance. The food and fiber system, considered one of the largest sectors in

the U.S. economy, produced output valued at roughly \$1.6 trillion or 12% of the nation's output (USDA-ERS, 2009). Additionally, approximately one out of every six jobs is attributed to the food and fiber system (Penson, et al., 2010).

Today, estimates of the number of people involved in farming and ranching range from 1% to 2% of our population (Terry, 2004). Put in perspective, this population provides food and fiber for the remaining 98% to 99% of Americans. Terry (2004) continues to explain that, in fact, all Americans interact with agriculture on a daily basis. The general population does not appear to realize that the food supplied on their dinner tables and the clothing on their backs all rely heavily on the state of the agricultural industry. Therefore, an extremely strong case should be made for people to understand the basic concepts of agriculture (Terry, 2004).

One hundred forty-four students in two inner-city Los Angeles schools participated in a study to evaluate their agricultural knowledge and the effectiveness of literacy activities in improving that knowledge (Mabie and Baker, 1996). The students, a combination of fifth and sixth graders, who were primarily African-American and Hispanic, were pre-tested about their knowledge of agriculture. They were asked to define agriculture, list three crops growing in California, and recognize common agricultural terminology, such as irrigation and drought. Mabie and Baker (1996) found that the students participating in the study appeared to know little about the food and fiber system. The researchers concluded that every child should grow up with a basic understanding of the food and fiber system and as adults they should be capable of making educated decisions on both agricultural as well as non-agricultural issues.

In a similar study conducted by Reidel (2007), the effects of an agricultural education course on the agricultural literacy of urban student enrollees were examined. Before and after the completion of the course, he investigated students' knowledge of agricultural careers, public policy in agriculture, environmental and natural resource issues, and food and fiber industry. The results indicated a lack of understanding of agriculture as compared to national standards before the completion of the course.

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An Analysis

Therefore, he stated a need to educate citizens to become agriculturally literate.

Smith et al. (2009) examined high school students' knowledge of agriculture based on the location of their high schools. The locations included a rural high school with an agricultural science program, a rural high school without an agricultural science program, and an urban high school without an agricultural science program. The study found that overall; students from each of these three types of high schools were not agriculturally literate. The location of the high school did not have a significant effect in the students' level of agricultural literacy. It was also noted that inaccurate representations of agriculture, such as labeling individuals related to agriculture with the traditional farming stereotype, existed among the subjects. Similarly, Birkenholz et al. (1995) examined the agricultural literacy levels of college students. The researchers found that students who had families living on farms or ranches were the most knowledgeable. Students who were living in a highly urban or suburban area tended to know the least about agriculture and its principles. Frick et al. (1995) found comparable results among adults. Those living on farms were more agriculturally literate than their rural non-farm neighbors, who, in turn, were more knowledgeable than their urban counterparts.

Today's college students are the future voters, agricultural and food policy makers, in addition to consumers of agricultural products. Awareness of the food and fiber system is thus vital in order for citizens to make informed decisions regarding agriculture and natural resources (Torres and Hopper, 2000). If these college students do not understand where their food, clothing, and shelter come from, then how can they make informed decisions about public policy?

Purpose and Objectives

The purpose of the study was to evaluate the agricultural knowledge of college freshmen based on the spatial density of population in which they were brought up. It is vitally important to learn what freshmen know about agriculture, and therefore determine the agriculture competencies that must be included in the primary, secondary, and post-secondary education of these individuals. Specific objectives of the study were to:

1. First determine the level of agricultural literacy among the freshmen students and then determine if the overall test scores differed based on the spatial density of population in which the students were brought up, and;

2. Determine if scores on the five thematic areas of an agricultural literacy assessment differed based on the spatial density of population in which the students were brought up.

Materials and Methods

The instrument used in this study was a criterion-referenced multiple-choice test titled the Food and Fiber Systems Literacy (FFSL) (Leising, et al., 2003). The agricultural literacy assessment measured agriculture content in five thematic areas: 1) understanding food and fiber systems, 2) history, geography, and culture, 3) science, technology, and environment, 4) business and economics, and 5) food, nutrition, and health.

The original pilot test was conducted and a reliability coefficient of $\alpha = 0.85$ was computed using the Kuder/Richardson-20 (Pense and Leising, 2004). Following the first test, the instrument was reviewed multiple times, adjusting questions as deemed necessary, and a second pilot test was done. The reliability coefficient was $\alpha = 0.93$. The resulting instrument was known as the Food and Fiber Systems Literacy student assessment.

The population consisted of 27,485 registered college students at a Texas university, 4,571 of whom had completed zero to twenty-nine credit hours and were considered freshmen. The ease and availability of electronic mail (e-mail) made it possible to send the survey instrument to the entire freshmen population in the sample, and offer the opportunity to all of them to voluntarily participate.

For the study's purpose, three classifications were used: urban, suburban, or rural. Respondents were asked to pick one out of three classes of spatial density of population which described most closely the area in which they were raised. Webster (1981) defined urban as "characteristic of a city." Suburban referred to "a district outside of, but adjoining a city," and rural "pertains to the country, or country life." These definitions were explained to participants in the beginning of the study.

The data was entered into an SPSS 17.0 data file and was analyzed using descriptive statistics and analysis of variance (ANOVA). Descriptive statistics included mean, standard deviation, aggregate mean, and frequencies. An analysis of variance was used to analyze differences in overall agricultural literacy scores and thematic scores for students from urban, suburban, and rural areas.

Results and Discussion

In order to gain a full understanding of the participants in the study, it was important to examine the demographics of the responding sample. The male ($n=194$) and female ($n=307$) respondents came from a mixture of locations (urban, suburban, rural), although the majority of participants described growing up in a suburban area ($n=260$, 51.9%). The remaining participants indicated that they grew up in an urban ($n=135$, 26.9%) and rural ($n=106$, 21.2%) setting, respectively (Table 1).

Overall agricultural literacy test scores ($M = 50.4\%$) were compared using the spatial density of

Table 1. Gender Distribution of College Freshmen Participants Based on Home Location

Geographical Location	Male		Female		Total
	n	%	n	%	
Urban	56	41.5	79	58.5	135
Suburban	97	37.3	163	62.7	260
Rural	41	38.7	65	61.3	106
Total	194		307		501

population groupings to determine if any statistically significant differences were present. Interestingly, students from suburban areas ($M = 52.4\%$) scored higher than students from either urban ($M = 46.8\%$) or rural areas ($M = 50.1\%$) (Table 2). It was found that a statistically significant difference ($p = 0.007$) existed between the three groups. A post hoc test (Tukey a) further analyzed the data finding that the difference occurred between urban ($M = 46.8\%$) and suburban ($M = 52.4\%$) students' scores.

Further spatial effects of population density on students' agricultural literacy scores were evaluated by examining the mean literacy scores in each of the five thematic areas of the FFSL framework. Theme 1 (Understanding Agriculture) evaluated participants' knowledge of basic agriculture, including agricultural systems, agriculture's relationship to society, and the importance and interaction of worldwide agricultural systems. Overall, all three groups of students did fairly poor ($M = 55.7\%$) on questions related to Theme 1. As shown in Table 3, a comparison of the urban ($M = 50.7\%$) suburban ($M = 57.9\%$), and rural ($M = 56.6\%$) students' scores on Theme 1 indicated a statistically significant difference ($p = 0.002$) between the urban and suburban groups.

Theme 2 of the FFSL framework was concerned with history, geography, and culture. Since agriculture is critical to the survival of a society, it is important for students to understand the food and fiber systems that have supported humanity over the course of time. Overall, scores on Theme 2 were a little higher ($M = 57.1\%$) than those on Theme 1. As shown in Table 3, scores of all three groups of students were compared and a statistically significant difference ($p = 0.012$) was evident. Suburban students ($M = 60.1\%$) scored the highest on this particular theme.

Rural students ($M = 55.9\%$) came in second followed by urban students ($M = 52.2\%$) Similar to Theme 1, a statistically significant difference existed between the urban and suburban students.

Theme 3 test questions covered topics in the areas of science, technology, and the environment. This section evaluated the knowledge of agriculture and ecosystems and their relationship with natural resources. Theme 3 overall mean score ($M = 52.3\%$) was fairly consistent with the previous two themes. Scores for urban students

Table 2. Analysis of Variance of Overall Agricultural Literacy Test Scores by Home Location

Area	n	M	SD	df	F	p
Urban	135	46.8	15.9	2	5.087	0.007*
Suburban	260	52.4	16.0			
Rural	106	50.1	18.2			
Total	501	50.4	16.6			

Note: * $p < .05$

Table 3. Analysis of Variance of Theme Literacy Scores by Home Location

Area	n	M	SD	df	F	p
Theme 1 (Understanding Agriculture)						
Urban	135	50.7	19.9	2	6.121	0.002*
Suburban	260	57.9	19.3			
Rural	106	56.6	20.3			
Total	501	55.7	19.9			
Theme 2 (History, Geography, and Culture)						
Urban	135	52.2	25.3	2	4.475	0.012*
Suburban	260	60.1	24.9			
Rural	106	55.9	26.5			
Total	501	57.1	25.5			
Theme 3 (Science, Technology, and Environment)						
Urban	135	48.2	20.9	2	2.881	0.057
Suburban	260	53.9	23.5			
Rural	106	53.2	24.9			
Total	501	52.3	23.2			
Theme 4 (Business and Economics)						
Urban	135	42.1	21.3	2	2.289	0.102
Suburban	260	47.3	23.2			
Rural	106	45.3	23.9			
Total	501	45.4	22.9			
Theme 5 (Food, Nutrition, and Health)						
Urban	135	39.6	17.4	2	1.470	0.231
Suburban	260	41.3	14.9			
Rural	106	38.4	16.2			
Total	501	40.2	15.9			

Note: * $p < .05$

An Analysis

($M = 48.2\%$) were the lowest on this theme with little difference between the suburban ($M = 53.9\%$) and rural ($M = 53.2\%$) students (Table 3). This particular theme showed no significance differences ($p = 0.057$) between urban, suburban, and rural students' literacy scores.

Theme 4 addressed topics related to the business and economics of agriculture. Understanding the impact of agriculture on the economy of a society at all levels, and the role of the government on the food and fiber supply and trade is critical. Theme 4 overall mean score ($M = 45.4\%$) was lower in relation to the first three themes. Urban students ($M = 42.1\%$) scored the lowest of the three groups of students compared to the scores suburban students ($M = 47.3\%$) and rural students ($M = 45.3\%$). An analysis of variance indicated that the difference between the scores was not statistically significant ($p < 0.05$) (Table 3).

The final theme, Theme 5, addressed food, nutrition, and health. Topics include human and animal nourishment, healthy food choices, and the safety of the food supply. The overall mean score for Theme 5 ($M = 40.2\%$) was the lowest of the 5 themes. This theme was fairly unique in that the rural students ($M = 38.4\%$) scored the lowest of the three groups of students followed by urban ($M = 39.6\%$) and suburban students ($M = 41.3\%$). As shown in Table 3, the differences between student groups on Theme 5 scores were not statistically significant ($p < 0.05$).

Summary

Overall agricultural literacy scores, as well as thematic area literacy scores of students from urban, suburban, and rural population areas were examined. The results revealed that significant differences ($p < .05$) existed between the student groups for the overall literacy scores, as well as for Theme 1 (Understanding Agriculture) and Theme 2 (History, Geography, and Culture) (Tables 2 and 3).

Students who indicated growing up in a suburban area scored higher than either urban or rural students on the overall agricultural literacy examination, as well as in each thematic area. These results did not concur with other research studies which found that college students and adults living or working on farms were the most knowledgeable about agriculture (Birkenholz et al., 1994; Frick et al., 1995).

At first glance these results might be unexpected. One might expect rural students to excel on a test about agriculture. However, rural populations are changing due to the fact that more and more families choose to live "in the country," causing farm families to be less dominant in rural areas. Additionally, rural students from farming and ranching backgrounds might tend to be more specialized in their knowledge, being less aware of aspects of agriculture outside their realm. Similarly, agricultural literacy programs

in rural schools might not be as prevalent as in suburban and urban schools due to a number of factors including funding, personnel, location, and the misconception that students are already familiar with the material. General practitioners tend to make inferences about the agricultural literacy of rural students, believing that since the rural students live among farming and ranching they understand the concepts. Agricultural educators should not take for granted the correlation between geographical locations and students' agricultural literacy. Agricultural awareness and literacy programs should be implemented at the elementary level and continue through post-secondary education in all geographical locations. This will create a greater awareness of agriculture and allow future generations to make sound decisions and judgments related to our food and fiber systems. Additionally, universities and departments of agriculture would be wise to consider the results of this study and begin discussions of what the profession can do to battle agricultural illiteracy. Are citizens agricultural illiterate due to location solely, or is it based on other issues, such as curriculum needs, teacher training, standardized testing mandates, etc.? Universities and agriculture departments should consider offering a general agriculture course in the core curriculum for the university. The general agriculture course(s) could fulfill several core curriculum areas, including a natural science, a social science, or an international perspective. Such an implementation could increase student enrollment in colleges and departments of agriculture by sparking students' interest and could increase student credit hours.

Since the results of this study cannot be generalized beyond this particular population, it is recommended that this study be replicated at other institutions in Texas and nationwide in order to determine if results would be similar. Additional studies should include sophomore, junior, and senior college students to determine if similarities or differences exist. Comparisons of agricultural literacy efforts at urban, suburban, and rural schools should be performed as well. Agricultural educators must continue to examine agricultural literacy competencies in order to fulfill the recommendations of the National Research Council's report (1988) which states that future generations should be able to make agriculturally-related public policy decisions, make educated consumer decisions, and create an environment of respect. Unfortunately, society is not quite there yet.

Literature Cited

- Bellah, K.A. and J.E. Dyer. 2007. Elementary teachers' attitudes and stages of concern about an agricultural literacy curriculum. In: Proc. American Association of Agricultural Education Conference 34: 66-81.
- Birkenholz, R.J., C. Harris, and H. Pry. 1994. A pilot study: Assessment of agricultural literacy among college students. NACTA Journal 38(1): 63-66.

- Frick, M.J., R. Birkenholz, H. Gardner, K. Machtmes. 1995. Rural and urban inner-city high school student knowledge and perception of agriculture. *Journal of Agricultural Education* 36(4): 1-9.
- Leising, J.G., S. Pense, and M. Portillo. 2003. The impact of selected agriculture in the classroom teachers on student agricultural literacy. <http://www.agclassroom.org/consortium/pdf/finalreport.pdf>. Accessed September 9, 2004.
- Mabie, R., and M. Baker. 1996. The influence of experiential instruction on urban elementary students' knowledge of the food and fiber system. *Journal of Extension* 34(6).
- Moore, G.E. 2000. Achieving 2020: Goal 3: All students are conversationally literate in agriculture, food, fiber, and natural resource systems. *The Agricultural Education Magazine* 73: 1-25.
- National Research Council, Board on Agriculture, Committee on Agricultural Education in Secondary Schools. 1988. *Understanding agriculture: New direction for agricultural education*. Washington, D.C.: National Academy Press.
- Pense, S.L. and J. Leising. 2004. An assessment of food and fiber systems knowledge in selected Oklahoma high schools. *Journal of Agricultural Education* 45: 86-96.
- Penson, J.B., O. Capps, C. Rosson, and R. Woodard. 2010. *Introduction to agricultural economics*. Upper Saddle River, NJ: Pearson Prentice Hall.
- Reidel, J., E. Wilson, J. Flowers, and G. Moore. 2007. Effects of an introductory agricultural education course on agricultural literacy and perceptions of agriculture in urban students. *Journal of Southern Agricultural Education Research* 57(1): 82-94.
- Smith, E., T. Park, and M. Sutton. 2009. High school students' perceptions and knowledge about agriculture based upon location of high school. *NACTA Journal* 53(3): 17-23.
- Terry, R. 2004. Questioning our purpose. *The Agricultural Education Magazine* 77: 6-8.
- Torres, R.M. and J. Hopper. 2000. A partnership for a better pre-service teacher education experience. *The Agricultural Education Magazine* 73: 22-23.
- United Nations Population Division. 2008. Urban and rural populations. http://www.un.org/esa/population/publications/wup2007/2007WUP_Highlights_web.pdf. Accessed February 23, 2010.
- United States Department of Agriculture – Economic Research Service (USDA-ERS). 2009. State fact sheets: Texas. www.ers.usda.gov/statefacts/TX.htm. Accessed February 23, 2010.
- Webster. 1981. *The New American Webster Handy College Dictionary: Revised and expanded edition*.

Concreting the Student Learning Experience in Agricultural Economics through Field Research Projects¹

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Abstract

In this study we evaluate the impacts of an experiential learning assignment in the form of a field research project on undergraduate student learning perceptions in an agricultural economics program. Data included a survey of all students completing the project and voluntary, open-ended interviews conducted by a non-course instructor. Results indicate students perceived the field project enhanced their learning over other assignments, especially with a higher frequency of interaction with industry professionals. Additionally, students stated an improved depth of content knowledge, improved professional understanding, and a deeper awareness of their strengths as a result of the field work project.

Introduction

Walk the halls of any university campus building or strike up a conversation at the student union, and it probably will not take very long until some student disparages his/her university studies in one (or all) of the following ways: *"It's not the real world," "It's just a bunch of hoops to jump through," "Those professors haven't been out in the real world since the middle ages," "It's just a bunch of useless theories," "I'm never going to use this stuff,"* or *"When I get out in the real world and get a job, that's when I'm really going to learn something."* The common denominator of such statements, the unifying theme, is the concept of university learning as being separate from the "real world." Anecdotally, it appears that many students simply do not see a connection between their university studies and their future career. Clearly, such comments do not apply to all coursework, and when pressed, most students would probably admit they have a certain course or professor in mind. Perhaps the grade they are receiving in that course is representative of less than their best efforts, and again when pressed, they might be able to recount some examples that in fact do relate to "reality." On the

other hand, examples to the contrary do exist. We would (having witnessed a few ourselves) that there are professors who do not feel a need to make such "real world" connections explicit, or are wrestling with course content.

According to Jiggins and Roling (1994), academic institutions have traditionally left professional work practice and skill development to employers, rather than incorporating it into university coursework. Experiential learning, where students are placed in a situation that allows them to interact and learn in and from a "real world" environment, is one instructional/teaching method which can be used to encourage student skill development for future employment (Dewey, 1938). Kolb (1984) stated that experiential learning is the critical link between the classroom and the "real world." Experiential learning is recommended and used successfully in agricultural education at all levels (Knobloch, 2003; Roberts, 2006; and Retallick and Steiner, 2009), as well as in university forestry and engineering programs (DeGiacomo, 2002; and Miles et al., 2005). Parr et al. (2007) note the importance of experiential learning in university agricultural education. Developers of a new undergraduate major in sustainable agriculture at the University of California, Davis surveyed faculty members from across the U.S. to determine the most important program content components and teaching approaches. The survey results indicated that the top three teaching approaches should include "experiences in the classroom and field," "experiential learning," and "opportunity to apply learned theory into practice." Hawtrey (2007) surveyed 500 students in a 300-level undergraduate economics course regarding the importance of 20 different learning activities. Sixty percent of the students rated experiential learning as "important" or "very important." The learning activities which were rated highest included a media presentation, class presentations, and intervarsity competitions. Overall, implementing experiential learning

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increases student enthusiasm and motivation for assignments (Koontz et al., 1995).

Experiential learning in the form of classroom experiments has been used in economics to demonstrate various hypothesis of economic theory. In a classroom experiment, the students participate as “subjects” in an economic “laboratory,” in which auctions and other types of games are performed. The active learning environment and concrete examples provided by the experiments allow the instructor to gauge what concepts students understand (or don't understand) and facilitate additional student questions and discussion (Barnett and Kriesel, 2003). Introductory microeconomics student participation in classroom experiments has been shown to increase post-test scores (Dickie, 2006).

Another option, service learning, matches students with a community partner who is in need of a service, which the students then complete as part of their coursework. Examples of service learning incorporated into classroom education and noted in the literature include assessing the economic impact of local events, constructing advertising campaigns for local programs, and assessing the demand for city/county services (Horrisher and Crawford, 2007; Fannin and LeBlanc, 2007; Haines, 2002; and McGoldrick, 1998; see McGoldrick and Ziegert, 2002, for more on service learning in economics). Holston and O'Neil (2008) incorporate service learning into a dietetics course by asking students to design and deliver educational modules for training Cooperative Extension Educators on various diseases such as cancer and diabetes. Students found the experience improved their ability to interpret and evaluate information, and improved their communication skills.

Experiential learning through field work or research, in which students are involved in actual data collection, often through interviews, is found in undergraduate sociology, political science, and qualitative methods courses. One example includes that by Rosenthal (1999) in which each student in a political science course was required to interview two high-level appointees in Oklahoma state government. The field research project was designed to concrete student learning on the impact gender has on individual life opportunities and experiences. In agricultural economics the use of field research projects in undergraduate education has not been documented in the literature. However, a recent report by the national Food and Agribusiness Management Education Commission (Boland and Akridge, 2006) recommends that food and agribusiness management education programs need to incorporate experiential learning such as internships, team based assignments, and special projects into the curriculum, as well as establish linkages between educational programs and industry. Industry linkages would facilitate course curricula and content required by industry and provide avenues for student internships and jobs.

Incorporating field work, such as interviewing agricultural producers to construct enterprise budgets or completing business feasibility studies for new or proposed industry, is an effective way of incorporating experiential learning into the classroom, as well as encouraging students enrolled in an agricultural economics program to apply course concepts to actual problems in the field, thus increasing the student's value to potential employers. To this end, we devised an assignment requiring students to complete a comprehensive business plan through interaction with a local or regional agricultural/food processing operation of their choice. The study was administered to students in two separate semesters (12 students the first semester and 18 students the second semester) of a 200-level agribusiness management course. We hypothesize that a structured experiential learning activity with industry engagement will help students to become critical thinkers and differentiate themselves for future employment (Boland and Akridge, 2004).

Methods

The study was conducted in a sophomore/junior level agribusiness management course. The course learning outcome was to complete a comprehensive business plan, including construction, analysis, and evaluation of business financial statements; as well as to compare and contrast financial outcomes of business management decisions, including interpreting results and predicting outcomes. In an effort to provide a “real world” learning experience for students, they were asked to create a business plan for a farming/ranching, horticultural, or food manufacturing business in Nevada. Students were required to interview a business owner/manager two or three times in order to collect relevant information/data to complete the business plan. They were also instructed to seek information from input suppliers, cooperative extension agents, and others as part of their data collection process. The business plan project was required of all students and constituted at its completion 55% of their course grade. Students submitted the components of their business plan in stages, so as appropriate content was presented in class, students applied what they learned in the classroom to their project. Each stage was graded individually and guidance was given to students at each stage, so as to increase their probability of success at the next stage. The requirements for each stage are given below.

Part I:

- Mission statement
- Goals
- Business details (size, location, product(s), customer, distribution)
- Pricing and revenue estimates
- Interview schedule (date, person interviewed, and contact information)

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Part II:

- All sections of Part I
- Description of expenses, definition of terms/formulas
- Enterprise budget (year 1)
- Investments overview
- Break-even analysis
- Updated interview schedule (date, person interviewed, and contact information)

Part III:

- All sections of Part I and II
- Cash flow budget
- Income statement (Profit/loss statement) (year 1)
- Balance sheet (as of the end of year 1)
- Business analysis overview (current ratio, debt/asset ratio, debt structure ratio, rate of return on assets (%), rate of return on equity (%), interest expense ration, gross revenue per labor unit, gross revenue per acre. Briefly discuss the profitability solvency, and liquidity of your business.
- Updated interview schedule (date, person interviewed, and contact information)

The field research project was based on a constructivist theory of learning which posits that cognitive functioning is best facilitated when students can connect new content to prior knowledge (Vygotsky, 1978). Meaningful engagement occurs when students find a fit between their learning needs and their futures and lives. This is known as situated cognition in which "...the student takes part in activities which are directly relevant to the application of learning and which take place within a culture similar to the applied setting" (Brown et al., 1989). Information is retained when students have the opportunity to apply this new learning in their own way. Constructivism also utilizes an inquiry approach, meaning there must be an element of motivation and a problem to be solved (Von Glasersfeld, 1989). Further, the learner must have some confidence that he or she can solve the problem. If subject matter is either too challenging or too easy for students, they will either disengage or disrupt the learning process. Conversely, optimal learning occurs when students are able to stay engaged in a challenging task, known as Vygotsky's Zone of Proximal Development (Vygotsky, 1978). Vygotsky believed that engagement could be secured through the assistance of a knowledgeable other that provided assistance or scaffolding of the learning event.

The project facilitated these constructivist conditions in several ways. First, students were able to choose an agricultural industry of interest. Some students choose their own family farms or industries in which they had worked during the summer or in high school. For most students, this was the first time they were required to make contact with community members and industry personnel during their

university experience. Not only were the students able to make valuable community and industry connections for their future employment, they also had an opportunity to apply their classroom learning to a "real world" experience. Additionally, the assignment served as an opportunity to compare and contrast their ideas and philosophies regarding industry practice.

Secondly, we recognized that this assignment had the chance to overwhelm students, as it was a new approach to learning economics and business concepts. Agricultural economics programs primarily utilize standard methodologies, such as text-based learning, analytical problems, lecture, and campus-based assignments. Thus, students had no prior coursework that employed a field experience in this way, nor to our knowledge would they encounter anything similar in the duration of their studies. We provided scaffolding by dividing the assignment into stages due throughout the semester, beginning with the least challenging concepts first, and by working with the students to select an appropriate target industry. If students did not have access to a workable site, we offered them options of local projects they might consider. In addition, we provided examples of past projects and sample interview questions, brought in local resource experts to discuss their own operations, and assisted students in locating and learning to use primary and secondary data sources.

This study employs the framework of evaluative inquiry and case study methodology to investigate the field work assignment. Due to the comprehensive nature of the research questions, which sought to understand not only if students learned from the project, but how they evaluated that learning, we utilized evaluative inquiry noted by King (1991) to guide the study's design. King (1991) states that evaluative inquiry is suitable for a range of curricular uses, including studying the effects of learning tools, such as assignments. King's evaluation inquiry is a flexible method suited to an array of research methodologies. Such inquiry is most appropriate when decisions regarding the viability or use of the curricular aspect are necessary. King developed a number of guiding factors for evaluative inquiry, which are explained below as they relate to our study.

- **Deciding a purpose:** It is important that a clear statement of purpose and streamlined goals are made at outset to facilitate an efficient investigation. In our study, the purpose was to examine the learning and perceived value derived from the introduction of a field-based approach designed to enable students to comprehend and apply business planning in an agribusiness management course.

- **Asking relevant questions:** As evaluation has a "real world" orientation, the research questions must be practical in nature and answerable by individuals in the field. Secondly, the questions must be divided according to those which focus on the process, and those which evaluate the product of the

approach. Finally, questions regarding change or modification of the practice should be included.

• **Making the human connection:** King (1991) notes that in the process of evaluation, people use the results that are most important to them. Thus, in the evaluation process it is important to include individuals who care enough to participate and then assist them in guiding the evaluation.

• **Developing an appropriate methodology:** Choices of which research to employ should be feasible and appropriate to the questions at hand. Whatever method is chosen, it is important that it be able to provide useable data on both the process and the product of the element(s) being studied. The specific method chosen to investigate the research questions was case study. According to Creswell (2006), case study develops an in-depth description and analysis of a case or multiple cases, for example in studying a program. Cases are bounded by certain features (the aforementioned criterion sample) and collected around a central factor. In this case, the central factor was the completion of a field-based business plan assignment.

• **Maintaining the flow of information:** King (1991) proposes that evaluative inquiry is dynamic. Thus, it requires continually sharing information on the progress of the evaluation with interested parties. While this may not always be feasible in some respects, at a bare minimum, information gathered from the evaluation should be available for use at any time, that is, results should not be held simply for a final report. Obvious cautions are to be made about premature or improper use of the information. Information flow was completed by sharing the ongoing research project with the resource economics department, as well as students enrolled in the course at its next offering.

• **Judging the judging:** The last element of King's (1991) evaluative inquiry process involves examining the overall process of the inquiry. The extent to which the process answered the research questions, met individual needs, and made suggestions for change must be analyzed. "If it fails in any of these areas – if it does not meet the overall need or answer the specific questions, if those who were interested are not satisfied with the process; or if individuals are left not knowing how to proceed – then the evaluation needs to look carefully at what went wrong" (p.

266). This last step provides valuable information, the author notes, due to the political nature of evaluation and those cases where "failure is predetermined." The process itself was judged through feedback from the participants, for example, ending each interview by asking for any information they wanted to share which was not included in the questions. It was also judged in its use for designing the project and course the next time it was offered.

Results and Discussion

In order to evaluate student perceptions of their learning due to the field research project two separate data sources were used. Data sources included a survey of all students completing the course, and voluntary, open-ended interviews conducted by a non-course instructor after course completion. Two

Variable	Description	Frequency	Mean
Learning	Students perception of learning experience in field work project over other assignments 0: Inferior 1: Same 2: Improved 3: Much improved	6.6% 7% 50% 36.6%	2.17
Previous Field Study	Number of field work projects student completed while in college 1: None 2: 1-2 3: 3-4 4: 5 +	7% 76% 10% 7%	1.90
Recommend	Student would recommend project for future courses 1: Definitely Not 2: Probably Not 3: Neutral 4: Probably Yes 5: Definitely Yes	0% 0% 0.4% 30% 66.6%	4.60
Class Standing (Class)	Class standing when student completed project 1: Freshman 2: Sophomore 3: Junior 4: Senior	13.4% 16.6% 16.6% 53.4%	3.13
College	0: Other College 1: College of Agriculture	33.4% 66.6%	0.66
Industry Contact (Industry)	Student perception of industry contact on learning experience 1: Detracted 2: Somewhat Detracted 3: Neutral 4: Somewhat Enhanced 5: Enhanced	3.4% 0% 6.6% 50% 40%	4.23
Gender	1: Male 2: Female	36.6% 63.4%	1.63
Age Group (Age)	1: 18-22 2: 23-26 3: 27-35 4: 26-45 5: 46+	50% 3.4% 23.3% 13.3% 10%	2.30
Homework (HW)	Student prefers homework assignments 0: No 1: Yes	6.6% 93.6%	0.93
Field Work (FW)	Student prefers field work assignments 0: No 1: Yes	13.4% 86.6%	0.86
Textbook (Text)	Student prefers textbook assignments 0: No 1: Yes	20% 80%	0.80
Lecture	Student prefers attending lectures 0: No 1: Yes	6.6% 93.4%	0.93
Case Study (CS)	Student prefers case study assignments 0: No 1: Yes	40% 60%	0.60
Exam	Student prefers exams 0: No 1: Yes	46.6% 53.4%	0.53

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separate data sources were used to satisfy the requirements for triangulation necessary to ensure validity in qualitative study (Creswell, 2006). Objective measurements of increased student knowledge or skills were not completed, as it has been shown that student perceptions of their strengths or capabilities are highly correlated to their actual performance (Lane et al., 2004; House, 1994).

