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A Case Study of Using Electronic Self-Assessment Rubrics in a Core Curriculum Writing Course

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Abstract

Writing is a necessary skill for graduates of colleges of agriculture. The purpose of the non-experimental, case study, guided by Bandura's theory of self-efficacy (1986, 1994, 1997), was to describe the use of self-assessment electronic rubrics in a university core curriculum writing course at Texas A&M University in the College of Agriculture and Life Sciences. Findings revealed that students' ability to accurately assess their score using an electronic rubric increased during the semester. Additionally, students' perceived and rubric-guided scores for all four constructs—Idea and Content Development, Style, Organization and Conventions—increased throughout the semester. Over time students' perceived and rubric-guided scores were within 0.56 points of each other indicating that students became better assessors of their own writing and more confident in their writing abilities. More research needs to be done on how instructors of university core curriculum writing courses can use self-assessment to enhance the learning process and help students understand writing as a process.

Introduction

Writing competence is a necessary skill in the 21st century. The Office of Undergraduate Studies at Texas A&M University (2011) has claimed that students will graduate with the oral and written communication skills they need to communicate effectively. However, the National Commission on Writing (2003) presented a differing point: Writing education is ignored and not considered an integral part of the classroom environment. "*American education will never realize its potential as an engine of opportunity and economic growth until a writing revolution puts language and communication in their proper place in the classroom"* (p. 3).

Universities and colleges admit students who do not have proficient writing skills as defined by the 2007 National Writing Report Card (Salahu-Din et al., 2008) while employers' communication needs are becoming greater (Peddle, 2000). This leaves an even larger gap between the writing abilities of students entering college and the needs of employers and graduate programs—students exiting college and entering the workplace or pursuing graduate education. Yet, universities and colleges (e.g., Marymount University, Tulane University, University of Missouri, Texas A&M University and Colorado State University) continue to require students to enroll in writing courses in an effort to improve written communication skills.

Assessment is an important component of the teaching and learning process and has the potential to improve instruction and student learning, but educators often times have the wrong mindset about why and how to assess students (Guskey, 2003). Limited time and resources can restrict instructors' ability to teach and assess students' writing abilities (Andrade, 2008; Cho and Schunn, 2010). Assessments should be used as a tool to gain an understanding of what the students know so information can be clearly explained (Guskey, 2003). Writing is a process learned through consistent writing, assessment and feedback (Cho and Schunn, 2010; White, 1991); it is more than rules (White, 1991).

Writing can be assessed using a variety of formative and summative assessments including self-assessment (Andrade, 2008; Boud, 1991; McDonald and Boud, 2003). Andrade (2008) claimed feedback is an important part of formative assessment and just as valuable when given by the students themselves if the right conditions exist. Boud (1991) stated self-assessment is the process of students judging their own work based on criteria

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presented by the course instructor. It is more than grading; it is evaluating writing on the basis of knowing what good writing is (Andrade, 2008). Although Kitsantas et al. (2004) stated "self-evaluation is a valuable learning tool" (p. 285) that could enhance students' performance, attitudes and self-efficacy, Andrade and Boulay (2003) found self-assessments did not improve students' writing. The latter authors believed, however, that facilitating revisions based on the criteria presented in the assessment and summoning students' help in designing the assessment could lead to more effective writing programs and develop reflective writers.

Using self-assessment gives students an opportunity to identify and recognize what they need to work on and improve (Andrade, 2008; Bruce, 2001). Students who assess their own work can identify and correct mistakes before completing an assignment (Kitsantas et al. 2004). Self-assessment exercises help students perform better than their counterparts who do not participate in self-assessment exercises (Kitsantas, et al. 2004).

Conceptual Framework

Bandura's theory of self-efficacy (1986, 1994, 1997) provided conceptual guidance for this descriptive case study. According to Bandura (1997), self-efficacy is defined as the "beliefs in one's capabilities to organize and execute the course of action required to produce given attainments" (p. 3). Additionally, self-efficacy is influential in a person's choices, efforts, perseverance, actions, resilience, thoughts, reactions and achievements (Bandura, 1986). Writing is about the process through which students develop confidence in their ability but not about the product or the end result (White, 1991). Mastering experiences helps students feel more confident in themselves and their abilities (Bandura, 1994).

Students entering their collegial years are transitioning from pedagogy to andragogy where self-directed learning begins (Knowles et al., 2005; Merriam, 2001). Self-efficacy is an essential component in the transition from childhood to adulthood, development of adults and achievement of success (Bandura, 1994). In each stage of development, humans should begin to take responsibility for their lives, successes and challenges (Bandura, 1994). Kitsantas et al. (2004) found that self-evaluation had a positive impact on students' self-efficacy. Students gain a deeper understanding of themselves and of their strengths and weaknesses during the self-assessment process (Bruce, 2001) and that understanding is an important part of the realization of themselves and self-directed learning (Merriam, 2001). Students who are not satisfied with their educational outcomes within a certain area may be reluctant to pursue more opportunities in that area because of their fear of failure or negative impacts (Kitsantas et al. 2004). In addition, students' confidence in themselves and their abilities can be linked to instructor's feedback (Nicholson et al. 2011).

The classroom has transitioned from a teacher-centered environment to a more student-centered (Catalano and Catalano, 1997), self-directed (Merriam, 2001) learning environment. Further, separating good information from bad information (Brew, 1999) and disseminating knowledge through oral and written communication channels are necessary skills in the 21st century workforce, government and society (National Writing Commission, 2003). Because of the lack of evidence to support Texas A&M University's (2011) claim that students will graduate with effective oral and written communication skills, the researchers chose to conduct a case study that explored self-assessment in a writing course.

Purpose/Objectives

The purpose of the case study was to describe the use of a self-assessment electronic rubric in a university core curriculum writing course at Texas A&M University in the College of Agriculture and Life Sciences. Three objectives guided this study:

1. Describe students' rubric-guided score and perceived score and an instructor-assessed score;
2. Compare students' rubric-guided score to their perceived score for each construct on each assignment; and
3. Describe students' perceived levels of confidence for each assignment.

Method

This non-experimental case study sought to describe the use of self-assessment rubrics in an upper-level, core curriculum writing course at Texas A&M University in the College of Agriculture and Life Sciences. AGCJ 404 – Communicating Agricultural Information to the Public, taught in the Department of Agricultural Leadership, Education and Communications, is a senior-level, university core curriculum course that fulfills the requirement of a writing course at Texas A&M University. Sixteen students enrolled in the course for fall 2011, represented a variety of majors, including those outside of the College of Agriculture and Life Sciences. The case study was approved by the Texas A&M University Institutional Review Board to ensure the rights and protection of human subjects.

Electronic Writing Rubric

The self-assessment rubric was adapted from Texas A&M University for the Writing Assessment Project and

converted to an electronic format by the researchers so the assessment link could be distributed 48 hours before the due date of the assignment. The rubric consisted of four constructs: Idea and Content Development (0 to 18 scale), Style (0 to 24 scale), Organization (0 to 24 scale) and Conventions (0 to 14 scale). Each construct was measured at four levels—developing, sufficient, proficient and exemplary. Within each level were statements that described the construct at that level. Each construct had varying numerical values because of the numbers of statements within each level and variation of construct importance. Each statement within the constructs was assigned a numerical value of one. If the statement was a double-barreled statement (Ary, et al., , 2010), the statement was divided into two statements for clarification, each receiving a numerical value of one. If the students perceived they had met the criteria outlined in the statement, they would select "yes" and be directed to the next level of that particular statement. If they selected "no," they would be directed to the developing level of the next statement. The statement values were calculated and reported as the students' rubric-guided score for each construct.

The rubric was considered content valid because it was extensively vetted and adopted by the Writing Assessment Project. Students with similar characteristics who were not selected to participate in this study were included in a pilot test of the rubric. The group of students independently assessed the same assignment using the electronic rubric. They were provided step-by-step instruction on how to complete the rubric and were instructed to ask for clarification of any unclear procedures.

Internal consistency was addressed using estimates of reliability as described by Spearman (1910) and Brown (1910), generally expressed as

$$r_{sh} = \frac{2r_{12}}{1 + r_{12}}$$

in which r_{12} represents the correlation between the two halves of a scale. When a scale is artificially split into equivalent halves that measure the same behavior based on content, the resulting correlation should be high and positive. Data collected during the pilot test using the electronic rubric were included in the estimates of internal consistency (split-half reliability), resulting in a reliability coefficient of .85.

Because instructor scoring was included in analyses, inter-rater reliability needed to be addressed. According to Ary, et al., (2010), inter-rater reliability can be determined when two or more trained observers independently complete the same test producing a positive and high reliability coefficient (≥ .90).

Two instructors who had previously taught the course independently completed the electronic rubric assessing the same assignment. The Spearman (1904) rank correlation coefficient rs, a nonparametric procedure for correlation of ranks, was used to estimate inter-rater reliability using the instructors' rubric-based scores. The rank correlation coefficient is generally expressed as

$$r_s = 1 - \frac{6\Sigma d^2}{n(n^2 - 1)}$$

where n is the number of measurements in each of the two variates in the correlation and d is the ranked distance between the measurements for the two variates (e.g., rank1 – rank 2). The results indicated a positive and high correlation (r_s = .92; p = < .05) between the instructors' assessments.

Procedure

Students were asked to complete a self-assessment for six writing-intensive assignments throughout the semester: journal assignment, technical memorandum, press release, business letter, application letter and résumé and technical report. The journal assignment was a two-page document designed for students to summarize a journal article that they would later use as part of their research for the technical report. The technical memorandum assignment, designed to teach students how to write and format a memo, was a one-page document that summarized their topic and audience for the technical report. The press release assignment was a two-page document used to teach students how to inform the public about a specific event or product. The business letter assignment was a one-page document designed for students to learn how to write and format a standard business letter. In addition, students were asked to complete an application letter and résumé, which was different from the business letter assignment. The application letter was a one-page standard business letter and the résumé was a one-page document that highlighted the students' education, professional experience and skills. The technical report was a six-page (minimum) research report about a topic of the students' choice and included multiple steps in the development process. The final document was submitted as a hard copy and presented to the class in a 10-minute oral presentation; the presentation was not included in the scoring of the assignment.

For all assignments, students were expected to take on the role of a technical writer. Students were asked to use the electronic rubric to self-assess each assignment before submitting it, but the self-assessment was not mandatory. As suggested by Andrade (2008), self-assessments were not included in students' scores

because, when self-assessments are included in scores, the assessment becomes an evaluation that can lead to students' negative opinions. The 16 students participated in the self-assessment activity. Of the 16 students, 14 assessed themselves on assignment one, 12 on assignment two, 13 on assignment three, nine on assignment four, 11 on assignment five and 11 on assignment six. Not every student completed a self-assessment for each assignment, but each student completed a self-assessment at least one time during the semester. Before beginning the self-assessment exercise, the instructor discussed self-assessment and the rubric with the students. As part of the course, the instructor taught the students material related to each construct of the rubric. For example, a set amount of class time was devoted to grammar and punctuation, whereas another part of the class included idea and content development.

Although the content for each assignment differed (e.g., technical memorandum vs. technical report), all assignments were assessed using the same rubric and construct scales, which measured students' competency in each of the rubric's four constructs. The analyses compared the individuals to themselves on a longitudinal series of performance measures. This approach was appropriate because the analyses were "… based on patterns of individual and group differences in assessment outcomes rather than content differences…" (Willingham, et al., 2002, p. 3).

Students were asked to estimate or assess their score on a percentage basis for each construct in the rubric and for the overall assignment. Each measure—perceived vs. rubric-guided—was independent. After completing the assignment and before completing the self-assessment rubric, students were asked to report their perceived performance on the assignment with a score of 0 to 100. For example, if a student believed he or she earned a B for a specific construct in the rubric, he or she would estimate a percentage ranging from 80 to 89 percent. This was the students' perceived (PER) score reported in the results.

Students navigated through the electronic rubric and assessed themselves based on the criteria established for each of the four constructs. For each assignment, students' individual construct scores were combined to create composite scores, yielding one student rubric-guided (RG) composite score and one instructor-assessed (IA) composite score. At the end of each self-assessment, students reported the level of confidence (0 to 100 scale) in their writing ability on that particular assignment. For example, if a student was not at all confident in his or her writing ability on a particular assignment, he or she would estimate a score near or at zero. Conversely, if a student was certain of his or her writing ability, he or she would estimate a score near or at 100. Disaggregating scores by construct allowed for description of students' confidence at a more finite level. Level of confidence was assessed because students' self-efficacy (Bandura, 1986, 1994), which impacts confidence, is related to their ability to achieve and master new tasks. The scores derived from this level of confidence score represented students' perceived level of confidence.

Each assignment was assessed independently of the other assignments. For assignment six, technical report, students were asked to submit formative assessments throughout the development of the report: topic and audience, empirical sources, topic outline and rough draft. In addition, students wrote a rough draft and attended mandatory student/instructor meetings to discuss their assignment. Students served as peer reviewers (Brew, 1999; Cho and Schunn, 2010) for two of their classmates, as well.

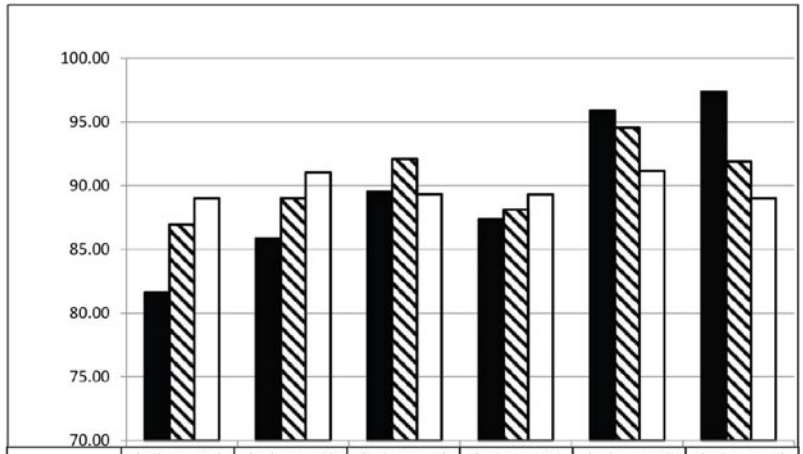
Data were analyzed using SPSS® version 20 to determine frequencies, means, standard deviations and reliability coefficients. Ideally, a multivariate analysis of variance would be used to compare the variables of interest—RG, IA and PER scores. However, the case study nature of this study and the limited sample size, ranging from 11 to 14 students per assignment, did not produce data that were not parametrically amenable or sufficiently large ($n \geq 30$) enough to conduct parametric tests. Only frequencies, means and standard deviations will be reported to describe the scores. Moreover, the results of this study cannot be generalized to a larger population.

Results

Objective One

For objective one, students reported their overall RG score and PER score on a scale of 1 to 100. The IA was also on a scale of 1 to 100. With the exception of assignment four (business letter), students' RG score increased from assignment one ($M = 81.61$, $SD = 10.77$) to assignment six ($M = 97.39$, $SD = 3.14$). Students' PER score increased from assignment one ($M = 86.93$, $SD = 6.57$) to assignment three ($M = 92.08$, $SD = 4.92$). The IA score fluctuated between assignments but remained between 89.0% and 91.5%. Students' RG score ($M = 89.52$, $SD = 8.59$) most closely aligned with the IA score ($M = 89.33$, $SD = 4.48$) on assignment three. Whereas, students' PER score ($M = 89.11$, $SD = 8.28$) most closely aligned with the IA score ($M = 89.31$, $SD = 6.26$) on assignment four (See Figure 1).

Figure 1



	Assignment 1 (*n* = 14)		Assignment 2 (*n* = 12)		Assignment 3 (*n* = 13)		Assignment 4 (*n* = 9)		Assignment 5 (*n* = 11)		Assignment 6 (*n* = 11)	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
RG	81.61	10.77	85.83	8.83	89.52	8.59	87.36	20.26	95.91	5.10	97.39	3.14
PER	86.93	6.57	89.00	4.05	92.08	4.92	88.11	8.28	94.55	2.54	91.91	4.35
IA*	89.00	5.99	91.03	5.62	89.33	4.48	89.31	6.26	91.15	5.65	89.00	6.48

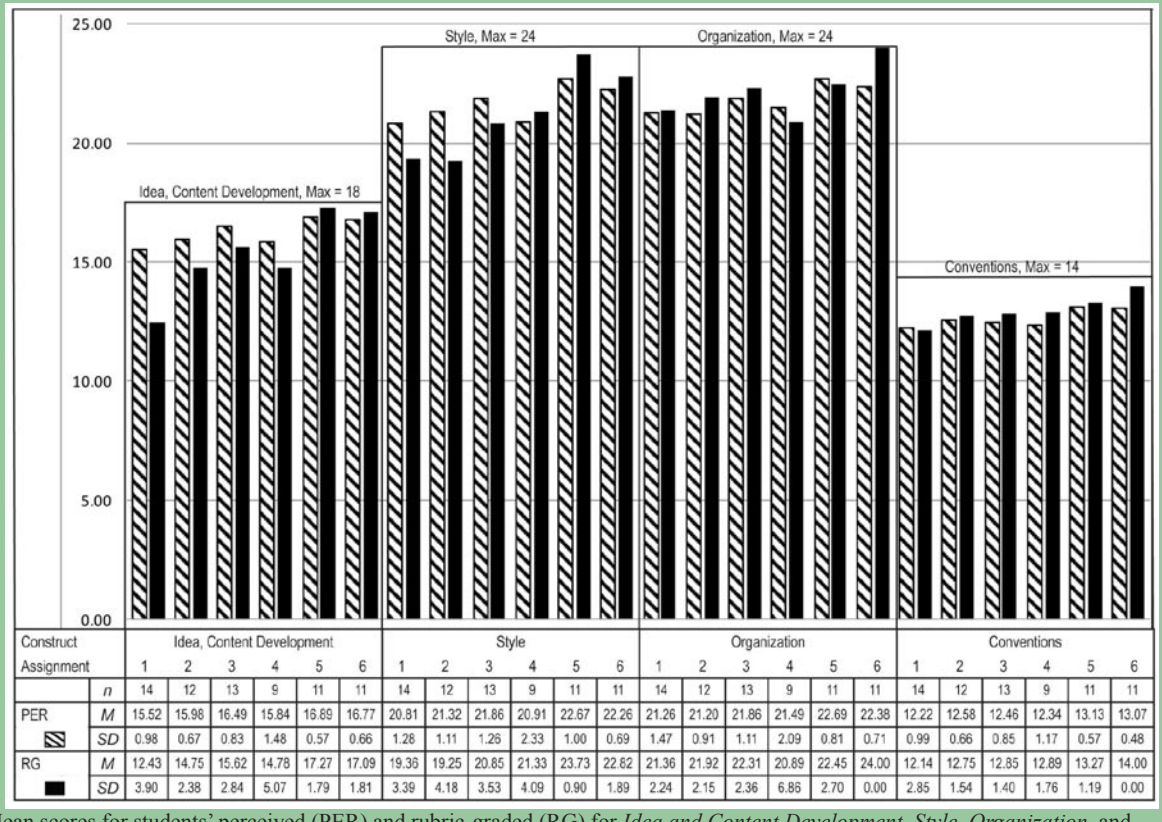
Mean percentage scores for students' overall rubric-graded (RG) score, perceived (PER) score, and *score earned (IA) (*n* = 16). RG score is the score students calculated using the electronic rubric. PER is the score students thought they earned prior to completing the rubric. IA is the score students received from the instructor.
1 = journal assignment; 2 = technical memorandum; 3 = press release;
4 = business letter; 5 = application letter and résumé; 6 = technical report.

Objective Two

For objective two, students' RG score and PER score were compared for each construct. Students' PER score for Idea and Content Development slightly increased from assignment one (M = 15.52, SD = 0.98) to assignment three (M = 16.49, SD = 0.83), whereas students' RG score increased by more than three points from assignment one (M = 12.43, SD = 3.90) to assignment three (M = 15.62, SD = 2.84). Over time, students' PER score and RG score for Idea and Content Development increased from assignment one (PER, M = 15.52, SD = 0.98; RG, M = 12.43, SD = 3.90) to assignment six (PER, M = 16.77, SD = 0.66; RG, M = 17.09, SD = 1.81).