Student Survey

A survey of all students completing the field project during the two semesters was conducted on the last day of the course. The survey was designed to gauge student evaluation of the field project compared to other learning experiences in the program. The first section of the survey examined students' perceptions of their learning, their experiences with industry professionals, and the value of the field research project to them and future students. The second section of the survey examined students' preferences for various instructional methodologies (lecture, textbook, case study, etc.), and the final section of the survey collected basic student demographic information. Students were given complete definitions of "case study," "field research study," and "learning" before completing the survey to avoid confusion. A complete overview of survey sample statistics can be found in Table 1.

As is shown in Table 1, the majority of the students completed the course in their junior/senior year (70%), approximately 66% were female, 50% were between 18 and 22 years of age, and 66% were majors in the College of Agriculture. Students recognized that working with a community member/industry professional enhanced their learning (90.0%) and believed their learning as a result of the field research project was improved or much improved over other methods (86.6%). Students preferred lectures, homework, and field work assignments over other types of assignments. Surprisingly, many students noted having completed one to three field work assignments while in college, with all students noting that they would recommend the field work project for future courses.

Given the discrete, ordered, and multinomial-choice nature of the student survey data, the students' perception of their learning as a result of the field work project was modeled using an ordered probit model. The ordered probit model evaluated the survey data to determine which

student demographics, preferences for learning/instruction methods, and perceptions of the effect of working with an industry professional were likely to positively influence their perceived learning experience in a field work project. The qualitative learning perceptions may be modeled as a linear function of the observable explanatory variables, x_i , and the unobservable variables, ε_i

$$(1) y_i^* = x_i\beta + \varepsilon_i$$

Each student respondent classified his/her learning perceptions across four categories and hence, we observe

$$y_i = 0 \text{ (inferior)}; y_i = 1 \text{ (same)}; y_i = 2 \text{ (improved)}, y_i = 3 \text{ (much improved)}$$

Equation 2 shows the vector of explanatory variables that was considered for their effect on the probability that the student perceived a much improved learning experience.

$$(2) x_i = \{ \text{College, Class, Industry, HW, FW, Text, Lecture, CS, Exam, Gender, Age} \}$$

The ordered probit model results are shown in

Variable		Coefficient	Std. Err.	Z Stat
College	0: Other College	-0.036	0.692	-0.05
	1: College of Agriculture			
Class	Class standing when student completed project	-0.905**	0.395	-2.29
	1: Freshman			
	2: Sophomore			
	3: Junior			
Industry	Student perception of industry contact on learning experience	1.400***	0.461	3.04
	1: Detracted			
	2: Somewhat Detracted			
	3: Neutral			
	4: Somewhat Enhanced			
HW	Student prefers homework assignments	-2.035	1.737	-1.17
	0: No			
FW	Student prefers field work assignments	2.013**	1.043	1.93
	0: No			
Text	Student prefers textbook assignments	1.373*	0.857	1.6
	0: No			
Lecture	Student prefers attending lectures	-0.857	1.552	-0.55
	0: No			
CS	Student prefers case study assignments	1.652**	0.863	1.91
	0: No			
Exam	Student prefers exams	-0.072	0.862	-0.08
	0: No			
Gender	1: Male	0.4527	0.608	0.74
	2: Female			
Age	1: 18-22	0.625*	0.341	1.83
	2: 23-26			
	3: 27-35			
	4: 26-45			
	5: 46+			
Observations: 30				
LR chi2: 21.98				
Pseudo R2: .3406				
Log Likelihood: -21.2744				
(*)(**)(***): Significant at the 0.10 (0.05) (0.01) level.				
Std. Err.: Standard error.				

Table 2. The marginal effects of the explanatory variables on the probabilities are not equal to the coefficients, only the signs are interpretable as having either a positive or negative effect on perceived learning experience.

Significant variables included lower class standing (freshman/sophomore); working with industry professionals; preferences for field research, textbook, and case study assignments; and age. These results are not altogether surprising. Students with a freshman or sophomore class standing were more likely to perceive an improved learning experience as a result of the field research project, which makes intuitive sense as the “newness” of their college experience and this type of assignment was likely to cause enthusiasm. Students who worked mainly with industry professionals to complete their business plan were more likely to perceive an improved learning experience over those who did not, demonstrating the importance of incorporating interaction with industry professionals into undergraduate curricula.

Students with strong preferences for field work, case study, and textbook reading assignments perceived an improved learning experience over students who did not prefer these methods. This was the result we anticipated, as we expected students who have preferences for more traditional university instructional methods such as lectures and exams would not value the field work project as much. These variables were not statistically significant, but were all negative as we expected. Finally, students in a higher age group would more likely find their learning experience improved through field work projects relative to younger students. This may be due to stronger recognition of the importance of job skills and assignments that can be directly applied outside of the university environment. Hawtrey (2007) found a similar result among students enrolled in evening classes. Interestingly, the college variable was not significant in the model, indicating that students with majors in the College of Agriculture were no more likely to find the agricultural-based field work project beneficial to their learning than students majoring outside the College of Agriculture. This could be a result of students finding the experience applicable across subject matter.

Student Interviews

In this study, a criterion sample was drawn from students who successfully completed the field research project. Students were informed of the study via e-mail invitation. In the end, four females and two males, all Caucasian and under the age of 25 completed the interviews. One student was a senior, three were juniors, and two were sophomores.

A set of interview questions was developed in order to validate the survey results and also to further probe student experience in the project. For example, students were asked, “*What aspects of this experience did you find most useful?*,” “*What if anything did this experience teach you about your strengths and weaknesses in regard to your major/future career?*,” “*Was your professional philosophy affected in any way by this experience?*,” and “*How are you different than students who have not had a similar field experience assignment?*”

As related by Miles and Huberman (1994), the approach to the data was inductive which is appropriate for exploratory and descriptive studies. The first phase of analysis was completed by identifying codes. Secondly, meaning-making was facilitated through data reduction which involves searching for themes, making initial intuitive hypothesis, and clustering like-items so that conclusions could be drawn. Finally, data display was completed through comparison and contrast.

The codes data resulting from the student interviews revealed a number of primary themes, including improved depth of content knowledge, improved professional understanding, increased self-reliance, deeper awareness of strengths, value of hands-on learning, and critical comparison. Further discussion of these themes is provided below along with selected student responses in italics.

•Improved depth of content knowledge:

Numerous students commented that they were surprised at how much work a business plan required. They appeared to develop a more comprehensive understanding of the variables involved in creating a comprehensive business plan and in forecasting a profitable business. In some cases students realized that the knowledge they gained from completing a business plan could also help them in their personal lives.

•Improved depth of professional understanding:

Students clearly showed a much stronger awareness of the depth and breadth of the profession they were entering, especially the extent to which professional contacts and resources could be helpful

Table 3. Codes

Codes	
2. APPA=Analyze Problem & Plan Approach	1. ALS=Awareness of Learning Style
4. CB=Changed Belief	3. BF=Budget/Finance
6. D=Disbelief	5. CONF=Confusion
8. E=Empowering	7. DT=Details not thought of
10. IPI=Influence of Perceived Expert	9. FFP=For Future of Profession
12. ME=More Encompassing	11. LCS=Lack of Self Confidence
14. MP=More Pertinent	13. MG=Mission Statement/Goals
16. O=Ownership	15. NAK=Newly Acquired Knowledge
18. P=Personalized	17. OV=Other views
20. PC=Personal Connections	19. PB=Personal Benefits
22. PH=Phone	21. PC=Procrastination
24. PL= Project Limitation	23. PI=Public Interaction
26. RLE=Real-life experience	25. PPW=Perceived Program Weakness
28. SB=Solidified Belief	27. SAR=Situational Analysis/Response
30. SL=Solidified Learning	29. SFW=Similarity to Future Work
32. SS=Surprise at Support	31. SR=Self reliance
34. TI=Take Initiative	33. ST=Stranger
	35. TOP=Talk to other people

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for support and information. Many students choose agriculture as a career because they have been raised on a ranch or have family in the business. Three of the students interviewed grew up on a family ranch. In these cases, the project enabled the students to look at their family business from a different perspective. Thus, in some cases the increase in professional knowledge came via their parents.

- **Self-reliance:** Students commented on how the project forced them to test their own limits and pushed them beyond their comfort zones.

- **Deeper awareness of strengths:** The project allowed students to become better acquainted with the aspects of their future work that might present them with the greatest challenges. However, students also gained confidence from recognizing their strengths.

- **Value of hands-on learning:** Students commented that case studies provided them with correct answers, but in the field work project they had to seek solutions for themselves.

- **Critical thinking:** The students also learned the importance of critical thinking and application to different environments. Students realized that in some cases what they had been taught would not always work in their particular industry, requiring them to make appropriate adjustments.

Summary

The results of this study are encouraging in terms of the benefits students derive from experiential learning, and suggest that further efforts to include field work as a part of such programs would have positive impacts on students' learning experience. As an evaluative inquiry, it is important that we describe areas where the research fell short of our expectations (King, 1991). One area that proved to be problematic was students' varied interpretation of the term "field experience." Certain responses given during the student interviews indicated that some students considered the project an assignment, and did not fully appreciate the field aspects. This was especially apparent among students who completed the majority of their interview work over the phone without visiting the operation. Secondly, some students gathered a great deal of information from the internet, instead of using primary industry sources. Finally, the lack of specifications regarding the number and variety of interactions with primary sources prevented students from viewing the operation from a systems perspective.

Additionally, there was an issue of bias not considered in the initial development of the project. Of the six students interviewed, two completed the work on their family farms, while a third worked with her former FFA advisor. While the students still completed the project, their personal connections removed an aspect of professionalism. In some cases, more information was available to these students without completing the data gathering done by other

students. However, both participants who used their own family businesses admitted to a much deeper understanding and appreciation of the work done by their parents. In addition, such connections gave the students, both of whom were intending to return to work in the family business, an opportunity to try out their own voice regarding the information and procedures they had learned as best practice during their course of study. Conversely, in the case of students who did not examine familiar industries, the assignment did not require job shadowing or a specific amount of time spent on-site. Therefore, future iterations of the project should include more specific protocols to encourage a deeper understanding of the business operation.

Regarding site selection, we would advocate that students investigate their family's industry, but not their family's operation. This will allow students to become more familiar with the variety of approaches to their industry's management while providing them with the experience of making professional contacts. However, another avenue for future exploration would be to have students' trade operations. That is, a student with a family background in cattle ranching might assist a fellow student to complete his/her assignment on the family's ranch, and vice-versa. A final limitation was the lack of regional specifications, as students commented that requiring them to investigate local operations (as opposed to those located 2-6 hours away) might encourage more frequent interactions with the producer and a better knowledge of the local area.

Overall, we believe the project added a much needed element of connectivity between classroom and context. The students had the opportunity to deepen their learning because the project utilized aspects such as prior knowledge, inquiry, and meaningfulness recommended through constructivist approaches to learning. Furthermore, they more closely approximated work which they will be called upon to do in the "real world;" they created their own viable business plans, tested their learning and beliefs, and perhaps most importantly, were forced to assert and insert themselves into the learning process.

Literature Cited

- Barnett, B.J. and W. Kriesel. 2003. Agricultural economists' use of classroom economic experiments. *Jour. of Agricultural and Applied Economics* 35(2): 321-335.
- Boland, M. and J. Akridge. (eds.). 2006. Food and agribusiness management education: Future directions. <https://www.agecon.purdue.edu/cab/NFAMEC/NFAMEC%20Final%20Report.pdf>. Publication of the National Food and Agribusiness Management Education Commission. Accessed December 22, 2009.
- Boland, M.A. and J. Akridge. 2004. Undergraduate agribusiness programs: Focus or falter? *Review of Agricultural Economics* 26(4): 564-578.

- Brown, J.S., A. Collins, and P. Duguid. 1989. Situated cognition and the culture of learning. *Educational Researcher* 18: 32-41.
- Creswell, J. 2006. *Qualitative inquiry and research design: Choosing among five approaches*. 2nd ed. Thousand Oaks, CA: Sage.
- Dewey, J. 1938. *Experience and education*. New York, NY: Simon and Schuster.
- DeGiacomo, J.A. 2002. Experiential learning in higher education. *The Forestry Chronicle* 78.
- Dickie, M. 2006. Do classroom experiments increase learning in introductory microeconomics? *Jour. of Economic Education* 37(3): 267-288.
- Fannin, J.M. and S.J. LeBlanc. 2007. Integrating university service learning courses with community development extension programs. *Jour. of Extension [On-line]* 42(2): 2IAW2.
- Haines, A. 2002. Blended teaching: Land use planning education in Wisconsin and lessons learned. *Jour. of Extension [On-line]* 40(5).
- Hawtrey, K. 2007. Using experiential learning techniques. *Jour. of Economic Education* 38(2): 143-152.
- Holston, D.M. and C.E. O'Neil. 2008. Students' evaluation of a communication-intensive, service-learning project in a dietetics course. *NACTA Jour.* 52(3): 2-8.
- Horrisberger, L. and D.C. Crawford. 2007. Lessons learned-service learning: A new initiative in field experience and collaboration between universities, county extension offices and communities. *Jour. of Extension [On-line]* 42(2): 2IAW1.
- House, J.D. 1994. The predictive relationship between academic self-concept, achievement expectancies, and grade performance in college calculus. *Jour. of Social Psychology* 135(1): 111-112.
- Jiggins, J. and N. Roling. 1994. Systems thinking and participatory research and extension skills: Can these be taught in the classroom? *Occasional Papers in Rural Extension* 10.
- King, J. 1991. Evaluative inquiry: Situational assessment. In Short, E.C. (ed.). *Forms of Curriculum Inquiry*. Albany, NY: SUNY Press.
- Knobloch, N.A. 2003. Is experiential learning authentic? *Jour. of Agricultural Education* 44(4): 22-34.
- Kolb, D.A. 1984. *Experiential learning: Experience as the source of learning and development*. Englewood Cliffs, NJ: Prentice-Hall.
- Koontz, S.R., D.S. Peel, J.N. Trapp, and C.E. Ward. 1995. Augmenting agricultural economics and agribusiness education with experiential learning. *Review of Agricultural Economics* 17: 267-274.
- Lane, A., J. Lane, and A. Kyprianou. 2004. Self-efficacy, self-esteem and their impact on academic performance. *Social Behavior and Personality: An International Jour.* 32(3): 247-256.
- McGoldrick, K. 1998. Service-learning in economics: A detailed application. *The Jour. of Economic Education* 29(4): 365-376.
- McGoldrick, K. and A.L. Ziegert. (eds.). 2002. *Putting the invisible hand to work*. Ann Arbor, MI: University of Michigan Press.
- Miles, M.B. and A.M. Huberman. 1994. *Qualitative data analysis: An expanded sourcebook*. 2nd ed. Thousand Oaks, CA: Sage.
- Miles, M., D. Melton, M. Ridges, and C. Harrell. 2005. Benefits of experiential learning in manufacturing education. *Jour. of Engineering Technology* Spring.
- Parr, D.M., C.J. Trexler, N.R. Khanna, and B.T. Battisti. 2007. Designing sustainable agriculture education: Academics' suggestions for an undergraduate curriculum at a land grant university. *Agriculture and Human Values* 24: 523-533.
- Retallick, M.S. and C. Steiner. 2009. A model for implementing a college-wide experiential learning program in higher education. *NACTA Jour.* 53(1): 2-6.
- Roberts, T.G. 2006. A philosophical examination of experiential learning theory for agricultural educators. *Jour. of Agricultural Education* 47(1): 17-29.
- Rosenthal, C.S. 1999. One experience is worth a thousand words: Engaging undergraduates in field research on gender. *Political Science and Politics* March: 63-68.
- Von Glasersfeld, E. 1989. Cognition, construction of knowledge and teaching. *Syntheses* 80: 121-140.
- Vygotsky, L.S. 1978. *Mind in society: Development of higher psychological processes*. Cambridge, MA: Harvard University Press.

Engaging Agriculture and Non-Agriculture Students in an Interdisciplinary Curriculum for Sustainable Agriculture

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Abstract

Interest in curricula addressing alternative agricultural production and marketing systems has grown among students and faculty at post-secondary institutions. In 2005, an interdisciplinary team from the University of Kentucky (UK) received a USDA Higher Education Challenge Grant to establish a curriculum in sustainable agriculture. In doing so, UK sought to join the growing number of post-secondary institutions with courses, concentrations and majors in alternative agricultural production and marketing systems. Some of these academic offerings arose as areas of specialized study within production-oriented agricultural science disciplines. More recent courses and programs tend to reflect a more holistic approach that incorporates social, economic, and natural resource management considerations. The UK team blended these approaches to produce a curriculum that would appeal to students within and beyond the College of Agriculture and support the transition of the state's small farmers to a post-tobacco economy. Combining the core elements of an agricultural science degree with requirements in the cultural dimensions of sustainability demanded clear definitions and priorities. The UK team adopted the USDA Sustainable Agriculture Research and Education Program's definition of sustainability as a management system that optimizes environmental, economic, and social resources to improve a farm's performance over time. Introduced in 2007, the curriculum combined requirements in agricultural, natural, and social sciences with an apprenticeship on an organically managed community supported agriculture project.

Introduction

Consumer demand for alternatively produced agricultural goods variously described as natural, organic, sustainable and/or local, has grown unabated for several decades. Today, the market for these products represents a growth category for specialty stores, food cooperatives, grocery chains, box outlets and direct marketing ventures such as

farmers markets and subscription sales. For example, there were 5,274 farmers markets in the United States in 2009, nearly triple the number from 15 years earlier and a 13% increase since 2008 alone (USDA, 2009). Similarly, domestic organic food sales reached \$22.9 billion in 2006, representing a 15.8% increase from the previous year (Organic Trade Association, 2009). Consumer research consistently identifies personal health and environmental protection as the primary incentives for purchasing alternatively produced foods (Gold, 2008). With the increasing public attention directed at these concerns, consumer demand for alternatively produced foods seems likely to continue.

Emerging social and economic trends provide fertile ground for new educational opportunities. As the early demand for natural and organic foods gained momentum after the 1960s, the opportunity arose to train farmers and other agricultural professionals to manage alternative production systems. By the late 1980s, a number of post-secondary agricultural educational institutions were adapting existing courses and curricula to reflect alternative principles and practices (Rodale Institute, 2009; Thompson, 2009). These initiatives typically evolved within one or more production-oriented departments such as soil and/or plant science, horticulture and agronomy that were simultaneously researching field application of alternative production systems. The pioneers behind these efforts commonly collaborated with peers departments including entomology and microbiology that were integral to their field research. The resulting academic offerings had a topical focus such as integrated/ecological pest management and biological/low-input soil management. While more interdisciplinary than traditional agricultural science classes and curricula, some programs retained a relatively narrow focus on production itself, albeit in an alternative system. Course content and curricula requirements focused almost exclusively on the core agricultural and natural sciences

The maturation of the alternatively produced

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foods market in the new millennium has fostered a growing appreciation for a systems approach to agriculture highlighting the connections between farmers, the environment, and society. Rather than seeing farming as an isolated specialization reserved for a dwindling percentage of the population, this new model assigns agriculture a central role in addressing significant economic, resource conservation and human health concerns. The principles of the Sustainable Agriculture Research and Education (SARE) Program, established in the 1990 Farm Bill, reflected this broader understanding of agriculture as a focal point for social organization. SARE defines the goals of sustainable agriculture as providing more profitable farm incomes, promoting environmental stewardship, and promoting stable, prosperous farm families and communities (SARE, 2005). Through this more holistic understanding, a host of disciplines that had previously been considered tangential to commercial agriculture became integral. Educational institutions responded by incorporating requirements including sociology, health and nutrition, rural development and agricultural or environmental policy into the study of sustainable agriculture (Anon., 2006). Though rich in agricultural heritage and resources, the agricultural sector in Kentucky was relatively slow in responding to the economic opportunities presented by alternatively produced foods. This record may be attributable to the federal tobacco program which provided the majority of the state's small farmers with a stable return on investment and a familiar set of production challenges. However, finalization of the tobacco buyout in 2004 ushered in a new era in which Kentucky's small farmers would increasingly need to look to other crops for revenue, or quit farming. While partially offset by buyout payments, revenue from the sale of tobacco in Kentucky dropped by \$150 million in the first year of the settlement (Snell, 2005). As a result, tens of thousands of Kentucky farmers, especially smaller producers in the eastern and central regions of the state, could no longer raise tobacco profitably and ceased doing so.

The search for economically viable alternatives to tobacco production prompted a team of UK faculty to propose the creation of a new curriculum in sustainable agriculture that would capitalize on the rapidly expanding market for foods characterized as natural, organic, sustainable, and /or local. The team also established three criteria that would ultimately differentiate their results from the more production-centered courses and curricula offered at other institutions. Specifically, the curriculum should (i) extend beyond production practices related to the field and barn and incorporate significant requirements in the social sciences, including economics; (ii) the curriculum should attract a substantial number of students from non-agricultural backgrounds whose involvement would mirror a broader commitment from the state's urban and suburban popula-

tions to support agriculture; and (iii) require students to gain hands-on experience in the practical application of alternative production practices.

Methods

A USDA Higher Education Challenge Grant (HECG) awarded in June 2005 enabled the UK faculty team to bring their sustainable agriculture curriculum initiative to fruition. The core group that wrote the grant expanded to form the Sustainable Agriculture Curriculum Committee (SACC) that included faculty members from six departments from the College of Agriculture (Agricultural Economics, Animal and Food Sciences, Entomology Forestry, Horticulture, Plant and Soil Science) and two from outside (Sociology and English). A staff member with expertise in pedagogical practice from the University's Teaching and Academic Support Center had been the lead author on the HECG grant and stayed on as a member of the SACC. The Committee began meeting regularly in early 2006 to determine which existing courses to include in the new curriculum and how to structure the new courses needed to fill in the gaps.

The SACC's first undertaking was to resolve the uncertainty associated with the relatively new term "sustainable agriculture." Some proponents of change in agriculture portray the concept of sustainability as a significant departure in our approach to keeping farming viable (National Research Council, 1989). Others from a more conventional background often wonder what farmer wouldn't plan on being "sustainable," if that meant being able to farm in the future. Without a clear, widely applicable, and readily recognizable definition for "sustainable agriculture," designing a coherent and comprehensive curriculum for the subject would be problematic. The SACC determined that using the SARE model of sustainable agriculture would maximize interest in the curriculum and foster the consensus on agriculture's role in the community that they sought to promote.

One significant benefit of defining sustainable agriculture as a voluntary management system is avoiding the judgmental premise that a particular farm either is or is not sustainable. Instead, sustainable agriculture is presented as a tool for measuring whether or not a farm is progressing towards the economic, environmental, and social goals identified by the farmer. Applying a consistent yardstick over an extended period of time provides a clearer understanding of what works for farmers and what doesn't. This approach makes sustainable agriculture relevant to all farmers because it can be applied to farms of every size and design. It also explicitly acknowledges the critical role on the non-farming community as an integral partner in the long-term viability of individual farms as well as agriculture's contribution to society as a whole.

Engaging Agriculture

At the same time, the SACC was concerned that making the curriculum's focus too narrow would impede desirable cross-pollination with other academic disciplines. They sought to avoid the specialization found in agricultural education that has distanced many non-agricultural students, staff and faculty from the land grant mission (Karsten and O'Connor, 2002; Karsten and Risius, 2004). As a result, the committee sought to incorporate what have come to be seen as non-agricultural perspectives and pursuits into the curriculum (Parr and Van Horn, 2006; Parr et al., 2007). This approach was designed to expand and enrich the curriculum while building "agro-literacy" among UK community members who might not otherwise connect with the offerings in the College of Agriculture. The SACC also felt that this inclusive approach would contribute to broad-based community support for alternative agriculture that would be an important component of strengthening markets for the state's farmers.

The SACC also formalized the proposal from the HECG grant to require curriculum majors and minors to complete a two semester apprenticeship for credit at an organically managed community supported agriculture (CSA) project. The Sustainable Agriculture CSA would make an ideal tool for taking students deeper into sustainable agriculture while building new relationships across the campus and community (Falk et al., 2005). Part of operating a CSA is planning, planting, tending, and harvesting the produce, flowers, and herbs. To handle this work, students who complete the introductory courses in the curriculum move into organic horticultural production through a season long apprenticeship with experienced practitioners on the UK Department of Horticulture Research Farm. The farm would serve as a living laboratory for apprentices to synthesize their training in soil science, entomology, plant pathology, and other disciplines. Distribution is another part of a CSA and it provides ongoing opportunities to connect with student, staff, and faculty shareholders and, through the ripple effect, their lives beyond UK. The contents of the weekly share becomes its own kind of living laboratory, demonstrating just how flavorful, nutritious and diverse seasonally grown Kentucky produce, herbs, and flowers can be.

Results and Discussion

The SACC's core task was to devise a coherent and rigorous course of study providing a comprehensive understanding of sustainable agriculture that would culminate in a B.S. degree. The SACC elected to postpone the establishment of an independent major and instead utilized the College's Individualized Program option to expedite the launch of the program. This option allows students who receive approval from the Associate Dean for Instruction to design and complete a unique course to satisfy the College's B.S. degree requirements. While

not formally establishing Sustainable Agriculture as a major, this approach would enable students to complete the designated coursework and graduate with a B.S. in Sustainable Agriculture. This approach would also allow the SACC or its successor to evaluate and potentially modify the curriculum's requirements before pursuing recognition as a discrete major. An interdisciplinary major established several years earlier in the College named Natural Resource Conservation and Management had been similarly introduced through the Individualized Program option.

Seventeen majors existed within the UK College of Agriculture when the SACC went to work on the Sustainable Agriculture curriculum. Students in each of the existing programs were required to complete GEN 100 "Issues in Agriculture" as well as the pre-major and major requirements specific to their major. In establishing its own set of pre-major and major requirements, the SACC began with fundamental coursework common to other programs including GEN 100, chemistry, and biology with their respective laboratories and mathematics. The additional pre-major and major requirements – Introductory Nutrition, Principles of Economics I and The Dynamics of Rural Social Life or Introduction to Sociology – reflected the new direction that the SACC was proposing. Other majors in the College included one of the Nutrition, Economics, or Sociology courses as requirements, but none included any two, much less all three (Table 1).

The SARE-inspired focus on integrating the economic, environmental, and social components of sustainable agriculture is most clearly reflected in the core course requirements (Table 2). Grouped into three clusters, these courses represent the upper level understanding of the diverse subject matter deemed essential to all Sustainable Agriculture majors. As a result, this is where decisions regarding the trade-off between depth and breadth that are implicit in designing an interdisciplinary B.S. degree played out. The Environmental Stewardship Cluster with its emphasis on production-oriented agricultural sciences contains the greatest number of required courses and credit hours. Whittling this group down to five courses involved the most difficult winnowing decisions involved in designing the curriculum. For example, the SACC considered but declined to include a Forestry course in this cluster. Another course that would naturally fit within this cluster, BIO 360 Introduction to Ecology, was instead designated as a Specialty Support requirement. In most other majors, students select 18 credits of Specialty Support with the consent of their faculty advisor. The SACC determined that its best option for satisfying the rigor threshold without raising the total number of required credits to an unacceptable level would be to infringe modestly on students' Specialty Support selections by making BIO 325 a requirement within this category.

Table 1. Pre-major and Major Requirements for the Sustainable Agriculture Major

Issues in Agriculture	Elementary Calculus and its Applications
General College Chemistry I	General Chemistry Laboratory I
General College Chemistry II	General Chemistry Laboratory II
Principles of Biology I	Principles of Biology II
Principles of Economics I	The Dynamics of Rural Social Life OR
Introductory Nutrition	Introduction to Sociology

Table 2. Cluster Approach to Course Requirements for Sustainable Agriculture Major

Environmental Stewardship Cluster*	Animal Science 382	Principles of Livestock Management
	Entomology 300	General Entomology
	Plant Science 366	Fundamentals of Soil Science
	Plant Science 404	Integrated Weed Management
	Plant Pathology 404G	Principles of Plant Pathology
Economic Profitability Cluster	Ag Economics 302	Agricultural Management Principles
	Ag Economics 305	Food and Agricultural Marketing Principles
	Ag Economics 445G	Intro to Resource & Environmental Economics
Social Responsibility Cluster	General Education 500	Agricultural and Environmental Ethics
	Sociology 360	Environmental Sociology
	Sociology 420 OR 517	Community Analysis OR Rural Sociology

*Biology 325 Introduction to Ecology is a required course closely related to the Environmental Stewardship Cluster that SAG majors must take to partially fulfill their Specialty Support requirements.

Taken separately, the Economic Profitability and Social Responsibility Clusters contain fewer courses and credit hours than the Environmental Stewardship Cluster. However, when combined they actually exceed those in the production-oriented cluster by both measures. This strong focus on the economic management and social connectivity embedded in the concept of sustainability made the overall curriculum genuinely interdisciplinary. No other B.S. program in the country oriented towards alternative systems requires a comparable quantity or high level of coursework outside of the traditional production-oriented departments. The SACC felt strongly that such an integrated approach would uniquely serve the small to medium-sized family farms across Kentucky in search of new ways to compete in a post-tobacco program world.

The SACC identified one existing and four new courses as additional requirements of the major (Table 3). The existing course, PLS 386 Plant Production Systems offered by the Plant and Soil Sciences Department was re-designed to incorporate alternative (generally non-chemical) weed management practices and was cross listed as SAG 386. Introduction to Sustainable Agriculture, SAG 101, was developed as an interdisciplinary course that provided a firm and clear foundation in the synergy between economic, environmental, and social conditions that drives the sustainability model. The SACC's intentions for SAG 201 Cultural Perspectives on Sustainability reflect the Committee's ambitious vision of the new curriculum as a bridge between, not just disciplines, but colleges. The course was designed to examine cultural dimensions within the concept of sustainability through a close reading of texts that address the relationship between people and nature. The course would explore the works of noted writers such as Henry Thoreau, Rachel Carson, and Barbara Kingsolver

on environmental themes addressing the interdependence between individuals, civilizations, and nature. SAG 201 had added importance since it was chosen to satisfy the Undergraduate Writing Initiative demonstrating proficiency in written language skills that every UK undergraduate had to complete successfully.