Students' PER score for Style increased from assignment one (M = 20.81, SD = 1.28) to assignment three (M = 21.86, SD = 1.26) while students' RG score increased between assignment three (M = 20.85, SD = 3.53) and assignment five (M = 23.73, SD = 0.90). Overall, students' PER and RG score for Style increased from assignment one (PER, M = 20.81, SD = 1.28; RG, M = 19.36, SD = 3.39)

Figure 2



Construct		Idea, Content Development						Style						Organization						Conventions					
Assignment		1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6
	n	14	12	13	9	11	11	14	12	13	9	11	11	14	12	13	9	11	11	14	12	13	9	11	11
PER	*M*	15.52	15.98	16.49	15.84	16.89	16.77	20.81	21.32	21.86	20.91	22.67	22.26	21.26	21.20	21.86	21.49	22.69	22.38	12.22	12.58	12.46	12.34	13.13	13.07
	SD	0.98	0.67	0.83	1.48	0.57	0.66	1.28	1.11	1.26	2.33	1.00	0.69	1.47	0.91	1.11	2.09	0.81	0.71	0.99	0.66	0.85	1.17	0.57	0.48
RG	*M*	12.43	14.75	15.62	14.78	17.27	17.09	19.36	19.25	20.85	21.33	23.73	22.62	21.36	21.92	22.31	20.89	22.45	24.00	12.14	12.75	12.85	12.89	13.27	14.00
	SD	3.90	2.38	2.84	5.07	1.79	1.81	3.39	4.18	3.53	4.09	0.90	1.89	2.24	2.15	2.36	6.86	2.70	0.00	2.85	1.54	1.40	1.76	1.19	0.00

Mean scores for students' perceived (PER) and rubric-graded (RG) for *Idea and Content Development, Style, Organization,* and *Conventions* of each assignment. RG score is the score the students calculated using the electronic rubric. PER is the score students believed they earned prior to completing the rubric. 1 = journal assignment; 2 = technical memorandum; 3 = press release;
4 = business letter; 5 = application letter and résumé; 6 = technical report.

to assignment six (PER, M = 22.26, SD = 0.69; RG, M = 22.82, SD = 1.89).

Students' PER score for Organization fluctuated between assignment one and assignment six with the lowest mean associated with assignment two (M = 21.20, SD =0.91) and the highest mean associated with assignment three (M = 22.69, SD = 0.81). However, with the exception of assignment four, students' RG score increased between assignment one (M = 21.36, SD = 2.24) and assignment six (M = 24.00, SD = 0.00). Overall, students' PER score and RG score for Organization more closely aligned with assignment one (PER, M = 21.26, SD = 1.47; RG, M = 21.36, SD = 2.24) than assignment six (PER, M = 22.38, SD = 0.71; RG, M = 24.00, SD = 0.00). Students' PER score for Conventions was steady with less than a one point increase at any point during the semester, whereas students' RG score increased during the semester from assignment one (M = 12.14, SD = 2.85) to assignment six (M = 14.00, SD = 0.00). Students' PER score and RG score for Conventions remained within one point of each other on all six assignments (See Figure 2). Additionally, the correlation between PER scores and RG scores—0.42 to 0.72—indicated students' ability to accurately assess their work without the aid of a grading rubric increased as the semester progressed.

Objective Three

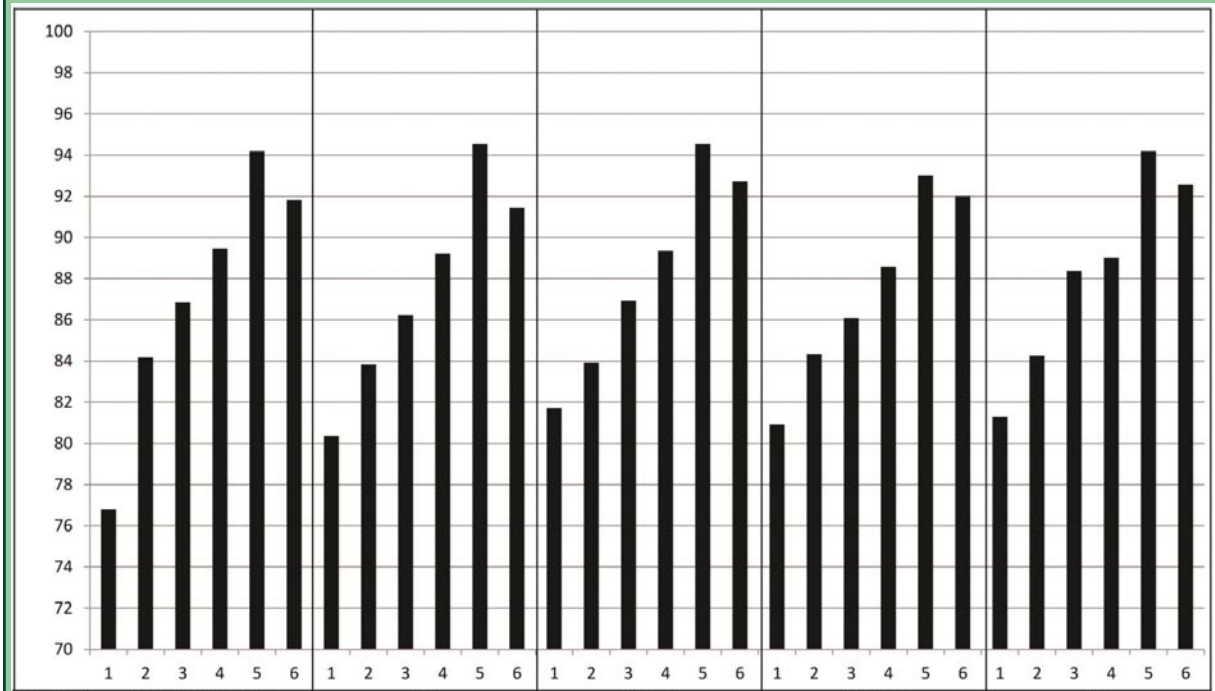
For objective three, students reported their perceived level of confidence in their writing ability for each assignment on a scale of 1 to 100. With the exception of assignment six, students' perceived level of confidence increased for Idea and Content Development, Style, Organization and Conventions on each assignment. Overall, students appeared to become progressively more confident in their writing ability with the exception of assignment six (See Figure 3).

Discussion

Writing instructors and assessors realize that some students respond better to different types of assessment. If instructors continue to use assessment to label writing as correct and incorrect (Guskey, 2003), students will likely miss the principle and most important part of writing—the process (White, 1991). Because students' PER score and RG score more closely aligned at the end of the semester, students' scores indicated they could more accurately assess their ability to write without using a rubric.

Students' RG score most closely aligned with the IA score on assignment three, press release and their PER score aligned with the IA score on assignment

Figure 3



Construct	Idea, Content Development						Style						Organization						Conventions						Overall					
Assignment	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6
n	14	12	13	9	11	11	14	12	13	9	11	11	14	12	13	9	11	11	14	12	13	9	11	11	14	12	13	9	11	11
M	76.79	84.77	86.54	89.44	94.18	91.82	80.36	83.83	86.23	89.22	94.55	91.45	81.71	83.92	86.92	89.33	94.55	92.73	80.93	84.33	86.08	88.56	93.00	92.00	81.29	84.25	88.38	89.00	94.18	92.55
SD	15.30	10.12	14.24	5.15	5.65	7.25	12.59	9.93	13.12	5.74	4.70	6.80	14.30	10.40	13.36	7.21	5.47	7.36	12.65	10.76	12.90	7.40	5.64	8.10	14.52	12.78	13.04	9.47	5.19	3.93

Mean scores for students' perceived (PER) and rubric-graded (RG) for *Idea and Content Development, Style, Organization,* and *Conventions* of each assignment. RG score is the score the students calculated using the electronic rubric. PER is the score students believed they earned prior to completing the rubric. 1 = journal assignment; 2 = technical memorandum; 3 = press release; 4 = business letter; 5 = application letter and résumé; 6 = technical report.

four, business letter. Students' RG scores increased throughout the semester, but the IA score remained consistent between 89% and 91.5%. Students' PER score and RG score for all four constructs—Idea and Content Development, Style, Organization and Conventions—increased. Students became more comfortable in assessing their writing using an electronic rubric and assigning themselves a score. Students who participated in self-assessment exercises played a more active role in their learning process. Instructors should not be the sole provider of feedback and assessment, and self-assessment can help relieve that stress from instructors (McDonald and Boud, 2003).

According to Andrade (2008) and Bruce (2001), using a rubric helps students understand what elements are needed to produce quality writing and improve their writing based on the feedback received through the self-assessment. Using self-assessment forces students to read and review their work before turning it in. Students do not always take the time to review summative assessment, but with self-assessment they can be involved in the process of improving their learning. When students are forced to reconsider their work and make judgments based on set standards, they have the opportunity to reflect on their writing and make necessary changes, which aligned with Andrade (2008), Bruce (2001) and Kitsantas, et al. (2004).

Further, students' PER and RG scores for Conventions steadily increased over time, whereas confidence scores showed fluctuation between assignments. As White (1991) noted, students are accustomed to a set of rules and think once they learn the rules their writing will improve. If students believe writing is a set of rules, it is obvious students would be more confident assessing their Conventions abilities because over time they would learn grammar, punctuation and spelling rules.

Between assignments three and four the scores dropped for each construct. The researchers concluded students' lack of ability and confidence in their ability to write business letters were the reasons for lower scores. Also, the business letter assignment was due mid-semester when students could have been overwhelmed and pressured with other courses and course assignments. Based on this study, students became more confident in their writing, with the exception of assignment six and more aware of their strengths and weaknesses based on assignment scores. Students' PER score and RG score were within 0.56 points of each other. Therefore, concluding that students became better assessors of their own abilities and more confident in their writing abilities, which was arguably in line with Bandura (1986, 1994, 1997).

Self-assessment, as used in the study, would be considered summative assessment in relation to the assignment and formative assessment in relation to the course. To better facilitate self-assessment, more training should have been provided to the students. Students should be taught specifically how to use assessment to better themselves and their work because incorporating self-assessment training into the "curriculum provides [students] a way of laying the foundation for the kinds of skills students will need as lifelong learners after school" (McDonald and Boud, 2003, p. 219).

Educators should continue to use self-assessment in their writing intensive courses because self-assessment enables students to become critics of their work and life-long, effective and responsible learners (McDonald and Boud, 2003). As students piece together the elements of writing and move through the writing process, they begin to understand, assess and evaluate good writing, as suggested by Andrade in 2008. Self-assessments could help increase students' ability to take responsibility for their education by providing a self-delivered learning activity. The electronic self-assessment used in the study disassembled the assessment component and provided students an opportunity to ensure they addressed each component of the assignment. Self-assessment could shift the classroom from a teacher-centered environment to a student-centered (Catalano and Catalano, 1997) environment where students focus on the writing process instead of the end result (White, 1991).

This descriptive study sought to describe self-assessment when used in a core curriculum writing course. Based on the results of this study, self-assessment should be explored more. More in-depth studies should be conducted to determine the effectiveness of using self-assessment in agriculture. More research needs to be conducted on how instructors of university core curriculum writing courses can use self-assessment to enhance the learning process and help students understand writing. "If students produce it, they can assess it; and if they can assess it, they can improve it" (Andrade, 2008, p. 63). By using self-assessment in writing education, students can assess their own level of performance and achievement (Bandura, 1986, 1994, 1997; Kitsantas, et al., 2004) and improve their writing abilities (Guskey, 2003). Further, research needs to be conducted to determine if there are differences between using self-assessment in university core curriculum writing courses and major-specific, writing-intensive courses. An experimental or quasi-experimental study could be conducted using two sections of the same course taught by the same instructor to determine if differences exist between atypical formative self-assessment (Andrade, 2008; Boud, 1991; McDonald and

Boud, 2003) and typical summative assessment (Brown, 1999; Trotter, 2006).

These types of studies are the first phase of developing strong writing assessment programs that could be used nationwide across multiple disciplines in colleges of agriculture. The findings of the study cannot be generalized to other populations because the study describes one course at one university. However, the findings can be used as a basis to compare to future writing assessment studies in agriculture. Similar, yet, more in depth randomized experimental design studies can be conducted comparing the findings of this study. Colleges of agriculture could implement an assessment program specific to each field of study that could revolutionize writing education and assessment as suggested by the National Commission of Writing (2003). Before higher education can encourage higher-level skills in application, analysis, synthesis and evaluation, a new level of assessment needs to be developed (Brown, 1999). Carefully designed and implemented self-assessments could be one piece to an in-depth assessment program.

Literature Cited

Andrade, H. 2008. Self-assessment through rubrics. Educational Leadership 65(4): 60-63.

Andrade, H.G. and B.A. Boulay. 2003. Role of rubric-referenced self-assessment in learning to write. The Journal of Educational Research 97(1): 21–30.

Ary, D., L.C. Jacobs and C. Sorenson. 2010. Introduction to research in education. 8th ed. Belmont, CA: Thomson-Wadsworth.

Bandura, A. 1986. Social foundations of thought and action: A social cognitive theory. Englewood Cliffs, NJ: Prentice Hall.

Bandura, A. 1994. Self-efficacy. In: Ramachaudran, V.S. (ed.). Encyclopedia of human behavior. New York, NY: Academic Press.

Bandura, A. 1997. Self-efficacy: The exercise of control. New York, NY: W.H. Freeman

Borko, H. and R.H. Putnam. 1996. Learning to teach. In: Berlinger, D.C. and R.C. Calfee (eds.). Handbook of educational psychology. New York, NY: Simon, Schuster and MacMillan.

Boud, D. 1991. Implementing student self-assessment. HERDSA Green Guide. 2nd ed. Sydney, Australia: Higher Education Research and Development Society of Australasia.

Brew, A. 1999. Towards autonomous assessment: Using self-assessment and peer assessment. In: Brown, S. and A. Glasner (eds.). Assessment matters in higher education. Philadelphia, PA: The Society for Research into Higher Education & Open Univ. Press.

Brown, S. 1999. Institutional strategies for assessment. In: Brown, S. and A. Glasner (eds.). Assessment matters in higher education. Philadelphia, PA: The Society for Resesarch into Higher Education & Open Univ. Press.

Brown, W. 1910. Some experimental results in the correlation of mental abilities. The British Journal of Psychology 3(3): 296-322.

Bruce, L.B. 2001. Student self-assessment: Making standards come alive. Classroom Leadership 5(1).

Calderhead, J. 1996. Teachers: Beliefs and knowledge. In: Berlinger, D.C. and R.C. Calfee (eds.). Handbook of Educational Psychology. New York, NY: Simon, Schuster and MacMillian.

Catalano, G.D. and K.C. Catalano. 1997. Transformation: From teacher-centered to student-centered engineering education. In: Proc. 27th Annu. Mtg Of Frontiers in Education, Pittsburgh, PA, 8 Nov.

Cho, A. and C. Schunn. 2010. Developing writing skills through students giving instructional explanations. In: Stein, M.K. and L. Kucan (eds.). Instructional explanations in the disciplines. New York, NY: Springer.

Guskey, T.R. 2003. How classroom assessments improve learning. Educational Leadership, 60(5): 6–11.

Kitsantas, A., R.A. Reiser and J. Doster. 2004. Developing self-regulated learners: Goal setting, self-evaluation, and organizational signals during acquisition of procedural skills. The Journal of Experimental Education 72(4): 269-287.

Knobloch, N.A. 2001. The influence of peer teaching and early field experience on teaching efficacy beliefs of preservice educators in agriculture. In: Proc 28th Annu. Mtg. of National Agr. Education Research, New Orleans, LA, 12 Dec.

Knobloch, N.A. and A. Ball. 2003. An examination of elementary teachers' and agricultural literacy coordinators' beliefs related to the integration of agriculture. http://www.agriculturaleducation.org/LinkPages/AgLiteracyK8.asp. December 10, 2011

Knobloch, N.A. 2008. Factors of teacher beliefs related to integrating agriculture into elementary school classrooms. Agriculture and Human Values 25(4): 529-539.

Knowles, M.S., E.F. Holton III and R.A. Swanson. 2005. The adult learner: The definitive classic in adult education and human resource development 6th ed. San Diego, CA: Elsevier.

Lawrenz, F. 1985. Impact on a five week energy education program on teacher beliefs and attitudes. School Science and Mathematics 85(1): 27-36.

McDonald, B. and D. Boud. 2003. The impact of self-assessment on achievement: The effects of self-

assessment training on performance in external examinations. Assessment in Education: Principles, Policy & Practice 10(2): 209-220.

Merriam, S.B. 2001. Andragogy and self-directed learning: Pillars of adult learning theory. New Directions for Continuing and Adult Education 89: 3-13.

Moseley, C., K. Reinke and V. Bookout. 2002. The effect of teaching outdoor environmental education on preservice teachers' attitudes toward self-efficacy and outcome expectancy. Jour. of Environmental Education 34(1): 9-15.

The National Commission on Writing for America's Schools and Colleges. 2003. The neglected "R": The need for a writing revolution. http://www.writingcommission.org/prod_downloads/writingcom/neglectedr.pdf. December 10, 2011.

Nicholson, L., D. Putwain, L. Connors and P. Hornby-Atkinson. 2011. The key to successful achievement as an undergraduate student: Confidence and realistic expectations. Studies in Higher Education: 1-13.

Office of Undergraduate Studies at Texas A&M Univ. 2010. University learning outcomes for undergraduates. http://president.tamu.edu/documents/StudentLearningOutcomesWebSite.pdf. December 19, 2011.

Pajares, M.F. 1992. Teachers' beliefs and educational research: Cleaning up a messy construct. Rev. of Research in Education 62(3): 307-332.

Peddle, M.T. 2000. Frustration at the factory: Employer perceptions of workforce deficiencies and training needs. The Jour. of Regional Analysis & Policy 30(1): 23-40.

Salahu-Din, D., H. Persky and J. Miller. 2008. The nation's report card: Writing 2007 (NCES 2008–468). National Center for Education Statistics, Institute of Educations Sciences, U.S. Dept. of Education, Washington, D.C.

Spearman, C. 1904. The proof and measurement of association between two things. The American Journal of Psychology 15(1): 72-101.

Spearman, C. 1910. Correlation calculated from faulty data. The British Journal of Psychology 3(3): 271-295.

Thompson, G.W. and M. Balschweid. 1999. Attitudes of Oregon agricultural science and technology teachers toward integrating science. Jour. of Agr. Education 40(3): 21-29.

Trotter, E. 2006. Student perceptions of continuous assessment. Assessment & Evaluation in Higher Education 31(5): 505-521.

Tschannen-Moran, M., A. Woolfolk-Hoy, and W.K. Hoy. 1998. Teacher efficacy: Its meaning and measure. Rev. of Educational Research 68(2): 202-248.

White, E. 1991. Assessing higher order thinking and communication skills in college graduates through writing. In: Proc. Annu. Mtg. of National Assessment Conference, Washington, DC, 17-19 Nov.

Willingham, W.W., J.M. Pollack and C. Lewis. 2002. Grades and test scores: Accounting for observed differences. Jour. of Educational Measurement 39(1): 1-37.

Factors Associated with Student Performance in an Equine Management Course[1]

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Abstract

In 2007, the University of Kentucky initiated its Equine Science and Management (EQSM) undergraduate program as a stand-alone degree housed within the Department of Animal and Food Sciences (AFS). From 2007 to 2010, the Equine Management (ASC 320) course was taught as the student population changed from predominately AFS to EQSM after the new equine degree program was established. The objective of this study was to determine factors associated with student success in ASC 320 before and after the redesign of the course between 2007 and 2008. Variables in the analysis included students' major, year, pre-veterinary program of study, years of horse experience, career aspirations, hours worked outside of school and percent of possible course points. Two multivariable linear regression models were developed to evaluate the effects of selected variables on course percent; one was created for the 2007 class, the other for 2008-2010 combined. The model for the 2007 class revealed that sophomores were at a disadvantage compared to upperclassmen ($p = 0.02$) for course percent. The model for the years 2008-2010 demonstrated a small positive association with years of horse experience and course percent ($p = 0.007$). Other variables examined were not significantly associated with student performance.