Apprenticeship in Sustainable Agriculture, SAG 397, represented another novel requirement of the major that linked production and marketing considerations. Students in this course work a minimum of 250 hours on a certified organic CSA operated by the Horticulture Department. Students are required to spread their hours over the spring and summer or summer and fall semesters to insure that they experienced a broad range of on-farm responsibilities. These responsibilities include all aspects of production as well as engagement with the CSA shareholders at the weekly distribution. The CSA model is recognized as growing in popularity in Kentucky with more than fifty such operations in business in 2009 and, along with other forms of direct marketing, provides a viable opportunity for many of Kentucky's family farms (Anon., 2009). Integration of Sustainable Agriculture Principles, SAG 490, was developed as a capstone course to bring together soon-to-graduate majors for a collaborative research or service-oriented project.

Table 3. Required Courses in Sustainable Agriculture

SAG 101 Introduction to Sustainable Agriculture
SAG 201 Cultural Perspectives on Sustainability
SAG 386 Plant Production Systems
SAG 397 Apprenticeship in Sustainable Agriculture
SAG 490 Integration of Sustainable Agriculture Principles

Table 4. Distribution of Credits within the Sustainable Agriculture Major

University Study Requirements	34
College of Agriculture Requirements	3
Pre-Major Requirements	6
Major Requirements	36
Sustainable Agriculture Core	16
Specialty Support	18
Free Electives	9
Total Credits for B.S. degree	122

Table 5. Course Requirements for the Minor in Sustainable Agriculture

Sustainable Agriculture Core	SAG 101 Introduction to Sustainable Agriculture	3
	SAG 201 Cultural Perspectives on Sustainability	3
	SAG 397 Apprenticeship in Sustainable Agriculture	3
Environmental Stewardship Cluster <i>Select One</i>	GEO 210 Pollution & Env. Management	3
	GLY 210 Habitable Planet	3
	ASC 382 Principles of Livestock Production	3
	PLS 210 The Life Processes of Plants	3
	PLS 366 Fundamentals of Soil Science	4
Economic Profitability Cluster <i>Select One</i>	AEC 302 Agricultural Management Principles	4
	AEC 305 Food & Agricultural Marketing Principles	3
	AEC 445G Introduction to Resource & Environmental Economics	3
Social Responsibility Cluster	SOC 360 Environmental Sociology OR	3
	GEN 501 Agricultural and Environmental Ethics	3
Total Credits for Minor		21-23

The complete listing of College and University credits needed to receive a B.S. in Sustainable Agriculture through the Individualized Program includes the Specialty Support credits that students select with the agreement of their faculty advisor to complement a subject area of particular interest (Table 4). These courses are chosen to provide expertise in a sub-specialization within the broader parameters of the major. After fulfilling their requirements to both their major and the University Studies Program, students have a minimum of 15 credits with which to select courses of their choosing. In an effort to make this subject of study available to a larger number of students, the SACC also designed a Sustainable Agriculture minor (Table 5). In addition to three required courses from the Sustainable Agriculture core, students in the minor must select one appropriate course from an Environmental Responsibility Cluster and an Economic Profitability Cluster. The requirement that minors in Sustainable Agriculture complete the time and energy intensive on-farm apprenticeship course significantly increased their exposure to and involvement in the community building exercise that the curriculum was intended to achieve.

Summary

Growing consumer demand for alternatively produced agricultural products and the economic vacuum resulting from the phase out of the federal tobacco support program prompted an interdisciplinary faculty team at the University of Kentucky to develop an undergraduate curriculum in sustainable agriculture. The new program was intended to expand opportunities for existing and new entry farmers by providing comprehensive training in alternative production and marketing practices. Additionally, the program was designed to prepare students including those from non-agricultural backgrounds for a variety of careers in which they would work to preserve farming's vital role in the state's economic and cultural life. The faculty team worked with the model of sustainability pioneered by the USDA's Sustainable Agriculture Research and Education Program that works by strengthening the connections between agricultural productivity, economic development, and environmental protection. The faculty team developed proposals for a broadly interdisciplinary major and minor in Sustainable Agriculture which required students to complete a two semester apprenticeship on the University's organically managed farm. On May 1, 2007, the UK University Senate approved the new Sustainable Agriculture core courses as well as the Sustainable Agriculture minor. Approval of the courses enabled students to receive a B.S. in Sustainable Agriculture through the Individualized Curriculum opportunity beginning in the fall 2007 semester.

Literature Cited

- Anon. 2006. Facilitating sustainable agriculture: A participatory national conference on post-secondary education. <http://casfs.ucsc.edu/education/conference/index.html#execsum>. The Center for Agroecology and Sustainable Food Systems, University of California – Santa Cruz. Accessed November 25, 2009.
- Anon. 2009. Directory of CSAs in Kentucky. <http://www.localharvest.org/search-csa.jsp?st=19&ty=6&nm=>. Local Harvest. Accessed December 6, 2009.
- Falk, C.L., P. Pao, and C. Cramer. 2005. Teaching diversified organic crop production using the community supported agriculture farming system model. *Jour. of Natural Resources and Life Science Education* 34: 8-12.
- Gold, Mary. 2008. Guide to organic market: Consumer and industry studies (2004-2008). http://www.nal.usda.gov/afsic/pubs/OAP/OAPGuide6.shtml#_Toc191694961. Alternative Farming System Information Center. Accessed November 25, 2009.
- Karsten, H.D. and M.L. Risius. 2004. Development of an interdisciplinary agroecology major with input from surveys of students, graduates, and employers. *NACTA Journal* 48(1): 58-64.
- Karsten, H.D. and R.E. O'Connor. 2002. Lessons learned from teaching an interdisciplinary undergraduate course on sustainable agriculture science and policy. *Journal of Natural Resources and Life Science Education* 31:111-116.
- National Research Council. 1989. *Alternative agriculture. Committee on the Role of Alternative Farming Methods in Modern Production Agriculture*. Washington, D.C.: National Academy Press.
- Organic Trade Association. 2009. *Organic Trade Association's 2009 Organic Industry Survey*. http://www.ota.com/pics/documents/01a_OTAEExecutiveSummary.pdf. Accessed November 25, 2009.
- Parr, D.M., C.J. Trexler, N.R. Khanna, and B.T. Battisti. 2007. Designing sustainable agriculture education: Academics' suggestions for an undergraduate curriculum at a land-grant university. *Jour. of Food, Agriculture, and Human Values* 24(4): 523-533.
- Parr, D. and M. Van Horn. 2006. Development of organic and sustainable agricultural education at the University of California, Davis: A closer look at practice and theory. *HortTechnology* 16(3): 426-431.
- Rodale Institute. 2009. *Farming for Credit Directory*. <http://www.newfarm.org/depts/student-farm/directory.shtml>. Accessed November 25, 2009.
- Sustainable Agriculture Research and Education. 2005. What is sustainable agriculture? www.sare.org/publications/explore/index.htm. Accessed November 25, 2009.

Snell, W. 2005. Kentucky's Tobacco Economy – An Industry in Transition. http://www.uky.edu/Ag/AgriculturalEconomics/pubssearch.php?subitle=Word%20Search&searcharea1=grouptype&searcharea2=title&searcharea3=keywords&searcharea4=alt_group&orderbywhat=nosort. University of Kentucky Department of Agricultural Economics. Accessed November 25, 2009.

Thompson, B. 2009. Educational and training opportunities in sustainable agriculture. <http://www.nal.usda.gov/afsic/pubs/edtr/EDTR2>

009.shtml. Alternative Farming System Information Center. Accessed November 25, 2009.

USDA. 2009. Farmers Market Growth: 1994-2009. <http://www.ams.usda.gov/AMSV1.0/ams.fetchTemplateData.do?template=TemplateS&navID=WholesaleandFarmersMarkets&leftNav=WholesaleandFarmersMarkets&page=WFMFarmersMarketGrowth&description=Farmers%20Market%20Growth&acct=frmrdirmtkt>. Accessed November 25, 2009.



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The USDA's Food and Agricultural Education Information System: FAEIS¹

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Abstract

As a comprehensive nationwide system, the Food and Agricultural Education Information System (FAEIS) provides empirical data and analyses for planning, benchmarking, and coordinating efforts, directed towards supporting higher education in the food, human, agricultural, and natural resource sciences. FAEIS ([http:// faeis.usda.gov/](http://faeis.usda.gov/)) is an accessible resource for data users that includes faculty, higher education administrators, government officials, industry professionals, and the general public to strengthen higher education programs and is sponsored by the U. S. Department of Agriculture (USDA). Recently 2008 marked one of the best years for FAEIS reporting with 100% reporting from nearly all of our sponsoring associations: Association of Public and Land-Grant Universities (APLU), formally National Association of State Universities and Land-Grant Colleges (NASULGC) ; American Association of State Colleges of Agriculture and Renewable Resources (AASCARR); Association of American Veterinary Medical Colleges (AAVMC); Board on Human Sciences (BOHS); Council on Administrators of Family and Consumer Sciences (CAFCS); Society of American Foresters (SAF); and National Association of University Forest Resources Programs (NAUFRP). This article seeks to expand awareness of FAEIS, discuss the data collection process, and provide readers with examples of how they can use FAEIS.

Introduction

The U.S. Department of Agriculture's (USDA) Food and Agricultural Education Information System (FAEIS) is a comprehensive web-based database of student and faculty data. Its purpose is to compile nationwide higher education data for life, food, veterinary, human, natural resource, and agricultural sciences (The USDA's Food and Agricultural Education Information System, 2009).

FAEIS is the nation's most definitive repository of student enrollment and degrees granted information for the food and agricultural sciences. FAEIS also includes useful faculty salary information as well as detailed reports, by variables such as gender and academic discipline, for benchmarking and other comparative studies. Congress periodically requests workforce projections from USDA, and FAEIS is our primary source for providing this response. Institutional research and administrative decision-makers also consult FAEIS data to develop policy statements and economic analysis. If you're a faculty member writing a grant application, there's no better place than FAEIS to find student enrollment projections to support your project. --Greg Smith, National Education Program Leader for Higher Education Programs at the National Institute of Food and Agriculture (NIFA) formally Cooperative State Research, Education, and Extension Service (CSREES), USDA, on July, 2, 2009 (Smith, G., personal communication).

FAEIS was originally developed by the USDA in 1983 to provide data for federal reporting purposes in collaboration with Texas A & M University. In 2001 FAEIS transferred to Virginia Tech and is currently funded through a USDA grant (#2008-38420-04799) and operated by the College of Agriculture and Life Sciences.

As a comprehensive nationwide system, FAEIS provides empirical information for use in planning, benchmarking, and coordinating efforts, directed towards supporting higher education in the food, agricultural, and natural resource sciences. FAEIS offers an accessible resource for data users that includes faculty, higher education administrators, government officials, industry professionals, and the general public to strengthen higher education programs. FAEIS can assist users examining enrollment trends, emerging disciplines, student placement, and faculty salaries.

¹The FAEIS project was supported by USDA grant (#2008-38420-04799) from the USDA's National Institute of Food and Agriculture (NIFA) Higher Education Program.

FAEIS Data Collection

FAEIS annually conducts three major surveys: the Fall College Enrollment Survey, the Student Survey, and the Faculty Survey. The Fall College Enrollment Survey asks for initial student headcount for an entire college or school in the program areas of life, food, veterinary, human, natural resource, and agricultural sciences (<http://faeis.usda.gov/> for a detailed listing of these programs). The Student Enrollment Survey collects data concerning institutional majors as categorized by Classification of Instructional Programs (CIP) codes and lists the students enrolled in those majors by gender, race/ethnicity, degree level, and graduate placement.

The Faculty Survey focuses on faculty and administrators and automatically assigns a unique identification number to insure anonymity. Some of the key areas in which FAEIS collects faculty information includes monthly salary, primary discipline, academic rank, appointment term (e.g. 9 month or 12 month), tenure track status, appointment types by full time equivalence (research, teaching, and extension full-time equivalent [FTE]) and demographic information (gender, race/ethnicity, citizenship and age).

Data Collection

Presently, FAEIS collects data from over 220 colleges and universities, including the 1862, 1890, and 1994 land grants, American Association of State Colleges of Agriculture and Renewable Resources (AASCARR); Board on Human Sciences (BOHS); Council on Administrators of Family and Consumer Sciences (CAFCS); and Society of American Foresters (SAF) colleges and universities (for a list of participating institutions visit <http://faeis.usda.gov/>).

For data to be useful to users, FAEIS relies on strong and congenial relationships with institutions and their respective colleges or schools to voluntarily report the necessary data. FAEIS data entry partners at colleges and universities are initially contacted electronically with notification that the system is ready for access. Data collection also occurs through a series of point person contacts, with the FAEIS team member providing help and support to the data entry partner by generating reports for the data entry partner to update and review. The relationship between the data entry partner and the FAEIS team member serves as an asset to provide accuracy and consistency in reporting because the data entry partner informs FAEIS of changes within their departments and colleges.

FAEIS data are reported and categorized through the Classification of Instructional Programs (CIP) codes from the CIP 2000 edition. CIPs are a "taxonomic coding scheme that contains titles and descriptions of primarily postsecondary instructional programs" (Morgan and Hunt, 2002) and were developed by the National Center for Education Statistics and are thus the federal classification

standard. The data entry partner chooses the appropriate CIP codes for their disciplines. The CIP codes are discipline specific and allow for historically tracking information. For example, historically the field of agronomy referred to multiple disciplines that have been subsequently developed into separate programs such as soil science, crop science, and plant science. In 2009, FAEIS will begin to use the 2010 CIP edition for reporting purposes to ensure that current and relevant reporting standards are maintained.

Accuracy, Reliability, and Uniqueness

Often self-reporting databases, such as FAEIS, are criticized for the reliability of the data. Concerns are that institutions may report inaccurate data or may be unwilling or unable to report their true data (Fixsen, et al., 1972; Fowler, 2008). The FAEIS team views data validity and reliability as a critical component of planning and assessment for FAEIS performance. To improve the reliability of the data, the FAEIS team e-mails and calls departments and institutional research offices of reporting institutions to ensure the accuracy of the data reported. At the end of a reporting year, the FAEIS team sends out a combined report to university and college administrators. This report allows the institution final approval prior to the data being made public. The FAEIS team also asks institutions to check data when anomalies are noted in data that have been submitted. These measures help to ensure the accuracy of the FAEIS data.

The FAEIS team consistently seeks to improve the completeness and reliability of the system thorough collaboration with FAEIS users, including presentations at professional conferences and symposiums to obtain user feedback. Routine examinations of the current and historical data insure that the data are as accurate and reliable as possible. To adequately evaluate the value of FAEIS, annual and comprehensive assessments are conducted, as well as an annual meeting of the FAEIS Peer Panel. FAEIS users receive an annual survey to assess the value and ease of use for FAEIS. During the three-year grant cycle, FAEIS also conducts a comprehensive assessment of FAEIS to determine progress and plans for the future. Finally, the FAEIS Peer Panel meets annually to discuss the direction of FAEIS from the higher education viewpoint. These measures ensure that FAEIS continues to improve in functionality and value to the user.

FAEIS Advisory Board

In an effort to maintain reporting effectiveness, FAEIS receives feedback from a Peer Panel consisting of individuals from the sponsoring professional associations identified above. This advisory board meets along with the APLU during this association's annual conference. The primary role of the FAEIS Peer Panel is to represent, advocate, and advise FAEIS. Peer Panel provides technical guidance to

The USDA's

FAEIS from its users on data collection, classification, formatting, and access issues. The advisory council provides valuable insight for improvements to FAEIS and recommendations for future reporting purposes. Finally, the Peer Panel serves as an advocate of FAEIS through communication with present and potential user groups across both the public and private sector.

Uses of FAEIS Data

The data that institutions provide to FAEIS are used to answer a wide variety of questions from different constituents. With the focus on agriculture and related sciences, government officials used FAEIS data for the 2008 Farm Bill (Boteler, 2008). Organizations also use FAEIS data for the promotion of legislation to state and federal government. Higher education administrators use FAEIS to learn about student and faculty trends.

"FAEIS data was very helpful for a comparative study of faculty compensation in family and consumer sciences requested by our central administration. The FAEIS data provided comparisons of different types of institutions to support this report. Information was concise, current, and easy to read. The prompt helpfulness of the staff was greatly appreciated." -- Nina Collins, C.C. Wheeler Professor and Chair, Family and Consumer Sciences, Bradley University (personal communication).

"We are trying to get a sense of the ratio of BS/MS/PHD in our 10 peer institutions. FAEIS happens to be very well suited to answer that question." -- Dale Whittaker, Associate Dean and Director of Academic Programs, College of Agriculture, Purdue University (Hunnings, 2009c).

By providing data to FAEIS, institutions enable the USDA to provide reports in response to Congressional inquiries, organizations to impact legislation, researchers to gain scholarship, and institutions to develop benchmark comparisons in a collegial fashion.

The 2008 reporting year marks the best year for FAEIS reporting with a record high 220 colleges and universities providing data. For the first time, 100% of the 1890 land grant colleges reported student survey data, a significant improvement from 2002, when only two of the eighteen 1890 institutions participated. In addition, 100% the 1862 Land-grants, Board of Human Sciences (BOHS), and Schools of Applied Forestry (SAF) institutions reported data.

As of this date, 2009 data is being finalized and will be available from FAEIS. As FAEIS reporting expands, new opportunities, resources and greater reliability of the data will be available to the user.

What FAEIS Can Do For You

Through the report builder feature on the FAEIS web site (<http://faeis.usda.gov/>). FAEIS provides users with the capability to select, filter, and present data exactly as needed, create multidimensional reports, and generate charts and graphs. These results can be downloaded to the user's computer in multiple formats that can be imported into Microsoft Word, Excel, or PowerPoint files. In conjunction, the FAEIS help desk can assist users to generate reports to meet specific needs.

For example, the report builder can generate an enrollment trend graph for peer institutions for an administrative user interested in creating a new undergraduate major in agribusiness example (Figure 1). Report builder can limit the type of data being accessed by a number of variables including but not limited to CIP codes, program areas, years, institution, and institutional type. Individuals that use report builder find this feature useful for conducting trend analysis and for benchmarking purposes.

For a grant writer whose grant focuses on underrepresented student populations, FAEIS can provide data on student diversity, (Figure 2).

For faculty interested in salary comparisons, the FAEIS report builder can generate a comprehensive report that delineates average salaries and headcount by tenure, appointment term, gender, race/ethnicity, and age. Figure 3 provides an example than compares 9 month to 10 month (or more) faculty

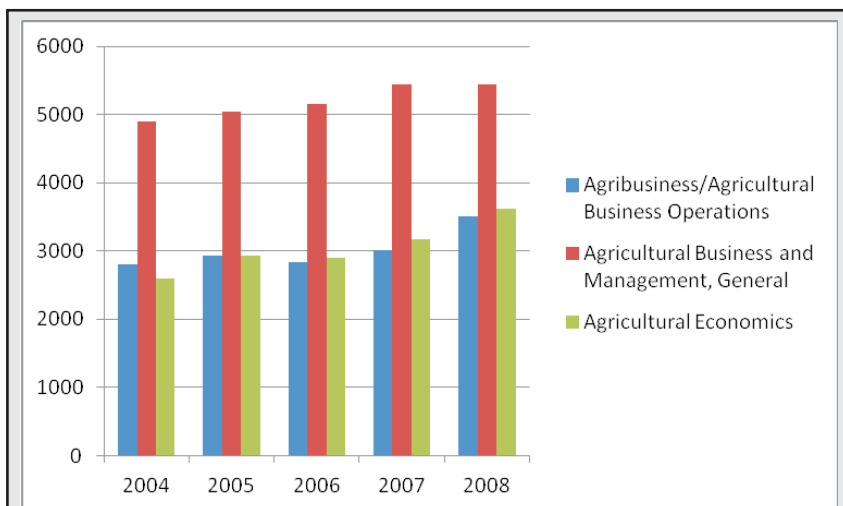


Figure 1. Baccalaureate Enrollment in Agribusiness.

Note: 88 institutions reporting. (The USDA's Food and Agricultural Education Information System, 2009c)

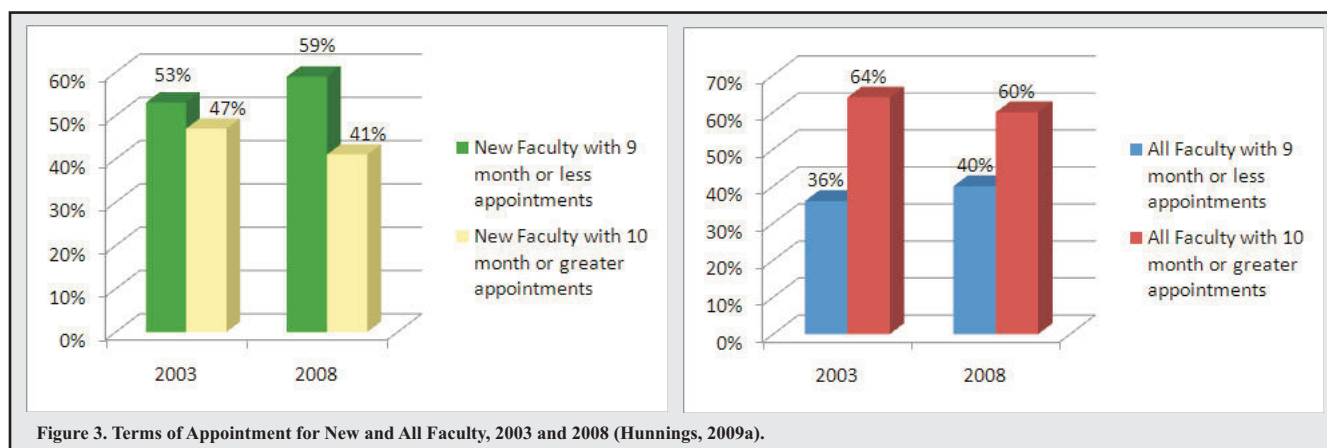
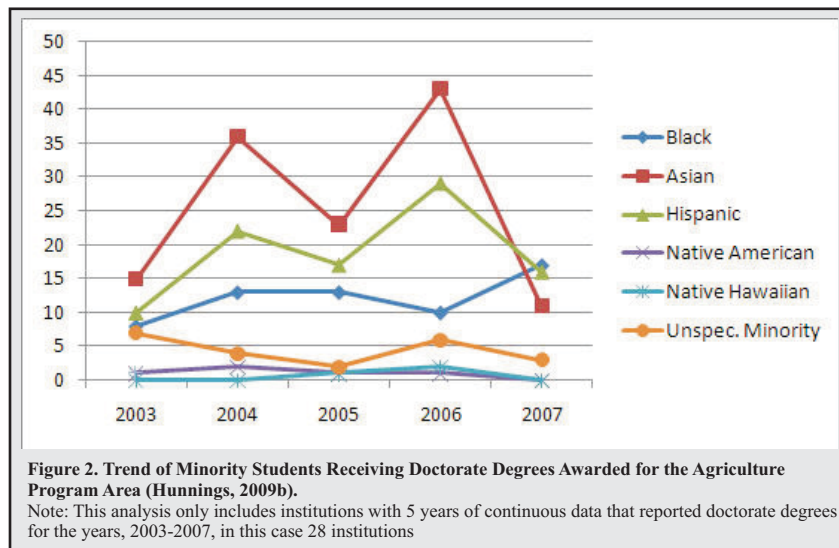
appointments over time for both new faculty hired and all faculty.

As FAEIS Grows ...

Since moving to Virginia Tech in 2001, three new components have been added to FAEIS: 1) the Board of Human Sciences (BOHS) benchmark survey, 2) the International Programs Database, and 3) the USDA Regional Teaching Workshops and Awards Programs website.

The BOHS benchmarking survey was developed at the request of the BOHS and Council of

For marketing, objectives include enhancing and improving the FAEIS website; reaching out to users by participating in conferences and workshops; and identifying non-participating institutions and working with them to foster participation. FAEIS will update its resources to include key information related to agriculture, natural resources, human sciences, and veterinary medicine. Examples include USDA's Resource, Education, and Economics Information System (REEIS) and Higher Education Programs (HEP). By attending national and regional conferences such as NACTA, the FAEIS team provides hands-on workshops on the uses of FAEIS. FAEIS has also reached out to non-participating institutions. Through these steps FAEIS plans to



Administrators of Family and Consumer Sciences. This annual survey serves as a repository for unique benchmarking data for the 50+ institutions that have family and consumer science programs. The International Programs Database (IPD) module was added in 2008 and collects data on students studying abroad, international research and outreach projects, and countries with international programs (Mack et al., 2008; Sutphin, 2008; Marchant et al., 2009).

The USDA Regional Teaching Workshops and Awards website was developed in collaboration with the APLU (www.aplu.org) and NIFA personnel. This site serves as a repository for presentations given at the regional teaching workshops, and highlights national and regional teaching award recipients. The website also links to other teaching resources such as NACTA and pertinent reports such as the National Research Council 2009 report: Transforming Agricultural Education for a Changing World.

In addition to these three new components, FAEIS consistently works to improve and reach out to the higher education community regarding the resources available through FAEIS. For the 2008-2011, FAEIS's objectives include market, enhance its databases, and survey and assess the value of FAEIS.

expand awareness and increase reporting institutions and users.

The FAEIS team is also striving to enhance the BOHS and International Database as well as the regional teaching workshops website. Currently, the FAEIS team is strengthening the BOHS Benchmarking Database and the International Database to provide survey trend results to institutions. The regional teaching workshop website is currently undergoing revisions to provide educators with the most recent teaching presentations from regional workshops.

Summary

FAEIS is a valuable resource for researchers, higher education administrators and faculty, government officials, industry professionals, and the general public in the fields of life, food, veterinary, human, natural resource, and agricultural sciences to use and is best summarized by the following quote:

"It was quite by accident that I found the FAEIS site while researching national degree programs in agriculture. What a treasure! The help desk is outstanding, the data are complete and current, and

The USDA's

the reporting functions are very user-friendly. Clearly, it is the best one stop shop for higher education data. I agree wholeheartedly that FAEIS really is "your best source for getting the 'big picture' on what is happening with enrollment, placement, and faculty salaries."--Marcia Jones, Center for Agribusiness and Economic Development, University of Georgia (Hunnings, 2008).

The hope of the FAEIS team is that we continuously improve our services to users and enhance our relationships with institutions. If you would like to take advantage of FAEIS please explore our website at faeis.usda.gov and contact faeis@vt.edu for an account to use the FAEIS report builder.

Literature Cited

- Boteler, F. 2008. CSREES-USDA Report to FAEIS. FAEIS Peer Panel of Experts Mtg., Chicago, IL.
- Fixsen, D., E. Phillips, M. Wolf. 1972. Achievement place: The reliability of self-reporting and peer-reporting and their effects on behavior. *Jour. of Applied Behavior Analysis* 5(1): 19.
- Fowler, F. 2008. *Survey resource methods*. Thousand Oaks, CA: Sage Publication Inc.
- Hunnings, J.R. 2009a. Terms of appointment for new faculty, 2003 and 2008. FAEIS Newsletter May Edition.
- Hunnings, J.R. 2009b. Trend of minority students receiving doctorate degrees awarded for the agriculture program area. FAEIS Newsletter April Edition.
- Hunnings, J.R. 2009c. Gender comparisons of faculty and students. FAEIS Newsletter March Edition.
- Hunnings, J.R. 2008. Trends in family and human development. FAEIS Newsletter September Edition.
- Mack T.P., M.A. Marchant, H.D. Sutphin, W.W. Richardson, and J.R. Hunnings. 2008. Refinement and improvement of the food and agricultural education information system. FAEIS Peer Panel of Experts Mtg.: Chicago, IL.
- Marchant, M.A., T.P. Mack, H.D. Sutphin. 2009. CRIS Report: Improvement and marketing of food and agricultural education information system. <http://cris.csrees.usda.gov/cgi-bin/starfinder/6864/crisassist.txt>.
- Morgan, R.L. and E.S. Hunt. 2002. *Classification of instructional programs: 2000 Edition*. U.S. Department of Education Institute of Education Sciences. Washington D.C.: National Center for Education Statistics.
- National Research Council. 2009. *Transforming agricultural education for a changing world*. Washington, D.C., National Academy Press.
- Sutphin, H.D. 2008. Global research, extension, and teaching in higher education: The FAEIS international program database. FAEIS Peer Panel of Experts Meeting, Chicago, IL.
- The USDA's Food and Agricultural Education Information System. 2009a. About FAEIS. <http://faeis.ahnrit.vt.edu/about.shtml>.
- The USDA's Food and Agricultural Education Information System. 2009b. FAEIS 2002-2008 FAEIS Surveys-Enrollment and Degrees Chart.
- The USDA's Food and Agricultural Education Information System. 2009c. Report builder. <http://faeis.ag.vt.edu/FAEISRPT.cfm>

Agriculture Courses during Summer School: Community College Students' Interests and Preferences

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Abstract

Forty-eight students currently enrolled at North Central Texas College were asked about factors influencing their decision to enroll in summer school agriculture courses. Identifying significant factors may help educators improve the scheduling and feasibility of summer school courses for both their institutions and students. This study investigated students' levels of interest in agriculture courses during summer school, preferred subject area(s), and delivery format. The results showed that common factors influencing students' choices to attend summer school have changed very little over the past few decades. This study also found that a large percentage of students who had never enrolled in summer school courses were interested in such courses to satisfy one of three current educational goals: associate's degree, core curriculum basics for university transfer, or technical certificate. Additional analyses revealed that many students who were not interested in agriculture summer courses had never enrolled in any non-agriculture summer school courses. Students indicated animal science and equine science as the most preferred subject areas and Monday through Thursday for five consecutive weeks as the most preferred delivery format. Community college educators and administrators should continue investigating students' preferences for summer school agriculture courses and use the findings from this study to evaluate their current course offerings for summer school.

Introduction

Summer school is included in the academic plans of many students at various institutions, including North Central Texas College. Summer courses are offered in a variety of disciplines and delivery formats to accommodate student and faculty schedules. These courses also create opportunities for additional income for both faculty and institutions. This study focused on the preferences of currently enrolled

agriculture students with regard to possible summer school courses offered at North Central Texas College in the agriculture department. Specifically of interest were students' preferred subject areas, delivery format, and factors which might influence their decisions to enroll. A review of the literature did not reveal previous research on agriculture students' preferences for agriculture courses during summer school among community college students. Sample populations in related studies either represented general student populations enrolled in summer school or students enrolled in business classes during a summer school term.