Introduction

Animal science departments are evolving to accommodate changing demographics and more diverse interests of students. Some have developed programs devoted specifically to equine science and management (Buchanan, 2008). Others offer options to emphasize equine studies within an animal science curriculum (Buchanan, 2008). In 2007, the University of Kentucky began offering an undergraduate B.S. degree program in equine science and management (EQSM), which received formal approval in early 2009. The first cohort of freshman students entered the program in the fall of 2007. Prior to that, students interested in horses could complete an equine option in the Animal and Food Sciences (AFS) undergraduate degree program and this alternative is still available to AFS students who do not wish to pursue the EQSM degree. Since its introduction, the EQSM program has grown in enrollment each year, with approximately 270 students in the program in fall 2012. The program also attracts a high percentage of out-of-state students (~65%, personal communication, R. Coleman, EQSM Director of Undergraduate Studies).

The Equine Management (ASC 320) course existed previously in the AFS curriculum as a course for animal science students pursuing the equine option. When the EQSM program was designed, ASC 320 was included among required classes for students in that major and was also retained in the AFS equine option requirements. In light of the changes in instructional programs of the AFS and EQSM degrees and the student populations they attract, this study was undertaken to evaluate existing data from students taking ASC 320 before and after the introduction of the EQSM major. The objective of the study was to determine factors associated with student success in ASC 320 before and after the redesign of the course between 2007 and 2008.

Methods

Equine Management (ASC 320) is a 3-credit course taught in the fall semester at the University of Kentucky that instructs students in a wide range of topics pertaining to the care and health of horses. The prerequisite is

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ASC 101 (Domestic Animal Biology), a rigorous 3-credit class that builds foundational knowledge of anatomy, nutrition, digestion and reproduction of domestic livestock species. Material is presented in two fifty-minute lectures and one three-hour laboratory session per week. Specific topics include normal health parameters (temperature, pulse, respiration) and how to measure them, digestive anatomy, physiology and nutrition, selection and management of feedstuffs, common horse diseases and prevention strategies, first aid for horses, parasite control and fecal egg counts, hoof care, management of pastures and horse facility design. In 2007, 450 of the possible 550 course points were derived from tests and the laboratory practical examination, with the remaining 100 points earned on quizzes and homework assignments. From 2008-2010, the grading was changed to decrease the emphasis on tests. In those years there were 600 possible points, 350 of which were derived from tests and the laboratory practical and 250 points earned on assignments. When first assumed by the instructor (M. Rossano) in 2007, the course was intended for juniors and seniors in the AFS undergraduate program. The topics were similar to those listed above, but also included material on horse breeds, coat colors and selection for purchase. Health topics and parasitology were not as strongly emphasized as in the present course, but equine nutrition and ration formulation was taught at a higher level, with the expectation that students had received previous instruction in animal nutrition. Between the 2007 and 2008 fall semesters, faculty mapped the curriculum for the new EQSM undergraduate degree. ASC 320 was redesigned to meet skill competencies in the EQSM course sequence while covering material appropriate for first-semester sophomores. The course is also taken by students in the AFS degree program pursing an equine degree option and other students in the EQSM program who take the course out of sequence, as juniors or seniors. ASC 320 has been taught by its present instructor from 2007 to 2011.

On the first day of class, the students completed a questionnaire. The purpose of the questionnaire was to gain information about the interests and horse experience of the students, how much time they expect to spend working outside of class, and to determine which lab session time they will attend. Questionnaires were stored in a file cabinet after they were used for the course. In 2011, the Institutional Review Board determined that an analysis of information from the questionnaires and student academic performance in the course from 2007 to 2010 met the criteria for an exempt study, thus a retrospective analysis of the data was conducted.

Data from questionnaires and grading records were entered in a relational database prior to analysis. Variables included student major, class level (sophomore, junior or senior), whether they were in a pre-veterinary (pre-vet) program of study, years of horse experience, career aspirations, hours they worked at jobs outside of school and their percent of possible course points, which were used to determine final letter grades. Career aspirations were reported as a short answer, and later classified as veterinarian, horse industry or undecided. Hours of work outside of school was analyzed as both a dichotomous (yes/no, the student did or did not work outside of school) and continuous variable, hours per week. Because the student population was overwhelmingly female, gender was not considered as a variable. Information on race and ethnicity was not collected by the questionnaire. Only records from students who completed the questionnaire and received a final course grade were included in the analysis.

Analysis of data was performed in SAS (version 9.2). Descriptive statistics were produced and tests of normality were conducted on continuous variables. Tests of association were performed to evaluate relationships between specific variables and the outcome of interest (final course percent) as well as associations between variables. Spearman correlation analysis was conducted on continuous variables, chi-square or Fisher's exact tests were performed when two or more categorical variables were evaluated and the Kruskal-Wallis test was used to compare continuous variables from related categories (such as year taught). Course percents were compared across years taught to determine whether statistical models should be controlled for year. Two multivariable linear regression models were developed to evaluate the effects of selected variables on course percent. One was created for the 2007 class (prior to the reorganization of the course) and the other for the years 2008-2010 combined. Variables were included in a starting, saturated model developed from preliminary analyses (with p-values < 0.25) and were eliminated using backward selection. In the final model a p-value of 0.05 or less was deemed significant, thus that variable (or group of related categorical variables) was retained in the model. If a variable did not reach statistical significance, but improved the model adjusted R^2 by its inclusion, it was retained.

Results and Discussion

The demographic distribution of the classes by year is shown in Table 1. A total of 172 students were included in the study. The largest class size was in 2009, when 53 students completed the course, and the smallest class in 2007 was comprised of 37 students. Because sophomores in the EQSM degree program did not begin taking the

course until 2008, the 2007 class was comprised mostly of AFS students; one geography major and one non-degree student also were included. In the years that followed, the percent of EQSM majors increased quickly to over 90%; the remaining students were of the AFS major. In 2007, 27% of students were pursuing a pre-vet program. This percent was lower in subsequent years, ranging from 8-15%, but the difference did not reach statistical significance when pre-vet status was tested for association with year taught. A significantly higher proportion of AFS students were pre-vet, compared to EQSM ($p < 0.0001$).

Means and standard deviations of the continuous variables in the study are shown in Table 2. Final course percent ranged from 59-95% in 2007, with a mean of 84.3% and for the years 2008-2010 it ranged from 64-97% with a mean of 83.2%. Course mean percent decreased slightly over the time the course was taught but was not significantly different by year and thus was not included in the regression model for classes from 2008-2010. Years of horse experience was lowest in the 2007 class; once EQSM students began to predominate, horse experience increased, however this difference did not reach statistical significance ($p = 0.12$). Hours worked outside of class rose from 2007 to 2008, then declined in the remaining two years. Spearman correlation analysis revealed no associations between course percent, years of horse experience and hours of work in the 2007 class, but in the 2008-2010 classes, years of horse experience was positively associated with course percent ($r = 0.21$, $p = 0.01$). Students who considered themselves to be pre-vet had a higher mean course percent (87.8%) in 2007 compared to other students (83.0%), but the difference was not statistically significant ($p = 0.11$). In 2008-2010, pre-vet students averaged 85.3% and other students averaged 82.9%. This difference was also not significant ($p = 0.24$). Course percent of students who worked outside of school (versus those who did not) did not differ in either the 2007 or 2008-2010 students, despite the fact that pre-vet students worked significantly more hours in the latter population ($p = 0.04$).

The final linear regression models are shown in Table 3. The model for the 2007 students had the highest adjusted R^2 (0.23) when a number of nonsignificant variables were retained. The only variable to reach statistical significance was sophomore status. There, it was apparent that sophomores were at a 7% disadvantage in course percent compared to juniors and seniors also taking the class. In the model for students from 2008-2010, after the course was redesigned for sophomore EQSM students, the only variable to attain significance in the multivariable model was years of horse experience. No other variable was significant or improved the model R^2 by its inclusion. The adjusted R^2 was 0.05 and years of horse experience had a negligible effect on course percent (0.3%), thus there may be other factors not examined in the present study that would be more helpful in explaining student performance in ASC 320 in its current format.

Table 1. Numbers of students by year and percent EQSM major, sophomores and students pursuing a pre-veterinary program of study.

Year	N Students	%EQSM	%Sophomores	%Pre-Vet
2007	37	0	22	27
2008	41	68	44	15
2009	53	92	59	8
2010	41	95	61	15
Total	172			

Table 2. Mean course percent, years of horse experience and hours worked per week, with standard deviations (in parentheses).

Year	Course Percent	Years Horse Experience	Hours Worked
2007	84.3 (0.08)	8.5 (7.1)	15.4 (11.3)
2008	84.0 (0.07)	11.3 (5.4)	17.7 (13.7)
2009	83.2 (0.07)	11.4 (6.7)	11.3 (10.9)
2010	82.5 (0.08)	10.8 (5.0)	10.4 (12.3)

Table 3. Multivariable linear regression models for course percent in years 2007 and 2008-2010.

Variable	*b*	SE (*b*)	P-value
Model 1: Year 2007 Model Adjusted $R^2 = 0.23$			
Intercept	0.857	0.029	<0.0001
Years of horse experience	0.003	0.002	0.11
Hours of work outside of school	-0.002	0.001	0.07
Pre-veterinary program (compared to all others).	0.039	0.029	0.20
Sophomore status (compared to all others).	-0.073	0.030	0.02
Model 2: Years 2008-2010 Model Adjusted $R^2 = 0.05$			
Intercept	0.799	0.014	<0.0001
Years of horse experience	0.003	0.001	0.007

The results of the study indicated that the disadvantage for sophomores compared to upperclassmen did not carry over into the model from 2008-2010. This suggests that the redesign of the course for sophomores was successful and the lack of significant differences in final course percent over time supports that the changes in course content did not affect student performance. In a study of animal science students in an animal science curriculum, McMillan et al. (2009) found that year of study was not associated with course percent, but that study encompassed courses across the curriculum, in which students would not necessarily be taking upper-level courses as underclassmen. While there was a significant association with years of horse experience and course percent, the practical effect was small, suggesting that

tests and assignments did not require students to draw on previous experience to do well in the course. It was surprising that hours worked outside of school was not associated with performance in the course, but this result should be interpreted with caution; there was no follow-up survey for the instructor to capture changes in work hours and employment status over the course of the semester, thus the expected hours reported by the students at the beginning of the semester may have differed from the actual hours worked. In addition, it is possible that pre-veterinary students were engaged in volunteer work at veterinary clinics that they did not consider "work" when they filled out the questionnaire. The use of existing data from questionnaires and grading records created some limitations for the study and this is evident from the R^2 values of the models. A more comprehensive study could include measurements of other variables, such as overall grade point average, hours spent studying for the class, hours spent with clubs and fraternal organizations and other activities that students engage in. This would allow investigators to explain more of the variation in student performance in the course than the present study's models could.

Two previous studies have investigated the association between equine experience and level of interest in pursuing an equine-related career with performance in equine management courses (Lawrence, 1987; Pratt-Phillips and Schmitt, 2010). Both found that level of horse experience did not significantly affect course grade. Both acknowledged the limitation of relying on self-reporting from students for this information. The present study used self-reported years of horse experience rather than level, and did identify a modest positive significant association. Together, all three studies demonstrate that students do not need extensive horse experience to succeed in equine management courses. The present study did not attempt to include interest in a career in the horse industry as a variable because the EQSM students all reported some kind of career aspiration involving horses. The courses examined in the previous studies (Lawrence, 1987; Pratt-Phillips and Schmitt, 2010) were taken by a wider variety of students from animal science and other majors and included those who were not focused predominantly on horses. This allowed for comparisons based on intent to work in the horse industry (including equine veterinary medicine). The present study examined career aspirations as variables for "veterinarian," "equine industry" and "undecided" and none was significantly associated with course percent. Even students who were undecided about specific careers still expressed an interest in working in the equine industry in some capacity, thus it was not possible to test for that association.

The student population studied here was somewhat different from what has been previously reported in similar studies on animal science majors. Other studies have reported higher percentages of students who considered themselves to be pre-vet. Peffer (2010) reported that in 2007-2008, 68% of the animal science majors taking an introductory animal science class were oriented towards careers in veterinary medicine. In the 1980's, Edwards (1986) and Mollet and Leslie (1986) reported in separate studies that 59% and 52% of students in animal science classes were taking pre-vet course work. In all three studies, student populations were comprised largely of freshman and sophomore students. The AFS students taking ASC 320 in 2007 were mostly upperclassmen, thus it is possible that by the time those students reached junior or senior status, they had revised their career goals. The rigorous course work in chemistry and physics required by a pre-vet program is another likely factor that drives student attrition or changes of major away from animal sciences. The low proportion of mostly sophomore students pursuing pre-vet course work in the 2008-2010 ASC 320 classes suggests that the EQSM program is attracting students who want to work with horses, but mostly in careers other than veterinary medicine. Further studies are underway at the University of Kentucky to describe and assess the EQSM students, identify variables associated with student success and to determine what types of careers alumni pursue.

Summary

In this study, the variables major, class level (sophomore, junior or senior), pre-vet status, years of horse experience, career aspirations, and hours worked at jobs outside of school were explored for association with final course grade percentage. For 2007 students, only the class level variable was associated with course grade percentage, with sophomores obtaining lower scores than juniors or seniors. For 2008-2010 students, years of horse experience was statistically significant within the model; however, this variable does not appear to be a good predictor of course grade. By redesigning the course to fit within a new equine curriculum, sophomore students may have become better accommodated while students with more horse experience may have gained a very slight advantage. Future studies will continue to examine EQSM students and program at the University of Kentucky.

Literature Cited

Buchanan, D.S. 2008. A.S.A.S Centennial Paper: Animal science teaching: A century of excellence. Jour. of Animal Science. 86:3640-3646.

Lawrence, L.M. 1987. The effect of prior horse experience and level of interest on student performance in light horse management. NACTA Jour. 31(1):25-27.

McMillan, M., A. Bullion, K. Stutts, S. Kelley, S. Beverly and L. Rakowitz. 2009. Variables affecting final grade outcome in undergraduate animal science courses. NACTA Jour. 53(2):29-33.

Mollet, T.A. and E.K. Leslie. 1986. Demographic profile of students majoring in animal science. NACTA Jour. 30(1).

Peffer, P.A.L. 2010. Demographics of an undergraduate animal sciences course and the influence of gender and major on course performance. NACTA Jour. 55(1):25-30.

Pratt-Phillips, S.E. and S. Schmitt. 2010. The effect of previous equine experience on performance and effort required in an introductory level equine science class. NACTA Jour. 54(1):41-45.

Factors Associated with Course Withdrawal and Final Course Grade in an Introductory Animal Science Course[1]

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Abstract

During a time of changing student demographics, it is necessary to examine factors associated with student success so that faculty can provide an environment supportive to student learning. The objective of this study was to identify factors associated with course withdrawal and course grade percentage in an introductory animal science course. Data were collected on 405 participating University of Kentucky students in two semesters of Domestic Animal Biology. During the first several weeks of the semester, students completed a demographic survey, background knowledge test and California Critical Thinking Skills Test (CCTST). Multiple logistic regression found that (1) high school GPA below 3.5, (2) residing in Kentucky longer than out-of-state and (3) being a non-traditional student were associated with increased odds of course withdrawal when adjusted for other variables within the model ($p<0.05$). Multiple linear regression found that (1) having a high school GPA above 3.5, (2) CCTST percentile rank in the top third, (3) attending private high school/homeschooling, (4) participating in agricultural clubs, or (5) coming from a suburban or rural non-farm home were associated with higher adjusted mean course grade percentages ($p<0.05$). Further research is needed to identify reasons for associations and develop strategies to assist at-risk students.

Introduction

In recent years, there has been a shift in the demographics of students who enroll in animal science courses (Buchanan, 2008). More females, individuals from urban/suburban communities, non-traditional students and students with interest in companion animals or equids rather than other livestock species, are enrolling in animal science programs (Buchanan, 2008; Peffer, 2011; Reiling et al., 2003). Knowledge of how these factors are associated with student success will help departments to meet the evolving needs of students.

A small number of variables have been examined for association with course grade in college agricultural courses, with mixed conclusions. Conflicting results have been obtained for gender and association with animal science course grade. One study found no association between course grade and gender (Peffer, 2011), while other studies found that females obtained higher grades than males (Lancaster and Robinson, 2011; McMillan et al., 2009; Soberon et al., 2012). Varying results were also found by major and course grade in agricultural courses. Course grade was higher for animal science majors when compared to other agriculture majors in an introductory animal science course (Peffer, 2011), while other studies found no effect of major on introductory plant science or animal science courses (Lancaster and Robinson, 2011; McMillan et al., 2009; Soberon, et al. 2012). Whether students are in-state or out-of-state residents may also play a role in course performance. One study found non-residents of New York to have higher course grades in an Animal Nutrition class, when compared with residents (Soberon et al., 2012).With changing student demographics in agriculture courses from rural to more urban/suburban; it is also of interest to determine how community type affects student success.

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One study found that having a farm background or previously taking agricultural classes had minimal effect on final course grade in introductory agriculture classes (Greene and Byler, 2004). Despite the rising numbers of nontraditional students in agricultural courses, academic success of these students has been the subject of limited study. Researchers found a trend (p=0.08) for a positive correlation between age and final course grade in an introductory plant science course (Lancaster and Robinson, 2011). High school GPA is commonly considered during the college admissions process as a potential indicator of student success in college. In one study, high school GPA was associated with year-end GPA for freshman agriculture students (Garton et al., 2002). Additional research is needed to determine which factors, if any, are associated with course grade in introductory animal science courses.

Few studies have examined factors associated with course withdrawal either in agriculture courses or in general. Retention at the program or university level has been examined in more detail. One study found that high school GPA was not associated with college of agriculture retention (Heitstuman and Cvancara, 1992), while another found it to be a predictor of continuing from freshman to sophomore year in a college of agriculture (Garton, 2001). No association was found between taking agricultural courses in high school and college of agriculture retention (Heitstuman and Cvancara, 1992), while another study found it to be associated with intent to complete an agricultural degree (Dyer et al., 2002). Experience in agriculture was another predictor of intent to complete an agricultural degree (Dyer et al., 2002). Students who participated in college clubs had significantly higher college of agriculture retention rates when compared to those who did not (Heitstuman and Cvancara, 1992). If variables of interest were examined for combined effect on individual course completion status or course grade, more information would be available to assist faculty members with maintaining and updating animal science courses.

The purpose of this study was to identify factors associated with student success in Domestic Animal Biology (ASC 101), an introductory animal science course taught in the fall semester at the University of Kentucky. The objectives of the study were to describe characteristics of ASC 101 students, as well as to identify variables associated with course completion status and final course grade.

Materials and Methods

Study Sample

Data were collected on participating students enrolled in the fall 2010 and fall 2011 semesters of ASC 101. This is a 3-credit introductory course required for Animal Science, Equine Science and Management and Agricultural Education majors. The course includes both lecture and laboratory components. Students in this course are graded by performance on exams, quizzes, homework assignments and laboratory exercises. The course material covered includes a broad survey of anatomy, physiology, nutrition, reproduction, genetics and behavior for major livestock species. A total of 425 students enrolled in ASC 101 during the two semesters. Students were excluded if they did not wish to participate, or if they were legally considered to be minors. Following approval by the University of Kentucky Institutional Review Board, students were provided with a cover letter detailing study procedures. Students who did not wish to participate were able to opt out of the study by signing and returning the cover letter. After 20 students were excluded from the study, 405 students remained for course withdrawal analyses. Of the 405 students who were eligible and willing to participate, 47 dropped or withdrew from the course. Thus, 358 students remained for course grade percentage analyses.

Instruments

Students completed a demographic survey, background knowledge test and the California Critical Thinking Skills Test (CCTST) during the first several weeks of the semester. The demographic survey consisted of 15 questions about previous agricultural experience, education and general demographic information. The background knowledge test consisted of 20 questions that graduates of the Animal and Food Science (AFS) program would be expected to answer correctly and focused on nutrition, anatomy and animal production. Students took the 2009 version of the CCTST. This test consisted of 34 non-discipline specific multiple choice questions designed to measure students' ability to think critically (Facione, 2009). This test was normed using a sample of undergraduate students and was reported to have a Kuder-Richardson-20 internal consistency estimate of 0.80 for college students sampled from a large public university (Lambert and Martin, 2010). Outcomes of this study were final course grades and course completion status and these items were tabulated at the conclusion of the semester. Variables were examined for association with these outcomes through statistical analyses.

Data Analysis: Course Completion

Using SAS (version 9.2), characteristics of the sample categorized by outcome (dropping or withdrawing from the course versus receiving a grade) were examined (Tables 1 and 2). Descriptive statistics such as mean, median, minimum value and maximum value were

Table 1. Characteristics of Fall 2010 and Fall 2011 ASC 101 students by course completion status. Variables listed in this table were not included in the final models for course completion status or final course grade percentage.

Characteristic	Completed Course	Dropped or Withdrawn	Combined
Gender			
Male	67(19.7%)	6(17.1%)	73(19.5%)
Female	2/3(80.3%)	29(82.9%)	302(80.5%)
Missing			30
Ethnicity			
Caucasian	209(61.3%)	21(58.3%)	230(61.01%)
Other	19(5.6%)	4(11.1%)	23(6.1%)
Choose not to respond	113(33.1%)	11(30.6%)	124(32.9%)
Missing			28
Degree			
Animal Science	152(42.3%)	17(37.0%)	169(41.7%)
Equine Science and Management	138(38.4%)	17(37.0%)	155(38.3%)
Other	69(19.2%)	12(26.1%)	81(20.0%)
Missing			0
High School Agriculture Classes[x]			
No	246(72.6%)	22(62.9%)	268(71.7%)
Yes	93(27.4%)	13(37.1%)	106(28.3%)
Missing			31
College Agriculture Classes[x]			
No	236(69.6%)	20(57.1%)	256(68.5%)
Yes	103(30.4%)	15(42.9%)	118(31.6%)
Missing			31
Background Knowledge Test Percent Correct[x]			
0-49%	159(46.9%)	21(58.3%)	180(48.0)
50-100%	180(53.1%)	15(41.7%)	195(52.0)
Missing			30

x: $p<0.25$ for chi-square test of independence for that variable by course completion status.

calculated for the continuous variable (age). Frequencies and percentages were calculated for nominal variables. The chi-square test of independence or the Wilcoxon rank-sum test (for the "age" variable) was performed to analyze differences in outcome for each level of the variable (Tables 1 and 2). When examining the results of these statistical tests, a significance level of $p<0.25$ was used to choose variables for inclusion when building the multiple logistic regression model. After the first round of variable selection, the chi-square test of independence or Fisher's exact test were performed for categorical explanatory variables that were suspected of having overlapping variability. Multiple logistic regression was chosen as the best analysis to answer the research question because of the dichotomous nature of the outcome (withdrawing versus remaining in the course). The multiple logistic regression model was created by adding variables that noticeably improved the area under the receiver operator characteristic (ROC) curve and removing any that did not have a substantial effect on the model statistics. Model fit was assessed by the Hosmer-Lemeshow goodness-of-fit test. Variance inflation factors were checked through multiple linear regression and did not indicate multicollinearity (range: 1.00-1.05).

Data Analysis: Course Grade Percentage

For the multiple linear regression analysis, final ASC 101 course percentage was used as the response variable. Explanatory variables used were the same as shown in Tables 1 and 2. Data were plotted and chi-square tests of independence were performed to find associated variables. A multiple linear regression analysis was conducted and a final model was created through manual selection. Any variables that did not have a noticeable effect on R^2 were removed, except for "year," which was forced into the model. Variance inflation factors did not indicate multicollinearity (range: 1.06-1.68).

Results and Discussion

Instruments

Reliability of the background knowledge test was calculated using scores from the 2010 cohort. The Kuder-Richardson reliability index was 0.43, the split-halves reliability was 0.49 and the standard error of measurement was 1.95. In the future, increasing the number of questions or including questions that result in a larger spread of scores may help to improve the background knowledge test.

Characteristics of the Sample

Many students in the ASC 101 course were around 18 or 19 years of age, female, Caucasian, from Kentucky, had come from suburban/urban neighborhoods, attended public high school and achieved a high school GPA above 3.5 (Tables 1 and 2). Most of the students sampled were working towards an Animal Science degree and had not taken a previous agriculture class. About half (Table 2) of ASC 101 students had participated in an agricultural club. Major organizations that students were involved with include 4-H (105 students), FFA (94 students), equine breed or discipline associations (28 students) and Pony Club (18 students). The race and ethnicity variable was not included in any of the inferential analyses due to the large number of students who chose not to respond to that question (Table 1).

Table 2. Characteristics of Fall 2010 and Fall 2011 ASC 101 students by course completion status. Variables listed in this table were included in final models for prediction of either final course grade or course completion status (as denoted in parentheses).

Characteristic (Associated Outcome)	Completed Course	Dropped or Withdrawn	Combined
Course Grade			
n	358	47	405
Mean (SD	74.5% (14.4)	N/A	N/A
Median (Q1, Q3)	76.5% (68.3, 83.6)	N/A	N/A
Min, Max	2.3, 96.4	N/A	N/A
Age[x] (Course Withdrawals)			
n	351	45	396
Mean (SD)	19.2 (2.6)	21.2 (6.5)	19.5 (3.3)
Median (Q1, Q3)	18 (18, 20)	19 (18, 22)	18 (18, 20)
Min, Max	18, 50	18, 53	18, 53
Missing			9
Location Lived in for Longest Duration[x] (Course Withdrawals)			
Kentucky	184 (54.4%)	25(69.4%)	209(55.9%)
Other	154(45.6%)	11(30.6%)	162(43.3%)
Missing			31
Community Type (Course Grade)			
Urban	36(10.6%)	3(8.3%)	39(10.4%)
Suburban	148(43.5%)	17(47.2%)	165(43.9%)
Rural non-farm	62 (18.2%)	7(19.4%)	69(18.7%)
Rural farm	94(27.7%)	9(25.0%)	103(27.4%)
Missing			29
High School Type[x] (Course Grade)			
Public	272(80.2%)	33(91.7%)	305(81.3%)
Other	67(19.8%)	3(8.3%)	70(18.7%)
Missing			30
High School GPA[x] (Course Withdrawals and Grade)			
<2.99	27(8.0%)	6(17.6%)	36(9.7%)
3.00-3.49	111(33.0%)	15(44.1%)	126(33.8%)
3.50-4.00	198(58.9%)	13(38.2%)	211(56.6%)
Missing			32
Agricultural Club Involvement (Course Grade)			
No	174 (51.5%)	21 (58.3%)	195 (52.1%)
Yes	164 (48.5%)	15 (41.7%)	179 (47.9%)
Missing			31
CCTST Percentile Cateory (Course Grade)			
1-33rd percentile	98(28.7%)	12(33.3%	110(29.2%)
34-66th percentile	118(34.6%)	15(41.7%)	133(35.3%)
67-99th percentile	125(36.7%)	9(25.0%)	134(35.5%)
Missing			28
Year (Course Withdrawals, Forced for Course Grade)			
Fall 2010	179 (49.9%)	25 (54.4%)	204 (50.4%)
Fall 2011	180 (50.1%)	21 (45.7%)	201 (49.6%)

x: p<0.25 for chi-square test of independence for that variable by course completion status.

Associations between Independent Variables

Independent variables suspected of multicollinearity were checked for associations through chi-square tests of independence (Tables 1 and 2). An association was found between location lived in for the longest duration (in-state or out-of-state) and high school GPA (p<0.0001). Students who spent the most time outside of Kentucky were more likely to have a high school GPA above 3.5. Additionally, previously taking a college agriculture course was associated with taking a prior high school agriculture course (p=0.0001). Another association was found between background knowledge test score and participation in agricultural clubs. Students who had previously, or were currently participating in, agricultural clubs had higher background knowledge test scores than students who had no experience in agricultural clubs (p=0.026). This indicates that students who have participated in agricultural clubs enter the course with more prior animal science knowledge than students who have not participated in agricultural clubs. An association was also found between participating in an agricultural club and community type (p<0.0001). Students who were from a rural area and lived on a farm were more likely to have participated in an agricultural club when compared to students from other community types. Students from urban areas were most likely to have attended a private school or have been homeschooled (p=0.049).

Course Withdrawal

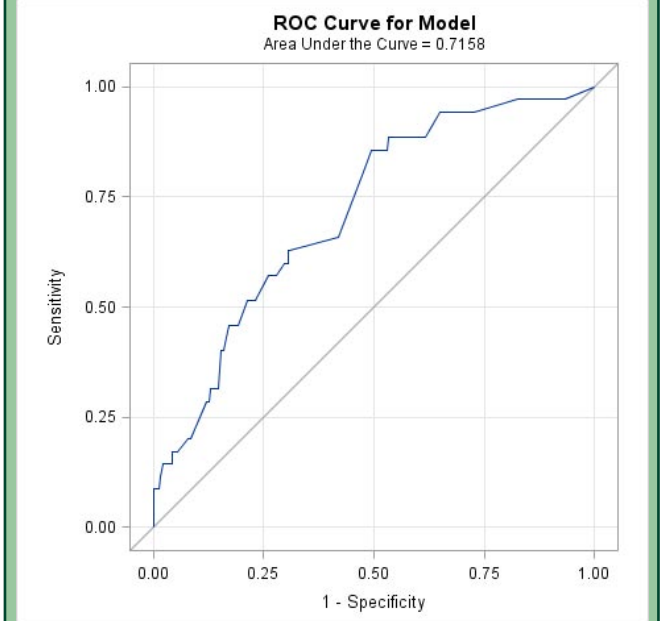
When variables were tested against course completion status using the chi-square test of independence (or the Wilcoxon rank-sum test for "age"), several variables met the criterion of p<0.25 to be offered to the multiple logistic regression model. For instance, a larger percentage of students who selected Kentucky as the location where they lived longest withdrew when compared with foreign/out-of-state state students (p=0.085). A disproportionate number of students who withdrew from the course had attended a public high school, rather than a school in the "other" category (private or homeschooled) (p=0.12). Additionally, a disproportionate number of students who withdrew from the course had a low high school GPA (p=0.036), low background knowledge test score (p=0.19), or had taken a previous agricultural course in either college (p=0.13) or high school (p=0.23). These variables were all offered to the multiple logistic regression model. The decision to include some variables with associations found during chi-square tests of independence was made after examining for effect on the area under the curve and the variance inflation factors.

The final model was:

Logit(probability of ASC 101 withdrawal)= α + ß1(year) + ß2(age) + ß3(HS GPA <3.0) + ß4(HS GPA 3.0-3.5) + ß5(location lived in: KY)

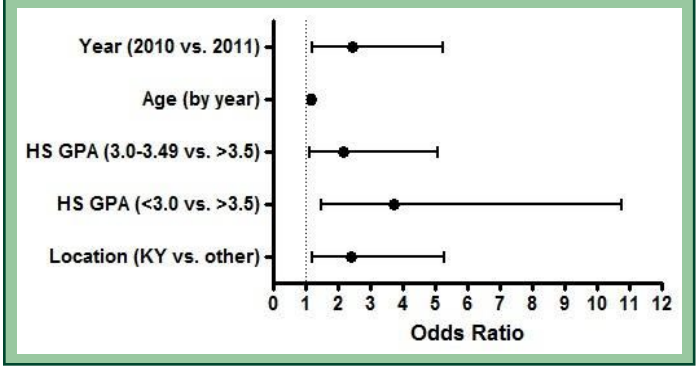
All variables included in the model (Table 2) were statistically significant at the α=0.05 level. The ROC curve displayed an area under the curve of 0.72 (Figure 1). Model fit was found acceptable by the Hosmer-Lemeshow test (p=0.15).

Figure 1. ROC curve for prediction of course withdrawal.



When accounting for other factors within the model, year was statistically significant (p=0.03). Students who took the course in 2010 were more likely to drop/withdraw when compared with students who took the course in 2011 (Figure 2). This probably resulted from differences in time of data collection during the semester. In 2010, assessment instruments were administered during the first laboratory course of the semester, while in 2011, due to scheduling conflicts, the instruments were administered in laboratory several weeks after the semester had begun. It is likely that some students who dropped the course in 2011 were not accounted for. Student age was also included in the model. Students who withdrew had a higher mean age when compared to those who remained in the course (Table 2). The odds of withdrawal increased for each one-year increase in age (Figure 2). Similarly, Murtaugh et al. (1999) found that non-traditional undergraduate students had lower retention rates. Bean and Metzner (1985) developed a model for non-traditional student attrition that included environmental variables (such as outside employment,

Figure 2. Adjusted odds ratio estimates and 95% Wald confidence limits from multiple logistic regression analysis for dropping/withdrawing from ASC 101. Variables include semester year, student age, high school GPA, and location lived in for the longest duration



family and finances), psychological variables, academic variables, background and intent to leave as factors influencing attrition.

Although students who withdrew were not surveyed to identify reasons for withdrawal, several students who had discussed withdrawing from the course with their instructor had cited time constraints due to family or career responsibilities. When compared with students who reported a high school GPA of 3.5 or higher, students with a high school GPA below 3.5 had higher odds of course withdrawal. This finding agrees with Garton et al. (2002), who found high school GPA to be a predictor of retention for freshman agricultural students. Students who performed well academically in high school may have been more prepared for ASC 101. It is suspected that some students may have dropped ASC 101 due to low course grade; however, course grade at time of withdrawal was not permanently recorded. The final variable included in the model was location lived in for the longest period of time. Students who had lived in Kentucky for the longest duration had higher odds of course withdrawal when compared with students who were from out-of-state or a foreign country. This contradicts findings of Murtaugh et al. (1999), who found in-state Oregon undergraduate students to be more likely to be retained when compared to out-of-state students. At the University of Kentucky, out-of state students may have more to lose by withdrawing from courses. Tuition and fees are approximately double for students who are considered to be out-of-state students and once classes begin, students are charged a portion of tuition at the time of dropping or withdrawing from the course. There also could be educational or socioeconomic factors not measured in this study that may differ between in-state and out-of-state students. Another limitation of the study was that students who dropped or withdrew had to be combined into one variable to permit statistical analyses. There are likely to be different reasons why students drop the course early during the semester versus

later; some students who are in danger of failing the course may drop it after mid-term grades are reported. Other researchers cited course grade, course difficulty, dislike of the instructor, low level of interest in the class, falling behind in class assignments and lack of time as major reasons for withdrawing from a college course (Hall et al., 2003). Variables not included in the model for course withdrawal due to lack of association were gender, degree, community type, high school type, taking high school or college agriculture classes, participating in agricultural clubs, CCTST percentile rank and background knowledge test score. Heitstuman and Cvancara (1992) also did not find an association between taking high school agriculture classes and retention.

Course Grade

When variables were tested for inclusion in the multiple linear regression models, effect on R^2 and variance inflation factors were examined closely to minimize issues due to multicollinearity.

The final model was:

ASC 101 Course Percentage = α + ß1(CCTST Percentile <34) + ß2(CCTST Percentile 34-66) + ß3(HS GPA <3.0) + ß4(HS GPA 3.0-3.49) + ß5(Urban) + ß6(Suburban) + ß7(Rural Non-farm) + ß8(Agriculture Clubs) + ß9(Public High School) + ß10(Year) + ε

When adjusted for other variables within the model and compared to students who obtained CCTST percentile ranks above 66, students with lower percentile ranks achieved lower mean ASC 101 course grades (Table 3). It appears that critical thinking is measured in the course and is reflected in course grades. Similarly, students who reported a high school GPA below 3.5 had lower adjusted mean course grades when compared to students with a high school GPA at or above 3.5. This finding supports the common use of high school GPA as a college acceptance criterion and agrees with the findings of Garton et al. (2002) as a predictor of GPA for freshman agriculture students. When compared with students from rural farms, students from suburban or rural non-farms had higher adjusted mean course grades. In another study by Siebert and colleagues (2006), no association was found between community type and GPA (or other academic motivation factors) for agricultural economics students. These results should help to alleviate concerns about performance of the increasing number of suburban and urban students in animal science courses. Additionally, students who were a current or past member in an agricultural-related club had higher adjusted mean course grades than students who had not participated in agricultural clubs. Students who were members of agricultural clubs also had higher background knowledge test scores (chi-square test of independence: p=0.026), so entering the course with more animal science knowledge may have given these students an advantage.

Many of the students who were from rural communities also participated in agricultural clubs; therefore, participating in an agricultural club may help to reverse the negative impact on course grades from living in a rural community. Lastly, students who attended public high schools had lower adjusted mean course grades when compared with students who attended private high school or were homeschooled. Factors that were not measured, such as socioeconomic status, educational level of parents, or quality of high school, may have had an effect within the community type and high school type variables. Barkley and Forst (2004) also found that college of agriculture freshmen who attended private high schools had higher first-semester GPAs than students who attended public high schools. Several variables, including age, gender, ethnicity, degree, location lived in for the longest duration, taking high school agriculture classes, taking college agriculture classes and background knowledge test score were not included in the model for course grade

Table 3. Results of multiple linear regression model for ASC 101 course grade percentage.

Variable	Adjusted Parameter Estimate	95% Confidence Interval	P-value
Intercept	80.08	75.51, 84.65	<0.0001
CCTST Percentile <34	-9.67	-12.88, -6.47	<0.0001
CCTST Percentile 34-66	-5.43	-8.39, -2.48	0.0003
CCTST Percentile >66	-	-	-
High School GPA <3.0	-6.74	-11.52, 1.96	0.0059
High School GPA 3.0-3.49	-5.24	-8.04, -2.44	0.0003
High School GPA >3.49	-	-	-
Urban	3.16	-1.49, 7.80	0.1826
Suburban	5.90	2.69, 9.11	0.0003
Rural Nonfarm	6.65	2.83, 10.48	0.0007
Rural Farm	-	-	-
Public High School	-3.78	-6.94, -0.61	0.0197
Agricultural Club Participation	4.45	1.74, 7.15	0.0013
Year: 2010 (forced)	-1.85	-4.35, 0.65	0.1459
R^2: 0.24			
Adjusted R^2: 0.21			

percentage due to lack of association. In agreement, Cole and Bokor (1989), also found no association between taking vocational agricultural classes in high school and GPA in college agricultural courses. Our results for gender agree with research by Peffer (2011), who found no association with course grade. Greene and Byler (2004) also found limited effect of taking high school agriculture courses on animal science course grade. Additionally, Pratt-Phillips and Schmitt (2009) found no association between major and course grade in an equine course. The variables that were included in our model account for 24% of the variance in course grade (Table 3), so there appears to be other unmeasured factors associated with final course grade percentage.

One potential limitation of using this model for prediction is that no two introductory animal science courses are exactly the same. Introductory animal science courses will have differences among professors, teaching assistants, course content, assignments, exam questions, laboratories, classroom environments and student populations. Additionally, there could be other important variables that were not surveyed here. Students were not surveyed upon withdrawing from the course, which could have provided additional information. Another study found number of absences to be associated with course grade (McMillan, 2009). Hours spent studying, course load, hours spent working, or ability to adjust to college life are other factors that could potentially affect course grade or course completion status. Attendance was not monitored in this course, but students were required to turn in laboratory sheets, quizzes and homework assignments during class time, so it is assumed that attendance would have a major impact on course grade. The main purpose of the models was to identify factors associated with successful course completion, rather than to predict course withdrawals or low grades. Identification of factors associated with course withdrawals and course grades should help to promote retention and student success for future animal science, agricultural education, and equine science students.

Summary

Both of the models developed in this study showed some ability to account for variability within course grade or course completion status. The multiple logistic regression model identified age, high school GPA, location lived in for the longest duration, and year as factors associated with course withdrawal. The multiple linear regression model found high school GPA, CCTST percentile rank, community type, high school type, and participation in agricultural clubs to be related to ASC 101 final grade. Future research should focus on reasons for associations between these variables and course grade or course completion status. Identification of variables associated with course grade and course completion status will assist faculty with course design and teaching strategies that will best support students who have varied backgrounds, skills, and goals.

Literature Cited

Barkley, A.P. and J.J. Forst. 2004. The determinants of first-year academic performance in the College of Agriculture at Kansas State University, 1990-1999. Jour. of Agr. and Applied Economics 36(2): 437-448.

Bean, J.P. and B.S. Metzner. 1985. A conceptual model of nontraditional undergraduate student attrition. Review of Educational Research 55(4): 485-540.

Buchanan, D.S. 2008. Animal science teaching: A century of excellence. Jour. of Animal Science 86(12): 3640-3646.

Cole, R.L. and D.A. Bokor. 1989. High school vocational agriculture and success in college. NACTA Jour. 33(1): 10-13.