Wayland et al. (2000) stated that a successful summer school program should offer courses that students want and need and an appropriate schedule of those courses. At North Central Texas College, courses selected by administrators for summer terms historically have been part of the institution's core curriculum. Literature suggests that students choose to attend summer school to graduate on time, complete their degrees more quickly, decrease course loads for regular fall or spring semesters, and/or make up course credits (Chandler and Weller, 1995; Keller, 1982; Patterson et al., 1981). Scott (1995) reported that students who enrolled in summer courses had expectations of less time required and that the academic standards were less rigorous than during the traditional academic year.

Very few community colleges offer agriculture courses during summer school. The purpose of this study was to explore students' preferences and expectations of summer school and factors influencing their decision to enroll in agriculture courses. The specific objectives guiding the study were to:

1. Determine the demographics of currently enrolled participating students;
2. Determine students' levels of interest in enrolling in summer school agriculture courses;
3. Determine common factors influencing students' decisions to enroll in a summer school courses; and,

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Agriculture Courses

4. Determine students' preferences with respect to subject areas and delivery formats for agriculture courses which could be offered during summer semesters.

By identifying the needs, wants, and preferences of agriculture students, institutions should be better positioned to meet those needs.

Materials and Methods

For this study, three instructors from the Department of Agriculture at North Central Texas College were asked to distribute paper questionnaires to students enrolled in their courses. All students enrolled in courses taught by these instructors during the spring 2009 semester were asked to complete the questionnaire. Participation was voluntary and no incentives were offered for participation.

The instrument was a 23-item questionnaire created by the researchers. Cronbach's alpha determined instrument reliability at 0.56. An alpha reliability of 0.7 - 0.8 is a generally acceptable value; however, when studying such diverse constructs combined with a small sample, a .56 alpha reliability can be acceptable (Field, 2005). The instrument contained three sections: student demographics, factors affecting the decision to enroll in summer school, and students' preferences for subject area and delivery format. Multiple choice questions were used when inquiring about students' demographics. Students were asked simple yes/no questions about whether they had ever enrolled in and completed summer school courses and whether they would consider enrolling in agriculture courses offered during summer term. Likert-type rating scales were used for the factors influencing decisions to enroll and subject/format preferences.

Descriptive statistics were conducted to describe demographics. Frequencies, measures of central tendency and variability were used to interpret the data.

Results and Discussion

The first objective was to determine the selected demographics for the students in the sample. Demographic data for the sample is summarized in Table 1. The sample included 41 females (85.4%) and seven males. Eighty-three percent of the respondents were between the ages of 18-23. Students were also asked to indicate which of three options (Associate's degree, core curriculum planning for university transfer, or technical certificate) best described their current educational goal. More than one-half (58.3%) of the respondents indicated that their current educational goal was to obtain an Associate's degree, followed by 25% who indicated their current educational goal was to complete basic core curriculum courses in preparation for university transfer. Participants were asked to indicate their current classification at the time of the study. Students in the

sample were divided almost equally between freshmen and sophomores at 41.7% and 50%, respectively.

The second objective sought to measure students' levels of interest in summer school agriculture courses. Twenty-seven (56.2%) of the participants indicated they would be interested in enrolling in an agriculture course if offered during summer school (Table 2). Fifteen of the 48 participants had previously enrolled in a non-agriculture course during a summer school session; 10 of these students (66.7%) indicated that they would consider enrolling in agriculture summer courses if offered. Sixty-three percent (n=17) of students who indicated interest in an agriculture summer school course had never enrolled in any summer courses. Of the 21 students not interested in an agriculture course during the summer, only five had previously enrolled in a summer course.

The decision to enroll in agriculture courses taught during summer school was greatly influenced by the students' current program of study (Table 3). Fifty-nine percent of those interested in taking such a course were pursuing an Associate's degree.

Table 1. Summary of Demographic Characteristics

Characteristic	<i>f</i>	%
Gender		
Female	41	85.4
Male	7	14.6
Age Groups		
18 - 20	26	54.1
21 - 23	14	29.2
24 +	8	16.7
Educational Goal		
Associates Degree	28	58.3
Core Curriculum - Planning to Transfer	12	25.0
Technical Certificate	8	16.7
Classification		
Freshmen	20	41.7
Sophomore	24	50.0
Other	4	8.3

Objective three explored factors influencing students' decisions to enroll in summer school. Students were asked to respond using a three-point Likert-type scale about their reasons for enrolling in summer school. From these responses (Table 4), it was found that students ranked acquiring a head start on their university degree as the most influencing factor ($M=2.8$, $SD=.9$) in their decision to enroll in summer school. Students also indicated that completing their current degrees in shorter time ($M=2.7$, $SD=.7$) and reducing course load during the regular semesters ($M=2.4$, $SD=.8$) were influential in their decisions to attend summer school. This data agrees with the findings of Keller (1982), Chandler

Table 2. Student Interest in Agriculture Course Offerings During Summer School

Interested in enrolling in an Agriculture course if offered during the summer	<i>f</i>	%
YES	27	56.2
Previously enrolled in non-agriculture summer course	10	37.0
Not previously enrolled in non-agriculture summer course	17	63.0
NO	21	43.8
Previously enrolled in non-agriculture summer course	5	23.8
Not previously enrolled in non-agriculture summer course	16	76.2

Table 3. Decision to Enroll in Summer Courses by Current Program of Study

Student characteristic	Total	Associates Degree		Core Curriculum and Planning to Transfer		Technical Certificate	
		<i>f</i>	%	<i>f</i>	%	<i>f</i>	%
Interested in agriculture course(s) during the summer	27	16	59.3	8	29.6	3	11.1
Previously enrolled in non-agriculture course(s) during the summer	15	12	80.0	3	20.0	0	0.0

and Weller (1995), and Patterson et al. (1981). Students were asked if they perceived summer school classes as being academically easier than the same course during regular semesters. Students reported that the perception of summer school as being easier was influential ($M=2.0$, $SD= 1.0$) in their decision to enroll. Scott (1995) also found that

students perceived summer school as being academically less rigorous and that perception influenced their decisions to enroll in summer school.

The fourth objective was to determine the preferred subject area and delivery format for possible summer school agriculture course offerings from those who were interested in agriculture summer school courses. Participants were provided with seven possible subject areas and were asked to rank their choices using a four point Likert-type scale. The options were: animal science, equine science, marketing of agricultural products, introduction to agriculture economics, introduction to agronomy, plant protection and horticulture. The results (Table 5) showed animal science as the most preferred ($M=3.04$, $SD=1.0$) subject, followed by equine science ($M=2.6$, $SD=1.3$), marketing of agricultural products ($M=2.4$, $SD=.9$), and introduction to agriculture economics ($M=2.4$, $SD=.9$). Participants indicated low levels of interest in agronomy, plant protection, and horticulture.

Students were provided with three common summer school delivery formats and were asked to rank their preferences using a four point Likert-type scale (Table 6). The options for delivery were: Monday through Friday for four consecutive weeks, Monday through Thursday for five consecutive weeks, and two days a week for eight consecutive weeks. Students preferred Monday through Thursday for five consecutive weeks ($M=2.4$, $SD=.9$). The least preferred format was two days per week for eight consecutive weeks ($M=2.04$, $SD=1.1$).

Table 4. Factors Influencing Students Decision to Enroll in Summer School

Ranked item	Mean ^A	SD
Plan to attend a university and a summer class will provide me with a head start on my degree	2.8	0.9
To complete degree in a shorter period of time	2.7	0.7
To reduce course load during the regular Fall and Spring semesters	2.4	0.8
Perceive summer courses as being academically easier than Fall or Spring semester courses	2.0	1.0

^A - Scale: one – not influential, two – influential, three – very influential.

Table 5. Student Preference Among Specific Subject Areas

Ranked item	Mean ^A	SD
Animal Science	3.0	1.0
Equine Science	2.6	1.3
Marketing of Agriculture Products	2.4	0.9
Introduction to Agriculture Economics	2.4	0.9
Introduction to Agronomy	1.9	1.0
Plant Protection	1.6	0.9
Horticulture	1.4	0.7

^A - Scale: one – not interested, two – may be interested, three – interested, four = very interested.

Summary

The findings from this study showed that a majority of agriculture students at North Central Texas College were interested in agriculture summer courses; the highest level of interest was in animal science courses. This student interest study may yield positive results for each of the parties involved. Departmental benefits may include: 1) increasing student contact hours without increasing the number of faculty, and 2) alleviating scheduling conflicts among departmental courses during regular semesters. Animal science faculty may benefit from being able to offer summer science courses when climatic

Table 6. Student Preference of Available Summer Term Formats

Ranked item	Mean ^A	SD
Monday through Thursday for 5 consecutive weeks	2.4	.9
Monday through Friday for 4 consecutive weeks	2.4	1.1
Two days per week for 8 consecutive weeks	2.0	1.1

^A - Scale: one – not interested, two – may be interested, three – interested, four = very interested.

Agriculture Courses

conditions may be better suited for field labs. Also, it may be easier for faculty to schedule daylong learning activities requiring travel during summer versus regular semesters. Students may benefit the most from agriculture summer courses. Their benefits may include: 1) reduced student:teacher ratios, 2) completing degree requirements during summer could allow students to complete their degrees in less time and/or enroll in lighter course loads during regular semesters without extending time to graduation, and 3) less scheduling conflicts with other courses during summer semesters could increase the frequency in which students participate in off-campus experiential learning opportunities. Additional studies are needed after summer agriculture courses are offered to investigate if students, faculty, or departments conceptually realized any benefits from the agricultural summer course offerings.

Literature Cited

- Chandler, E.W. and R.D. Weller. 1995. Empirical investigation of student motivations to attend summer school. *Jour. of Marketing for Higher Education* 6(1): 69-86.
- Field, A. 2005. *Discovering statistics using SPSS*. 2nd ed. Thousand Oaks, CA: Sage Publications Ltd.
- Keller, M.J. 1982. Factors influencing students' decisions to attend summer school. *College Student Jour.* 16(4):348-352.
- Kretovics, M.A., A.R. Crowe, and H. Eunsook. 2005. A study of faculty perceptions of summer compressed course teaching. *Innovative Higher Education* 30(1):37-51.
- Patterson, A.M., W.E. Sedlacek, and T.J. Tracey. 1981. Attitudes and characteristics of summer school students. *Southern College Personnel Association Jour.* 3(2):28-34.
- Scott, P.A. 1995. Learning experiences in intensive and semester-length classes: Student voices and experiences. *College Student Jour.* 29:207-213.
- Wayland, J.P., E.W. Chandler, and R.F. Wayland. 2000. Summer scheduling on a traditional campus: Expectations, reality, and implications. <http://www.sbaer.uca.edu/research/swma/2000/48.pdf>. Accessed March 17, 2009.



Do Students Have Fixed Classroom Perceptions?¹

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Abstract

The importance of expectations and lack of change in student evaluation of teaching scores are key criticisms of the evaluation instrument even though prior research shows students are able to separate expectations from the final evaluation. Our research shows significant changes do occur when results are segregated by course division level. Those changes are often small, one-unit positive or negative changes from initial student perceptions leading to an average score reflecting no change. Nearly half of students change their overall instructor appraisal across the semester.

Introduction

Students' evaluations of teaching are a common practice at institutions of higher education throughout the U.S. although the importance placed on results varies by institution. The importance placed upon the Student Evaluation of Teaching (SET) reflects the debate over whether evaluation scores accurately reflect the course experience and the persistence of expectations in determining the final evaluation. The validity of the SET is often questioned in the SET literature as a result of the belief that students form lasting opinions of instructors with only limited interaction.

Merritt argues that evaluations measure snap judgments that occur at the beginning of the semester. For teaching faculty throughout the agricultural disciplines whose SET scores are a part of the review, promotion, and tenure decision, a bad first impression could persistently plague the instructor as negative expectations would develop among current and future students. Faculty with primarily extension appointments would face a similar situation when working with producers even though a formal evaluation instrument may not be involved. If snap judgments are being recorded through SET and other evaluation measures, then the procedure is measuring perceptions of what the audience believes will occur and not what did occur.

The SET literature is full of analyses that conclude that expectations affect SET, but the question remains, "Does a change occur in the individual evaluation?" Statistically significant changes may occur when evaluations are disaggregated into upper and lower course divisions. Simply evaluating the means of course or instructor appraisal would mask shifts in the individual student scores. Overall instructor and course appraisal are reflective of specific characteristics that students perceive and changes in these underlying characteristics would alter final ratings of instructor and course appraisal. This study includes an analysis of the differences and similarities of these specific SET characteristics (for example, instructor presentation of material) between initial and final student evaluations with respect to both the instructor and the course. Our research is not designed to provide an alternative to the SET, but rather to use the SET to better understand how perceptions of student engagement and learning change over the course of the semester.

Background

The role of students' evaluations as measures of instructor effectiveness has an extensive history of research in the United States, with nearly 2,000 published studies (Wilson, 1998). Regardless of the debate on the appropriateness of the SET as a measure of teaching quality, the SET is a tool for students to express their views on instructors and courses. Previous experiences shape the student's view of instruction and the lack of a broad educational experience, especially in lower division courses, results in lower validity of the evaluation instrument (McKeachie, 1997). As a result, comparison of the SET cannot be made across disciplines or levels (such as graduate versus undergraduate or lower division courses versus upper division courses).

Merritt (2008) states that standard SET are constructed to rely on instinctive judgments that can be formed with as little as five minutes of interaction

¹The authors express their gratitude for the comments of three anonymous reviewers. All errors are those of the authors.

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Do Students

with the instructor. Widmeyer and Loy (1988) find that terms such as “warm” and “cold” to describe a guest lecturer impacts how an audience perceives and evaluates that lecturer at the conclusion of the lecture. This is consistent with persons holding to initially formed hypotheses and misinterpreting new information to support initial perceptions (Rabin and Schrag, 1999). Instructor ratings from students with *a priori* knowledge of the instructor are no more consistent than those with limited or no *a priori* knowledge (Kohlan 1973). Kohlan suggests this may reflect that students gain little new information on the ability of the instructor following initial class meetings.

Pruitt, Dicks, and Tilley (2009) find that perceptions of instructors are most impacted by “presentation of material,” for both upper and lower division courses. “Ability to explain subject matter” and a “positive attitude toward students” were also important to students in upper division courses. The “instructor's effort devoted to teaching” is also important to students in lower division courses. Perceptions of the course at the beginning of the semester were impacted most by the degree to which the individual felt the course was worthwhile for both lower and upper division courses. Other significant factors for both course divisions were perceptions about testing and evaluation procedures and if students were adequately involved in the course. These findings are consistent with Remedios and Lieberman's (2008) findings that courses perceived to be stimulating, interesting, and useful, largely determine course ratings. Remedios and Lieberman (2008) find that grades, study hours, and perceived difficulty do have a small impact on ratings.

The stability of student ratings across time is well documented (Bejar and Doyle, 1976; Costin et al., 1971; Frey, 1976; Merritt, 2008; Wetzstein et al., 1984) in the SET literature. Costin et al. (1971) note that faculty members' peer evaluations of an instructor vary across time whereas the corresponding student ratings are stable. Frey (1976) concludes that results are not “reliably different” when a subgroup of the class completes the SET at the end of a semester and another subgroup completes the SET during the first week of the following term.

Bejar and Doyle (1976) find expectations and evaluations are similar, but students are able to separate their expectations from the SET. Students in their research did not know the identity of the instructor as the pre-evaluation was administered prior to the students seeing the instructor. Wetzstein et al. (1984) compare the pre- and post-evaluations of a professor with a teaching reputation and a graduate student instructor with no teaching reputation. Using a Bayesian method, the authors conclude that the graduate student outcores the professor on the end of semester SET. Larger standard deviations are observed in the pre-evaluation than the post-evaluation which is consistent with Kohlan (1973).

Conceptual Model

Students evaluate their instructors and courses on several different factors. Merritt (2008) suggested that students form expectations (opinions) of both courses and instructors prior to the first day of class or within the first course meetings. These expectations may be formed from input from other students, websites, professors, and/or advisors in addition to the student's own prior interaction with the instructor. These factors are in addition to the learning process students develop over their educational experiences (McKeachie, 1997).

Actual experiences in the classroom may or may not alter the student's perceptions of the course and/or instructor. No change in the student ratings indicates that information obtained from various sources regarding the instructor/course is consistent with actual experiences, that is, the expected utility from the course $E(U_{initial})$ is equal to the actual utility received $E(U_{final})$. Due to the finding of Bejar and Doyle (1976) that expectations and final evaluations are consistent, but not the same, we ask if divergence occurs between expectations and actual experience?

The hypothesis is that students' experiences in the classroom and with the instructor are consistent with the expectations formed prior to taking the course and perceptions developed in the first few course meetings. More succinctly, (1) $\Delta E(U) = E(U_{final}) - E(U_{initial}) = 0$.

The expected utility is observed for both the overall instructor and course appraisal. The design of the SET provides specific questions related to the instructor that focus the student's mind on instructor performance prior to asking the student to appraise the overall performance of the instructor. A similar pattern is followed for questions related to the course.

Data

Students in twenty-two courses in the College of Agricultural Sciences and Natural Resources (CASNR) participated in this research. Classes with students participating were from the departments of animal science, agricultural economics, agricultural communication, education, and leadership, plant and soil science, horticulture, and natural resource ecology and management. Of the twenty-two courses, one course was being offered for the first time by a full professor and one course was being taught by a graduate instructor for the first time. Two freshmen, four sophomore, nine junior, and seven senior level courses were used. Seventeen instructors participated with nine of those being full professors. Of the remaining instructors, two were associate professors, five were assistant professors, and one was a graduate student instructor.

Evaluations were completed within the first two weeks of the fall 2007 semester with evaluation time being determined by the instructor to allow for the least amount of intrusion to the instructor. As a

reviewer noted, this time span may impact initial perceptions, but an instructor's desires to have (freshmen) course rosters and logistics settled before the first instructional period led to a wider variation in the date of the initial SET than desired. The final round of evaluations was conducted from November 15th through December 7th. Students, on average, completed the questionnaire in fifteen minutes at both points in the semester.

An informational cover sheet was included that listed the title of the research, a student's rights as a research volunteer, instructions on how to determine their individual identification code, and a statement that the research would occur twice in the semester. The individual identification code is used to match responses at the beginning with those at the end of the semester while maintaining anonymity and confidentiality. The code number is a five digit alphanumeric code based on information known only to the student. The first digit is the first letter of the high school where the student graduated. Digits two and three are the student's birth month (January is 01, February as 02, and so forth) with the final two digits being the last two digits of the student identification number. The informational cover sheet also indicated the confidentiality of all responses including the fact that instructors would not see the results until after grades had been submitted.

A total of 867 evaluations were collected at the beginning of the semester and 897 evaluations were collected at the end of the semester. A total of 423 evaluations were successfully matched by identification code number from earlier in the semester. Sixty-two percent of respondents whose SET were matched

were females compared to 47% of persons who completed the initial SET. Students majoring in a field contained in CASNR accounted for approximately 95% of responses. Eighty percent of respondents reported the course was required and students with junior standing were the mean class.

Results

Aggregation of all matched responses for mean overall instructor appraisal shows no statistical difference between the beginning and end of the semester. However, statistically significant changes do occur when responses are segregated by course division. Comparison of means by a pooled means test for upper and lower division courses are included in Tables 2 and 3, respectively. Statistically significant decreases in the mean overall appraisal of instructors occur in upper division courses while statistically significant increases in lower division courses occur. For students in upper division courses, two of the factors related to the instructor show a statistically significant increase (*Knowledge and Attitude*) and two show a significant decrease (*Presentation and Explain*) compared to four statistically significant increases for students in lower division courses. This suggests that students are perceptive of difference in specific instructor and course factor characteristics. Changes in factor characteristics in turn alter the way students perceive overall instructor and course appraisal. For example, the decline in overall instructor appraisal among students in upper division courses may be a result of the student's perception of the decline in ability to explain and present material.

Presentation of material is the leading factor that determines differences in perceptions of initial instructor appraisal (Pruitt, Dicks, and Tilley, 2009) and the decline of this characteristic likely impacted the overall instructor appraisal score.

Statistically significant differences in means were found for all course characteristics in both upper and lower division courses. This is largely due to students having the option of rating a course characteristic as undecided or not applicable. Undecided or not applicable responses were grouped together at the beginning of the semester and treated as being in the middle of the rating scale. The "not applicable" option was included on the final SET, but responses that marked this option were treated as non-responses at the end of the semester due to the presence of the undecided option.

Observed standard deviations increase with many of the collected factors and factor characteristics which stands in contrast to the findings of Wetzstein et al. (1984). The majority of instructor and course characteristics largely see increases in standard deviations across the semester and may be par-

Table 1. Questions on University Student Evaluation of Teaching Form

Variable Name	Question
Instructor Variables	
<i>Preparation^a</i>	Preparation and effort
<i>Teaching Effort^a</i>	Effort devoted to teaching
<i>Presentation^a</i>	Presentation of material
<i>Knowledge^a</i>	Knowledge of subject
<i>Explain^a</i>	Ability to explain subject matter
<i>Attitude^a</i>	Positive attitude toward students
<i>Instructor Overall^f</i>	Overall INSTRUCTOR appraisal
Course Variables	
<i>Workload^b</i>	The workload is appropriate for the hours of credit
<i>Assignments^b</i>	Assignments are relevant and useful
<i>Tests^b</i>	Testing and evaluation procedures are good
<i>Involve^b</i>	Students are adequately involved
<i>Worthwhile^b</i>	This course is worthwhile to me
<i>Course Overall^b</i>	Overall, this is a GOOD course

^a Options were Very High, High, Average, Low, or Very Low.

^b Options were Definitely Yes, Yes, Undecided, No, Definitely No, or Not Applicable.

Do Students

Table 2. Comparison of Means for All Collected Questionnaire Types for Upper Division Courses

Variable	Matched initial			Matched final	
	Range	Evaluations		Evaluations	
		Mean	Std Dev	Mean	Std Dev
Instructor Characteristics^z					
<i>Preparation</i>	0-4	3.41	0.71	3.51	0.74
<i>Teaching Effort</i>	0-4	3.49	0.65	3.57	0.70
<i>Presentation</i>	0-4	3.52	0.62	3.26*	0.95
<i>Knowledge</i>	0-4	3.26	0.78	3.60*	0.73
<i>Explain</i>	0-4	3.59	0.58	3.38*	0.92
<i>Attitude</i>	0-4	3.41	0.71	3.65*	0.66
<i>Instructor Overall</i>	0-4	3.65	0.55	3.54*	0.74
Course Characteristics^y					
<i>Workload</i>	1-5	3.83	0.77	4.27*	0.78
<i>Assignments</i>	1-5	3.83	0.78	4.29*	0.82
<i>Tests</i>	1-5	3.54	0.73	4.20*	0.93
<i>Involve</i>	1-5	4.00	0.72	4.40*	0.71
<i>Worthwhile</i>	1-5	4.00	0.81	4.25*	0.95
<i>Course Overall</i>	1-5	3.90	0.79	4.34*	0.86

^z Very low is 0, Low is 1, Average is 2, High is 3, and Very High is 4.
^y Definitely No is 1, No is 2, Undecided/Not Applicable is 3, Yes is 4, and Definitely Yes is 5.
 *Mean is significantly different from corresponding mean in matched initial evaluation column at the 5% level

Table 3. Comparison of Means for All Collected Questionnaire Types for Lower Division Courses

Variable	Matched initial			Matched final	
	Range	Evaluations		Evaluations	
		Mean	Std Dev	Mean	Std Dev
Instructor Characteristics^z					
<i>Preparation</i>	0-4	3.21	0.75	3.56*	0.60
<i>Teaching Effort</i>	0-4	3.34	0.74	3.65*	0.55
<i>Presentation</i>	0-4	3.23	0.74	3.31	0.77
<i>Knowledge</i>	0-4	3.05	0.80	3.75*	0.49
<i>Explain</i>	0-4	3.50	0.73	3.47	0.70
<i>Attitude</i>	0-4	3.21	0.750	3.64*	0.64
<i>Instructor Overall</i>	0-4	3.32	0.83	3.59*	0.61
Course Characteristics^y					
<i>Workload</i>	1-5	3.41	0.62	4.24*	0.67
<i>Assignments</i>	1-5	3.40	0.62	4.24*	0.72
<i>Tests</i>	1-5	3.22	0.53	4.13*	0.86
<i>Involve</i>	1-5	3.48	0.67	4.21*	0.67
<i>Worthwhile</i>	1-5	3.59	0.69	4.14*	0.87
<i>Course Overall</i>	1-5	3.56	0.67	4.28*	0.81

^z Very low is 0, Low is 1, Average is 2, High is 3, and Very High is 4.
^y Definitely No is 1, No is 2, Undecided/Not Applicable is 3, Yes is 4, and Definitely Yes is 5.
 * Mean is significantly different from corresponding mean in matched initial evaluation column at the 5% level

tially the result of the period of time in which final SET were collected. Increased standard deviations reflect the changes in scores of instructor and course appraisal as well as factor characteristics by the individual student. Although additional instructional periods and graded assignments could impact the results seen for course characteristics, the ability of the instructor to influence students' ability to learn and provide an experience different from the expectation does occur. Kohlan (1973) states that little new information about the instructor is gained after the initial course meetings, but this lack of new information does not mean that students are not interpreting the information in a different manner.

Cross tabulations are calculated for course and instructor variables and shown in Tables 4 and 5 (initial ratings are in the rows with final ratings in the columns). These tables show the distribution of changes by direction and magnitude of the change which illustrate why standard deviations increase while the means of collected variables show sometimes statistically insignificant changes. Note that only a small percentage (less than 5%) of the students use below average evaluations and almost all of the below average ratings were observed at the end of the semester. Of the 234 evaluations collected in upper division courses, 50 students decrease their overall instructor appraisal rating, 32 increase their instructor appraisal, and 152 do not change. In lower division courses, 29 students decrease their overall instructor appraisal, 62 increase instructor appraisal, and 98 do not change among 189 observations. For overall course appraisal in upper division courses, 30 students decrease their ratings, 102 students increase their opinion, and 100 exhibit no change of overall course appraisals. Overall course appraisal in lower division courses had 14 students decrease their ratings, 119 increased their ratings, and 54 students exhibited no change.

The majority of changes shown in Tables 4 through 7 are one unit changes in either direction although larger changes are observed for course appraisal due to the presence of the undecided/not applicable option at the beginning of the semester. When graphed, the changes that do occur approximate a normal distribution which results in the charge that SET are constant throughout the semester. The rating may not change, but as Bejar and Doyle (1976) show,

Table 4. Cross Tabulation of Overall Instructor Appraisal across the Semester in Upper Division Courses

		End of Semester					Total
		Very Low	Low	Average	High	Very High	
Beginning of Semester	Very Low	0	0	0	0	0	0
	Low	0	0	0	0	0	0
	Average	0	1	3	1	4	9
	High	0	1	10	25	27	63
	Very High	1	1	7	29	124	162
	Total	1	3	20	55	155	234

Note: The question stated "Overall INSTRUCTOR appraisal"

Table 5. Cross Tabulation of Overall Course Appraisal across the Semester in Upper Division Courses

		End of Semester					Total
		Definitely No	No	Undecided	Yes	Definitely Yes	
Beginning of Semester	Definitely No	0	0	0	0	0	0
	No	0	0	0	0	0	0
	Undecided/Not Applicable	2	7	12	31	34	86
	Yes	0	1	8	38	37	84
	Definitely Yes	0	1	0	11	50	62
	Total	2	9	20	80	121	232

Note: The question stated "Overall this is a GOOD course"

Table 6. Cross Tabulation of Overall Instructor Appraisal across the Semester in Lower Division Courses

		End of Semester					Total
		Very Low	Low	Average	High	Very High	
Beginning of Semester	Very Low	0	0	0	0	2	2
	Low	0	0	0	3	0	3
	Average	0	1	0	6	16	23
	High	0	1	0	30	35	66
	Very High	0	1	3	23	68	95
	Total	0	3	3	62	121	189

Note: The question stated "Overall INSTRUCTOR appraisal"

Table 7. Cross Tabulation of Overall Course Appraisal across the Semester in Lower Division Courses

		End of Semester					Total
		Definitely No	No	Undecided	Yes	Definitely Yes	
Beginning of Semester	Definitely No	0	0	0	0	0	0
	No	0	1	0	0	0	1
	Undecided/Not Applicable	2	2	5	50	39	98
	Yes	0	2	2	37	30	71
	Definitely Yes	0	0	1	5	11	17
	Total	2	5	8	92	80	187

Note: The question stated "Overall this is a GOOD course"

this does not mean that expectations are equal to the final evaluation.

Conclusions

Expectations are important in obtaining student engagement and determining the final student evaluation of teaching, but those expectations are not always equal to actual experiences of students as measured by the SET. As found in Bejar and Doyle (1976), we find significant differences between expectations measured early in the semester and later in the semester. These changes become apparent when viewed by course division level as opposed to aggregation of all matched responses. Final evaluation scores do reflect the expectations and perceptions a student begins the semester with, but ability of the instructor and course content does change the student's thinking as reflected on the end of semester SET. Students in upper division courses tend to decrease their evaluations of the instructor while students in lower division courses tend to increase their evaluations of the instructor.

Analysis of the means and standard deviations collected for course and instructor appraisal as well as their related factor characteristics, masks the large number of students who change their responses over the course of the semester. The numbers of students who change their instructor and course appraisal scores exceed those that do not, indicating a difference between expectations and actual performance of course and instructor. This suggests that instructors do have influence on students' ability to learn and leads to students having an actual experience that is different from their previously held expectation.

Changes in factor characteristic scores show significant changes across the semester indicating that students are perceptive of differences and will not hold to their original expectation of a specific factor characteristic. Changes in perceptions about a specific factor characteristic can certainly lead to changes in overall instructor or course appraisal. Statistically significant decreases in the mean score of presentation of material by an instructor in upper division courses as the semester progresses suggests that as material becomes more difficult through a semester, instructors should alter the manner of their presentation to find new ways to connect with students. Students in those upper division courses do not see an increase in the effort devoted to teaching as the semester progresses, and this may be nega-

Do Students

tively impacting the presentation of material score. Students in lower division courses do see a difference in effort devoted to teaching across the semester and although the presentation of material does not change, overall instructor appraisal does see an increase.

When a student enters a classroom, the previous educational experiences also enter and shape the perceptions of that student. Students with poor expectations for the instructor and the course may be less engaged and perform at a lower level than students with higher expectations. Other factors shape expectations, especially of items the students would not have experience with such as course exams and assignments. The lack of experience with course exams and assignments does not prevent students in upper division courses from expressing a perception or expectation on these items. In our data, the mean rating is closer to 4 (agreeing with appropriate evaluation instruments) as opposed to being neutral or undecided (a rating of 3). In lower division courses, the initial ratings were more neutral or undecided. How these expectations are being formed should be a topic of future work since Pruitt et al. (2009) found that recommendations from friends, professors, and websites often have little explanatory power (specifically on presentation of material, effort devoted to teaching, and the worth of the course).