Dyer, J.E., L.M. Breja and P.S.H. Wittler. 2002. Predictors of student retention in colleges of agriculture. In: Proc. of the 27th Annu. National Agr. Education Research Conference. 490-501.

Facione, P. 2009. The California critical thinking skills test, form 2009. The California Academic Press, Millbrae, CA

Garton, B.L., B.O. King and J.E. Dyer. 2002. The academic performance and retention of college of agriculture students. Jour. of Agr. Education 43(1): 46-56.

Greene, B.B. and B.L. Byler. 2004. Effects of pre-college agricultural background on student performance in college introductory agricultural courses. NACTA Jour. 48(3): 14-18.

Hall, M., K. Smith, D. Boeckman, V. Ramachandra and J. Jasin. 2003. Why do students withdraw from courses? In: Proceedings of Southern Association for Institutional Research Conference, San Antonio, TX, Oct.

Heitstuman, M.D. and J.G. Cvancara. 1992. Retention of students. NACTA Jour. 36(1): 44-46.

Lambert, M.E. and W.E. Martin. 2010. The California Critical Thinking Skills Test [Revised]. In: R. A. Spies, J.F. Carlson and K.F. Geisinger (ed.) The Eighteenth Mental Measurements Yearbook. Buros Institute of Mental Measurements, Lincoln, NE.

Lancaster, S.H. and J.S. Robinson. 2011. Factors associated with student success in an introductory plant science course. NACTA Jour. 55(2): 26-31.

McMillan, M., A. Bullion, K. Stutts, S. Kelley, M. Beverly and L. Rakowitz. 2009. Variables affecting final grade outcome in undergraduate animal science courses. NACTA Jour. 53(1): 29-33.

Murtaugh, P.A., L.D. Burns, J. Schuster. 1999. Predicting the retention of university students. Research in Higher Education 40(3): 355-371.

Peffer, P.A.L. 2011. Demographics of an undergraduate animal sciences course and the influence of gender and major on course performance. NACTA Journal 55(1): 26-31.

Pratt-Phillips, S. and S. Schmitt. 2009. The effect of previous experience on performance in an introductory-level undergraduate equine science class. Jour. of Equine Veterinary Science. 29(5): 450-451.

Reiling, B.A., T.T. Marshall, J.H. Brendemuhl, J.A. McQuagge and J.E. Umphrey. 2003. Experiential learning in the animal sciences: Development of a multispecies large-animal management and production practicum. Jour. of Animal Science 81(12): 3202-3210.

Siebert, J., K. Litzenberg, R. Gallagher, C. Wilson, F. Dooley and A. Wysocki. 2006. Factors associated with students' academic motivation in agricultural economics classes. American Jour. of Agr. Economics 88(3): 750-762.

Soberon, M.A., D.J.R. Cherney and R.C. Kiely. 2012. Predictors of performance in an animal nutrition classroom. NACTA Jour. 56(3): 6-9.

Quantifying Student Preferences for Spending Fees for Technology in a College of Agricultural Sciences and Natural Resources

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Abstract

This study utilized Internet-based surveys to elicit preferences for student technology fee spending in the College of Agricultural Sciences and Natural Resources at Oklahoma State University. The results show that 80% of students are unaware that they pay technology fees and almost 93% had little or no knowledge of how the fees were spent. Based on students' responses the two most popular spending areas are for classroom multi-media technologies and departmental proposals using field-specific technologies such as GPS units or field specific computer software/hardware with each receiving an average of 25.2% for responses. Preferences by respondent characteristics showed that individuals' habits affect categorical spending. For example, students who use computer labs more often for classwork prefer that more money go towards department technology proposals than classroom technology; upperclassmen have a significantly negative preference for department proposals; and students who own a computer have a stronger preference toward department proposals than those who do not own a computer. The job of the administrators is to understand these differences and shape policies that provide students with the technologies they need to succeed.

Introduction

The growth of technology in the past century has drastically shifted the pedagogy of teaching and learning at universities away from using chalk and a blackboard. Simultaneously, universities have sought to increase non-tuition fees to cover increasing costs of providing technology to students (Carnevale, 2007). Despite opposition concerning increases in fees, little research has been done on how students prefer that fees be spent. Some quantitative research has aimed at examining whether the use of technology such as PowerPoint presentations and student response systems such as clickers, improves student learning (Carnevale, 2005; French, 2006; Kozma and Russell, 1997; Mayer, 2001; Murray, 1999; Nowaczyk et al., 1998; Trees and Jackson, 2007). At the forefront of media use in the classroom are newer technologies such as using mobile phones for instant messages and Twitter or similar live feedback which have been found to increase student engagement and attendance (Higdon et al., 2011). Schacter and Fagnano (1999) found that technology based on sound learning theory can significantly improve students' learning abilities and that the role of teachers, administrators and policy makers is to select and implement the technologies that best support student achievement. Another vein of the classroom technology research has shown that perceptions of the usefulness and student's willingness to pay for multi-media technologies vary by demographics and pedagogy style of the instructor (Graham et al., 2007; Boyer et al., 2009). Debate is still ongoing regarding which technologies can provide the best pedagogical improvement, but the increased technological presence has been evidenced by the increased classroom presence of computers, projectors and smart boards; the growth of computer labs and wireless capabilities across universities; and the influx of personal devices (handheld GPS units for example) for use in the field and in the lab. To fund these initiatives, many universities started charging

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technology fees in the 1990's and have been using the revenue to construct, maintain and support the necessary information technology infrastructures (Green, 1996).

Universities have turned to technology fees as a significant alternative source of revenue to fill budget gaps (Wellman et al., 2009). Historically, students have had a voice in how the funds from fees are distributed (Meabon et al., 1985). Unfortunately, with the continued collection and dispersion of technology fees, this voice seems to have been lost. A survey conducted at Oregon State University showed that only 36.6% of students even knew they paid a technology fee (Webster and Middleton, 1999). The results of a more recent survey from the University of Minnesota- Twin Cities showed that almost no progress was made in the past decade toward increasing student awareness. In that survey, 59% of students answered that they were not aware of how much they paid in technology fees and almost 90% answered that they knew little or nothing about how the fees are spent (Walker and Jorn, 2009).

Bringing students back into the discussion of how funds are allocated could be mutually beneficial to both students and universities. Students actively engaged in budgetary decisions are more accepting of the fees and provide a measure of approval for funding decisions (Webster and Middleton, 1999). The failure to include the "tech-savvy" generation of students in the decision process may hinder rather than promote academic success and technological innovation on campuses across the country (Carlson, 2005).

The College of Agricultural Sciences and Natural Resources (CASNR) at Oklahoma State University (Stillwater, OK) has had average annual revenues of approximately $253,500 from technology fees over the past five years (Oklahoma State University, 2012). These fees have gone to support the CASNR computer labs, departmental computer labs, classroom technologies and departmental proposals (such as funding field and lab equipment) with input from only a handful of students who sit on the technology fee committee. The objective of this research is to determine student preferences for technology spending within the college. Giving faculty and administrators a better idea of which technologies students perceive as academically beneficial will fill a void in the current literature on students' campus technology preferences.

Materials and Methods

Survey Construction

An internet survey was sent by email to all CASNR students to obtain their input on the fee spending for this research. (The full survey is available upon request.) The Oklahoma State University Institutional Review Board approved the study protocol as exempt and all participants provided informed consent prior to participation in the online survey. Prior to sending an individual email solicitation, a PowerPoint slide was shown in four of the largest courses known to hold predominantly CASNR students informing students of the study. The email solicitation, containing a link to the survey, was emailed to all 2,552 students in the College of Agriculture. Participants were told two people would be chosen randomly to win $50 cash for completing the survey should they wish to enter after completing the survey. A follow-up email was sent two weeks later to all recipients as the final contact and reminders with a link were published in one CASNR career fair newsletter. A total of 262 responses were received out of the 2,552 surveys sent out for a response rate of approximately 10.2%. Responses were collected from a diverse group of students, with students responding from each of the departments. Descriptive statistics of the survey respondents are shown in Table 1. As part of the survey, students were asked to provide their knowledge of how much they paid in technology fees and how those fees were spent. The students' responses (as shown in Table 2) reflect the findings of similar surveys (Webster and Middleton, 1999; Walker and Jorn, 2009). Eighty percent of the respondents were unaware of how much they paid in fees and almost 93% had little or no knowledge of how the fees were spent.

To elicit students' preferences for technology spending, each respondent was given a hypothetical funding scenario where they were asked to allocate a percent-

Table 1. Descriptive Statistics (n=262)

Descriptive Statistics	%
Male	31
Female	69
Race	
White	85.7
Black or African-American	1.2
American Indian or Alaskan Native	5.2
Asian	4.4
Native Hawaiian or other Pacific Islander	0.4
Hispanic	4.3
From Multiple Races	3.2
Major Departments	
Agricultural Economics	17.1
Ag Education, Communication, and Leadership	14.8
Animal Science	32.3
Biochemistry and Molecular Biology	4.7
Biosystems and Agricultural Engineering	7.8
Entomology and Plant Pathology	4.3
Environmental Sciences	3.1
Horticulture and Landscape Architecture	2.7
Natural Resource Ecology and Management	7.4
Plant and Soil Sciences	5.8
College Standing	
Freshman	10.8
Sophomore	15.4
Junior	14.6
Senior	34.6
Master's	16.2
Doctoral	8.5

age share to each of five different funding categories (CASNR computer labs, departmental computer labs, classroom technologies, departmental proposals and other technologies) with the total summing to 100%. (An example of the question for percentage share of funding is included as Figure 1. The complete survey is available upon request) Based on the students' responses, the two most favored categories were classroom technologies and departmental proposals with each receiving an average of 25.2%. The shares that the other categories received are displayed in Table 3. Analysis of Variance for these results shows that the difference in assigned percentages between categories is significant at the 99% confidence level (Table 3). The students also provided feedback for other technologies that consisted of E-books, upgraded wifi, wireless printers, software package licenses, laptops and iPads for checkout, more scanners and fax machines. Surprisingly, the students did not propose any cutting edge technology such as cloud based computing, smart boards, or mobile apps. Instead most of them simply wanted better printing capabilities, free copies and more up-to-date computers and software.

Once all of the responses were collected, the data were compiled and grouped for different student characteristics and behaviors. Variables such as class standing, computer ownership and gender were used to determine whether there is any difference in preferences among various student populations. Furthermore, student's behavior may result in different preferences. For instance, students vary in the number of hours spent in a computer lab on academic work (completing homework, class projects and printing notes) versus hours spent on non-academic work (accessing email, social networking and online gaming). All of these demographic and behavioral differences may affect preferences.

Table 2. Student Awareness of Technology Fees (n=262)

Question	Response	%
Do you know how much you paid in technology fees to CASNR this semester?	Yes	19
	No	80
	I did not pay a technology fee	1
How much do you know about what the CASNR technology fees are spent on?	A lot	2
	Moderate	5
	A little	34
	Nothing	59

Table 3. Summary Statistics for Technology Fee Spending Preferences

Groups			Count	Sum	Average	Variance
Funding % Department Computer Labs			262	5,417	20.68	127.09
Funding % CASNR Computer Labs			262	6,072	23.18	149.70
Funding % Classroom			262	6,610	25.23	163.74
Funding % Departmental Proposals			262	6,611	25.23	192.48
Funding % Other			262	1,490	5.69	64.09
Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	70,773.26	4	17,693.31	126.91	1.422E-91	2.38
Within Groups	181,940.74	1,305	139.42			
Total	252,714.00	1,309				

Empirical Model

Students' percentage share rankings of technology spending are used as the dependent variables and the student characteristics mentioned above were the independent variables. The model used is based on Zellner's (1962) seemingly unrelated regression model and is estimated in the following functional form:

$$Pref_n = \beta_{n0} + \beta_{n1}AcademicWork + \beta_{n2}NonAcademic + \beta_{n3}Computer + \beta_{n4}Gender + \beta_{n5}GraduateStudent + \beta_{n6}Upperclassmen + \varepsilon_n, \quad (1)$$

where the variables are defined as follows:

$Pref_n$ = percentage preference for technology n

$ß_{nk}$ = the coefficients to be estimated for the students' characteristics

n = 1,…, 5 for technology spending categories

AcademicWork = Hours spent in a computer lab on academic work

NonAcademic = Hours spent in a computer lab on non academic work

Computer = takes the value of 1 for students who own a computer, 0 otherwise

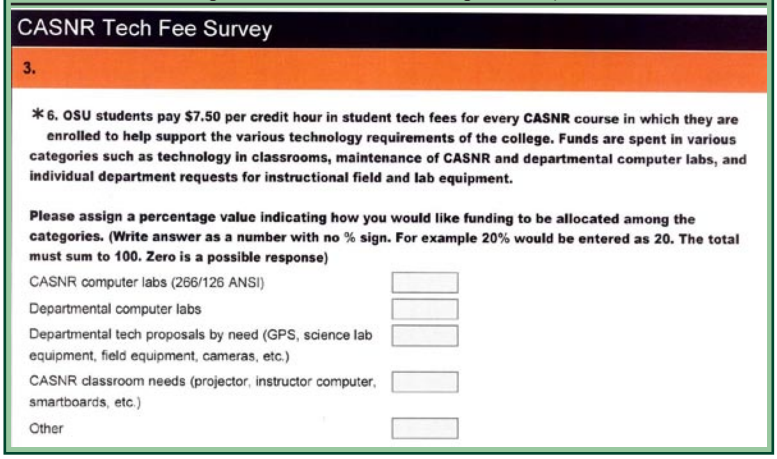
Gender = takes the value of 1 for students who are male, 0 for female

GraduateStudent = takes the value of 1 for graduate students, 0 otherwise

Upperclassmen = takes the value of 1 for upperclassmen, 0 otherwise

Since the model is defined as a system of equations, one equation has to be dropped for the model to run. The equation dropped is the percentage preference for departmental computer labs. Once the parameter estimates are obtained, the effect that different attributes have on preference can be measured by conducting hypothesis tests on the significance of the coefficients. The coefficients for *AcademicWork* and *NonAcademic* can be compared across the system of equations to rank student preferences based on the number of hours they spend on academic work and nonacademic work in computer

Figure 1. Example of Percentage Share Allocation Question (This is an example of the percentage share funding allocation question presented to the student respondents.)


CASNR Tech Fee Survey

3.

*6. OSU students pay $7.50 per credit hour in student tech fees for every CASNR course in which they are enrolled to help support the various technology requirements of the college. Funds are spent in various categories such as technology in classrooms, maintenance of CASNR and departmental computer labs, and individual department requests for instructional field and lab equipment.

Please assign a percentage value indicating how you would like funding to be allocated among the categories. (Write answer as a number with no % sign. For example 20% would be entered as 20. The total must sum to 100. Zero is a possible response)

CASNR computer labs (266/126 ANSI)

Departmental computer labs

Departmental tech proposals by need (GPS, science lab equipment, field equipment, cameras, etc.)

CASNR classroom needs (projector, instructor computer, smartboards, etc.)

Other

labs. The number of hours spent in a computer lab for academic use can be used as a measure of student effort. Student effort has been shown to play a significant role in predicting student success (Carbonaro, 2005) and is used to see if students who expend more effort on school prefer different technologies. If so, these areas of spending may be a good place to start when trying to determine which campus technologies students think will help them succeed academically.

Results and Discussion

Descriptive statistics of survey respondents are shown in Table 1. A disproportionate number of female students (69%) responded to the survey. In fall 2012, the only available timely accounting of student makeup, female students made up 52% of the CASNR student body (Oklahoma State, 2012). The majority of student respondents were Caucasian (85.7%), a higher percentage than those enrolled in fall semester 2012 (76.7%) (Oklahoma State, 2012). The greatest percentages of respondents were from the two largest student majors, Animal Science (32.3%) and Agricultural Economics (17.1%). The greatest percentage of respondents was made up of students with Senior standing (34.6%). In descending order, Seniors were followed by Masters (16.2%), Sophomores (15.4%), Juniors (14.6%), Freshmen (10.8%), and Doctoral Students (8.5%). As stated previously and shown in Table 2, students either do not examine their tuition and fee statements or do not pay it personally, as 80% report that they were unaware technology fees were assessed.

The model is run in SAS 9.2 using the GMM procedure to correct for potential heteroskedasticity (SAS, 2007). Results for the seemingly unrelated regression model are shown in Table 4 showing the ranking within funding category by group. All of the constant terms, which represent the estimated preference for the base group of undergraduate females who do not own a computer, are significant at the 5% level. Upperclassmen show a strong positive and significant preference for allocating funds to CASNR computer labs when compared to graduate students and underclassmen. The reason for this may be because the CASNR labs are larger and better support students working on group projects and have more updated computers and the software required for some higher level course homework assignments. Graduate students also have separate computer labs available to them, which possibly limits their preference for CASNR computer labs. Most of the coefficients for departmental proposals are significant indicating that students tend to

Table 4. Seemingly Unrelated Regression Results for Students Preferences for Technology Fee Spending

Parameter	Label	Estimate	
CASNR Labs			
B20	Constant	26.073*** [1]	(4.329) [2]
B21	Academic Lab Use	-0.016	(0.012)
B22	Non-Academic Lab Use	-0.018	(0.016)
B23	Own Computer	-3.907	(3.858)
B24	Gender	-3.264*	(1.621)
B25	Graduate Student	1.823	(2.161)
B26	Upperclassmen	6.086***	(1.761)
Classroom Technology			
B30	Constant	26.922***	(5.981)
B31	Academic Lab Use	-0.044*	(0.019)
B32	Non-Academic Lab Use	0.055	(0.049)
B33	Own Computer	-0.620	(5.533)
B34	Gender	-0.123	(1.707)
B35	Graduate Student	2.087	(2.274)
B36	Upperclassmen	-1.647	(1.693)
Departmental Proposals			
B40	Constant	20.169***	(3.662)
B41	Academic Lab Use	0.046**	(0.017)
B42	Non-Academic Lab Use	-0.049**	(0.017)
B43	Own Computer	5.967*	(3.026)
B44	Gender	2.970	(1.928)
B45	Graduate Student	-2.209	(2.613)
B46	Upperclassmen	-5.095**	(1.809)
Other Technology			
B50	Constant	6.706*	(2.647)
B51	Academic Lab Use	0.002	(0.009)
B52	Non-Academic Lab Use	0.013	(0.016)
B53	Own Computer	0.235	(2.391)
B54	Gender	0.006	(0.967)
B55	Graduate Student	-4.202**	(1.271)
B56	Upperclassmen	-1.299	(1.252)

either have a strong positive or negative preference for departmental proposals. Upperclassmen have a significantly negative preference for departmental proposals (Table 4), meaning they may not want to pay for a significant investment in things like field equipment if they will graduate before being able to use it. Students who own a computer also have a strong preference for departmental proposals, potentially because they do not have as strong a preference for computer labs, although that cannot be concluded from the model results. For the other technology category, the only significant finding was that graduate students have a strong negative preference toward it. Since "other technology" as a category included things such as E-books, wireless printers and laptops and iPads for check out, graduate students may not see any benefit from these technologies since graduate classes tend to be taught as traditional lectures and labs.

In order to rank students' preferences across the funding category equations, the variable in question must be continuous so that meaningful conclusions can be drawn from the comparison. *AcademicWork* is the only individual demographic variable with enough variation to have a significant effect among the funding category equations. A one-tailed t-test at the 10 % significance level results in the highest ranking for departmental proposals, followed by equal ranks between the three categories of CASNR computer labs, departmental computer labs and other technologies for second, and the lowest ranking for classroom technologies. These were calculated for each of the variables across each equation. For example, students reporting more hours spent on academic work, the null hypothesis is null hypothesis is that the $\beta_{Dept\ Proposal} - \beta_{OtherTech} = 0$ and the alternative hypothesis is that this difference would be greater than zero. (Calculations were as follows: $t= ((ß_{Dept\ Proposal}-ß_{OtherTech})-0)/sq.rt.(var(ß_{DeptProposal})+var(ß_{OtherTech})-2(cov(ß_{DeptProposal},ß_{OtherTech})))$. It was found that $t=1.7755 > 1.29\ t(0.90,262)$; therefore, we conclude: B41>B51 at the 90% confidence level.)

The more effort that students put into school work creates a stronger preference for departmental proposals, potentially because they view field and lab equipment as providing hands on learning and a real world experience and a weak preference for classroom technology, because they may view PowerPoint technology as just a nice perk that does not increase learning or academic success.