Each instructor needs to carefully evaluate, throughout the semester, those changes in perceptions as this research documents, students can be negatively or positively impacted by what occurs in the classroom. Some of these perceptions can be managed while still expectations, that is, prior to any contact by the student with the instructor and course. The SET literature possesses many ways to alter these perceptions (Merritt, 2008; Wilson, 1998) although caution should be used as these strategies may not improve student learning.

Although this research does shed light on changes that do occur from initial perceptions and expectations of students on instructor and course characteristics, the underlying factors that lead to these changes are not understood and should be a course of future research. Remedios and Lieberman (2008) do indicate that stimulating courses that are interesting and useful largely determine course ratings and would likely impact the appraisal of the instructor.

Literature Cited

- Bejar, I.I., and K.O. Doyle. 1976. The effect of prior expectations on the structure of student ratings of instruction. *Jour. of Educational Measurement* 13(2):151-54.
- Costin, F., W.T. Greenough, and R.J. Menges. 1971. Student ratings of college teaching: Reliability, validity, and usefulness. *Rev. of Educational Research* 41(5):511-35.
- Frey, P.W. 1976. Validity of student instructional ratings: Does timing matter? *Jour. of Higher Education* 47(3):327-36.
- Kohlan, R.G. 1973. A comparison of faculty evaluations early and late in the course. *Jour. of Higher Education* 44(8):587-595.
- McKeachie, W.J. 1997. Student ratings: The validity of use. *American Psychologist* 52(11):1218-1225.
- Merritt, D.J. 2008. Bias, the brain, and student evaluations of teaching. *St. John's Law Rev.* 82(4):235-87.
- Pruitt, J.R., M.R. Dicks, and D.S. Tilley. 2009. Determinants of students' first impressions of instructors and Courses. *NACTA Jour.* 53(3):24-36.
- Rabin, M. and J.L. Schrag. 1999. First impressions matter: A model of confirmatory bias. *Quarterly Jour. of Economics* 114(1):37-82.
- Remedios, R. and D.A. Lieberman. 2008. I liked your course because you taught me well: The influence of grades, workload, expectations, and goals on students' evaluations of teaching. *British Educational Research Jour.* 34(1):91-115.
- Wetzstein, M.E., J.M. Broder, and G. Wilson. 1984. Bayesian inference and student evaluations of teachers and courses. *Jour. of Economic Education* 15(4):40-45.
- Widmeyer, W.N. and J.W. Loy. 1988. When you're hot, you're hot! Warm-cold effects in first impressions of persons and teaching effectiveness. *Jour. of Educational Psychology* 80(1):118-21.
- Wilson, R. 1998. New research casts doubt on value of student evaluations of professors. *The Chronicle of Higher Education* January: A-12-14.

Students Knowledge and Attitudes towards Agricultural Shows and Fairs in Botswana

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Abstract

This paper examined knowledge and attitudes towards agricultural shows and fairs among secondary school students in Botswana. A simple random sampling technique was used to select three schools and 60 students from the selected schools. The results show that many students are females (53.3%) enrolled in secondary schools, between 14 to 16 years of age (73.3%), aware and had visited agricultural shows and fairs (51% and 78.3%) respectively. There is a significant relationship between knowledge and attitude ($r = 0.34$, $p < 0.05$, df_{58}). It is important therefore that the education objectives of agricultural shows and fairs be made more prominent and realistic.

Keywords: knowledge, perception, agricultural shows and fairs, youth, career

Introduction

Botswana is an arid country in which less than 5% of the land area is cultivable and irrigated crop farming has proved difficult to promote. Cattle ranching have been the most prominent enterprise and have skewed agricultural income distribution in favor of large commercial farmer. Livestock remains the focus of traditional and modern agricultural sector, with four-fifths or more of the population dependent on these activities (Ministry of Agriculture (MoA) 2007). Beef processing accounts for around 80% of agricultural output, and more than 95% of beef output is exported. Food-crop production covers less than one-third of consumption, even in drought free years (MoA, 2009). Kanaimba (2009) noted that great priority should be placed on agricultural sector due to its strong backward and forward linkages with the rest of the economy. Purushothaman et al. (2003) concluded that the success of agricultural development in developing countries largely depend on nature and extent at which mass media mobilization has been adopted. Radio and television have been acclaimed to be effective media for mobilization of people and dissemination of agricultural information. The revolution of Information Communication Technology (ICTs) has introduced many other media especially in urban centers.

Presently in Botswana, most families reside in urban, suburban cities and communities which have made most children removed from farms and agriculture in general. Most youth lack knowledge on agriculture and have a narrow perception of associated career opportunities. Among many reasons, agricultural shows and fairs was introduced to promote agriculture among future generation. These are learning events which are mostly experiential and consist of exhibitions mounted by volunteers from various fields of agricultural production. The event features many educational stations displaying and demonstrating animals, equipment, plants products and how they were manipulated to bring high productivity. The national agricultural show is an initiative that gives the ministry, farmers and stakeholders the opportunity to showcase their products, latest technologies and models of good practices for possible replication (MOA, 2009). In Botswana, agricultural fairs and shows take place annually, starting at district levels before they are held nationally in Gaborone.

Fairs bring children out of classroom; allow the community opportunity to educate them about agriculture and are designed to teach youth its linkage to social, economic, and environmental factors. Blackburn et al. (1995) and Blackburn (1999) documented that youth participating in agricultural fairs gained knowledge. Boleman and Burrell Jr. (2003) stated that Dallas County has a long history of developing, coordinating, and implementing agricultural awareness activities for young people through agricultural fairs referred to as farm day. Students were brought from metropolis, exposed to agricultural practices and illustrating how it influences and touches young people's daily lives. Agricultural educators built their entire educational programs on the philosophical foundation of experiential learning and commonly describe their instruction as practical, applied, and hands-on (Neil, 2003). Experiential learning through events such as agricultural fairs has various dimensions such as real experience, concrete experience, reflective thinking, observational learning, abstract conceptualization, active experimentation and teacher-as-facilitator (Herbert, 1995).

According to Boud and Miller (1996) the distinguishing feature of experience-based learning is that it comprises earlier events in the life of the learner,

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Students Knowledge

current life events, or those arising from the learner's participation in activities implemented by teachers and facilitators. Cheek et al. (1994) described experiential learning as practicing in a real situation, modeling appropriate behaviors and procedures, receiving appropriate feedback and reinforcement, and providing opportunities to apply knowledge in new situations. Experiential learning increases critical thinking and empowers students with greater responsibility after being engaged in activities or events that left them being equipped with experience due to prior knowledge.

Oladele (2010) reported that in Botswana, there has been less emphasis on agricultural education in primary and secondary curricula. This makes it difficult for student to take agricultural based careers hence development of negative attitudes towards agriculture due to lack of knowledge. Attitude has been reported to be central in assessing perceptions, as it consists of affective- an individual's feelings about the attitude object; cognitive - an individual's belief or knowledge about the attitude object; and behavioral- an individual's predisposition to act towards the object in a particular way (Steele, 1997).

Agricultural shows and fairs have been on for several years and it is getting a lot more expanded with the consignment demand on resources such as time, space, human, and money. The question is: Do agricultural shows and fairs fulfill their educational role? The objective of the study was to determine students' knowledge and attitudes toward agricultural shows and fairs. The specific objectives were to identify students' demographic characteristics, assess students' knowledge towards agricultural shows and fairs and determine student attitudes about agricultural shows and fairs

Materials and Methods

The study was conducted among secondary school students in Gaborone, the capital of Botswana, where national agricultural shows are held every year. The target population was all students of agricultural science in Junior Secondary Schools

(JSS) and Senior Secondary Schools (SSS). From 17 JSS and four SSS available, simple random sampling was used to select two JSS and one SSS. From each school, 20 students were selected randomly out of available 100 students to give a total sample size of 60 respondents.

A structured questionnaire designed based on review of literature and objectives of the study was used to collect data on personal characteristics, knowledge and attitude towards agricultural shows and fairs. Knowledge was operationalized on a 2 point scale of True or False for 19 items. Students' attitudes towards agricultural shows and fairs consist of 19

Table 1. Gender, Age, Awareness, and Visitation to Agricultural Shows by Students

Variables	Frequency	Percentages
Gender		
Male	28	46.7
Female	32	53.3
Age		
14 -16	44	73.3
17- 20	16	26.7
Visited agricultural shows and fairs		
No	13	21.7
Yes	47	78.3
Awareness of agricultural shows and fairs		
Yes	31	51.7
No	29	48.3

Table 2. Knowledge about agricultural shows and fairs*

Knowledge about agricultural shows and fairs	TRUE F (%)	FALSE F (%)
Agricultural shows and fairs are beneficial to students.	60(100)	
Agricultural training videos (VCD and DVD) were given out during fairs.	52(86.7)	8(13.3)
Agricultural shows and fairs meet educational needs of students	59(98.3)	1(1.7)
Agricultural shows describes linkages between farming, social, economic, health and environment	48(80)	12(20.0)
Agricultural shows and fairs enhance students understanding in agriculture.	56(93.3)	4(6.7)
Agricultural shows and fairs supplement curriculum through real life experience.	56(93.3)	4(6.7)
Organic agriculture was displayed during agricultural shows and fairs	59(98.3)	2(3.4)
Computerized equipment were displayed during agricultural shows	57(95)	3(4.7)
Career prospects and opportunities were displayed during agricultural shows	49(89.7)	10(16.7)
Agricultural shows and fairs include young farmers competition	58(96.7)	2(3.3)
Agricultural shows encourage farmers to engage on agricultural business.	53(86.7)	8(13.3)
Agricultural shows and fairs demonstrate agro-tourism.	56(93.3)	4(6.6)
Awards and prizes were given to farmers during agricultural shows and fairs	51(85)	9(15.0)
Indigenous practices were displayed in agricultural shows and fairs.	42(70)	18(30.0)
Agricultural shows and fairs include educational exhibitions.	57(95)	3(5.0)
Agricultural shows and fairs support local agriculture through direct sales	57(95)	3(5.0)
Agricultural shows and fairs create opportunity for networking.	58(96.7)	2(3.4)
Processing techniques were displayed during agricultural shows and fairs	56(93.3)	4(6.7)
Agricultural shows and fairs educate on current policy programs and projects	56(93.3)	4(6.7)

*Figures in parenthesis are percentages

Table 3. Attitude towards Agricultural Shows and Fairs

Attitudinal statements	Mean	SD
Learning more about agricultural shows and fairs helps me understand future changes in agricultural production	4.16	1.15
Politics has a major effect on agricultural shows and fairs.	2.68	1.26
Agricultural shows and fairs help to know more about agricultural industry.	4.30	0.99
It is important to know how agriculture is practiced and affects local community.	4.41	0.92
Agricultural shows and fairs are a waste of time	1.33	0.85
Agricultural shows helps student on hands-on experience	4.01	1.37
Agricultural shows and fairs are of less importance especially for people who live in the city.	1.95	1.34
Agricultural shows and fairs are relevant student learning process	3.76	1.39
Agricultural shows and fairs leave you as a student with an agricultural awareness and appreciation especially in the world of work.	4.20	1.17
Farmers should be aided with the government so as to excel well in shows and fairs, so as to bring quality products and material.	4.40	0.96
High breed of cattle and vegetable products should be displayed in shows and fairs	4.11	1.36
Agricultural shows and fairs are the main activities that bring about production and should be given a better priority.	4.13	1.15
Young people should participate in agricultural shows and fairs in large numbers.	4.53	0.91
Fairs and shows educate people on the operations of agricultural development programs	4.56	0.89
Students should be obliged to attend Agricultural shows and fairs to enhance their agricultural awareness.	3.98	1.18
Agricultural teachers should be included in the planning agricultural shows and fairs so as to pass the knowledge to students.	4.55	0.94
Agriculture touches my life everyday therefore there is need for agricultural activities such as shows and fairs to exist annually.	4.23	1.09

items; anchored on 5-point Likert scale of Strongly agree (5), Agree (4), Undecided (3), Disagree (2), and Strongly disagree (1), which were reversed for negative statements. The questionnaire was face validated by Lecturers from the Department of Agricultural Economics, Education and Extension in Botswana College of Agriculture and has a reliability coefficient of 0.92. Data were analyzed with Statistical Package for Social Sciences (SPSS) version 16 using frequency counts, percentages and correlation analysis.

Results and Discussion

Table 1 shows frequency counts and percentages on gender, age, awareness and visitation to agricultural shows by students. About 53% of the students interviewed for the study are females. This agrees with the findings of Hulela (2009) who reported that there was more female enrollment at primary and secondary schools in Botswana. In terms of age, 73.3% of the students are between 14-16 years old. Thobega (2010) reported that the modal age category of students in secondary school was 14-17 years.

About 52% of the students are aware of agricultural shows and fairs. This may be attributed to the intensity of publicity given to agricultural shows over

the media by Ministry of Agriculture. Similarly, majority of the students (78.3%) visited agricultural shows and fairs. This may be due to the educational importance attached to agricultural shows and fairs and the curiosity of students to be acquainted with agricultural issues in the country. It may also be as a result that some agriculture science teachers often plan excursions to agricultural shows as one of their activities to engage their students and supplement their learning experiences.

From the list of 19 items on knowledge of agricultural shows and fairs in Table 2, students were more knowledgeable on items such as agricultural shows and fairs are beneficial to students (100%), agricultural shows and fairs meet educational need of students (98.3%), organic agriculture was displayed during agricultural shows and fairs (98.3%), agricultural shows and fairs creates opportunity for

networking (96.7%) and agricultural shows and fairs include young farmers competition (96.7%). Blackburn (1999) noted that students who participated in agricultural shows and fairs became more knowledgeable about agriculture.

Table 3, shows a list of 15 statements about students attitudes towards agricultural shows and fairs. The respondents were asked to rate the statements using 5- point Likert scale as follows; 1 (Strongly disagree), 2(Disagree), 3(Undecided), 4(Agree), and 5(Strongly agree). The actual mean is 3 due to the rating scale, and mean greater than 3 denoted that students were favorably disposed and mean of less than 3 denoted unfavorable dispositions by students. The results in Table 3 revealed that students are favorably disposed to fairs and shows educate people on the operations of agricultural development programs (4.56); agricultural teachers should be included in planning of agricultural shows and fairs so as to pass the knowledge to students (4.55); youth should participate in agricultural shows and fairs in large numbers (4.53) and it is important to know how agriculture is practiced and affects local community (4.41). However students are not favorably disposed to politics has a major effect on agricultural shows and fairs (2.68); agricultural shows and

Students Knowledge

fairs are a waste of time (1.33) and agricultural shows and fairs are of less importance especially for people who live in the city (1.95).

A test for relationship between knowledge and attitude towards agricultural shows and fairs was conducted using the Pearson Product Moment Correlation. The results shows that a significant relationship exists between knowledge and attitude towards agricultural shows and fairs ($r = 0.34$, $p < 0.05$, df_{58}). This implies that knowledge is a correlate of attitude towards agricultural shows and fairs; and thus, the higher the knowledge the more favorable the attitude.

Summary

The paper has clearly shown that there are more females in agriculture science class in secondary schools. Also, students' age range between 14 and 16 years, are aware and visited agricultural shows and fairs. The study also reveals that knowledge of agricultural shows and fairs influence attitude toward the event. Students are more knowledgeable on items such as agricultural shows and fairs are beneficial to students; agricultural shows and fairs meet educational need of students; organic agriculture was displayed during agricultural shows and fairs; agricultural shows and fairs creates opportunity for networking and agricultural shows and fairs include young farmers competition.

Students are favorably disposed to fairs and shows educate people on the operations of agricultural development programs, agricultural teachers should be included in the planning agricultural shows and fairs in order to pass the knowledge to students; youth should participate in agricultural shows and fairs in large numbers and it is important to know how agriculture is practiced and affects local community. The study recommends that emphasis should be placed on the educational objectives of agricultural shows and fairs so that as many students would participate will be able to gain knowledge about agriculture in all its ramifications.

Literature cited

- Blackburn, D.A. 1999. Ag science fairs: The next wave in agricultural literacy. *Journal of Extension* [On-line] 37(4). Accessed August 13, 2009.
- Blackburn, D.A., B.R. Skaggs, and T.A. Vestal. 1995. Where agriculture comes alive. Brochure Publication, Texas Agricultural Extension Service. College Station, TX.
- Boleman C.T. and F. Burrell, Jr. 2003. Agricultural science fairs: Are students truly learning from this activity? *Journal of Extension* 41(3): 3RIB4.
- Steele, R. 1997. Analysis of the continuing decline in use of supervised agricultural experience. *Journal of Agricultural Education* 38(2): 49-58.
- Boud, D. and N. Miller. 1996. Working with experience: Animating learning. London, England. <http://74.125.155.132/scholar?q=cache:99ImzvJoUMUJ:scholar.google.com/&hl=en>. Accessed September 28, 2009.
- Cheek, J.G., L.R. Arrington, S. Carter, and R.S. Randell. 1994. Relationship of supervised agricultural experience program participation and student achievement in agriculture. *Journal of Agricultural Education* 35(2): 1-5.
- Hulela, K. 2009. Role of women in livestock production in sub-Saharan Africa. In: Proceedings of the Animal Agriculture Conference. Botswana College of Agriculture. Gaborone, Botswana. October.
- Kanaimba, E. 2009. Prioritize agriculture. www.mmegibw.com. Mmegi. Accessed July 16, 2008.
- Ministry of Agriculture. 2007. Agricultural statistics. Government Printer, Gaborone, Botswana.
- Ministry of Agriculture (MoA). 2009. Economy of Botswana. <http://www.iss.co.za/AF/profiles/Botswana/Economy.html>. Accessed October 13, 2009.
- Neil, K. 2003. Agricultural experience program quality. *Journal of Agricultural Education* 37(4): 25-37.
- Oladele, O.I. 2010. Challenges and opportunities in teaching agriculture at primary and secondary schools in Botswana: Perception of in-service students. *Botswana Journal of Agriculture and Applied Sciences* 6(3): 260-267.
- Purushothaman C., M. Kavaskar, Y.A. Reddy, and K. Kanagasabapathi 2003. Role of mass media in agriculture. In: Proceedings of the International Conference on Communication for Development in the Information Age: Extending the Benefits of Technology for All, Varanasi, India, 7-9 January. 2003 Eds. Basavaprabhu Jirli Editor in Chief, Diapk De, K. Ghadei and Kendadmath, G.C., Department of Extension Education, Institute of Agricultural Sciences, Banaras Hindu University, p11.
- Thobega M. 2010. Effects of school geographical location on performance of candidates in the Junior Certificate Agriculture Practical Examinations in Botswana. *Botswana Journal of Agriculture and Applied Sciences* 6(1): 26-34.

The Impact of Agriculture Future of America (AFA) Participation on Workplace Skills

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Abstract

This research investigates the impact of student involvement in the Agriculture Future of America (AFA) on workplace skills, by quantifying former AFA participants' self-reported workplace skill sets, as defined by agribusiness employers. The analysis is based on survey results from former AFA participants. The conceptual model examined the relationship between AFA, college, and the skills desired by agribusiness employers. The skills measured include interpersonal communication skills, critical thinking skills, writing skills, knowledge of general business practices, quantitative analysis skills, cultural/gender awareness, and oral presentation skills. Former participants attributed AFA as helping them develop workplace skills. As AFA involvement increased, individuals agreed more that AFA contributed to their workplace skill competencies.

Introduction

The Agriculture Future of America (AFA) is a nonprofit organization that focuses on creating partnerships that identify, encourage, and support college students preparing for food and agricultural careers. AFA provides students with professional and personal development opportunities as a capstone experience to their collegiate classroom and organization experiences, rather than as a traditional membership-based organization.

AFA began in 1996 through the efforts of R. Crosby Kemper and agribusiness leaders in Kansas City, Missouri (Weathers, R. personal communication). These individuals identified a need for a leadership development organization for college students pursuing careers in the food and agriculture industry. They envisioned AFA to be complementary to 4-H and FFA, both agriculture/rural youth leadership organizations. At the collegiate level, AFA provides students with internship opportunities, leadership and career development training, and scholarships. AFA promotes internships from its partners in business, government, and organizations tied to the food and agriculture industry. In turn, AFA connects these partners with an extensive network of agriculture students, who are, in most cases, the top-achieving leaders on their respective campuses. As a provider of leadership and development training, the organization offers the AFA Leaders Conference, a

four-day development conference that provides students with a unique opportunity to interact with agriculture and food industry professionals through session speakers, roundtable discussions, and other networking experiences.

Since its inception, AFA has provided personal and professional development for more than 5,000 college students attending 70-plus colleges and universities in more than 30 states. AFA has also distributed more than 1,300 scholarships, totaling more than \$5 million (Phillips, 2009). In AFA's effort to prepare college students for careers in the food and agriculture industry, the organization aims to help provide students with a set of core competencies (Table 1; Weathers, 2008). The AFA believes that there is an "AFA Advantage," where former AFA participants have an advantage over their peers when entering the workforce due to their involvement with AFA. Likewise, employers who hire former AFA participants may have an "advantage" because these new hires possess the skills needed to enter the workplace, allowing for fewer company resources to be focused on employee training. This research investigates the possibility of an "AFA Advantage." The results may help AFA and other college-level agricultural organizations better demonstrate their efforts in effectively preparing future generations to enter careers in the food and agriculture industry.

Many studies have reinforced this need for college graduates to possess skill sets beyond knowledge acquired in the traditional classroom. The study conducted for the National Food and Agribusiness Management Education Commission showed that agribusiness executives, in informational interviews and surveys, ranked interpersonal communications and critical thinking as the most important skills (out of 16 capabilities) for new hires (Boland and Akridge, 2006). The results also show knowledge of the food and agribusiness marketplace; accounting and finance; macroeconomics, international trade; and broad-based knowledge in liberal arts ranking near the middle to lower ends of the most desired capabilities for the workplace (Boland and Akridge, 2006).

Miller et al. (2005) also examined this concept by using mailed surveys to agribusiness managers from across the nation to assess the competencies of recent college graduates, comparing agricultural or business degrees. The authors used the concept of knowledge,

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The Impact

skill, ability, and trait (KSATs) areas of entry-level college graduates and careers in agribusiness. Results showed business graduates rank higher for seven of the 11 KSATS, including speaking effectively; understanding basic business principles; using computer technology; knowledge of cultural/economic differences in international business; understanding the U.S. economy functions; understanding the global nature of business; and understanding the interdependence of business functions/departments (Miller et al., 2005). Agricultural graduates had higher ratings on only two of the 11 KSATs: using good decision-making techniques and demonstrating ethical behavior on a personal level (Miller et al., 2005). Overall, both groups of students received low ratings for their knowledge of cultural and economic differences in international business (Miller et al., 2005).

Outside the classroom, students gain leadership skills that are transferable to the skills needed in the workplace. The survey of University of Missouri College of Agriculture students suggests that involvement in student organizations and activities enhances their communication skills (McKinley et al., 1993). This involvement helps college students develop skills needed in their careers after they graduate.

This study investigates the hypothesis that college students who participated in Agriculture Future of America (AFA) may have an “AFA Advantage” when entering the workplace. Survey

respondents with AFA experience reported their self-assessment of the importance of seven job-related skills, and the importance of AFA in the development of those skills.

Materials and Methods

A survey was conducted to find the degree to which survey respondents with AFA experience self-assessed the importance of seven job-related skills. The survey also asked respondents for their beliefs of the importance of AFA in the development of those skills. Simple regressions were estimated to estimate the statistical relationship between the number of years of AFA involvement and the self-reported level of career skills. Lastly, the survey results were used to investigate the possibility of an “AFA Advantage” when entering the workplace, by interpreting the simple regression results for the self-assessed levels of skills relative to non-AFA participants.

The data for this research were gathered through a qualitative online survey, targeting the population of 506 former AFA participants from a list provided by AFA staff. These individuals were selected because they are the alumni, which AFA still has current contact information. Additionally, these participants were selected because they were involved with AFA during the span of time when the organization was established (1996) to the year before the study was conducted (2008).

The survey had 116 participants, resulting in a 23% response rate. In general, the targeted participants were young professionals with less than one year to 13 years of work experience. Their involvement in AFA varied from one to three years, dating from 1996 to 2008. The survey was administered to the target participants through an e-mail detailing the research (Svacina, 2009). The e-mail included a link to the online survey, where participants completed the 31-question survey anonymously. Participants had 15 days to complete the survey. An e-mail reminder was sent midway through the period while the survey was open.

The survey measured the possibility of an “AFA Advantage” by asking former AFA participants to self-assess the level of career skills. Note that this measurement of the AFA advantage is based solely on self-assessed survey question results. While the results provide important information about how former AFA participants feel about their experience with the organization, the survey results are limited to AFA participants only. A survey on non-AFA participants would provide additional useful information, but was beyond the scope of the current study.

This AFA advantage could arise from skills desired by agribusiness employers, as indicated in the USDA National Food and Agribusiness Management Education Commission report by Boland and Akridge (2006). The conceptual model in equation (1) specifies this possible relationship between AFA, college,

Table 1. Agriculture Future of America Core Competencies

Self Assessment (collegiate level only)

Personal Financial Skills
Goal Setting
Time Management
Resume Development
Self-Exploration

Communication

Networking
Presentation Skills
Business Writing
Selling Yourself and Your Ideas
Interpersonal Communication

Embracing Change

Systems Thinking in a Global Market
Change Management
Innovation and Entrepreneurialism
Conflict Management
Problem Solving/Decision Making
Valuing Difference and Diversity

Lifelong Learning

Current Issues and Trends in Agriculture
Mentoring
Professional Development

Organizational Leadership (Alliance only)

Project Management
People Management
Professional Financial Skills

Source: Weathers, R., 2008.

and skills desired by agribusiness employers: skills are determined by college activities and AFA involvement.

$$(1) \text{ SKILL} = f(\text{College, AFA})$$

In the equation, SKILL represents seven skills, based on the concept that agribusiness employers expect new hires to be competent in a number of skills when they enter the workplace. Many of these competencies are needed for future leadership positions within a company. The model for new hires with leadership potential includes the following seven core competencies: interpersonal communication skills (IC), critical thinking skills (CT), writing skills (W), knowledge of general business management (KGB), quantitative analysis skills (QA), cultural/gender awareness/sensitivity (CGA), and oral presentation skills (OP). Thus, the variable SKILL can be written as the seven individual skills: SKILL = IC, CT, W, KGB, QA, CGA, OP.

College experiences (such as student organization involvement and classes) and AFA involvement are hypothesized to influence how competent young professionals are in the skills desired by agribusiness employers. While the seven skills are expected to be a function of both college activities, including academics, and AFA experience, this study focused only on the potential impact of AFA on skill development. Academics and other college activities are crucial to skill development, but are not considered in this research. We hypothesize that the "AFA Advantage" exists when skill levels increase due to larger number of years involved in AFA, as shown in equation (2).

$$(2) \text{ "AFA Advantage"} = \text{SKILL}/\text{AFA} > 0$$

The seven core competencies listed in the model were rated the greatest in importance of 16 competencies, all ranking four or greater on a scale of zero to five (Boland and Akridge, 2006). Interpersonal communication skills (IC) provide employees with an ability to effectively interact with colleagues through word choice, body language, active listening, attention to team dynamics and various types of communication (Boland and Akridge, 2006). Critical thinking skills (CT) allow employees to gather information and base decisions on facts (Boland and Akridge, 2006).

Writing skills (W) allow employees to successfully communicate their ideas clearly and effectively in various business-writing styles, such as proposals, e-mails, memos and reports (Boland and Akridge, 2006). Knowledge of general business management (KGB) practices provides new employees with an understanding of day-to-day business operations and economic concepts, such as finance and marketing. Quantitative analysis skills (QA) allow employees to evaluate, interpret and explain data. Awareness and sensitivity to culture and gender (CGA) provide employees with an open-minded approach to business operations and interaction with colleagues, customers and business partners. Oral presentation skills (OP) allow employees to be confident in their

knowledge and judgment, while communicating their position efficiently and influentially (Boland and Akridge, 2006).

Survey participants assessed their competencies of seven skill sets in relationship with both their AFA and collegiate experiences. In analyzing the data with Excel software, the mean of each Likert scale question was calculated and reported. Seven simple regressions also were calculated based on the survey results in relationship to the AFA experience to test the impact of AFA experience (AFA) on the self-reported skill level (SKILL). The regression models are shown in equation (3) below:

$$(3) \text{ SKILL} = \alpha + \beta(\text{AFA}) + u$$

Where SKILL is the seven self-reported skills, alpha is the estimated regression intercept term, beta is the estimated coefficient on AFA, and u is the disturbance, or error, term. The variable AFA is measured as years of experience in AFA, as explained below. Note that the beta coefficient is described in equation (2): the change in skill level, given a change in the number of years of involvement in AFA.

Results and Discussion

Of the respondents, 47% were male (55) and 53% were female (61). The survey respondents represented 32 universities and identified 19 states as "home." Some individuals indicated multiple states as "home." The greatest concentration of students came from Missouri (36) and Kansas (17), which reflects the large concentration of alumni from the University of Missouri – Columbia (20) and Kansas State University (16). Respondents also ranged in the years involved in AFA, which is designed to be a three-year experience. The average AFA participation was 2.2 years, with the greatest response from one-year participants (36%). Other AFA participation included 20% for two years, 27% for three years and 17% for three years, plus involvement in the AFA Alliance, a related young professional program. Only 29 (25%) served in an AFA student leadership position as members of the AFA Student Advisory Team.

The mean education level for participants was a bachelor's degree. Specifically, 75% of the respondents held a Bachelor's degree, 18% held a Master's degree, 4% held an MBA and 3% held a Ph.D. or comparable degree at the time of the survey. During their undergraduate years, the mean number of internships held was 3.0. All respondents were involved in extracurricular activities, averaging participation in three to four organizations. Overall survey participants strongly agreed (78.5%) or agreed (20.7%) that they had a positive collegiate experience.

At the time of the survey, respondents lived in 22 different states, with the greatest concentration residing in Missouri (22), Kansas (15) and Iowa (15). They are professionals working in a wide range of industries connected to food and agriculture, including the greatest concentrations in education (secondary, greater education) (13%), agronomy-related field

The Impact

(15%), grain (10%) and finance/banking field (9%). Participants averaged 4.6 years of work experience and held 2.7 positions since receiving their undergraduate degree. In addition, respondents have averaged 2.7 career advancements in their professional experience. About 49% of respondents have management experience, supervising an average of 18.5 individuals. Nearly 60% of respondents have not participated in the AFA Alliance, a young professional association with ties to AFA. Overall, former AFA participants find their current position satisfying, with 62% strongly in agreement and 35% in agreement.