Although many of the results from the regression model in Table 4, proved inconclusive, evidence is found that different student populations have varying preferences for technology spending. Administrators and policy makers may want to consider this when deciding how to allocate technology budgets. Based on the results for upperclassmen in particular, schools may find it beneficial to students to consolidate some of the departmental computer labs so that they are larger and then use excess funds to upgrade the computers and software for them. Another idea may also be to treat technology fees differently based on the class level of the course being taught. Fees collected for upper level and graduate courses could be used to support technologies that promote more academic achievement in the groups taking those courses.

Summary

The use of technology on campuses across the country has the potential to revolutionize the way that today's students experience college. If universities plan to continue to assess technology fees, they need to educate students about how these fees are spent and provide the opportunity for input into the decision-making process. Simply surveying students about their preferences such as done in this study may serve to educate many students about the levels of fees and the potential to participate in the process of spending allocations. Students in college today are more technologically savvy than any generation before them and understanding what they want for the classrooms of the future is important (Carlson, 2005). Understanding students preferences for technology on campus will help ensure that universities are investing in programs that students feel improve their education experience and prepare them to compete in a global work force.

The results of this research show that students have differences in how they think their technology fees should be spent. Students of different class standing prefer different allocations for fees for technology according to the varying demands of their classwork. Students who use labs more often for classwork prefer that more money go toward departmental technology proposals than classroom technology, potentially because they find field and lab equipment enhances the learning experience and the creation of job skills more than PowerPoint technology. Students who own computers have a significantly higher preference for proposals enhancing departmental or major-specific needs than those students who do not own a computer. This preference is especially important since more students are bringing their own technology to college (Crews et al., 2007). The job of the administrators is provide avenues for student involvement in decision making, to understand these differences, and to shape policies that provide students with the technologies they need to succeed. They also must ensure that students' fees are not being used to subsidize the technology use of specific subgroups of students. Ultimately administration must also find ways to support faculty who effectively use media and technology to improve learning by investing and rewarding innovation in teaching as well.

Inevitably students must actively begin to participate in the allocation process to determine which campus technologies add value to their education and are worthy of being funded. This research simply provides the groundwork for understanding how students would like to see their technology fees spent. These results may also be isolated to the specific university where the data were collected, so it is necessary for future studies to look at multiple universities to compare findings. Future research also needs to focus on using different surveying techniques, such as conjoint choice, that better elicit ranked preferences. Researchers can estimate students' willingness to pay technology fees so that policy makers can implement an optimal fee structure. Although the adoption of technology on college campuses has been slower than most of the rest of society, assuming that we know what technology students want on campus and what they are willing to pay for it is unwise.

Literature Cited

Boyer, T., B. Briggeman and B. Norwood. 2009. Demand for multimedia in the classroom. Jour. of Agricultural and Applied Economics. 41(3): 791-808.

Carbonaro, W.. 2005. Tracking, students' effort, and academic achievement. Sociology of Education 78(1): 27-49.

Carlson, S. 2005. The net generation goes to college. The Chronicle of Higher Education A34.

Carnevale, D. 2007. Students at U. of Southern Mississippi grumble over technology fee. Chronicle of Higher Education A29.

Carnevale, D. 2005. Run a class like a game show: "Clickers" keep students involved. Chronicle of Higher Education 51: 1.

Crews, T., H. Brown, S. Bray and E. Pringle. 2007. Student campus technology trends: 2001 versus 2006. Educause 30(4).

French, D. 2006. I Pods: Informative or invasive? Jour. of College Science Teaching 36: 58-59.

Graham, C.R., T. Tripp, L.Seawright and G. Loeckl III. 2007. Empowering or compelling reluctant participators using audience response systems. Active Learning in Higher Education. 8(3): 233-258.

Green, K.C. 1996. The coming ubiquity of information technology. Change 28(2): 24-29.

Higdon, J., K.L. Reyerson and C. McFadden. 2011 Twitter, Wordle, and Chimeln as student response pedagogies. Educause Quarterly. 34(1).

Kozma, R. and J. Russell. 1997. Multimedia and understanding expert and novice responses to different representations of chemical phenomena. Jour. of Research in Science Teaching 34: 949-968.

Mayer, R. 2001. Multimedia learning. Cambridge: Cambridge University Press.

Meabon, D., D. Sudick and A. Gibbs. 1985. A student activity fee primer: Current research on collection, control and allocation. Columbia, SC: National Association for Campus Activities.

Murray, M.. 1999. Econometrics lectures in a computer classroom. The Jour. of Economic Education 27: 308-321.

Nowaczyk, R., L. Santos and C. Patton. 1998. Student perception of multimedia in the undergraduate classroom. International Jour. of Instructional Media 25: 367-382.

Oklahoma State University College of Agricultural Sciences and Natural Resources Technology Fee Committee. 2012. Student Technology Fees. Meeting Agenda.

Oklahoma State. 2012. Oklahoma State University Five-Year Academic Ledger: College of Agricultural Sciences and Natural Resources. Oklahoma State President's Webpage. Available at http://vpaf.okstate.edu/IRIM/AcademicLedger/Documents/DASNR_report.pdf. Accessed February 22, 2013.

SAS. 2007. SAS 9.2. Cary, N.C.

Schacter, J. and C. Fagnano. 1999. Does computer technology improve student learning and achievement? How, when, and under what conditions? Jour. of Educational Computing Research 20(4): 329-343.

Trees, A. and M. Jackson. 2007. The learning environment in clicker classrooms: Student processes of learning and involvement in large university-level courses using student response systems. Learning, Media, and Technology 32: 21-40.

Walker, J.D. and L. Jorn. 2009. 21st century students: Technology survey. Survey, Office of Information Technology, University of Minnesota Twin Cities.

Webster, J. and C. Middleton. 1999. Paying for technology: Student fees and libraries. The Jour. of Academic Librarianship 25(6): 462-472.

Wellman, J.V., D.M. Desrochers, C.M. Lenihan, R.J. Kirshstein, S. Hurlburt and S. Honegger. 2009. Trends in college spending: Where does the money come from? Where does it go? Washington, DC: The Delta Cost Project.

Zellner, A. 1962. An efficient method of estimating seemingly unrelated regressions and tests for aggregation bias. Jour. of the American Statistical Association 57(298): 348-368.

Do Independent Farmers Serve the Common Good?

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Abstract

In the management of agricultural resources, private initiative is often advocated as the surest path to sustainability due to its reliance on human self-interest and innovative entrepreneurship. Aimed at helping students develop critical thinking skills, we explore the difference between political versus economic independence among farmers. Game theory is applied to farmers' management strategies and outcomes. Application of the Prisoners' Dilemma suggests that the motive of self-interest, though powerful, does not necessarily lead to outcomes that promote the long-term common good. The key to wise agricultural management is not independent decision-making, but voluntary and transparent cooperation guided by cultural norms.

Introduction

Thomas Jefferson's model of an agrarian America envisioned "a nation of small, independent farmers as the proper basis for democratic society" (Knutson et al., 1983). Today, the independent mindset of many American farmers remains an enduring cultural ethos based on a deeply held value system with powerful implications. Yet, what does it mean to be "independent"? There can be a difference between having an independent mindset versus behaving independently.

Possessing an independent mindset has broad personal and political dimensions that may or may not be consistent with farmers' focused economic behavior. For example, in our national elections most U.S. farmers vote along conservative lines by a 2 to 1 margin for reasons that resonate with their personal and political values (Walker, 2012). However, considerably more American than European farmers vote for liberal candidates based on U.S. economic policies that traditionally support cooperative farm programs (de Graaf et al., 1995).

Agricultural educators need to help students distinguish between independent thinking versus acting in the agrarian milieu. Under oligopolistic (few sellers) market structures, independent minded farmers can be better off when they collaborate, rather than compete, with each other in the economic arena. Similarly, on a global scale, the few giant agribusiness firms generally choose to consolidate and concentrate their resources geographically and sectorally based on the market strategies of peer firms to avoid direct competition (Rama, 2005).

Using oligopolistic game theory, this article offers a simple lesson with hypothetical rules of engagement to illustrate how independent behavior can impede attainment of the common good across current and future generations. A lack of trust among players erodes cooperative behavior, with perverse results for all.

One of the most powerful metaphors in agricultural economics education is Adam Smith's famous notion of an *Invisible Hand*: when rational individuals and groups act out of their own self-interest, with or without regard for others, the outcome maximizes the common good. In other words, a rising tide lifts all boats. It is a powerful phenomenon - to the extent that it is true.

Agricultural educators have long professed a mixed attitude toward reliance on the free market to allocate resources. Which is more important for farmers to follow: market incentives or cultural norms? Libertarians assert that private landowners have a strong incentive to manage their natural assets in a sustainable manner. In their view, government should adopt a *laissez faire* (hands off) approach toward the private sector, including agribusiness.

Conversely, skeptics of raw capitalism advocate voluntary agreements or government regulation where members agree to "co-operate" for the common good. Nevertheless, because of its reliance on individual self-interest and entrepreneurial initiative, many resource managers advocate privatization as the surest path to sustainable agriculture.

However, under certain conditions/rules, rational self-interest, private initiative and unregulated markets

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do not lead to the socially optimal outcome (Frank, 2000). In other words, the *Invisible Hand* may sometimes be too aggressive and need a counterbalancing element of justice to achieve sustainability. For example, Hardin's (1968) classic analysis of the "Tragedy of the Commons" offers students an example how private initiative can backfire.

Classroom Exercise: Management of Common Property Resources

Ask your students: "Who likes to fish? Who likes to make money?" Ask for four volunteer fishers. Have them stand around the four edges of a table, surrounded by the rest of their classmates. Tell the four fishers that the rules are simple.

Rules: You will place 20-30 pieces of Goldfish Crackers on the table, each representing one fish. The four fishers, without talking to each other, will simultaneously fish for 30 seconds, competitively gathering as many fish as they wish with their hands. For each fish they "catch," you will "pay" them one dollar (or a quarter, piece of candy, points on next exam … some tangible reward per fish caught).

After each 30 second round of fishing, you will pay the fishers, then add two additional "baby" fish for the next round for each fish left un-caught on the table … replenishing the species. Without much discussion or delay, "Go!"

Usually, one or more fishers will exploit the resource by trying to catch all or most of the fish, leaving none or a few for replenishing the species for future rounds of fishing/harvests. If so, pause and ask the class about what happened and why?

Now change the rules: using two belts or yard sticks, form an "X" on the table. Place an approximately equal number of fish in each quadrant. Assign one quadrant as property rights to each of the four fishers, as their fishery to manage as they wish. Inform them that cheating will not be tolerated and heavily enforced. Then play another iteration of fishing rounds. Usually, students realize that it is in their best interests to manage the resource in a sustainable manner.

Ask students to identify other examples of the Tragedy of the Commons (crowded beaches, highway congestion), including success stories (American bison, campus parking permits) where management systems were implemented to ration the resource in a sustainable framework.

Figure 1. Years Incarcerated Based on Individual's Responses

Prisoner A Strategy \ Prisoner B Strategy	Confess	Don't Confess
Confess	B = 4 **A+B = 8** A = 4	B = 6 **A+B = 6** A = 0
Don't Confess	B = 0 **A+B = 6** A = 6	B = 2 **A+B = 4** A = 2

Theoretical Model

It is generally good for one farmer to have a bumper crop. However, it can be disastrous for all farmers to simultaneously have bumper crops ... market prices will likely plummet, especially for food/fiber products viewed as necessities (inelastic demand) by consumers who want only a certain quantity regardless of price. Hence, the production planning behavior of farmers is framed within their expectations of other farmers' decisions. Such behavior in oligopolistic markets is typically explained in the context of players in game theory analysis (Mathis and Koscianski, 2002), where one's outcome is dependent upon the actions of others, such as the famous Prisoners' Dilemma (PD) paradigm (Nicholson, 1989). For example, see Figure 1.

Working in collusion, two criminals are guilty of committing a crime. When captured and interrogated separately by police, the criminals are told that if they both confess they will each receive four years in prison (Cell 1,1: Row 1, Column 1 in upper left quadrant). If one confesses, but the other does not, the confessor will be granted leniency with probation and no jail time and the non-confessor will be severely punished with a six year sentence (Cell 1,2 or 2,1). If neither party confesses, they will both be charged with a lesser crime and likely receive two years each in jail (Cell 2,2). Each outcome (cell) has a probability of 0.25 of occurring.

If the criminals act in their own individual self-interest, each of their optimal strategies is to confess. From the perspective of Prisoner A, to confess is clearly the optimal ("dominant") strategy because both of his potential outcomes, depending on Prisoner B's decision, result in less jail time than if Prisoner A does not confess: $0 < 2$ or $4 < 6$. The same is true for Prisoner B.

A "Dominant Strategy" occurs when a player's optimal strategy (not outcome) is independent of the expected behavior of others. A PD with Dominant Strategies is a special case of Nash Equilibrium (Mathis and Koscianski, 2002), as in the example above.

The PD represents a non-zero-sum game in an oligopolistic market structure. Ethicist Gary Comstock (2002) believes that the PD illustrates the fallacy of assuming or asserting that the human motive of self-interest leads to socially optimal outcomes. Under the above conditions/rules, the strategy of maximizing self-interest leads to disaster. By both confessing, the prisoners incur the worst possible collective result: a combined total of eight years in jail. Collectively, the best outcome would be a combined four year sentence (two years each) if neither prisoner confesses. However, in the absence of trust, to not confess is a risky strategy.

Regarding the management of agricultural resources, some scholars assert that the root of the problem is a lack of property rights and hence privatization of ownership presents the best, perhaps only, solution because it empowers landowners to act to maximize their self-interest (Sanera and Shaw, 1996). Independence is a farmer's virtue!

At the macro level, some analysts assert that an oligopolistic market structure can entice sustainable behavior by producers. For example, Datta and Mirman (1999: 233) demonstrate that oligopolistic market power induces under-harvesting of species for the sake of future production, thereby avoiding exploitation even with a lack of property rights.

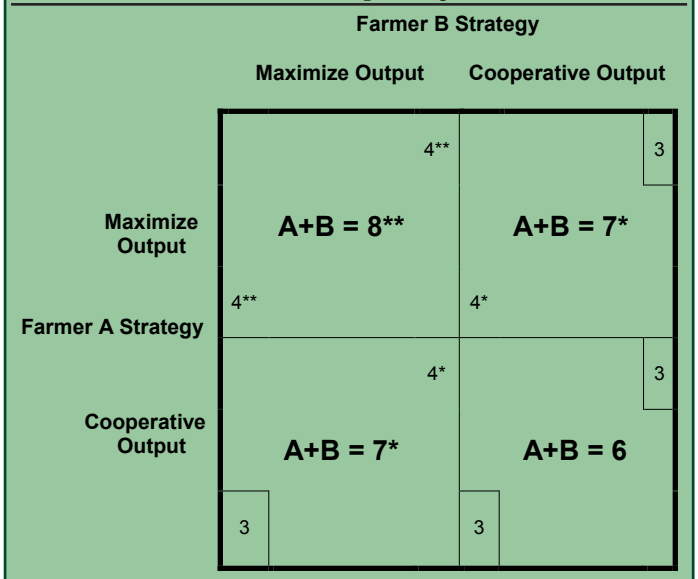
Other scholars argue that the real issue is cooperation to eliminate free-riders, i.e., lone operators who let everyone else cut back production while they don't (Seitz et al., 2002). Similarly, Morgenstern (1995) sees the problem in the light of an externality: "when private and social costs diverge, private profit-maximizing decisions are not socially efficient." Thus, Costanza (1991) says that independent farmers "must realize that their activities are individually rational, [yet] collectively undesirable." Appropriate informal rules developed over generations can achieve "governance without government" (Swallow and Bromley, 1992: 12).

Laissez faire advocates view government regulation as an unacceptable solution because it relies on legal coercion; though Hardin (1968) responds that market prices, fees and fines are also a form of "mutually agreed upon mutual coercion." Recognizing that perfectly competitive markets seldom exist, laissez faire disciples stress that government solutions are universally infallible (Anderson and Leal, 1992: 412).

Results

Individual self-interest and privatization of property do not necessarily lead to socially optimal outcomes and, under certain conditions, can backfire, i.e., detract from maximizing the common good. Applying the PD to agriculture can illustrate the predicament.

Figure 2. Relative Units of Agricultural Output Based on Strategies Adopted



** Physically unsustainable long-term level of output.

* Culturally unsustainable long-term distribution of output.

In contrast to Figure 1, the numerical values in Figure 2 are good things (relative levels of agricultural output) as opposed to jail time. Assume that both farmers/firms seek to maximize production in (Cell 1,1) by free range grazing on common property. Collective output is maximized at eight units in the short-term, which is physically unsustainable in the long-term due to loss of soil fertility, erosion, depletion of irrigation water, rising marginal input costs, falling product prices and/or labor fatigue.

Instead, assume both farmers agree to engage in cooperative management (Cell 2,2) by reducing their own level of production by 25%, perhaps by rotational grazing. They each generate three units of output for a collective level of six, which is sustainable indefinitely. If one farmer cheats (Cells 1,2 or 2,1), under-reporting his/her harvest or secretly grazing livestock, his/her output returns to four units and the cooperative farmer's is three, which may be physically – but likely not culturally – sustainable. Once the cooperative farmer finds out, he/she will likely return to competitive behavior. Furthermore, community resentment and/or peer pressure will likely surface. Hence, the situation results in a long-term sustainable solution (Cell 2,2) only under the conditions of multiple iterations (repeated cycles that reveal actual behavior), earned trust, effective supervision and ecological feasibility.

Discussion

"Hundreds of reviews and case studies" (Grafton, 2000) demonstrate the conditions under which various management strategies lead to socially optimal outcomes, depending upon factors such as a reliable degree of trust

or third-party enforcement, well defined and defensible geographical boundaries, small numbers of members and dependence of the community on the resource. A common culture in rural agriculture enhances the likelihood of cooperation in managing shared agricultural resources (Ostrom and Ostrom, 2004). A key factor in sustaining agricultural resources is transparent collaboration.

Leeson (2003: 35-54) and Brennan (2000: 7) acknowledge that single-round PDs (a type of coercion) can fail to attain a sustainably optimal solution, whereas repeated negotiations between individuals can achieve the common good without coercion. Just, et al., (2005: 470) explored the conditions under which a Nash bargaining strategy can lead to cooperation among players: transparent and enforceable property rights (ownership, access, excludability); acceptable rules of access and withdrawal; effective supervision and dispute resolution mechanisms; cultural norms and trust; and repeatable interactions and information gained.

Even without a third-party overseer, it is possible to achieve a stable coalition of cooperators, even with some defecting free-riders, depending on the relative amounts of benefits and costs in managing a shared resource (Becker and Easter, 1999; Kathuria and Sterner, 2002). Feeny et al., (1996) demonstrated that the typical libertarian assumptions of profit maximization, homogeneous agents, free entry and exit and lack of altruism and non-pecuniary rewards seldom hold.

Summary

In today's Western culture, competition is as pervasive as water to a fish. For better and worse, the competitive impulse governs most dimensions of life: nature, economics, education, science, law, politics, entertainment, media, arts, sexuality, religion, sports, crime and war. Though competition, self-interest and private property are powerful stimulants for advancing many citizens' quality of life, when unregulated they are neither assurances of each other, nor guarantors of socially optimal outcomes.

Markets pose the primary means for valuing and managing scarce natural resources. However, competition, self-interest and private property are necessary, but not sufficient conditions for market-based solutions to work efficiently. Successful strategies for sustainable agriculture must balance humanity's competitive nature with relationships based on cooperation and consensus. The goal is achieving win/win strategies, where "getting ahead" is not measured by those one passes. Collaboration may not be humanity's instinctive impulse, but may be our most reliable path to a sustainable future.

Literature Cited

Anderson, T.L. and R.R. Leal. 2005. Free market versus political environmentalism. in environmental philosophy: from animal rights to radical ecology (Michael E. Zimmerman, et al., Upper Saddle River, NJ: Pearson-Prentice Hall, 4th edition), 409-418.

Becker, N. and K.W. Easter. 1999. Conflict and cooperation in managing international water resources such as the great lakes. Land Economics 75(2): 233-245.

Brennan, T.J. 2000. The economics of competition policy: recent developments and cautionary notes in antitrust regulation. Resources for the Future Discussion Paper 00-07. Washington, DC.