Former AFA participants rated (Likert scale, 0=not important to 5=very important) the value of the seven workplace competencies most valued by agribusiness employers. The value was analyzed from the perspective of their current position. Respondents placed relatively high value (mean >4.4) on interpersonal skills (4.8 mean) and critical thinking skills (4.8 mean). They stated skills that were somewhat valuable (mean >3.4 and <4.5) to their job included business writing skills (3.9 mean), understanding of economic concepts and day-to-day business practices (4.2 mean), quantitative analysis skills to make decisions (4.4 mean), awareness to cultural and gender differences (3.6 mean) and oral presentation skills (4.3 mean). The results of Miller et al. 2005 suggested that communication and interpersonal skills were valued as most important, even over course content, to employers. However, communication and interpersonal skills are usually rated as weak among recent college graduates by employers (Miller et al., 2005). Williams (2002) used the term "society-ready graduates" in his study of undergraduate learning experiences. He defined this concept as graduates who are the product of a strong science-based education who have developed problem solving skills, critical thinking, social literacy, ethics, leadership, written and oral communication skills, international awareness, and an appreciation for lifelong learning (Williams, 2002).

Survey participants also assessed (Likert scale) how their AFA involvement contributed to their development of seven workplace skill competencies identified by agribusiness employers. On average, individuals agreed (mean >3.4 and <4.5) their AFA involvement contributed to their oral presentation skills (3.8 mean), awareness of cultural/gender differences (3.7 mean), understanding of economics concepts and day-to-day business practices (3.7 mean), critical thinking skills (3.7 mean), interpersonal skills (4.1 mean), and quantitative analysis skills to make decisions (3.5 mean). Survey respondents did not agree or disagree (mean >2.4 and <3.5) that AFA helped contribute to their business writing skills (3.3 mean). The Oregon State University College of Agricultural Sciences studied the perceptions of employers regarding employment skills and satisfaction with college graduates that they have

hired in comparison with those outside the college (Cole and Thompson, 2002).

By estimating simple ordinary least squares regressions (equation 3), the survey results were analyzed based on each skill competency as a function of the number of individuals' years of AFA involvement. In all, seven simple regressions were estimated, evaluating each skill competency. While the complete regression results are not reported here, results indicated that as years of AFA involvement increased, respondents attributed AFA as helping to develop their workplace skills in interpersonal communication skills, understanding of economic concepts and day-to-day business practices, awareness to cultural/gender differences, and oral presentation skills. Regressions attempting to examine critical thinking, business writing and qualitative analysis skills were statistically insignificant. Wachenheim and Lesch (2004) surveyed International Food and Agribusiness Management Association executives, who also indicated communication and interpersonal skills the most important skills for college graduates entering the workforce. The study also placed a high value on foreign language competency and international agriculture and cultural courses for students interested in pursuing international business career paths (Wachenheim and Lesch, 2004).

Survey participants also completed a self-comparison (Likert scale) of their skill sets as a new hire in relationship with their peers who were not involved in AFA. Note that survey results here are for recent college graduates with AFA experience only; students who were not involved in AFA were not surveyed. Future research is needed to compare the self-assessment of AFA participants with former college student peers who did not participate in AFA.

Respondents agreed (mean >3.4 and <4.5) that their AFA experiences helped them be more prepared for the workplace than their non-AFA peers, by possessing stronger competencies in oral presentation skills (3.8 mean), awareness of cultural/gender differences (3.6 mean), understanding of economic concepts and day-to-day business practices (3.6 mean), critical thinking skills (3.6 mean), and interpersonal skills (4.1 mean). However, AFA participants somewhat agreed that they were better prepared as a new hire than their non-AFA peers in regard to quantitative analysis skills to make decisions (3.4 mean) and business writing skills (3.3 mean). It should be emphasized that these results report the beliefs of AFA participants only.

These results were also analyzed by estimating simple regressions based on each skill competency as a function of individuals' years of AFA involvement (equation 3). In all, seven simple regressions were calculated, evaluating each skill competency. Results indicated that as participants' years of AFA involvement increased, respondents increasingly agreed that their AFA experience helped them possess a

number of stronger workplace skills than their peers who were not involved in AFA. These skills include interpersonal communication skills, critical thinking skills, understanding of economic concepts and day-to-day business practices, and an awareness of cultural/gender differences. Regressions that examined business writing skills, oral presentation skills and quantitative analysis skills for decision making showed no statistically significant relationship. These regression results suggest that students receive the most benefit from AFA by participating in all three tracks (three years) and potentially in the AFA Alliance as a fourth year.

Former AFA participants were also surveyed about their perceptions of AFA value, if there is an “AFA Advantage,” and the future direction of AFA. Respondents indicated they greatly value their AFA experience, with 50% rating it as “very high value” and 35% rating it as “somewhat high value.” In addition, when asked if they thought that there is an “AFA Advantage,” 84% said yes, while 16% said no. Note that these results are from AFA participants only, and there were no additional responses available to survey respondents for these questions.

As young professionals, the former AFA participants rated the workplace competencies that they feel AFA should focus on in the future. Overall, the mean score for each skill competency was categorized as “agree” or “strongly agree.” The respondents strongly agreed (mean >4.4) that AFA should focus on developing participants’ interpersonal skills (4.7 mean), oral presentation skills (4.6 mean) and critical thinking skills (4.5 mean). The other five workplace competencies were rated slightly lower, indicating they “agree” (mean <3.4 and <4.5) that the AFA should focus on helping develop business writing skills (3.9 mean), knowledge of general knowledge of economic concepts and day-to-day business practices (4.2 mean), quantitative analysis skills for decisions making (4.3 mean), and cultural and gender awareness (3.8 mean).

Former AFA participants also rated how AFA should focus in relationship to leadership and careers. Overall, the survey respondents strongly agreed (mean >4.4) that AFA should help its students provide networking opportunities (4.7 mean), access to internships (4.6 mean), access to career opportunities (4.5 mean), leadership development (4.6 mean) and career development (4.5 mean).

Summary

As Agriculture Future of America (AFA) has evolved since its inception in 1996, the organization has received positive feedback from both participating students and employers. The feedback has led the organization to believe that there may be an “AFA Advantage,” where AFA participants have an advantage over their peers when entering the workforce due to their AFA involvement. This research investigated the possibility of an “AFA

Advantage,” by measuring former participants’ workplace skill sets, as determined by agribusiness employers. Former AFA participants completed a survey, self-assessing how their AFA involvement contributed to their development of seven workplace skill competencies identified by agribusiness employers.

The research findings provide some quantitative evidence to support the idea of an “AFA Advantage” demonstrated through past participants’ self-assessment. The study suggests that AFA contributes to its participants’ development of workplace skills in interpersonal communication skills, critical thinking skills, understanding of economic concepts and day-to-day business practices, quantitative analysis skills to make decisions, awareness to cultural/gender differences, and oral presentation skills. The survey results also suggested that AFA participants believe that they possess stronger workplace skills than non-AFA participants, in their own self-assessment.

These skills included interpersonal communication skills, critical thinking skills, understanding of economic concepts and day-to-day business practices, awareness to cultural/gender differences, and oral presentation skills. Simple regression analysis also suggests that students may want to consider continuation of their AFA involvement – participating in all three tracks, with the optional fourth year in the AFA Alliance – to maximize the full advantages of AFA. The data show that as participants increase their AFA involvement, their responses become more positive to attributing AFA to their skill development and believing they have stronger workplace skills than their non-AFA peers. Other survey data gathered indicated that 84% of participants believe there is an “AFA Advantage.” Overall, a majority of participants rated their AFA experience as a high value (50%) and somewhat high value (35%).

As a result of this research, two implications were identified. First, it is important to call attention to the positive value of participants continuing their AFA involvement throughout college. For students to maximize their AFA experience, AFA staff will need to strongly encourage participation in all three tracks throughout college. The second implication is that it is not evident if AFA is helping its participants develop their business writing skills. It also is not clear if AFA participants have stronger quantitative analysis skills for decision making. As an organization, AFA will need to determine if these skill competencies are an opportunity for growth or if they are not priority competencies.

As AFA continues to help prepare college students for careers in the food and agriculture industry, the organization will need to continue to assess its capabilities to meet the human capital needs of agribusiness employers. However, this research demonstrates that AFA does provide an advantage to its college student participants. AFA is positively contributing to the development of students’ work-

The Impact

place skill competencies, which are identified by agribusiness employers. AFA must continue to work closely with agribusiness employers to ensure it is most effectively preparing college students for leadership positions in the food and agriculture industry.

Literature Cited

- Barcus, N., M. Bornhorst, and R. Weathers. 2007. AFA donor proposal. Agriculture Future of America. Kansas City, MO, May.
- Boland, M. and J. Akridge. (eds.). 2006. Agribusiness. Food and agribusiness management education: Future directions. USDA National Food and Agribusiness Management Education Commission, Kansas State University and Purdue University.
- Cole, L. and G. Thompson. 2002. Satisfaction of agribusiness employers with college graduates they have hired. NACTA Journal 46(1): 33-39.
- McKinley, B.G., R.J. Birkenholz, and B.R. Stewart. 1993. Characteristics and experiences related to the leadership skills of agriculture students in college. Journal of Agricultural Education 3: 76-83.
- Miller, S.E., T.D. Davis, W.N. Ferreira, L.D. Fredendall, and L.B. Nilson. 2005. Competencies of entry-level college graduate employees in agribusiness. In: Proc. of the Southern Agricultural Economics Association Annual Meeting, Little Rock, Arkansas, 5-9 February.
- Phillips, H. 2009. Agriculture future of America program specialist, interview by author, Kansas City, MO, 22 January.
- Svacina, L. 2009. M.A.B. Thesis, Dept. of Agricultural Economics, Kansas State Univ., Manhattan, KS 66506-4011.
- Wachenheim, C. J. and W.C. Lesch. 2004. U.S. 'executives' views on international agribusiness education in the United States: An IAMA membership survey. International Food and Agribusiness Management Review 7(1): 42-59.
- Weathers, R. 2008. Personal communication. Agriculture future of America. AFA Competencies. Kansas City, MO.
- Williams, J.E. 2002. Producing society-ready graduates by engaging alumni in the undergraduate learning experience. In: Proc. Of AAEA Annual Meetings, Long Beach, California, 28-31 July.



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The Attributes and Attribute-Consequences of Great College Teachers

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Abstract

A great teacher is one who facilitates a large volume of learning and achieves adulation from the students. To aid teachers aspiring for greatness, this study employs personal interviews and questionnaires to identify the attributes students associate with great teachers, as well as the consequences of those attributes students value. Results suggest that great teachers are dynamic lecturers and clear communicators; these two attributes help students focus in class and understand the material. Students desire to commit to a class, and they find this commitment easier if teachers get to know their students, exhibit a personable personality, and signal their desire for students to learn. Driving these preferences is the students' desire to commit to the class, understand the material, and improve class focus. Teachers who find it difficult to exhibit all of these attributes can instead focus on the attribute-outcomes students desire, and devise their own strategy for achieving these outcomes that is consistent with the class size, class topic, and the teacher's personality.

Keywords: teaching effectiveness, student assessment, teacher attributes, student preferences

Good teachers impart good education. Great teachers groom their students to become leaders. Ordinary teachers direct us along the right path, but great teachers inspire us to seek our own path. They encourage us to discover our talents.

-- Author Unknown

The success of a class is largely determined by the amount of learning that takes place and the students' ability to transfer that learning to other problems. Because it is impossible to measure learning perfectly, indirect measures are often used alongside with direct measures of learning for a holistic appraisal of a teacher's effectiveness. Student perceptions constitute one of these indirect measures. Even though student appraisals are imperfect measures of learning (Rodin and Rodin, 1973), it would be difficult to claim that learning takes place if the student asserts otherwise. In fact, Jones (1981) argues that the only criteria by which models of great

teachers should be judged are (1) the learning that occurs and (2) opinions of parties involved with the teaching. Models of great teachers should be built, at least partially, with the input of students.

The purpose of this study is to characterize student preferences for teachers by employing a preference elicitation tool developed in the marketing literature. Referred to as laddering, this method articulates the attributes students attach to great teachers, the consequences of those attributes that make the attributes important, and the terminal values driving these student preferences. Two applications of laddering are performed. One application conducts personal interviews of 45 undergraduate students majoring in agricultural economics. The second application administers a questionnaire to 135 undergraduates in agricultural economics and 209 engineering undergraduates. The two laddering applications also allow an exploration into how descriptions of great teachers vary across measurement instruments, the students' major, and whether great teachers are described as students' 'favorite' teacher or one who 'best facilitates learning.'

Periodically the paper refers to Appendices A and B. These appendices are available online at <http://asp.okstate.edu/baileynorwood/Misc1/default.aspx?name=teaching>. Also at this website is a video presentation of the present research, as well as other research on teaching and advising the reader might find interesting.

Introduction

College instruction differs from primary and secondary education in that the teacher and student meet for only small periods of time. A large volume of information must be covered in these short lectures, and a large amount of independent studying and practice is presumed to take place independent of the instructor. This presents a conflict. Instructors who consume a large amount of time motivating the material and holding class discussions may find themselves covering an insufficiently small amount of material, and the instructor who covers much material finds little time for making the subject interesting and stimulating class discussion. The lecture must provide students with the intellectual tools to study without supervision, but also provide

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The Attributes

the inspiration and motivation to study independently. When students struggle, it is often unclear whether they struggle with the concepts or the motivation. It is likely that most cases involve a complex mixture of both.

Universities and colleges host a variety of disciplines and scientific knowledge is specialized, making it difficult for scientific experiments to identify specific teaching methods that can be generalized to all classes. The idiosyncratic personalities of instructors limit the extent to which a successful teaching method for one instructor can be extended to others. These considerations make it difficult for strictly scientific methods to help one become a great teacher. Consequently, faculty strives for great teaching largely by reflecting on personal and shared teaching experiences (Kane, et al., 2004; Schindler, 1991; Ward, 1968; Opulente, 1965). Motivated teachers will also seek to reflect upon the experiences of students. This includes students' perceptions of what attributes describe a great teacher. Student perceptions then cause the ambitious instructor to alter their teaching style in accordance with their personality and their course topic.

Student perceptions of the ideal teacher are informative and useful. Although one can envision a number of biases students might hold, empirical evidence suggests these biases may be too small for much concern (Grush and Costin, 1975). Students possess some information that the teacher does not. If college students and teachers agreed on what comprises a great teacher, instructors could simply pursue their own perceptions of ideal teachers and would achieve the respect and approval of students. To some degree, students and teachers do agree on the attributes of excellent teachers (Shikiar, 1976), but they do differ on some points. Both students and teachers concur on the importance of understanding the material and effective communication of the material, but students place a higher weight on stimulating/engaging lectures and the friendliness of teachers. As teachers have aggressively adopted new multimedia technologies, they have overestimated students' desire for these technologies over traditional chalkboard lectures (Boyer, et al., 2009; Miron, 1985; Miron and Sebal, 1978; Yourgliche, 1955).

In pursuit of these unique student insights, an interesting literature has developed focusing on student descriptions of great teachers. Some studies employ survey techniques, where students are given a list of teacher attributes and are asked to rank the most important attributes. These studies demonstrate the importance of stimulating students' curiosity, preparation of lectures, using a variety of teaching methods, effective communicating, and encouraging independent thinking (Mannan and Traicoff, 1976; Pogue, 1967; Miron, 1985; William and Tomlin, 1996; Onwuegbuzie, et al., 2007). More than simply detailing important attributes, some

studies document the synergies between enthusiastic personalities and competent teaching abilities (Jones, 1989). One of the more interesting studies contains narratives written by 26 students describing their favorite teachers—narratives which illustrate the importance students place on amicable teachers who are anxious to help students learn (Anonymous, 1955).

A separate line of literature exploits the information inherent in teacher-award applications. Some teaching awards require students to both nominate the teacher and provide a written narrative on the teachers' merits. By studying the application narratives, researchers can infer the qualities of the teacher that earned them the student nomination. Students self-select into these samples, and thus are not representative of the student population. The disadvantage of a biased sample is accompanied by a number of advantages though. The student narratives contain more detail than traditional surveys. The students are not constrained by a particular survey design, nor are they restricted to a particular set of attributes and attribute descriptions. The descriptions of excellent teachers are therefore more genuine, which may compensate for the biased sample.

The nomination narratives from one study assert that the ideal teacher is one who (1) treats students and assigns grades fairly (2) is inspiring and stimulating (3) extends students respect as a person (4) commands an impressive knowledge of the material and (5) is enthusiastic about teaching (Goldsmith, et al., 1977). In similar spirit, Hoffman (1963) asks college seniors to think of their favorite teachers and to write reasons for their selections. The most important justification for a favorite teacher is categorized as a kind, respectful, and helpful personality. The second most important attribute relates to the effectiveness of the instructor's presentation and communication of course content. The third most important attribute describes great teachers as possessing an admirable personality and character.

Similar to Hoffman (1963), a more recent study of Chinese students concur with the claim that students' favorite teachers inspire students with both kindness and encouragement, whereas their least favorite teachers give dry lectures that pertain only to examinations. Another study asks students to state in one sentence what describes their best professor; a categorization of the statements reveals that an interest in student success and a variety of teaching methods is the most frequent response. Using a more sophisticated data analysis, Slate et al. (2009) found that when students are given open-ended questions about great teachers, the dominant themes include communication, helping, fun, and the like. Together these students contend that the ideal teacher sincerely cares that the student learns, and that sincerity shows in the variety and engaging classes they hold. Such a claim is further supported by a symposium

sium of students concerning potential improvements to university instruction (Rinn, 1981), and is found among excellent teachers at the community college (Horan, 1991), and the primary school level (Acocella, 2002).

An alternative methodology is to identify excellent teachers and study their teaching techniques. Studies that audio-tape lectures of high and low-rated teachers find that higher-rated instructors are more responsive and interactive with students, incorporate more course discussion, blanket students with criterion-based praise, and encourage students to learn from their errors. In contrast, lower-rated instructors employ more dry lectures, less student involvement, and frequently exhibit confusion in the classroom (Phoenix, 1987). A slightly different research approach identifies teaching award recipients, interviews them about their methods, and then conducts similar interviews with novice teachers to contrast their teaching styles and beliefs about effective teaching. It is clear to the researchers of this approach that exemplary teachers have a sophisticated view of teaching and assessment, and place a higher priority on long-term learning. Award-winning teachers place a high importance on student feedback (Duncan and Precians, 1992). An excellent book by Bain (2004) conducts thorough interviews with excellent teachers, also finding a sophisticated view of learning, assessment, and teaching.

Much work has focused on the attributes of great teachers, but why those attributes are important to the student. The consequence of a teacher possessing a particular attributes is important because it addresses the outcome students seek. Do they want to be entertained or to understand the material better? Understanding attribute-consequences allows teachers who have difficulty manifesting a particular attribute to achieve the same outcome in a manner more amenable to their personality. Using the laddering interview process described below, this study identifies both the attributes and attribute-consequences of great teachers. It goes even further by connecting these two features with the terminal values motivating the students.

In the pursuit of the great teacher, it is also useful to delineate different descriptions of “great.” Through the analysis of questionnaires, this study explores the attributes of great teachers defined as (a) students' favorite teachers and (b) teachers that best facilitate learning. The questionnaire is then extended to answer other questions, such as how perceptions differ across disciplines and how attribute-consequences vary under different definitions of great teachers.

Laddering Application 1: Personal Interviews

Students have preferences for certain teacher-attributes because those attributes lead to consequences the students' desire. The desire for these consequences is driven by the terminal—or,

core—values of the individual. To understand the primary attributes of great teachers, the attribute-consequences, and the terminal values motivating the whole process, a trained interviewer conducts personal interviews with students, where each student is asked to explore and articulate their preferences in their own words. This laddering interview technique was pioneered by marketing researchers who sought to thoroughly understand what consumers seek in retail products, and why. This study closely follows the methods outlined in the marketing and food marketing literature (Kambua, et al., 2006; Makatouni, 2002; Miele and Parisi, 2000; Reynolds and Olson, 2001; Russell, et al., 2004) in regards to both how the interview is conducted and how the results are summarized. The technique is often referred to as means-end-chain analysis, as it seeks to understand the end-goals the consumer is pursuing, and the means (attributes) by which these ends are obtained.

Personal Interviews - Methodology

Data are collected using the “soft-laddering” technique, whereby face-to-face interviews are conducted. The interviews consist of two main sections. First the interviewer asks the student to think about their favorite and least-favorite teachers they have experienced during their tenure at Oklahoma State University. They are asked to consider what the good teachers did that the other teachers did not, including the differences in teacher personalities and their teaching style. The student is then asked to think of three to seven attributes that describe their favorite college teachers. Each attribute is written on a separate index card, and it is on this card that the interviewer will record all the consequences and values emanating from that attribute. After the student has finished listing attributes, they are asked to take the index cards and order the attributes from the most to least important attributes. The interviewer then begins exploring the consequences of these attributes by taking the highest ranked attribute and asking a series of questions of the form: “Why is the attribute <insert attribute> important to you? What are the consequences of a college teacher possessing <insert attribute> that you value?”

After the student provides a consequence, they are asked to name a second consequence resulting from the prior consequence that is important to them. This line of questioning continues, seeking to add consequence on top of consequence. The student will eventually reach a point where they reach a consequence that has no subsequent consequence. At this point, they are asked to identify one or more terminal values, which represent the driving motivation of their answers. Attributes and consequences are concepts easily grasped and described without prompting by the researcher, but most students have no exposure to the concept of terminal values, and

The Attributes

find articulation of such values daunting. To aid the identification of values students are provided with a list of sixteen specific terminal values taken from Rokeach (1973). These values are listed in Appendix A.

Consider a hypothetical example, where the student states that *dynamic presenter* and *cares students learn* are two attributes of their favorite teachers. If *cares students learn* is the more important attribute, the interviewer will begin conducting a means-end-chain analysis of the attribute. They might find that *cares students learn* has the consequence of *keeps me motivated*, which has its own consequence of *understand material better*, which has a third consequence of *higher salary*. If no more consequences are easily conjured, the student may then state that their terminal values driving the desire for a higher salary are a *comfortable life* and *sense of accomplishment*. The interviewer will then go back to the attribute or one of the initial consequences to explore other consequences. They ask questions such as, "Are there any other consequences of 'cares students learn' that are important to you," or, "Are there any other consequences of 'keeps me motivated' that are important to you." After a thorough means-end-chain analysis of the attribute *cares students learn* is obtained, the researcher then turns to the other attribute, *dynamic presenter*, and follows the same process.

This technique is referred to as *soft-laddering*. The *soft* adjective refers to the fact that students describe their preferences in their own words, and except for the terminal values, no attempt is made by the researcher to encourage the use of specific terminologies. All interviews are performed by a trained interviewer (one of the authors), who follows the same general instructions for each subject, but is allowed freedom in how many attributes to explore in the attribute-consequence-value chain and how to help the interviewee make attribute-consequence-value connections. The interviewer is trained not to put words in the students' mouth, but at the same time an informative interview requires some adaptive interaction between the interviewer and interviewee.

While each interview is interesting and contains unique information, reporting the results of each interview in a single article would make for a tedious read and would fail to highlight the most prominent themes. Consequently, soft-laddering transcripts must be summarized and reported in a more succinct fashion. The conventional method in the marketing and food marketing literature is to group attributes and consequences into similar categories, and then use a Hierarchical Value Map to communicate the most important categories. The authors held numerous meetings where we reviewed the transcript pertaining to each interview (interviews were audio-taped), designed category labels to describe repeating themes, and used these labels to denote attributes

and consequences of the same spirit. These labels are shown in Appendix A, as well as the comments recorded during the interview pertaining to that label.

The interview results can be reported in various formats. For example, a list of the most frequently mentioned attributes can be listed along with the most frequently mentioned consequences associated with those attributes. The identification of consequences is more complex than the attributes, due to the existence of direct and indirect consequences. For example, a student may state *entertaining lectures* as an attribute of great teachers. When asked the consequence of *entertaining lectures*, the student may state *keeps you awake*, and when asked the consequence of *keeps you awake* may state *understand material better*. The consequence *keeps you awake* is a direct consequence because it follows directly from the attribute with no intermediary consequence. Conversely, the consequence *understand material better* is an indirect consequence because the *keeps you awake* attribute is an intermediary variable between the consequence and attribute. Although *understand material better* may be an indirect consequence it is obviously a consequence resulting from *entertaining lectures*. Consequently, the reporting of consequences requires some decision about whether only direct or both direct and indirect consequences are used.

Hierarchical Value Maps (HVM) are created to summarize the interviews, which are flow diagrams illustrating the most important attributes (at the bottom), arrows pointing to their subsequent consequences (and consequences of the consequences), and (at the top, signifying their importance in determining everything below) finally the terminal values. Attributes share many direct and indirect consequences, and the number of times a consequence is mentioned signifies its importance. The HVM's are designed to describe the details communicated in the personal interview. Unless the HVM's are parsed to reveal only the most important attributes and attribute-consequence-value connections, the arrows will more resemble a cacophony of lines than a succinct description of the interviews. Parsing is typically performed by reducing the number of attributes to a manageable number, counting the number of times a consequence is mentioned (directly or indirectly), and reporting only those consequences mentioned a certain number of times--this number being referred as a *cutoff* point. The researcher then experiments with higher and lower cutoff points, choosing the value that best describes the details of the interview without exhausting the reader with details. The cutoff point is then a subjective decision, one that is determined in both the scientific and the aesthetic spirit.

Personal Interviews – Participants and Results

The interviews are conducted using students

majoring in agricultural economics or agribusiness (hereafter, agricultural economics) in the College of Agricultural Sciences and Natural Resources (CASNR) at Oklahoma State University. Recruitment is limited to this discipline because we possess the contact information allowing us to selectively target certain students, with the goal of ensuring all genders, class distinctions, and GPAs are represented. As the descriptive statistics in Table 1 show, the sample is represented equally by males and females and possesses similar ratios for students of different class distinction and [reported] grades. Recruitment was initially performed through e-mail invitations by the trained interviewer, who was also a student in the department. The low response rate required the interviewer to contact students directly in class, through personal e-mails or phone calls, or at student organizational events. This more personal invitation, along with a ten-dollar-cash compensation, proved effective, allowing us to reach our targeted sample size in a few months.

percentage of times they are mentioned) are (1) dynamic lecturer—58% (2) personable—49% (3) clear communicator—36% (4) gets to know students—36% and (5) cares students learn—36%. A great teacher is thus one who cares enough that students learn the material that they show a personal interest in the student and a commitment to providing interesting lectures that clearly communicate the material concepts. This is perhaps not surprising, so this ideal teacher can perhaps be further described by mentioning the attributes that did not make the top-five list: challenging, hands out grades often, knowledgeable, organized, respectful, and real-world experience. One could imagine ways in which some of these attributes overlap. It may be hard to imagine a teacher that is a clear communicator but disorganized, or one that is personable but not respectful. To help the reader understand why these attributes are separated, the online appendix provides a list of verbatim comments by the student which are grouped under various categories. To illustrate, the

online appendix shows that the comment, “good attitude towards students” is listed under the personable attribute and the comments, “trusts the class and treats them maturely” and “not politically biased, respects others’ opinion” is grouped under the respectful attribute. These judgments are often difficult to make and it is possible a different research team would have made different decisions. Consequently, the appendix is provided as a layer of transparency to the research methodology.

To describe the most prominent attributes and attribute-consequence connections across the interviews, Figure 1 provides a Hierarchical Value Map (HVM) where consequences are only shown if they directly follow from an attribute—meaning there is no intermediary consequence – a minimum of three times. Figure 2 is another HVM, that differs in that it allows both direct and indirect links, and only shows such links that occur a minimum of seven times. These figures suggest the following concept of students’ favorite teachers, which is taken largely from Figure 2. Teachers who provide dynamic lectures and communicate clearly help students focus on and better understand the material, which translates into higher grades, better career opportunities, and higher salaries – ultimately leading to life happiness and a sense of accomplishment. Instructors who get to know the students, exhibit a personable demeanor,

Table 1. Demographic Profile of Students Participating in Interviews and Questionnaires

	Agricultural Economics Students in Personal Interview	Agricultural Economics Students Taking Questionnaire	Engineering Students Taking Questionnaire
Gender			
Male	48.89%	59.26%	78.47%
Female	51.11%	40.74%	21.53%
Class Distinctions			
Freshman	22.22%	0.0%	0.0%
Sophomore	15.56%	14.81%	11.00%
Junior	37.78%	51.85%	27.75%
Senior	24.44%	33.33%	61.24%
Reported GPA			
4.00-3.50	44.44%	33.58%	31.40%
3.49-3.00	31.11%	29.10%	46.38%
2.99-2.50	20.00%	29.85%	19.81%
2.49-2.00	2.22%	6.72%	2.42%
1.99 and less	2.22%	0.75%	0.0%
Average Age	20.38 years	21.07 years	21.69 years
Sample Size	45	135	209

The interviewer follows a consistent script to begin the process, where the purpose and format of the interview is described. Students are told their participation is voluntary and they may exit the interview at any time and still receive their ten dollar payment (no student did). They are encouraged to provide truthful answers that reflect their personal preferences, and not to be influenced by a desire to provide answers that are socially desirable, but not consistent with their preferences.

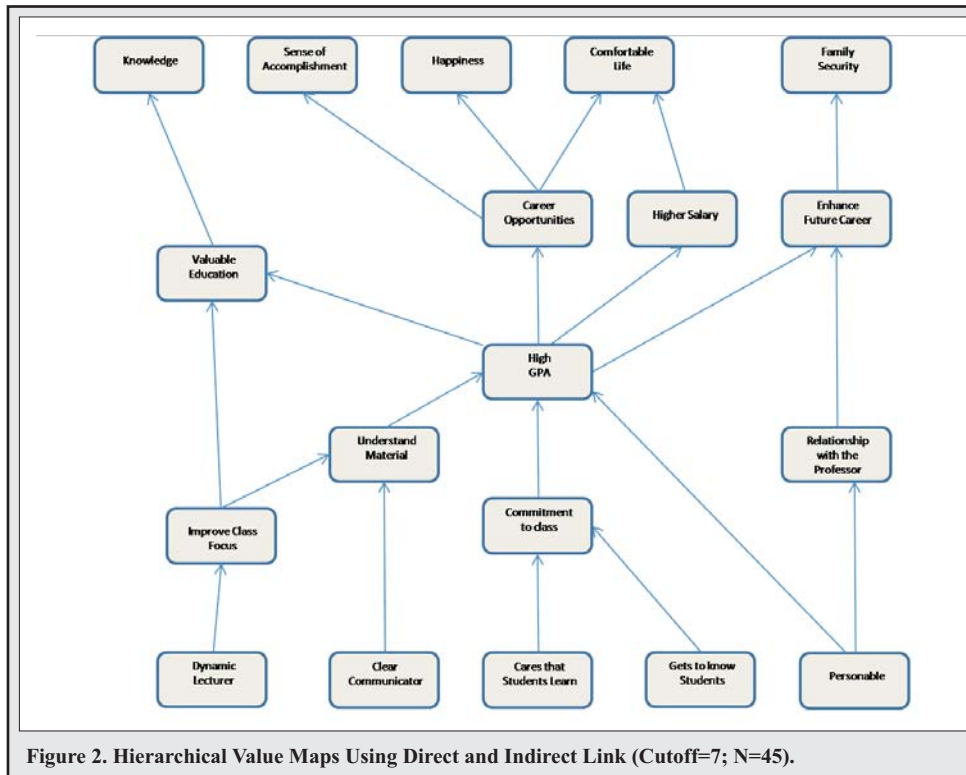
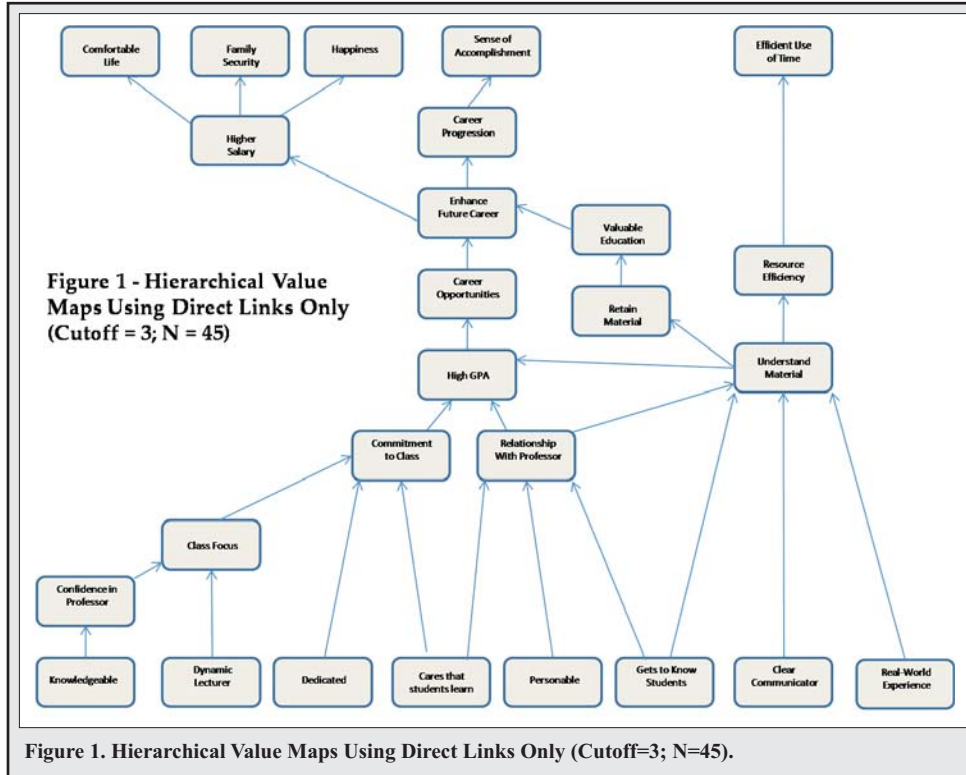
The interview conversations are categorized to reflect fifteen different attributes of students’ favorite teachers and 24 consequences. Recall the list of 16 values is provided for the student to choose among, and hence require no categorizations. The most frequently mentioned attributes (and the

The Attributes

and extend a personal commitment to learning motivate the students commit to class, which leads to higher grades and, as before, has the consequence of better career opportunities and higher salaries.

A personable instructor also nourishes student-teacher relationships which (bypassing higher grades, somewhat) improves career opportunities.

This is not surprising within the agricultural economics major, where professors are sometimes directly responsible for job interviews. In addition to improving career opportunities and salaries, higher grades and improved class focus encourage a valuable education and knowledge, with knowledge being one of the terminal values alongside happiness and sense of accomplishment.



It is our opinion that Figure 2 provides a more salient and logical conceptual model of preferences for teachers than Figure 1. Readers should not take these results to imply that all instructors should strive to match the description in Figure 2 exactly. While clear communication should be present throughout any class, not everyone has the personality or teach topics amenable to dynamic lectures. It is also difficult to get to know students in classes with large enrollments. When possession of some teacher attributes is difficult, instructors can instead find creative strategies for achieving the same consequences. For example, students desire teachers who get to know students because it helps them commit to the class. Instructors of large classes can then place greater emphasis on communicating their desire for students to learn, which also encourages class-commitment.

Laddering Application 2: In-Person Questionnaires

Questionnaires are developed to delve further into student preferences in ways personal interviews cannot. The method of using a paper-and-pencil questionnaire with defined categories of attributes and consequences is known as "hard-laddering." It is similar to the "soft-laddering" method used in the interviews, however, instead of asking students to

state attributes and consequences in their own words, students are provided a list of attributes and consequences to choose among—the list is constructed based off the personal interviews. While there is currently less research on “hard-laddering,” studies have begun to compare the two forms of laddering techniques to determine if the form used affects responses; no tenable conclusion has yet to be found (Phillips and Reynolds, 1998; Russell et al., 2004).

In reality, there is probably no such thing as the “true preferences for teacher,” but a number of truths that depend on how preferences are elicited. The questionnaires used here have the disadvantage of forcing students to utilize pre-determined attributes and consequences; they have the advantage of allowing one to discover more precisely how preferences change across discipline and descriptions of great teachers.

The attributes and consequences used in the questionnaire are borrowed from the responses given by interviewed students. The 24 consequences inferred from the interview responses are consolidated to 15 to manage the cognitive burden placed on the student. Some of the consequence-categories are combined, while seven others that are seldom mentioned in the interviews are removed. The reader can compare the consequences listed in Appendix A for the personal interviews with the questionnaire provided in Appendix B to better understand how consequences between the two research methods are treated.

In-Person Questionnaires – Methodology

The questionnaire is administered using a gray background with white response categories throughout. The questionnaire consists of four main sections, and a sample copy is provided in Appendix B. The first section contains a question asking students to choose the four most important attributes that their favorite teachers exhibit. This is followed by a question asking them to state which of those four is in fact the most important, and what four consequences from the list of 15 represents why that attribute is indeed the most important. The next section is formatted in the same manner, except that it asks students about the teachers that are best at facilitating learning, or in other words, teachers from which the students learn the most. In order to account for any form of bias based on the order of questions, half of the surveys pose the favorite-teacher question first, while the other half asks first about teachers who best facilitate learning. Also, for both of these sections mail merge is used to randomize the order in which the attributes and consequences are listed—to avoid anchoring or ordering bias. Each version of the questionnaire is distributed equally among all students in the sample, thus there is no need to control for the questionnaire format. The remainder of the questionnaire contains attitudinal and demographic questions.

In-Person Questionnaires – Participants and Results

Respondents for the questionnaire are students who are currently enrolled in either engineering or agricultural economics courses. Instructors are notified of the research project through e-mails, and are asked if they would be willing to provide 15 to 20 minutes of their class time to let their students participate in the research. A positive response was received from both majors.

Students are informed at the time of completing the questionnaire that participation is voluntary and will not affect their grade in the course. Also, all questionnaire responses are obtained anonymously—subjects are identified by identification number only. Table 1 provides descriptive statistics of the sample, illustrating that only sophomores, juniors, or seniors complete the questionnaire. The disproportionate number of males compared to females in engineering classes is reflective of the actual gender profile of engineering majors, not an artifact of how the sample is obtained. To ensure results reflect differences in major and not demographics, the responses of the engineering students are adjusted to reflect their predicted responses if their demographic profile exactly match the agricultural economics students, in terms of class status and gender. However, the results change only slightly after this adjustment. Five students are dropped from the analysis because they were either a graduate student or because they failed to answer all of the questions.

Questionnaire responses are first parsed by major to determine how preferences for teachers vary across the two majors. When describing their favorite teacher (see Table 2) the two majors differ little in their most preferred attributes. The favorite teachers of agricultural economics students are those who possess the following attributes: (1) *cares that students learn* (2) *personable* (3) *clear communicator* and (4) *possess real-world experience*. Engineering students concurred on the three most important attributes, but replaced *possess real-world experience* with *knowledgeable* for their fourth most important attribute. Table 2 provides shading to differentiate the four most important attributes, but this masks the true similarity of importance among some attributes. Standard errors are not provided in Table 2 because the percentages are correlated with each other. Determining whether one percentage is statistically different from another is performed using nonparametric bootstraps, where new simulated versions of Table 2 are created by randomly sampling the original sample with replacement. This nonparametric bootstrap suggests that the percentages for *real-world experience* between majors (in columns 2 and 3 of Table 2) are not statistically distinguishable, though the percentages for *knowledge* are statistically different. Thus, the shading is provided more to help navigate the reader than to

The Attributes

distinguish between statistically different percentages.

The last two columns in Table 2 describe teachers who are adept at facilitating learning. For both majors, *cares that students learn, knowledgeable, and clear communicators* are among the most important attributes. The attribute *personable* remains within the top four attributes among agricultural economics students, and *organized* makes its first appearance within the top four attributes for engineering students. Again, however, statistical tests demonstrate the percentages for *organized* and *personable* are not statistically different between majors

Table 2. Percent of Times Attribute Is Selected among Top Four Attributes Describing Students' Favorite College Teachers and Teachers Who Best Facilitate Learning (using questionnaire)

Attributes of Students' Favorite College Teachers	Agricultural Economics Students (N = 135)	Engineering Students (Adjusted, N = 209)	Agricultural Economics Students (N = 135)	Engineering Students (Adjusted, N = 209)
	Great Teachers Defined As Students' Favorite Teachers		Great Teachers Defined As Those That Best Facilitate Learning	
Hands Out Grades Often	4.25% ^a	3.00% ^b	2.50%	2.00%
Challenging	2.00%	3.50%	3.25%	3.75%
Have Clear Expectations	5.25%	7.00%	6.75%	7.75%
Respectful	7.50%	5.25%	4.00%	3.25%
Involve Students in the Class	4.75%	5.00%	7.00%	6.25%
Organized	7.50%	6.75%	7.50%	9.50%
Possess Real-World Experience	8.75% ^b	5.75%	8.25%	6.75%
Connects Class Activities	2.50%	2.75%	4.25%	3.75%
Dedicated	4.75%	4.75%	4.00%	6.00%
Knowledgeable	6.75%	8.00%	10.75%	11.25%
Cares that Students Learn	11.75%	14.25%	10.50%	13.50%
Clear Communicators	9.75%	11.00%	9.75%	12.00%
Gets to Know Students	8.25%	5.50%	7.00%	3.25%
Personable	11.75%	12.25%	9.00%	5.00%
Dynamic Lecturers	4.25%	5.75%	5.25%	5.75%

^aThe percentages are calculated as the number of times an attribute is chosen as a top-four attribute, divided by the number of subjects completing the questionnaire, divided by four. Standard errors are not provided because the correlations between the percentages make the standard errors invalid.

^bThe percentages for engineering students are adjusted to reflect the predicted responses if their demographic profile (gender and class distinction) match the profile of the agricultural economics students. This is achieved by calculating the percent of students and the percentage of students selecting each attribute in each gender/class distinction, and for each major. To weight the engineering students' responses, the percent of times an attribute is chosen for each gender/class distinction for engineers is multiplied by the percent of students in each gender/class distinction combination for the agricultural economics students.

^cAll percentages shaded and/or of larger values are indeed the largest percentages, as determined by nonparametric bootstraps. That is, these percentages are not simply the product of chance. However, a percentage shaded may be statistically indistinguishable from a non-shaded percentage.

It is interesting that *dynamic lecturer*, the most important attribute in the personal interview, is relegated to a lesser role in the questionnaires. This could be attributed to differences in the elicitation instrument, or it could signify that our term “dynamic lecturer” is poorly chosen to describe certain teacher characteristics. Or, perhaps we made a mistake in separating *dynamic lecturer* and *involve students in class*. These are questions that remain unanswered. Although it is natural to concentrate on the most important attributes, understanding the lesser important characteristics of great teachers is

equally informative. The low importance placed on *challenging* may be disheartening to teachers who believe this is a quintessential characteristic of great teachers, but the reader is reminded that students do not have a monopoly on defining great teachers.

The unique contribution of this study is the focus on why students prefer teachers with certain attributes. What is it about those attributes that the students value? This answer also depends on whether it is obtained through structure questionnaires or more loosely-structured interviews. Table 3 compares the top-four attributes and attribute-consequences for agricultural economics students in

the personal interviews and questionnaires. The desire for *class focus, understand the material, and develop a relationship with the professor* is robust across research methodologies. In fact, *understand material* is an important consequence of every top-four attribute in both the questionnaires and interviews. The consequence *improve class focus* arises for all top-five attributes in the questionnaires but for only one attribute in the personal interviews. It is not surprising that *high GPA* is prevalent in the interviews but not the questionnaires, as the questionnaires allow only one consequence following an attribute, whereas the interviews allow a sequence of consequences. Achieving a high GPA is more likely to result from understanding the material and focusing in class—acting as an indirect consequence of an attribute—as opposed to attributes directly. Despite these differences, the general theme in Table 3 is that

students want teachers who help them understand the material and commit to and focus in class. This helps them achieve high grades and enhance their future career.

Conclusion

Although there are many valid definitions of a great teacher, all definitions should be partially informed by student preferences for teachers. However much one may abhor the idea of teaching being a popularity contest, in some facets, popularity

Table 3. Top Five Attributes and Their Related Consequences for Favorite Teachers from Personal Interview and Questionnaire (Agricultural Economics Students Only; N=135)

Top Five Attributes From Personal Interview	Top Four Consequences of Left Attribute	Top Five Attributes From Questionnaire	Top Four Consequences of Left Attribute
Dynamic Lecturer (58%)^a	Understand Material	Personable (47%)	Improve Class Focus
	Improve Class Focus		Commitment To Class
	Retain Material		Understand Material
	Valuable Education		Relationship With Professor
Personable (49%)	High GPA	Cares Students Learn (47%)	Understand Material
	Relationship With Professor		Retain Material
	Career Opportunities		Improve Class Focus
	Understand Material		Valuable Education
Clear Communicator (36%)	Understand Material	Clear Communicator (39%)	Understand Material
	High GPA		Retain Material
	Enhance Future Career		Commitment To Class
	Higher Salary		Improve Class Focus
Gets To Know Students (36%)	Relationship With Professor	Real-World Experience (35%)	Understand Material
	Commitment To Class		Confidence In Professor
	Understand Material		Improve Class Focus
	Enhance Future Career		Relationship With Professor
Cares Students Learn (36%)	High GPA	Gets To Know Students (33%)	Improve Class Focus
	Commitment To Class		Commitment To Class
	Understand Material		Confidence In Professor
	Enhance Future Career		Understand Material

^a Number in parenthesis indicates the percent of times the attribute is chosen among top four attributes in personal interviews or questionnaires. The consequences pertaining to each attribute in the personal interviews refer to both direct and indirect consequences, whereas the questionnaires contain only direct consequences. For this reason, percentages referring to the frequency of the consequences are not provided, as comparisons of the consequences across the interviews and questionnaires could be misleading.

to be a great teacher. Moreover, the similarity of desired consequences for teacher-attributes suggests that ambitious teachers may focus on the goals of improving class focus, understanding of the material, and commitment to the class in whatever fashion is best suited for their personality and class.

For teachers who are struggling to acquire the approval of their students, this study points to a few suggestions which are—fortunately—relatively easy to execute. Getting to know students personally, demonstrating a concern for student learning, and exhibiting personable character traits are simple notions that do not require an overhaul of a course structure, nor do they require a change in teaching style. Yet, these simple notions are among the most important characteristics when students describe great teachers.

should be sought not for popularity itself, but as a medium to inspire and encourage students. Indeed, students themselves assert they prefer a teacher who cares that they learn, gets to know students, and is personable; such teachers help students achieve their goals of focusing in class, understanding the material, and developing a personal relationship with the teacher. These are but intermediary goals which help students enhance their grades, improve their careers, and increase their salary—ultimately achieving happiness, financial success, and a sense of accomplishment. Though it may not be surprising that students also prefer teachers who communicate well and provide dynamic lectures, the strong evidence supporting this notion may help instructors commit to clarity and variety in the classroom.

Measured student preferences for teachers in this study are largely similar across major, how great teachers are defined, and how preferences are measured. This should not be interpreted to imply that all teachers must act and instruct the same way for students to consider them great teachers. The attributes of great teachers are defined rather vaguely, so that instructors of myriad personalities, class sizes, and class topics can achieve greatness in different manners. It is not required for teachers to obtain all the important attributes of a great teacher

Instructors of large classes should not bemoan the importance students place on getting to know the students. Discovering creative ways of connecting to students in a large class demonstrate more powerfully the instructor's desire for personal connections. One of the authors teaches a large class and begins each lecture with a Know Your Classmates activity, where one student is singled out (based on a student information sheet completed by the student) for discussion. The student's career interest is discussed and used to show how the impending lecture can be used in their desired occupation. This activity demonstrates a desire to know the students, and by demonstrating the usefulness of the course content it relays a sincere concern for student learning and gives them the motivation to commit to the class—recall that committing to the class is a consequence of getting to know students, which helps compensate for the inability to personally know each student in a large class. Know Your Classmates is a surprisingly popular activity, one that students promptly note if the instructor fails to do at the start of class.

Although becoming a dynamic lecturer may be difficult for some personalities, one can instead focus on the consequences of dynamic lecturers that students value: understanding and retaining the material and focusing in class. The fact that dynamic lecturer is

The Attributes

far less important in the questionnaire than the personal interview suggests an instructor who faces significant personal challenges in acquiring a “dynamic” trait may still become a great teacher through other means.

Acquiring the approval and respect of the class—one might even add, admiration—should not be thought of as a conflict to class learning. It is clear from the students that learning is a consequence of a caring, dynamic, and articulate teacher that students strongly desire. A set of attitudinal questions within the questionnaire supports this notion. A large majority of the agricultural economics and engineering students claim that their favorite teachers are also the teachers that impart the most learning. Students reject the notion that teachers must decide between having fun or learning in class, and state that they learn the most from their most entertaining teachers.

The most encouraging result from this study is that, among the various outcomes students seek in a class, learning the material is among the highest. To a large extent, students and teachers share the same goal. Learning can be measured, and the intricate assessment programs being developed at most universities and colleges seek to gauge and enhance learning. A teacher who achieves high levels of learning is no doubt a great teacher, but we assert that instructors should go one step further, and also seek the label of greatness from the students. Hopefully, this study will aide in this noble pursuit.

Literature Cited

- Acocella, A.R. 2002. Elementary school students' perceptions of the ideal teacher. Dissertation. Seton Hall University, 400 South Orange Ave, South Orange, NJ. 07079.
- Anonymous Students. 1955. My favorite college or university teacher. 3(4):78-83.
- Bain, K. 2004. What the best college teachers do. Harvard University Press: Cambridge, MA.
- Boyer, T.A., B.C. Briggeman, and F. Bailey Norwood. 2009. Demand for multimedia in the classroom. *Journal of Agricultural and Applied economics* 41(2009): 1-18.
- Duncan, M.J. and R.P. Precians. 1992. Award-winning university teachers' concepts of teaching. *Higher Education* 24(4): 483-502.
- Goldsmid, C.A., J.E. Gruber, and E.K. Wilson. 1977. Perceived attributes of superior teachers (PAST): An inquiry into the giving of teacher awards. *American Educational Research Journal* 14(4): 423-440.
- Grush, J.E. and F. Costin. 1975. The student as consumer of the teaching process. *American Educational Research Journal* 12(1): 55-66.
- Hoffman, R.W. 1963. Students portray the excellent teacher. *Improving College and University Teaching* 11(1): 21-24.
- Horan, M. 1991. Attributes of exemplary community college teachers: A review of literature. Educational Resources Information Center.
- Jones, J. 1989. Students' ratings of teacher personality and teaching competence. *Higher Education* 18(5): 551-558.
- Jones, J. 1981. Students' models of university teaching. *Higher Education* (10): 529-549.
- Kane, R., S. Sandretto, and C. Heath. 2004. An investigation into excellent tertiary teaching: Emphasizing reflective practice. *Higher Education* 47(3): 283-310.
- Kambua, S.C., L.A. Marks, J.L. Parcell, and M. Bredahl. 2006. Marketing biotech soybeans with functional health attributes. *Canadian Journal of Agricultural Economics* 54: 685-703.
- Makatouni, A. 2002. What motivates consumers to buy organic food in the UK? *British Food Journal* 104(3/4/5): 345-352.
- Mannan, G. and E.M. Traicoff. 1976. Evaluation of an ideal university teacher. *Improving College and University Teaching* 24(2): 98-101.
- Miele, M. and V. Parisi. 2000. Italian report on ladder- ing interviews. Department of Agricultural Economics. Pisa, Tuscany, Italy: University of Pisa.
- Miron, M. 1985. The 'good professor' as perceived by university instructors. *Higher Education* 14: 211-215.
- Miron, M. and E. Segal. 1978. The 'good university teacher' as perceived by students. *Higher Education* 7(1): 27-34.
- Miron, M. and E. Segal. 1986. Student opinion of the value of student evaluations. *Higher Education* 15: 259-265.
- Onwuegbuzie, A.J., A. Witcher, K.M.T. Collins, J.D. Filer, C.D. Wiedmaier, and C.W. Moore. 2007. Students' perceptions of characteristics of effective college teachers: A validity study of a teaching evaluation form using mixed-methods analysis. *American Educational Research Journal* 44(1): 113-160.
- Opulente, B.J. 1965. The great teacher is a creative individual. 13(2): 89-90.
- Phillips, J.M. and T.J. Reynolds. 1998. A hard look at hard ladder- ing. *Qualitative Market Research: An International Journal* 13(2): 83-99.
- Phoenix, C. 1987. Get them involved! Styles of high- and low-rated teachers. *College Teaching* 35(1): 13-15.
- Pogue, F.G. 1967. Students' ratings of the 'ideal teacher.' *Improving College and University Teaching* 15(2): 133-136.
- Reynolds, T.J. and J.C. Olson. 2001. Understanding consumer decision making: The means-end approach to marketing and advertising strategy. Lawrence Elbaum Associates: Mahwah, NJ.

- Rinn, F.J. 1981. Student opinion on teaching: Threat or chance for dialogue? *Improving College and University Teaching* 29(3): 125-128.
- Rodin, M. and B. Rodin. 1973. Student evaluations of teachers. *The Journal of Economic Education* (5): 5-9.
- Rokeach, M. 1973. *The nature of human values*. The Free Press: New York, NY.
- Russell, C.G., A. Busson, I. Flight, J. Bryan, J.A. van Lawick van Pabst, and D.N. Cox. 2004. A comparison of three laddering techniques applied to an example of a complex food choice. *Food Quality and Preference* (15): 569-583.
- Schindler, S. 1991. The Tao of teaching: Romance and process. *College Teaching* 39(2): 71-75.
- Shikiar, R. 1976. Student and faculty perceptions of teacher characteristics. *The Journal of Psychology* (92): 215-218.
- Slate, J.R., K. LaPrairie, D.P. Schulte, and A.J. Onwuegbuzie. 2009. A mixed analysis of college students' best and poorest college professors. *Issues in Educational Research* 19(1): 61-78.
- Ward, P.L. 1968. The teacher as an actor. *Improving College and University Teaching* 16(1): 6-7.
- William, B. and J. Tomlin. 1996. Best and worst university teachers: The opinions of undergraduate students. *College Student Journal* 30(4): 431.
- Younglich, A. 1955. Study on correlations between college teachers' and students' concepts of "ideal-student" and "ideal-teacher." *The Journal of Educational Research* 49(1): 59-64.



CURRENT REFLECTIONS

Toward Excellence in Teaching

Neil E. Harl

The formalized teaching-learning process is one of civilization's vital elements and one of the most fundamental to its survival. This is the route by which a rapidly growing body of theoretical principles, practical knowledge, and cultural heritage is transmitted from generation to generation. To be entrusted with the guardianship of a segment of that process is one of society's highest callings. Those of us who are fortunate enough to be involved in teaching undergraduates at a college or university need bow to no one when it comes to social significance of our efforts.

The Role of the Modern University

The dynamics of change in higher education with respect to knowledge generation and information dissemination warrant a review of the role of the modern university as a key element in the teaching-learning process. The university is our environment; it is the institution that is viewed with sufficient confidence by taxpayers (and contributors) to justify their expenditure of funds and by students to justify their expenditures of time. It is the institution that is viewed by students as having sufficient legitimacy to justify a life-long professional identification.

Not unlike the gross national product, population growth, the federal budget, and various other indicators of 20th century gigantism, institutions of higher education have become marvels of budgetary growth and diversity. Evidence of diversity within the university of today is everywhere — in public service programs launched, research undertaken, and courses of study offered. The pre-World War II president of an educational institution would be impressed and probably bewildered to see higher education in the late 20th century.

The easy conclusion would be that the size and diversity of institutions of higher education attest to the approbation lavished by a grateful and generous public. At no other point in history has the university possessed such vast resources. It can likewise be said that at no other point in history has the university shouldered such vast obligations.

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But that argument is too easily made and too quickly demolished to serve as a dependable scaffolding for higher education policy. Optimality of performance can scarcely be measured by viewing singularly the marginal productivity of what "is" in terms of extant programs. Assessment of what "might be" is elusive and troublesome — but vital if the highest level of stewardship is to be assured for the resources entrusted to higher education.

In its earnest attempt to be responsive to societal needs, the university is always in danger of losing sight of its own uniqueness as it functions in juxtaposition with government, foundations, and institutions in the private sector. (These are also evaluated on the basis of serving the same public.) With substantial public and private monetary support, in addition to student fees, and with some of the better minds in the world stabled in academia, institutions of higher education possess enormous capabilities. The possibilities for allocating those scarce resources are almost limitless.

Maintaining a sense of perspective as to the functions of the university that are vital to its continued uniqueness in terms of contribution to the human family should be an important criterion in the resource allocation process. For example, other institutions may be able to carry out part of the research function, possibly with unrivaled intensity and singleness of purpose. Others may be in a position to undertake public service activity, perhaps with greater efficiencies than could be attained by a university.

And this is not to say that research or public service are unworthy or inappropriate adjuncts of a great university. Their value to society is not seriously questioned. Rather, the point is that the one function that is central to the mission of the university is the renewal of civilization by developing the potential of creative minds capable of critical and independent thought, with the ability to communicate effectively.

This function has been the unique responsibility of higher education.

Not that learning, development of minds, creative thought, and detached criticism cannot take place elsewhere. They can, and do. But the university more than any other institution provides an environment for developing in its students creativity and the facility for critical thought —

- by insisting unswervingly upon integrity and objectivity in all it undertakes, with emphasis on disciplined and systematic inquiry;

- by assuring freedom to teach and to pursue inquiry even though some may perceive themselves or their interests personally disadvantaged thereby;
- by creating for its academic staff and students an environment of sensitivity to humanity and its problems; and
- by developing within its students an unanesthetized conscience and a sense of intolerance of injustice in any form.

The core of the university must continue to be the teaching function. Research and service are worthy, often complementary, and certainly research is a major part of the regenerative force within the university that enriches and makes more relevant the teaching function. Society has viewed favorably a wide array of activities for its great universities. Now, in responding to an almost endless litany of societal needs, the university should not lose sight of its most basic function, teaching.

The Educational Process: Desirable Qualities of Product Output

In our day to day efforts to do our very best teaching we sometimes lose sight of the basic development tasks we face as educators. We are charged, of course, with teaching subject matter content. For example, the agricultural economist must teach elasticity of demand, the theory of consumption, the principles of public goods and externalities, the nature and power of production function analysis and the theory of market structure, to mention the more obvious. But we are charged, implicitly, with more than that. The undergraduate years are a time for development, a time for building foundations. We know not what our students will be doing in 10 years or even five. We assume they will need to know something about our subject matter area or at least that they would find it to be useful.

But our sights should be set higher than that. I would mention three key abilities which every undergraduate should have on leaving the university. They will probably not possess these qualities or attributes unless we hold them up as beacon-like in importance.

1. The ability to think and to reason — creatively, analytically, thoroughly, and with reasonable alacrity. We in economics have jurisdictions over one of the most powerful and practical sets of analytical tools in existence. Few disciplines can boast of greater pragmatism in the application of subject matter to day to day life. This ability should be at center stage for every set of undergraduate teaching objectives worthy of the name.

Part of the ability to think and to reason is the quality of doing so with a restless intellect. It is important for students to have or to develop an insatiable curiosity and a sense of great impatience with the status quo. Effective educators can, I would submit, have an impact on the level of intellectual curiosity possessed by students —

- by encouraging students to search out the issues,
- by helping the students learn how to analyze those issues,

- by developing the ability to communicate the results of analysis clearly and effectively, and
- perhaps most importantly, setting a high standard for intellectual questing and curiosity. Our influence as a role model may be greater than we think, even at the university level. If students see the educator as having the qualities that are synonymous with intellectual curiosity, analytical ability, and effectiveness in communication, they are more likely to aspire to those same qualities which they admire and respect.

2. The ability to communicate in writing — accurately, precisely, and with a certain richness worthy of the language. Need for the ability to communicate in written form is not dead even though some teachers of high school and middle school English appear to have pronounced its benediction. There has never been a time when the ability to communicate was more important to individuals than now.

We all bear a special sense of responsibility for developing this ability in students. I am appalled and concerned at how little we expect of our students in terms of written exposition. It is unfair and unwise to assume that monitoring writing capability is someone else's problem. It's our problem because student development is our responsibility. If we do not expect students to write clearly, correctly, and in a readable manner, and do not insist that it be done, it probably won't be done. I would encourage every one of you to create opportunities for students to wax creative in written expression as part of your regular educational approach to development or revision of courses.

By not encouraging students to develop a finely honed set of writing skills, we may be contributing to the problem of inability to think and communicate in an even more subtle and pernicious way. If in our examining process and in other types of graded exercises we place a premium on memorization and give no rewards for or recognition of outside reading, we are helping the student who is not highly motivated to develop a feeling of great comfort with a limited intellectual horizon.

3. Finally, the ability to speak is an ability of obvious importance. Even in a time of increased use of the computerized communications process, the need for clear oral expression is great.