Comstock, G.L. 2002. Life science ethics. Ames: Iowa State Press. pp. 175-176, 179.

Costanza, R. 1991. Ecological economics: The science and management of sustainability. New York: Columbia University Press. pp.322, 408-410.

Datta, M. and L.J. Mirman. 1999. Externalities, market power, and resource extraction. Jour. of Environmental Economics and Management 37: 233-255.

de Graaf, N.D., P. Nieuwbeerta and A. Heath. 1995. Class mobility and political preferences: Individual and contextual effects. American Jour. of Sociology 100(4): 1008-1027.

Feeny, D. S. Hanna and A.F. McEvoy. 1996. Questioning the assumptions of the "tragedy of the commons" model of fisheries. Land Economics 72(2): 187-205.

Frank, T. 2000. One market under God. New York: Anchor Books. pp. 436.

Grafton, R.Q. 2000. Governance of the commons: A role for the state? Land Economics 76(4): 504-517.

Hardin, G. 1968. The tragedy of the commons. Science 162: 1243-1248.

Just, R. S. Mitra and S. Netanyahu. 2005. Implications of nash bargaining for horizontal industry integration. American Jour. of Agricultural Economics 87(2): 467-481.

Kathuria, V. and T. Sterner. 2002. Monitoring and enforcement: Is two-tier regulation robust? Resources for the Future Discussion Paper 02-17. Washington, DC.

Knutson, R.D., J.B. Penn and W.T. Boehm. 1983. Agricultural and food policy. Englewood Cliffs, NJ: Prentice-Hall, Inc.

Leeson, P.T. 2003. Contracts without government. Jour. of Private Enterprise 18(2): 35-54.

Mathis, S.A. and J. Koscianski. 2002. Microeconomic theory: An integrated approach. Upper Saddle River, NJ: Prentice-Hall, Inc.

Morgenstern, R. 1995. Environmental taxes: Dead or alive? Resources for the Future Discussion Paper 96-03. Washington, DC.

Nicholson, W. 1989. Microeconomic theory: Basic principles and extensions. Chicago, IL: The Dryden Press.

Ostrom, E. and V.Ostrom. 2004. The quest for meaning in public choice. American Jour. for Economics and Sociology 63(1): 1-43.

Rama, R. 2005. The changing structure of the world's food oligopoly. Multinational Agribusinesses. New York: Food Products Press, 22-28.

Sanera, M. and J.S. Shaw. 1996. Facts not fear: A parent's guide to teaching children about the environment. Washington, D.C.: Regenery Publishing, Inc. pp. 36, 51-52, 118.

Seitz, W.D., G.C. Nelson and H.G. Halcrow. 2002. Economics of resources, agriculture, and food. New York: McGraw-Hill. pp. 370-372.

Swallow, B.M. and D.W. Bromley. 1992. Institutions, governance, and incentives in common property regimes for African rangelands. Institute for Environmental Studies, University of Wisconsin-Madison. 1-15.

Walker, J. 2012. The industry divide in the elections. (Gallup Poll) http://elections.firedoglake.com.

Faculty Advisors' Attitudes towards Undergraduate Advising in a College of Agriculture and Natural Sciences: A Non-Experimental Study

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Abstract

In this non-experimental study preliminary data collection, the authors sought to better understand perceptions of advising by faculty in a Midwestern, college of agriculture and natural resources. Participants were asked to respond to a variety of questions on a five-point Likert-type scale, rating the process and perceptions of undergraduate advising by both the advisor and students. Respondents were also given the opportunity to respond to open-ended questions regarding the advising process and their perception of student's advising experiences. The results of the survey indicated that the majority of advisors found the advising process to be effective, 87% found advising pleasant and rewarding and 72% believed students were neutral in their perceptions of advising. Six broad themes emerged from the open-ended questions: relationships with students, faculty perceptions of students' attitude of advising, degree of effectiveness, frustrations with advising, recognition and reward and areas for improvement. Faculty valued building relationships with students, but felt that it was not properly rewarded and that more training should be done to prepare advisors. The results of this survey could pave an opening for a more extensive assessment interpretation study of faculty advising within this college at a later time.

Key words: undergraduate, advising, faculty

Introduction

While higher education has existed in the United States since 1636, most campuses consisted only of "tutors" and students until sometime in the 1800's. It was not until the introduction of curricular electives in the 1870's that entering freshmen were required to consult with an 'advisor', typically a faculty member to select their course of study (Kuhn, 2008). Students had only a limited number of professionally-aimed courses of study from which to choose. As post-secondary education curricula expanded and students began to have a choice in their academic pursuits, colleges saw the need to provide more specialized individual guidance for students in making wise course decisions. Thus, academic advising became formally recognized as an independent venture in the 1970s. The field has continued to grow and expand with the needs of colleges and universities and so too have the number of advising models within higher education. A "faculty-only" model

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is one of many models, employed commonly on college campuses (Kuhn, 2008).

Advising is critical to student satisfaction (Nutt, 2003; Tinto, 1994; Noel et al., 1986). Advisors are frequently among the first contacts students have with their new educational institution. They can serve students by encouraging them to become involved in activities inside and outside of the classroom that can aid in their success (Kuhn, 2008). In short, advisors have the opportunity to shape students' educational paths, an endeavor that comes with much responsibility. In order to ensure that advising is effective, universities must continually evaluate their practices. As Cuseo (2008) explains:

"*Assessing the effectiveness of academic advisors delivers a strong and explicit message to all members of the college community that advising is an important professional responsibility; conversely, failure to do so sends the tacit signal that academic advisement is not valued by the institution and that the work of academic advisors is not worthy of evaluation, improvement, and recognition" (p. 369).*With increased efforts to recruit and retain students within the college, the role of academic advising in the process needs to be evaluated.

The College of Agricultural Sciences and Natural Resources (CASNR) relied primarily on a faculty advising model. According to the University of Nebraska-Lincoln (UNL) Fact Book (2012), CASNR had the highest first year retention rates (74.9%) of students staying within the college for freshman entering in 2010. Much of this increased retention has been credited to faculty advising efforts. One faculty member said, "Our retention rate seems to speak well for advising, even though it isn't the whole reason." However, little has been done to quantify the impact of advising on this campus. The purpose for this non-experimental study was to gauge faculty members' perceptions about advising, how it impacts their jobs, and how they see student engagement in the advising process. The results of this survey could pave an opening for a more extensive assessment of faculty advising within the College of Agriculture and Natural Resources at the University of Nebraska-Lincoln.

Materials and Methods

Advising System

The College of Agricultural Sciences and Natural Resources (CASNR) at the University of Nebraska-Lincoln employs predominantly a faculty advising system for undergraduate advising. There are a total of 105 advisors for 28 majors in the college. While most programs utilized a faculty-only model, a few exceptions do exist: the School of Natural Resources utilizes an academic coordinator in addition to faculty advisors, while the department of Biochemistry has a full time advisor plus shares a split advisor position (0.25 FTE) with Forensic Science (0.75 FTE). Although one professional advisor participated initially, responses were not included to focus solely on faculty perceptions. The number of faculty advisors and advisor loads varies by department. While students are encouraged to come in for advising, it is not mandated and certainly, the degree to which it is promoted varies from department to department.

Survey Design

All faculty advisors in CASNR were asked to complete a survey to share their impressions and experience with undergraduate advising to determine their overall satisfaction with the current advising system within the college. The surveys asked initial demographic information including department advised in, teaching appointment percentage, number of years advising undergraduates and current number of undergraduate advisees.

Participants were then asked to respond to a variety of questions on a five point Likert-type scale (5 = strongly agree, 4 = agree, 3 = neither agree nor disagree, 2 = disagree, 1 = strongly disagree). These questions related to the advisor's rating of the academic advising process and their perceptions of undergraduate advising by both the advisor and students. In addition to Likert-type scale survey items, respondents were given the opportunity to respond to open-ended questions.

The survey link was provided through an e-mail to all faculty advisors in CASNR with a reminder sent two weeks after initial survey distribution date. The survey was provided in an online format through a Google form. The survey procedures were approved by the University of Nebraska - Lincoln's Institutional Review Board (IRB) and completion of the survey indicated consent.

Data Analysis

Mean, range and standard deviation were calculated for responses to Likert-type questions. Due to the wide range of responses, the percentage of advisors who agreed (4 or 5), were neutral (3) or disagreed (1 or 2) was calculated and compared. The responses to the open-ended question items were analyzed using qualitative data analysis techniques. The first step was horizontalization of the data (Creswell, 2012). Researchers reviewed the responses and identified common statements or themes. Next, the researchers reviewed the responses as a group to find commonalities among the responses. These commonalities were then grouped into meaning units (Creswell, 2012) and reviewed again until themes emerged to find the essence of the faculty advising experience.

Results and Discussion

Approximately 46% of CASNR faculty advisors (47/102) responded to the survey. Because the college only has three professional advisors, the authors excluded their responses from the survey, focusing solely on faculty perceptions. The author who advised in CASNR at the time of the study refrained from completion of the survey. The average teaching appointment was 42% with a range of 0 to 100% for those that responded (Table 1). There was large variation in the teaching appointments of the faculty that responded (SD = 30.9). Five respondents indicated a teaching appointment of less than 5%, while all others had appointments greater than 20%. The number of years advising varied from 4 months to 38 years with an average of 13 years. The average number of undergraduate advisees for survey respondents was 22 with a range of 0 to 120 (SD = 23.1). The sample provides a broad picture of advisors within the college. A variety of practices are utilized for assigning advisors in CASNR; some departments utilized only one faculty member for all students while others use multiple faculty with fewer advisees per faculty member.

When asked about the efficacy of the advising process, 95% of advisors found the process to be effective, nearly half of those (40%) rating it as highly effective. In regard to their attitude about advising, 87% found the process to be pleasant and generally rewarding and none felt it was a negative experience. However, when asked about students' perceptions of advising, 72% felt that students were neutral on the advising process finding it neither pleasant nor unpleasant. Further research conducted on student perceptions of faculty advising in CASNR is an important piece to the proposed assessment project. From the quantitative questions (Table 2), advisors seemed to agree that they were able to give accurate advice regarding curricular requirements (89% agreed), options following graduation (98%) and serve as a resource related to choice of major (81%) or career (85%). This aligns with results from the University of Kentucky College of Agriculture, where 98% felt competent to plan class schedules and 94% felt competent to assist with career choices (Horstmeier, 2006). Results were mixed about advisors' ability to assist with advisees' personal problems (45% agreed, 25% were neutral, and 30% disagreed). However, most indicated that they felt comfortable referring their advisees to student support services on campus for matters that are beyond their expertise (92%). Noting that faculty feel adequate about the logistical tasks of advising (creating degree plans, dealing with curricular requirements and career options), faculty appear less confident in the interpersonal and social components required of advising, which may impact their responses to why they feel students could be neutral, rather than positive. As such, increasing the expectations of the interpersonal tasks and bolstering advisors' interpersonal ability to address personal student concerns may improve the students' perception of the advising process. The results parallel those found on faculty advising at other institutions (Horstmeier, 2006; Meyers and Dyer, 2005). In terms of student use of the advising services, most felt that students kept appointments (77%), but results were mixed as to whether students came with a pre-planned schedule (21% agreed and 45% disagreed).

The qualitative results from this survey of faculty members fell into six broad themes: relationships with students, faculty perceptions of students' attitude of advising, degree of effectiveness, frustrations with advising, recognition and reward and areas for improvement.

Table 1. Demographic information of faculty advisors in CASNR responding to survey (n = 48)

Item	Mean	Min	Max	SD
Teaching appointment, %	42	0	100	30.9
Number current undergraduate academic advisees	22	0	120	23.1
Years advising in CASNR	13	0.33	38	11.2

Table 2. Percentage of faculty advisors who agreed (4 or 5), were neutral (3) or disagreed (1 and 2) based on current academic advising structure.

Item	Disagree	Neutral	Agree
I give accurate advice and answers on curricular requirements.	4	7	89
I give accurate advice and answers to student questions relating to their options after graduation.	6	2	92
I serve as a resource person to my advisees on matters relating to choice of major.	6	13	81
I serve as a resource person to my advisees on matters relating to career choices.	6	9	85
I help my advisees with their personal problems.	30	25	45
I refer my advisees to campus support services for assistance on matters that are beyond my expertise.	4	4	92
I encourage my advisees to become involved in campus life and off-campus community service.	4	32	66
I make detailed notes after each of my advising appointments.	47	23	30
Students often do not keep appointments.	77	14	9
Students often do not come with any pre-planned schedule.	45	34	21

Relationships with Students

Fundamentally, as with any helping profession, relationships were paramount to the level of energy most faculty extended to advise when adding it to their already heavy teaching and research loads. Most responses were pleasant: "I find advising VERY fulfilling and wish that there was more time for it in my day/semester." Another described advising as a "critical aspect of our positions for student academic success."

Within this theme, many sub-themes emerged. One faculty member noted that advising afforded him/her to have a constant hand in the undergraduate program: *"Advising allows me to get to know our students better, to help determine if our programs are on track with their career goals, and to help with retention by making sure students' questions and concerns are answered. Additionally, it helps me adjust or modify their courses if needed to suit individual academic or career needs."* Advising, thus, ensured that students were in the right program, that the university may retain them and that a more individualized course of study could be planned to meet the needs of students. Pascarella and Terenzini (1991) found that faculty contact correlated to increased retention and persistence toward degree completion. Accordingly, faculty advising may improve graduation rates among students who utilize it. This faculty member's remarks also indicate the explicit value faculty advisors can have in shaping the department curriculum, thereby streamlining and connecting the disparate aspects of the student's academic experience.

A few advisors noted how the relationship (one-on-one teaching) in advising differs from their teaching in the classroom. One response was: *"Advising allows me to have an influence on the way students think about their overall University education and life in general - as opposed to being focused on a single subject, which occurs in my courses."* Faculty want students to feel free to share what else might be going on in their lives: *"I try to get them to open up about their personal lives as a means to get to know them better and because of the strong impact personal decisions have on their academic and professional careers."* Thus, the concern of these advisors goes well beyond "doling out classes." With the emphasis on the development of the whole student, these responses illuminate the principle of "advising as teaching" (Appleby, 2008).

Advisors noted that they felt personal satisfaction seeing students succeed: *"I have many long-term, positive relationships with past advisees. Most advisees show appreciation for time and effort provided by their advisor. It is a pleasure to watch young people mature and become contributors in society."* Several advisors commented on their relationships with students evolving into friendships and eventually, peers and colleagues. Holland discussed the notion that individuals choose their occupations because it fits their personality and having a congruent environment allows for more satisfaction, stability and persistence (Zunker, 2006). The responses in this study indicate that advisers gained much personal satisfaction, which could also explain why the average longevity of time spent advising in the college has been 13 years. Similarly, Retallick and Pate (2009) found that students found faculty who shared their interests, were aware of their professional needs and listened were the best mentors.

Once these relationships are developed, faculty members see the benefits being reciprocated. One advisor wrote:

"*Advising is establishing and building your professional relationship with students. I now have enough years in the business to experience the benefits of this relationship building work. Former advisees are now peers, providing insights, advice and resources for my day to day teaching and research work at UNL. Most importantly, the past advisees become advisors and mentors for current UNL students in professional work. As a result, advising as well as teaching have knit me into the fabric of Nebraska agriculture. Advising gives you the opportunity to make your professional contributions as a faculty member complete."*

On one level, advisors have a sense of personal and professional satisfaction when they see their students succeed, but some also enjoy additional benefits as they rely on these former students to contribute and teach them. The flow of knowledge goes both ways, enabling these maintained relationships to provide a personal and professional network. One faculty member indicated that they offered to be 'Advisor for Life' for their students, communicating with them long after they graduate*: "I recently got a [former student] that was super bright and super unfocused. I listened to him a lot and helped him discern his true joys. He just finished a PhD and got a job (without a post-doc)…I smiled all day on that one!"* Quality mentoring includes not just advising related to class work, but also personal and professional development (Wolfe et al., 2009).

The results of this section of the survey suggest that while some faculty advisors understand and appreciate the component of relationships, others do not. As one of the participants stated, "*Faculty need to understand that a vigorous undergraduate program is essential to most departments/disciplines, and that advising is critical to a successful undergraduate program.*" Smith (2002) highlights the wealth of guidance that students find from having advisors that help them grow developmentally, rather than just provide a prescription for completing

their degree requirements. Having a faculty member that enjoys that relationship and seeing students succeed empowers the student to increase their motivation. Faculty that enjoy their role as advisors will provide additional resources outside of prescribing a major, which is also evidenced in the results of this study that show that a majority of faculty provide resources beyond the prescriptive requirements of their majors (Table 2).

Many people—some advisors included—view advising as unidirectional process whereby information is simply distributed to the student. To circumvent the problem, Habley (1986) outlined three realms of advising: conceptual (knowledge of students and student body, philosophy of advising, and on the context of the school, laws, policies, procedures and resources); informational (degree requirements, career information, etc); and relational (interpersonal skills and communication skills for effective relationships with students). Training is often relegated to the informational component while the other two are abandoned (Habley and Morales, 1998). To be effective, advisors need training to master tasks in all three areas. Indeed, with training expanded to include conceptual and relational elements, advisors will not only be more effective, but also, be more comfortable in their roles and get more satisfaction from their jobs.

Faculty Perceptions of Students' Attitude toward Advising

When asked to comment on how students viewed the advising process, the results were mixed. Many respondents acknowledged that students were appreciative of their advising efforts, noting, for instance that the students recognize, "that advising is an added work load for faculty." Another advisor found *that "students look forward to touching base with me each semester…I often find that students request meetings at other times besides [registration period] …this could aid in retention if they have concerns or questions that I can help the resolve."* A few faculty also noted, "students who take advantage of these services are more engaged in their education." This quote supports Tinto's Student Engagement Model regarding student engagement and persistence (Tinto, 1994). Students who are engaged in the advising process are more likely to complete their degree.

However, faculty members were also aware that many students did not always enjoy the process: *"Most students view visits to their advisor's office as a necessary but negative obligation, but because it's not actually required many stop going later in their degree programs…few stick it out…[and] actually gain a lot from the interaction."* One of the ways students could benefit from seeing an advisor was to see the 'bigger picture:' *"For many students, the whole process of correctly sequencing classes to meet prerequisites and build a solid academic program is confusing. They often don't look at the entire 4-year degree program. Instead they just focus on what needs to be done now, so they find it beneficial to have someone looking at the bigger picture with them."* One advisor even found this to be a "fun" venture. A relationship with the student in which the advisor has some context for the student's life can aid them in offering guidance specifically geared toward them. This is where the relational component of advising is critical to student success.

Other advisors noted that many students did not show up for advising appointments or make any effort to see an advisor; one admitted, "I'm not sure how students feel. I would like to know. I probably only see a little over half my advisees in any given semester. Does that mean they think it's an unpleasant or unhelpful experience? I hope not." One advisor summarized students' perception very succinctly: "You cannot lump all students into one answer! Some students love the process. Others never show up." Knowing that many questions about the advising process would be unanswered in this survey was precisely what made the authors decide to embark on this multi-phase assessment. An upcoming phase will later include a better understanding of the students' perceptions.

Degree of Effectiveness

Most study participants viewed their advising system as moderately effective, often qualifying their response: *"While I have great advising experiences, I feel I could be doing much better. It is sometimes difficult for me to make/find the time needed to accommodate student requests for meetings between advising sessions. Even though I would very much like to be available, the teaching, research, outreach and service responsibilities sometimes make it difficult for me to keep up with all of them."* Another faculty member reiterated the theme of faculty being overwhelmed, lamenting, *"there is logistically no way that we faculty can provide a meaningful advising experience for our students anymore—with our numbers that have doubled in the past 10 years. The college will need to decide if it wants more students, which it does, how academic advising will look like in the future and it is not going to be how it has looked in the past."* That faculty members feel strapped for time and resources likely perpetuates a negative perception of faculty members' availability in the minds of the students. Although future research should address students perceptions of advising in this college, it may be fair to say that structuring out more time for faculty to advise and faculty emphasizing the importance that advising plays in their personal

profession, may help to raise both the effectiveness as well as student's perception of availability and help that advisers have (see Hemwall, 2008).