Many of our students are woefully unprepared to speak in public after four years of higher education. One of the major barriers to meaningful progress in this area, and in fact in all three areas, is class size. We pay a price for large section instruction even though we may impart technical subject matter with effectiveness comparable to that in small group instruction.

Qualities of a Successful Educator

For our purposes, I would like to disaggregate the teaching-learning function into three components: the student, the educator, and the instructional process that is created, molded, and shaped to accomplish the relevant educational objectives. Hopefully, the set of

relevant educational objectives includes the key abilities identified in the preceding section — the ability to think, the ability to write, and the ability to speak effectively.

Because our emphasis here is on the instructional process from the instructor's vantage point, I have chosen to emphasize those aspects here and to devote relatively less time to the student and the student's role except as it bears upon the effectiveness of the educator and the instructional process.

Essential qualities

Excellence in instruction is, in many ways, difficult to define and even more difficult to subject to a Procrustean bed of guidelines. Yet there are certain features of excellence in instruction that seem to cry out for recognition.

1. First, to know the subject matter is not enough to be an excellent teacher; but it is a vital component and no one can be a truly excellent teacher who has not fully mastered the subject matter to be taught on a level appropriate for the students. For this quality of an excellent instructor there is no meaningful substitute.

2. Second, to be able to communicate effectively with students is not enough but it is an essential component. Again, it is a necessary but not a sufficient condition for excellence in teaching. Yet were I faced with a highly knowledgeable individual who could not teach effectively or a highly effective educator who lacked subject matter understanding, I would easily choose the former, assuming the prospects for remedial activity were equally grim in both instances.

3. Third, excellence in instructors is often characterized by a great, boundless, infectious enthusiasm for the subject matter, its potential societal contribution, and its prospects for aiding in the development of the students. A truly outstanding instructor often views teaching as one of life's great pleasures, not a sentence to be carried out while tenure and promotion are being earned so that the individual can go on to higher and better things.

4. Fourth, a successful educator demonstrates a continuing interest in students and a willingness to meet students where they are. The most crucial time in take off of a modern jet airplane is in the first 30 seconds after commencement of the take-off roll. Similarly, the most crucial time in the formal educational process is during the first three minutes of class time. Students enter the classroom worried about the physics examination from the last hour, anticipating the coke break the next hour, and already thinking ahead to the chemistry lab after lunch. With all of that excess mental baggage weighing down the student, it's no wonder that the first three minutes may fail to lift that student into an appropriate intellectual orbit. And if that does not occur, the entire hour may be an aborted educational journey to nowhere. The educator should insure that students are brought quickly into a learning posture. This is where the excellent teacher makes the intellectual bells ring and the lights flash. There should be no doubt in anyone's mind

at the end of the first three minutes of the class that this will be an exciting intellectual venture. This is when the instructor needs to identify and bring into focus the linkages of the subject matter to the real world, for it is the real world from which the students have come and it is the real world to which the students will return.

The task of establishing linkages to the real world isn't just an introductory task for the first two or three minutes of class time — it is a continuing task throughout the classroom experience. A good argument can be made that genuine learning has not taken place unless even the abstract rule or proposition can be applied by the student in some meaningful, real world setting. It is not enough to be able to parrot the formulae for deriving point elasticity of demand unless the student has some grasp of the application of the concept, for example.

5. Fifth, a successful educator elevates his or her sights above single minded attention to the subject matter alone, and devotes attention to how the subject matter can be made more interesting. This may be partly a matter of making use of the various teaching technologies, as discussed in the next section, or it may be nothing more complicated than variations in speech or gestures. Dullness probably has no rival or peer in killing intellectual interest.

6. Sixth, an excellent instructor not only assures that the student has ready access to adequate support material but also encourages students by precept, example, and otherwise to make full use of available supporting material in the quest for additional grist for the analytical mill.

7. An especially important point for those of us in major universities is that the effective educator works at personalizing the educational process in an impersonal environment. For example, working with students outside the lecture room may be the only way to elevate the slowest students to some minimum level of competence and to challenge the brightest students to the outer limits of their abilities. A good educator makes every student in a class feel important even though each operates at a different ability level. Our challenge is to expand the capacity and confidence of students, those lumbering through the educational wilderness as well as the star performers sprinting on a fast intellectual track.

8. Finally, an excellent teacher is professional within and without the classroom. Although differences of view exist as to what constitutes a professional approach, and each instructor should develop an individual credo for guidance, at a minimum it is suggested that attention be given to assuring that the approaches taken to the teaching-learning process be nonsexist and devoid of offensive material otherwise. Appropriate anecdotes and illustrative stories with humor can be effective adjuncts to a teaching program; offensiveness can never be.

It is also suggested that a professionally minded educator deals with other professionals on a professional basis, without disparaging remarks or a trace of intellectual arrogance.

Qualities of Successful Instruction

It has been the practice at least since the time of the ancient Greek philosophers that an instructor should lecture to students, under the premise that the instructor is the more knowledgeable, and that students should dutifully and laboriously take notes of what is said. That pattern continues to be the dominant information delivery mode despite decades of research on effectiveness in communication that have identified potential improvements to the traditional lecture approach. It would be impolitic, impertinent, and improper to specify a model instructional approach; that is a matter for the educator to determine in light of the educational environment, the strengths of the instructor, the unique features of the students, and the nature of the subject matter being taught. It is possible to identify some of the potential components of a successful instructional plan.

A successful instructor makes use of every available technique that could be used to enhance teaching effectiveness. In particular, this involves utilizing as many of the senses as possible. In addition to making use of the students' ability to hear in processing information selectively for storage between the left ear and the right, it involves the student's ability to see. Through multiple delivery techniques, the instructor can fortify, emphasize, clarify, and extend the concepts under discussion.

- Where possible to do so, the use of colored slides can be used to highlight and to emphasize points as well as to dramatize and to portray complex concepts that are difficult for the student to grasp. If a relationship, principle, or concept can be visualized, the learning process is generally facilitated, sometimes very substantially.

Colored slides can also be used to bring the real world into the classroom and to maintain a continuous linkage to real world problems. Moreover, artful use of color and form can add contrast to classroom presentations. The technology for the use of slides in the classroom is relatively simple and inexpensive.

- Videotape is a highly flexible tool that can be used to portray subject matter in expert fashion. Especially for concepts used repeatedly, a substantial investment can be justified in preparing videotape segments for use in the classroom and for later reuse by the students individually.

Unfortunately, videotape is not an inexpensive supplemental technology but rather requires a significant capital commitment for necessary production and playback equipment.

- Although it can be over used, the use of transparencies with overhead projectors can be a helpful educational technique and can be as simple or as elaborate as desired by the instructor. Again, the overhead projector technique can be used to illustrate, to emphasize, to visualize, and to clarify.

- The audiotaping of classroom presentations can be an effective teaching device. The taping process can be handled unobtrusively with cassette copies made

available at a central media library location for use by students — (1) as an opportunity for repetitive and error-free coverage of the subject matter and (2) as an opportunity for initial and repetitive coverage of those, for whatever reason, who found it necessary to miss class. In addition to being more accurate than even the most complete class notes, audiotape can be used by students to recreate difficult or vague parts of classroom presentations with a vividness not otherwise attainable short of in-class videotaping of presentations.

Audiotaping is a relatively low cost technology with the major cost being for mastering and reproduction of cassettes. Cassettes can, of course, be reused. Moreover, it is generally not necessary to retape for each term unless the subject matter change is sufficient to warrant retaping.

For teachers who do not have an extension appointment, many valuable instructional aids can often be obtained from extension educators making use of such techniques.

For all educators, instructional aids and techniques should be orchestrated singly or in combination to produce maximum educational effectiveness. Uncoordinated and unplanned use of educational techniques can actually be counterproductive.

Sharing Instructional Techniques

Although it is indeed desirable to develop one's own set of instructional aids where that is possible, much could be gained from sharing instructional ideas, concepts and technologies on a "common market" basis. It should not be necessary for each instructor at each institution to redevelop instructional materials if materials of equal or better quality could be obtained at less cost from another instructor or institution. If an institution invests sufficient time and capital to develop a highly effective videotape on the concept of the social and private discount rates, it may not be necessary for that effort to be replicated elsewhere. For budget-conscious administrators who are sensitive to balance of trade considerations, if preparing materials for export costs five percent more, an administrator should be indifferent if the use of one item is obtained for every 20 exported. A "common market" approach to sharing educational materials should be cost effective for every participating institution.

Conclusion

For each of us, we must keep at least the basic parameters well in mind for a personal educational plan for the 80's. The guiding objectives must necessarily be influenced by your own institutional environment. I would hope that prominent among those objectives is a commitment to genuine educational excellence in developing in students the capacity and desire for creative thought, the ability to communicate effectively in writing and the ability to communicate well in oral expression.

What Is Critical Thinking?

Critical thinking is a rich concept that has been developing throughout the past 2500 years. The term "critical thinking" has its roots in the mid-late 20th century.

Critical thinking is the intellectually disciplined process of actively and skillfully conceptualizing, applying, analyzing, synthesizing, and/or evaluating information gathered from, or generated by, observation, experience, reflection, reasoning, or communication, as a guide to belief and action. In its exemplary form, it is based on universal intellectual values that transcend subject matter divisions: clarity, accuracy, precision, consistency, relevance, sound evidence, good reasons, depth, breadth, and fairness.

It entails the examination of those structures or elements of thought implicit in all reasoning: purpose, problem, or question-at-issue; assumptions; concepts; empirical grounding; reasoning leading to conclusions; implications and consequences; objections from alternative viewpoints; and frame of reference. Critical thinking — in being responsive to variable subject matter, issues, and purposes — is incorporated in a family of interwoven modes of thinking, among them: scientific thinking, mathematical thinking, historical thinking, anthropological thinking, economic thinking, moral thinking, and philosophical thinking.

Critical thinking can be seen as having two components: 1) a set of information and belief generating and processing skills, and 2) the habit, based on intellectual commitment, of using those skills to guide behavior. It is thus to be contrasted with: 1) the mere acquisition and retention of information alone, because it involves a particular way in which information is sought and treated; 2) the mere possession of a set of skills, because it involves the continual use of them; and 3) the mere use of those skills ("as an exercise") without acceptance of their results.

Critical thinking varies according to the motivation underlying it. When grounded in selfish motives, it is often manifested in the skillful manipulation of ideas in service of one's own, or one's groups," vested interest. As such it is typically intellectually flawed, however pragmatically successful it might be. When grounded in fair-mindedness and intellectual integrity, it is typically of a higher order intellectually, though subject to the charge of "idealism" by those habituated to its selfish use.

Critical thinking of any kind is never universal in any individual; everyone is subject to episodes of undisciplined or irrational thought. Its quality is therefore typically a matter of degree and dependent

on , among other things, the quality and depth of experience in a given domain of thinking or with respect to a particular class of questions. No one is a critical thinker through-and-through, but only to such-and-such a degree, with such-and-such insights and blind spots, subject to such-and-such tendencies towards self-delusion. For this reason, the development of critical thinking skills and dispositions is a life-long endeavor.

Source: A statement by Michael Scriven and Richard Paul presented at the 8th Annual International Conference on Critical Thinking and Education Reform, Summer 1987.

Another Brief Conceptualization of Critical Thinking

Critical thinking is self-guided, self-disciplined thinking which attempts to reason at the highest level of quality in a fair-minded way. People who think critically consistently attempt to live rationally, reasonably, empathically. They are keenly aware of the inherently flawed nature of human thinking when left unchecked. They strive to diminish the power of their egocentric and sociocentric tendencies. They use the intellectual tools that critical thinking offers – concepts and principles that enable them to analyze, assess, and improve thinking. They work diligently to develop the intellectual virtues of intellectual integrity, intellectual humility, intellectual civility, intellectual empathy, intellectual sense of justice and confidence in reason.

They realize that no matter how skilled they are as thinkers, they can always improve their reasoning abilities and they will at times fall prey to mistakes in reasoning, human irrationality, prejudices, biases, distortions, uncritically accepted social rules and taboos, self-interest, and vested interest. They strive to improve the world in whatever ways they can and contribute to a more rational, civilized society. At the same time, they recognize the complexities often inherent in doing so. They avoid thinking simplistically about complicated issues and strive to appropriately consider the rights and needs of relevant others. They recognize the complexities in developing as thinkers, and commit themselves to life-long practice toward self-improvement. They embody the Socratic principle: The unexamined life is not worth living, because they realize that many unexamined lives together result in an uncritical, unjust, dangerous world.

Source: Linda Elder, September, 2007

Critical Thinking Defined

The ability to think critically involves three things: (1) an attitude of being disposed to consider in a thoughtful way the problems and subjects that come within the range of one's experiences, (2) knowledge of the methods of logical inquiry and reasoning, and (3) some skill in applying those methods. Critical thinking calls for a persistent effort to examine any belief or supposed form of knowledge in the light of the evidence that supports it and the further conclusions to which it tends. It also generally requires ability to recognize problems, to find workable means for meeting those problems, to gather and marshal pertinent information, to recognize unstated assumptions and values, to comprehend and use language with accuracy, clarity, and discrimination, to interpret data, to appraise evidence and evaluate arguments, to recognize the existence (or non-existence) of logical relationships between propositions, to draw warranted conclusions and generalizations, to put to test the conclusions and generalizations at which one arrives, to reconstruct one's patterns of beliefs on the basis of wider experience, and to render accurate judgments about specific things and qualities in everyday life.

Source: Edward M. Glaser, *An Experiment in the Development of Critical Thinking*, Teacher's College, Columbia University, 1941.

The Concern

Why should critical thinking even be a concern? Here is the problem: Everyone thinks; it is our nature to do so. But much of our thinking, left to itself, is biased, distorted, partial, uninformed or down-right prejudiced. Yet the quality of our life and that of what we produce, make, or build depends precisely on the

quality of our thought. Shoddy thinking is costly, both in money and in quality of life. Excellence in thought, however, must be systematically cultivated.

A Short Definition

Critical thinking is that mode of thinking - about any subject, content, or problem - in which the thinker improves the quality of his or her thinking by skillfully taking charge of the structures inherent in thinking and imposing intellectual standards upon them.

A well cultivated critical thinker:

- Raises vital questions and problems, formulating them clearly and precisely;
- Gathers and assesses relevant information, using abstract ideas to interpret it effectively comes to well-reasoned conclusions and solutions, testing them against relevant criteria and standards;
- Thinks open-mindedly within alternative systems of thought, recognizing and assessing, as need be, their assumptions, implications, and practical consequences; and
- Communicates effectively with others in figuring out solutions to complex problems.
- Critical thinking is, in short, self-directed, self-disciplined, self-monitored, and self-corrective thinking. It presupposes assent to rigorous standards of excellence and mindful command of their use. It entails effective communication and problem solving abilities and a commitment to overcome our native egocentrism and socio-centrism.

Source: Richard Paul and Linda Elder, *The Miniature Guide to Critical Thinking Concepts and Tools*, Foundation for Critical Thinking Press, 2008

Green Morality: Mankind's Role in Environmental Responsibility

By Edward Flattau. 2010. *The Way Things Are Publications*. Hard cover, 279 pages, \$29.95, ISBN 9780982141922

In *Green Morality*, Edward Flattau has written a scathing treatise against our economic, social, and moral choices that contribute to widespread environmental destruction. Flattau has issued a rousing call for humanity to meet its moral obligation of sustainability. Flattau's newest book uses countless examples to document that we are woefully short of meeting our moral imperative. As renowned 40-year syndicated environmental columnist, Flattau has ample examples to demonstrate our environmental mishaps and destruction. Expounding on instances of corporate and political green-washing, Flattau's polemic on leaders who make unsustainable decisions for economic gain exposes the urgent need for a realignment of our values, policies, and lifestyles.

Flattau takes a global perspective on our environmental problems focusing on both western lifestyles of consumption and waste coupled with the environmental impacts of population growth. He delicately weaves together interrelated issues such as women's rights, private property, corporate responsibility (or lack thereof), and political finance to illustrate how such seemingly disparate issues affect the health of human and environmental communities. Yet for all the negative environmental behaviors, Flattau does not ignore acts of courage by politicians and citizens that have succeeded in protecting environmental resources. Michael Bloomberg, New York City mayor, is noted for his willingness to outline 'specific and attainable' objectives to make New York City the "first environmentally sustainable metropolis." Other, less well known figures, are lauded by Flattau including Joe Mehrkens. Mehrkens was a U.S. Forest Service employee so dismayed by the agency's management of our national forests that he quit his job to join an environmental organization critical of his former employer.

Green Morality offers countless examples of environmental destruction. However, at times Flattau's presentation of individual incidents or behaviors makes for choppy reading. For example, Chapter Nine 'All Things Equal' begins discussing environmental elitism and ends with a polemic on how a cost benefit analysis used by the Bush administration to set air pollution standards was unfair to senior citizens. Additionally, a narrow use of biological information to denounce human behavior is short-sighted, at best. For example, Flattau

laments our treatment of senior citizens; equating nursing homes with abandonment. Lions, he contends, never send their elderly 'out to pasture' and therefore exhibit more compassion than some humans. However, after displacing or killing a pride's male, the new alpha male will also kill all baby cubs not his own. It is a slippery road to compare the actions of animals to the actions of humans, especially when the purpose of the book is to examine morality. Lastly, while some of the book has appropriate citations, too many statements lack the necessary references to make valid arguments.

Flattau's book advances a critical topic for the 21st century; environmental moral responsibility. Everyone, from environmental professionals to policy makers and everyday citizens, should have the information presented in *Green Morality* and the opportunity to discuss its implications. However, the disjointed nature of the book may prompt instructors to pull excerpts for classroom discussion rather than utilize the text in full. Flattau's manifesto creates a bleak picture of our past actions, but let us hope that through works such as *Green Morality*, our future behaviors can meet our moral obligation to the environment and each other.

Courtney Quinn
University of Nebraska - Lincoln

Animal, Vegetable, Miracle: a Year of Food Life

By Barbara Kingsolver, with Steven L. Hopp, and Camille Kingsolver. 2007. *Harper Collins*, New York. 370 pp., cloth, \$26.95, ISBN 978-0-06-085255-9.

Only Barbara Kingsolver could make a one-year family locovore experience into a readable and compelling adventure. Just as any major conversion in behavior begins in the mind, their decision to depend almost entirely on the home garden, farmers market, and other local sources was based on long-held concerns about the health and safety of what is supplied by the global food industry. With some conventional wisdom gleaned from grandparents and experience growing up in a rural area, the first author combines resources from the library and the web with common sense and a strong commitment to reduce their reliance on outside food. The goal was to achieve an independence from the multinational corporations by raising food and developing a local network of sources for things they could not produce on their small farm in the foothills of Virginia.

What ensues is a year-long quest for a balanced and healthy diet based on the vegetables and fruits, the eggs and poultry, and the wild species gathered on their farm or purchased nearby that could be coaxed into an imaginative and nutritious series of meals. It was no small task to overcome the longing for some prepared foods, the bananas that represented corporate greed and exploitation of farm labor in another country, and the guilt at not giving up coffee ... at least this last luxury was Fair Trade© and organic. But true to their ideals, the family persevered and discovered a new frontier that resembled in many ways what their ancestors had enjoyed for decades before the age of fast food. They also found joy and pride in growing food for their own needs and sharing with others, and they did not lose weight as some have in this conversion.

Starting with the first shoots of wild asparagus gathered from the fields, working through the early greens and cherries as the first fruits to appear, to the mid-summer onrush of zucchini and tomatoes, and on to the joy of fall harvest and the food festivals of the season, this is a celebration of local food and indigenous knowledge. But the locovore of today also surfs the web for details on how to produce these local foods, where to find ideas on creative ways to produce, prepare, and preserve them, and how to combine the age-old wisdom of food and culture with the latest on nutritional research. Eating foods in season was a basic principle of the adventure, as well as canning, freezing, drying, and storing what would be needed through the hungry time of winter.

Rich in technical detail, *Animal, Vegetable, Miracle* also reflects a year of thoughtful scholarship that brought experiential learning and immersion in the context of the food-producing farm to a new level. From botanical detail that reflects the author's background in biology to research on the mating habits of turkeys that have long lost their natural instincts to reproduce, the book is a treasure trove of ideas for the home gardener, whatever degree of self-reliance she or he intends to achieve.

For this reviewer there was an initial disappointment that this Barbara Kingsolver book was not going to provide the mishaps of the missionary adventure in Zaire (*Poisonwood Bible*), any historical depth and exciting connections to Frida Kalo, Diego Rivera, and Leon Trotsky (*The Lacuna*), or the heart-rending personal stories of the poor and oppressed (*The Bean Trees* and other early novels). What was found was an in-depth and thoughtful vision of organic farming and local food systems, made real by one family's example and the articulate writing of Ms. Kingsolver. This would be an excellent book for a course in organic farming, in applied ecology, or in anthropology. Based on contemporary and real-world experiences in the U.S. food system, it provides an alternative to the Fast-Food Nation that we have become. When one reads that the current generation of children in this country will be the first

in our history to have a shorter life expectancy than their parents, that there is an epidemic of obesity, and that even our schools are purveyors of addictive high-sugar drinks, candy snacks and fried foods, it is vital that we seek alternatives. Barbara Kingsolver provides us with viable options, told in a clear and often amusing way, putting a very human dimension into the local food we could eat. The book is highly recommended for its content and readability ... some who take this adventure will never eat the same again.

Charles Francis
University of Nebraska – Lincoln

Canine and Feline Behavior and Training

By Linda P. Case, copyright 2010, Delmar, Cengage Learning, paperback; 332 pages, approximate cost \$85, ISBN-13: 978-1-4283-1053-7, ISBN-10: 1-4283-1053-3

This is an excellent book. I say that both as a person who teaches Intro to Animal Science at a university and as a person who has 4 dogs and 3 cats at home. The book is well-written, easy to read, and is authored by a highly qualified university instructor who provides ample references at the end of each chapter and sidebar. In addition to being in a logical format with a comprehensive Table of Contents and Index, this book provides sidebars and pictures to illustrate points. It is enjoyable to read, and I plan to recommend it to my students and also to my animal-loving friends and colleagues.

This book will be useful to college instructors, instructors of advanced high school students, dog and cat behavior specialists and trainers, and any people with a general interest in dog and cat behavior. Readers who do not have a background in Animal Science or a medical profession may need to spend some time looking up words that are not in the glossary, such as sebaceous glands, interdigital glottis, premolar, mitochondrial DNA, perineal region, etc. The level is fine for college students, but may be a little advanced for high school students.

Most books are species-specific, but millions of people have both dogs and cats in the same household. It is important to know the natural behavior of each species, but it is also refreshing to read this book and appreciate the interactions between these two species whose ancestors did not socialize together.

The book is divided into three sections. The reader first learns about the history of domestication of dogs and cats and how the relationship between these animals and humans is rooted in natural behavior. By understanding this, the reader can then progress to the section that describes how dogs learn, how cats learn, and how our interactions with these animals will impact their behavior. The author describes how to interact with dogs and cats in a way

Book Reviews

that will result in favorable animal behavior (good manners).

The final section of the book covers some behavioral problems that dog and cat owners may encounter. By this point, the reader understands the natural behavior and can understand what leads to "bad behavior" in dogs and cats. The author's solutions to behavioral problems are scientifically based, thoroughly explained, and can be practiced by pet owners everywhere. The solutions utilize positive interactions with the pet that successfully result in behavioral changes, and the book constantly emphasizes that old-fashioned punishment is not needed and is not appropriate.

The only slightly negative comment I have about this book is that the sidebars are inserted in the middle of the text and are in the same font. I found this to be a little bit disruptive, and would prefer to have the sidebars truly along the side or in separate boxes that are clearly defined. (The sidebars do have a slightly yellowed background, but I did not notice

that in the dim reading light I was under for the first few chapters.) I will say that the sidebars are very interesting and add important information in a fun way.

The author's ample knowledge, clear and smooth writing style, and gift for explaining concepts make this an excellent book to be used in a classroom or to be read at home. The author of this book teaches dog and cat behavior at the University of Illinois College of Veterinary Medicine, and she has written other books about dog behavior and cat behavior. I highly recommend this book to people who teach animal behavior and to others who are interested in a practical approach to dog and cat behavior.

Jeannette A. Moore
North Carolina State University

50+/- Years ago (Volume V, No 2, 1961)

In their article on the “Role of the Agricultural Research in NACTA Colleges” Burton and DeVau discussed the value of undergraduate research. “One of the most important responsibilities of the teacher is to help students clarify their values and to teach them to think critically more effectively. A technique which may be used to accomplish this responsibility, particularly with the more gifted student, is the utilization of student research projects. One purpose of student research is to provide an opportunity for the able student to achieve a greater depth in learning than possible in an ordinary classroom situation. Providing an opportunity for students to achieve a greater depth of learning is vital in teaching them to think critically and developing versatile minds capable of dealing with the social, economic, and political problems of our era.”

It's amazing how similar the view is today as we encourage undergraduate research, critical thinking, and how to deal with “the social and political problems of the era.”

30 Years Ago (Volume XXIV, No. 4)

In the **Current Reflections** section of the December issue of the NACTA Journal in 1980 Dr. Neil Harl from Iowa State wrote an article titled “Toward Excellence in teaching.” An excerpt about the role of the university states, “Maintaining a sense of perspective as to the function of the university that are vital to the continued uniqueness in terms of contribution to the human family should be an important criterion in the resource allocation process. For example, other institutions may be able to carry out part of the research function, possibly with unrivaled intensity and singleness of purpose. Others may be in a position to undertake public service activity, perhaps with greater efficiencies than could be attained by a university. And this is not to say that research or public service are unworthy or inappropriate adjuncts of a great university. Their value to society is not seriously questioned. Rather, the point is that the one function that is central to the mission of the university is the renewal of civilization by developing the potential of creative minds capable of critical and independent thought, with the ability to communicate effectively. This function has been the unique responsibility of higher education. This is not to say that learning, development of minds, creative thought, and detached criticism cannot take place elsewhere. They can and do but the university

more than any other institution provides an environment for developing in its students creativity and the facility for critical thought—.” (Editor's note: Harl's article is the featured reprint in this issue of the NACTA Journal.)

Food for thought as we compete for funds in difficult economic times, and need to explain the role and value of the residential university and its value to society.

20 Years Ago (Volume XXXIV, No. 4)

Dr. Dan Eversole contributed an article published under the **Communication Skills** section of the December 1990 NACTA Journal entitled, “Video Provides Essential feedback for Course in Livestock Judging.” His ideas about the use of the new technology, the video camera, and traditional training in livestock judging reasons follows, “My philosophy in training livestock judging students is to develop their ability to think, reason, and communicate with others. Because of the diverse background among students, the basic fundamentals and skills of livestock evaluation and selection are established first in the teaching process. Once these fundamentals are established in the minds of my students, I proceed in the expansion of their livestock terminology and begin developing their written and oral communication skills in livestock judging....The inability of college graduates to communicate effectively is recognized by educators and employers as a primary factor that hinders job performance. It has been my experience that livestock judging students are provided opportunities to expand their critical decision- making and communication skills which are necessary for job survival. One educational technique that I found to be effective in developing advanced interpersonal skills among livestock judging students is the use of video. Videotaping oral reason presentations is a unique learning experience that allows graphic feedback and self-evaluation. Students are able to critique their style of delivery and witness any mannerisms such as eye contact, head bobbing, or poor enunciation which is distracting. Video is an excellent instructional medium to illustrate the importance of voice inflection and the persuasiveness of oral reason delivery.”

This article illustrates a specific experiential learning experience that Harl alluded to in his article published 10 years before (above).

10 Years Ago (Volume 44, No. 4)

From **Teaching Tips** in the December 2000 NACTA Journal, Lynne Hamilton, former Regional Director for the West suggests, “The most important day of class is the first one. That day you have a golden opportunity to set the tone of the class, and to get your students excited about learning. In addition to going over the syllabus, text, and course objectives, it is well worth the time to allow both you and the students to get to know each other a bit. I ask students to pair up with the person across the aisle from them and give them a short list of questions to

ask each other: typically their name, hometown major, year in school, hobbies, as well as a “fun” question, like what they did over quarter break. They talk about five minutes. Afterwards I ask each pair to introduce each other. This helps in several ways. The students on the first day now know at least one person in class and feel more comfortable.”

This short tip rounds out the theme of communication and student development.



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Teaching Award of Merit June 2009-2010



<i>Name</i>	<i>Institution</i>
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James J Riley	The University of Arizona
James A Ottea	Louisiana State University
George Fitzpatrick	University of Florida
Lisa Shinn	Northeastern Junior College, Sterling, CO
Crystal Groesbeck	Delaware Valley College, Doylestown, PA
Tom H Shellhammer	Oregon State University
Charles F Rosenkrans, Jr	University of Arkansas, Fayetteville
Stephen Devadoss	University of Idaho
William Hoch	Montana State University
Philip Smartt	University of Tennessee-Martin
Maria Boerngen	Lake Land College, Mattoon, IL
William Moore	Abraham Baldwin Agricultural College, Tifton, GA
Jeanna M Serb	Iowa State University
James Palmieri	University of Connecticut
David Kopsell	Illinois State University
Beth Helen Rice	University of Vermont
Laurie Abbott	New Mexico State University
Rachel Watson	University of Wyoming
Heidi Wengreen	Utah State University
O L Robertson	Murray State University, KY
Paul C Siciliano, Jr	Purdue University, IN
Nicholas Low	University of Saskatchewan
Matthew J Gray	University of Tennessee, Knoxville
Garald L Horst	University of Nebraska-Lincoln
Herman A Sampson III	North Carolina State University
Kenneth Fugelsang	California State University, Fresno
Martin Wiedmann	Cornell University, New York
Peggy C Papathakis	California Polytechnic State University, San Luis Obispo
Louis Harveson	Sul Ross State University, Alpine, TX
Steve Kelm	University of Wisconsin-River Falls
Brad Ramsdale	Nebraska College of Technical Agriculture
Lisa Kessler	California State Polytechnic University-Pomona
Bodo Steiner	University of Alberta
Harold Taylor	Longwood Gardens, Kennett Square, PA

Graduate Student Teaching Award of Merit June 2009-2010



<i>Name</i>	<i>Institution</i>
Bernard Seigfried	University of Alberta
Susan Robertson	University of Alberta
Guinevere Z Jones	University of Wyoming
Rachael Smith	Murray State University, KY
Nathan Haislip	University of Tennessee, Knoxville
Amy Wilson	Sam Houston State University, TX
Erica Lassiter	North Carolina State University, Raleigh
Brian Henriott	California Polytechnic State University, San Luis Obispo
Chris Pipes	Sul Ross State University, Alpine, TX

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University of Minnesota-Crookston, Crookston, MN
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