While some advisors felt their faculty responsibilities prohibited them from doing as good of a job as they could, many also admitted to having no advising training whatsoever*: "As a new faculty member, it's hard to know what the processes are for substituting or waiving courses, what's acceptable and what's seen as a no-no… This would be helpful information for an orientation session for new faculty."* Faculty often felt that they could be doing a better job if they were more equipped to give better advice about university requirements. At the same time, many recognize the importance of faculty autonomy. Determining the best way to provide training to faculty is challenging. Similarly, Horstmeier (2006) found that 64% of faculty had received no training prior to starting to advise undergraduate students. Little has been written on the ideal methodology for training new faculty advisors, but training could include a combination of formal workshops, online materials and informal mentoring from other advisors. In whatever form the training in which the training takes place, it is crucial that tasks from each of the three realms (conceptual, informational, relational) be included and equally emphasized.

A variety of systems were used by advisors to keep track of advisees. When asked if they took detailed notes of their advising appointments, 30% agreed, 23% were neutral and 47% disagreed (Table 2). Fifteen (31%) respondents indicated they use a pen and paper file system akin to a medical doctor's file. Surprisingly, twelve respondents indicated they had no system at all. One faculty member quipped, "No. This takes more time than I have." Some respondents specifically named the university-wide computerized student information systems they used as they advised students, while others expressed concern about the inefficiency or unreliability of the new electronic system. Companies and institutions have built advising note systems, which operate under the assumption that they improve retention as well as cooperation and knowledge sharing among faculty and departments. Seeing the varied responses to use of advising note systems is concerning to the researchers and it is important to ensure that faculty continue to find ways to improve note systems to allow advisers and students alike to have the most complete understanding of the advising conversations that are occurring to best guide the advising process.

Frustrations with Advising

When asked to describe the most frustrating or dissatisfying aspect of advising, the most common comment dealt with time. Respondents explained that advising either took much of their time or that they were not recognized for the time spent on advising students. One advisor felt like they were "always in catch up mode with curriculum changes and ramifications on attempting to advise potential majors for an entire college." Another was frustrated by doing essentially clerical tasks instead of focusing on developmental advising*: "You don't need someone with a Ph.D. to pick out or check a student's classes. I prefer advising to be on a personal level, i.e. like a coach. Again, I don't advise many students and if I did, I could see where advising could become a time sink."* Only one faculty advisor mentioned the challenges of advising 200 students who are minoring in the discipline and not being "recognized in any way by the department, the college, or the system." Because some faculty view advising in such a negative light to the extent that it can be a "time sink", college administrators must place an emphasis on training, understanding and valuing the advising process in order for faculty buy-in.

Other frustrations expressed were unmotivated or disengaged students. For example, advisors were off-put by the laziness of their advisees: "Students looking for the most convenient rather than most beneficial path to graduation" and "I learned long ago…that my job wasn't to help them with career and life goals. (I offer but they aren't that interested). Rather my job is to help them navigate the system and succeed in getting a degree." Many advisors also mentioned the problems that ensue when students self-advise and "then appear at the end of their programs with a 'fix it for me' attitude." For example, they saw that students who transfer into the program and are not required to meet with an advisor "get lost in the shuffle. " This can be a significant issue, as over 80% of students change their majors at least once (Rowh, 2003). Getting lost or off track can drastically increase the total number of credit hours the student may take to graduate. Ultimately, the efficacy of their system is dependent on the students actually coming for advising, but a few faculty noted that advising success is harder to quantify than teaching success.

Faculty advisors were also frustrated by "red tape." Specifically, one advisor noted the various outdated systems for advising: *"Nobody seems to own any of the processes related to advising…If we want to maintain or improve our retention numbers, we have got to ensure that students who move between majors are picked up by the receiving program, welcomed and integrated into the advising system for the new program. If we do not do that, it appears we do not care about them."* Commenting on the need for a new system, another frankly says, "the old days are over."

Recognition and Reward

Nineteen respondents believed advising was appropriately recognized and rewarded by the college while 12 disagreed, primarily pointing out that it was not enough of a factor in consideration for promotion and tenure. Conversely, at the departmental level, 23 respondents said no, while 15 said yes. Some faculty felt that advising is taken for granted unless there was a problem that causes it to surface. Having such a division for recognition indicates that there is significant work that can be done to improve the perception of advising, particularly in regards to recognizing the role of advising within faculty members' tenure and promotion considerations (Drake, 2008).

The responses varied from no recognition to focusing on intrinsic benefits. One faculty member admitted that he/she tried "not to spend too much time" on advising, as not enough credit was given for the effort. On the opposite side of the spectrum, another advisor cared little about the recognition and instead viewed it as a privilege: *"The success of my students has been my reward. Very few individuals have the opportunity to guide and to encourage these students through their academic program as they mature as well as develop into campus leaders. Making these students to realize their potential can be challenging but well worth the effort."* The focus of this response exemplifies how advising enriches this individual's life. In our opinion, this response exhibits the model attitude for our profession.

However, faculty recognized that most advisors would need more than intrinsic benefits in order to do a good job. Survey respondents suggested incentives or rewards for advising students: *"Properly recognize the time commitment good advising requires, reward those advisors that do well - How long it takes a student to graduate is one measure, perhaps students (and maybe parents) should be asked to evaluate their advisors in a similar manner to course evaluations. Provide good mentoring to new faculty so that they can develop into excellent advisors. Finally, weed out those advisors that are unwilling or incapable of doing a good job."*

Sometimes faculty who do a good job advising tend to attract students from other advisors who do not put forward the same amount of energy and effort. As a result, some students engage in a process known as "advisor shopping." Consequently, because people who put the necessary time, energy and effort in the process are the people we want working with students, some advisors get "penalized" for doing a good job and are thus, overworked. One faculty member says*, "Carrying a heavy load wouldn't bother me as much if I knew… administrators were holding other faculty with teaching appointments accountable for their contributions to undergraduate education … Most of these faculty are relatively unconnected to undergraduate education."* While some concern relates to overload, this comment illustrates a point evident elsewhere: some advisors are uncomfortable with the training they have received. It is possible if the advisors who are not doing a good job were trained more appropriately, that the advising loads could be spread more evenly and give students a better experience across advisors. Again, more emphasis on relational and conceptual components of advising will assist with this goal.

When asked to describe the most rewarding aspects of advising, the words "interaction" and "helping" were prominent in the responses. Faculty advisors enjoyed the personal interactions they had with their advisees. They were proud to make a difference in the students' lives and they enjoyed getting to know the students on a more personal level than the classroom allows. Many faculty focused on the intrinsic rewards of advising: *"Advising is one of the most rewarding activities I do. Helping troubled students to succeed is by far the most rewarding and has a lasting effect on the life of the individual and enriches mine."* Additionally, survey respondents described helping students meet career goals, being successful, navigating the college landscape and "find[ing] their own path" as rewarding aspects of their advising experiences.

The issue of recognition and reward must continue to be explored. Harrison (2009) noted that this is a problem that has faced many faculty advisors for years. In fact, the second most important characteristic of an effective advisor found in his study was availability. Thus, if advisors do not spend too much time advising, students will see them as unapproachable, which impedes their development and success. Krush and Winn (2010) argue that when there are many responsibilities for faculty, it is hard to dedicate enough time to provide effective and clear advising. As a consequence, students may be receiving insufficient information at best and incorrect advice at worst.

Properly recognizing the amount of time good advising requires will be critical to the future of effective faculty advising in the college. Our survey respondents commented on the time commitment of advising students and the lack of recognition they received for their efforts. A college wide effort to improve advising should strive for a balance between teaching, research, outreach and advising. The need for professional development opportunities was also expressed, echoing the results of a 2007 survey of NACADA (National Academic Advising Association) members, which found that faculty members most highly valued such training opportunities (Drake, 2008). What seems clear is that

regardless of how it is done, more recognition of the time, the necessary skills and the intricacies of the processes for advising must be illuminated. Over-simplifying the process and taking advisors and the activity for granted does not help to increase its impact. A college wide effort to improve advising should strive for a balance between teaching, research, outreach and advising.

Areas for Improvement

The final section consists of areas faculty advisors felt could be improved systematically. For example, many respondents believed it should be mandatory for students to see advisors prior to enrolling. Without such a mandate, students are free to "self-advise" and enroll in anything.

Survey respondents were asked to list types of institutional support to help make advising more satisfying. The responses were mixed, but two main ideas emerged; one centered around information for and training of advisors, the other on the time it takes to advise students. Suggestions for improvement were to hire more professional advisors or support staff to handle some advising tasks. One respondent said *"CASNR needs leadership at Dean level to facilitate a change to a new system of advising that will work in a modern era...a system that acknowledges the real demands on faculty time and provides the assistance to students that is needed."* Another advisor elaborated on this point: *"Designated full time advisors in the College or in Departments....Unless a faculty person meets with advisees regularly, advising is a difficult task to master. I suspect that most faculty members do not want to advise students because of this and advising does take time away from other activities. I enjoy working with (most) students, but I occasionally feel inadequate regarding University requirements, the best instructors, etc. It's a trade-off."* Another advisor agreed and stressed the difficulty in keeping up with the curriculum: *"I advise so few students that I am not always up on every change that happens—I advise many different options. Sometimes I think the student would be better served if we had a main advisor that knew everything and then I would have students that I advise their last couple of years on a research project."* While this may change the dynamic of faculty advising, such a system would still facilitate ongoing connection to faculty mentoring outside of the classroom setting. Though some admitted they had trouble keeping up with all of the many roles advisors play, some faculty advisors felt strongly about keeping faculty involved in advising instead of moving to "a system of 'paid advisors'."

However, faculty felt that putting resources into advising at UNL would be a worthwhile investment: *"Generally speaking, I would predict that the CASNR model of faculty advising would emerge as a wise, long term investment of [Nebraska] taxpayer dollars that will impact the long term trends in tax revenue generation because it resulted in a more effective use of time and more productivity post-graduation."* Many listed faculty advising training as one component of this investment: "Make it a requirement and provide incentives to those who do a good job at advising. Also, require new incoming faculty to receive training!!"

Advisor training could cover many different areas. Some faculty advisors noted, for instance, that they felt ill-equipped to give career advice. In one case, "my own career is completely different from what 99% of UG students will experience." In other words, advisors may not feel qualified to lead students through career trajectories that are different from their own. Some advisors noted they even experienced visible insecurity in advising sessions: "there are times I feel unsure of what I am doing with students and I think they can sense that from me." This finding is consistent with Myers and Dyer's (2005) study, in which faculty members indicated that additional training would be helpful. Recognizing the importance of training shows that they are open to training and that there is room to improve their skills in effectively advising students. To accomplish this, advisors indicated the need for resources such as workshops, handbooks and other resources; one faculty member mentioned a website that contained accessible advising information and forms.

Summary and Conclusions

This study was an important first step in understanding the current advising culture in CASNR. Our study revealed six main themes: relationships with students, faculty perceptions of students' attitude of advising, degree of effectiveness in advising, frustrations with advising, faculty recognition and reward and areas for systematic improvement.

In her chapter on Faculty advising, Hemwall (2008) proposes three steps toward fully realizing "the potential of faculty advising", which include: changing the language of academic advising to focus on learning and teaching and changing the support structures of faculty advisors on large and small scales. Building on her discussion and based on themes derived from our study, the authors would like to suggest implications, as well as directions for the next step of the multi-phased study:

Faculty training for advising. This training can be done in multiple ways. Having formalized training modules to address major, department, and institutional requirements, tools and advising resources is one way. Meanwhile, ongoing discussion groups and formalized

advising workshops can serve to keep faculty members up-to-date with pertinent information.

Adequately reward faculty for their advising efforts though a) course-load reductions; b) inclusion for promotion and tenure review; c) college-wide advising awards; and/or d) funding to attend advising-related conferences.

Build requirements directly into the job description that appropriately represents the amount of time that will be devoted to academic advising. Far too often, advising accounts for far more time than is outlined in one's job-description.

Develop more social and academic opportunities that build students' desire to meet with their advisors so the established relationship feels more mutual than forced and increases the percentage of students utilizing advising.

Additional information should be gathered as the next steps are taken to improve faculty advising. This includes determining:

- What are students' perceptions of academic advising?
- What is administrators' value of and perceptions of current academic advising?
- Comparison of the experiences of students with faculty and professional advisors within the college.
- What perceived role has advising played within academic success of students within this college (retention rates, graduation rates, alumni donations)?

Academic advising has been said to be harder to evaluate than teaching. In a time when governmental funding for education is based on proven measures of success, assessing the effectiveness of academic advising will help to ensure institutional support. Advisors have the opportunity to enrich the overall experience of their students and challenge them to think more broadly about their education. While faculty advising has many potential benefits for students, additional training and support are required to improve the overall process. It is our hope that advisors from other universities that employ a similar faculty model can consider the conclusions made here and glean some insight into their own campus advising culture before evaluating their own practices.

Literature Cited

Appleby, D.C. 2008. Advising as teaching and learning. In: V.N. Gordon, W.R. Habley and T.J. Grites (eds). Academic advising: A comprehensive handbook (2nd ed.) San Francisco: Jossey-Bass. pp. 85-102.

Creswell, J.W. 2012. Qualitative inquiry and research design: Choosing among five approaches. (3rd ed.). London: Sage Publications, Inc.

Cuseo, J. 2008. Assessing advisor effectiveness. In: V.N. Gordon, W.R. Habley and T.J. Grites (eds). Academic advising: A comprehensive handbook (2nd ed.) San Francisco: Jossey-Bass. pp. 369-385.

Drake, J. 2008. Recognition and reward for academic advising in theory and in practice. In: V.N. Gordon, W.R. Habley and T.J. Grites (eds). Academic advising: A comprehensive handbook (2nd ed.) San Francisco: Jossey-Bass. pp. 396-412.

Habley, W.R. 1986. Advisor training: Whatever happened to instructional design? ACT workshop presentation. Iowa City, IA: ACT.

Habley, W.R. and R.H. Morales. 1998. Current practices in academic advising: Final report on ACT's fifth national survey of academic advising. NACADA Monograph Series, No. 6.

Harrison, E. 2009. Faculty perceptions of academic advising: "I don't get no respect." Nursing Education Perspectives, 30(4): 229-233.

Hemwall, M.K. 2008. Advising delivery: Faculty advising. In: V.N. Gordon, W.R. Habley and T.J. Grites (eds). Academic advising: A comprehensive handbook (2nd ed.) San Francisco: Jossey-Bass. pp. 253-266.

Horstmeier, R.P. 2006. Mentoring in a college of agriculture: Faculty perspectives of student advisement. NACTA Jour. 50: 47-53.

Krush, J.M. and S. Winn. 2010. Professional advisors and faculty advisors: A shared goal of student success. Academic Advising Today. 33(4).

Kuhn, T.L. 2008. Assessing advisor effectiveness. In: V. N. Gordon, W. R. Habley, and T. J. Grites (eds). Academic advising: A comprehensive handbook (2nd ed.) San Francisco: Jossey-Bass. pp. 369-385.

Myers, B.E. and J.E. Dyer. 2005. Attitudes, value and perception of university faculty and administrators for advising. J. Agricultural Education 46(3): 35-46.

Nutt, C.L. 2003. Academic advising and student retention and persistence. (http://www.nacada.ksu.edu/Clearinghouse/AdvisingIssues/retention.htm). Kansas State University (September 1, 2012).

Noel, L., R. Levitz and D. Saluri. 1986. Increasing student retention: Effective programs and practices for reducing the dropout rate. (1st ed.). San Francisco, CA : Jossey-Bass.

Pascarella, E.T. and P.T. Terenzini. 1991. How college affects students: Findings and insights from twenty years of research. San Francisco, CA: Jossey-Bass. 50-51.

Retallick, M.S. and M.L. Pate. 2009. Undergraduate student mentoring: What do students think?" NACTA Jour. 53: 24-31.

Rowh, M. 2003. Choosing a major. Career World. 31(5): 21-23.

Smith, J.S. 2002. First-year student perceptions of academic advisement: A qualitative study and reality check. NACADA Journal. 22(2): 39-49.

Tinto, V. 1994. Leaving college: Rethinking the causes and cures of student attrition. (1st ed.). Chicago: University Of Chicago Press.

University of Nebraska-Lincoln. 2012. Fact Book. (http://irp.unl.edu/sites/unl.edu.institutional-research-and-planning/files/fb11_12_2.pdf). (Accessed September 1, 2012).

Wolfe, A.J., M.S. Retallick and R. Martin. 2009. Agriculture faculty perspectives on undergraduate mentoring: definitions, practices, and processes. NACTA Jour. 53: 44-49.

Zunker, V.G. 2006. Career counseling: A holistic approach. (7th ed.). Belmont, CA: Thomson Brooks/ Cole.

Promising Coaching Practices of Expert Dairy, Horse and Livestock Career Development Event Coaches: A Qualitative Study

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Abstract

The purpose of this qualitative study was to describe promising practices of successful dairy, horse and livestock Career Development Event coaches in Indiana. Utilizing theoretical frameworks including symbolic interactionism, social cognitive theory and cognitive apprenticeship theory, researchers interviewed expert dairy, horse and livestock Career Development Event coaches. Twenty-six promising practices and eight central tendencies were identified. Central tendency categories included expectations, effective coach, experience, goals, knowing the youth, foundational knowledge, youth development and positive environment. The coaches interviewed shared a deep sense of passion and dedication toward youth development and coaching, as well as a desire to see new coaches gain resources and experience to be successful. This study suggests that utilization of identified promising practices may facilitate greater coaching success in terms of competition placement and overall youth development.

Introduction

Career Development Events (CDEs) are competitive educational experiences established to enhance present and future practical application of youths' knowledge and skills in specific career-related domains. Dairy, horse and livestock evaluation are three of 13 CDEs held in Indiana that help youth develop knowledge, skills and experiences in order to heighten their potential proficiency in future careers (Croom et al., 2005; Nash and Sant, 2005; Radhakrishna et al., 2006; Russell et al., 2009). In Indiana, these events are offered through collaborative efforts of Indiana 4-H Youth Development and FFA (Smith and Kirkpatrick, 1990).

The objective of dairy, horse and livestock CDEs is to provide youth with practical experiences studying and evaluating animals while developing skills that prepare them for industry professions. These evaluation events provide youth with opportunities to develop skills in cooperative learning, observation, analysis, decision making and communication. Additionally, youth have the opportunity to learn and develop sportsmanship and competitiveness skills as well as realize the embodiment of team spirit (National FFA Organization, 2006).

Coaches take on the role of preparing youth for a specific CDE. This role consists of coaching individual youth as well as the team. The role of coaching individuals includes conveying information, motivating youth, praising youth, helping youth learn from errors and providing performance feedback (Becker and Wrisberg, 2008). In terms of coaching the team, the role of the coach includes structuring and organizing the team, identifying learning resources and utilizing individuals as resources for the benefit of the entire team (Hackman and Wageman, 2005).

A quantitative measure for coach's effectiveness in regard to CDE's is through youth and team performance scores. Research suggests an effective coach is one who has an adequate combination of coaching competence, content competence, time dedication, personal motivation and ability to motivate students (Abraham et al., 2006; Becker and Wrisberg, 2008). Coaching competency is defined by Stone and Bieber (1997) as being adequately skilled in the application of best coaching practices,

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where best coaching practices are standards of coaching efficacy that are tested and generally held to be true (Leseure et al., 2004). However, Leseure et al., (2004) explains that promising coaching practices must be identified before the acceptance of best coaching practices. Promising practices are standards supported by professionals and evidence such as observations, but have not been rigorously tested. Within the context of CDE dairy, horse, and livestock coaches, no promising practices have been established.

Indiana provides no formal coach or CDE training for agriculture teachers (Talbert, B.A., personal communication) or volunteers (Brady, C., personal communication) who coach students participating in CDEs. Coaches must rely on their own experiences and expertise. Previous research has found that less experienced agriculture teachers have a low competency level in regard to preparing youth for CDEs (Layfield and Dobbins, 2002). Based on this information the question arises; what are the promising practices successful CDE dairy, horse and livestock evaluation coaches employ?

Literature Review

While numerous studies have focused on participants in CDEs (Croom and Flowers, 2001; Mounce and Terry, 2001; Nash and Sant, 2005; Talbert and Balschweid, 2006); very few have looked at coaches for these events (Jones, 2011; Rayfield et al., 2009). Rayfield et al. (2009) conducted a study over a six-year time frame to identify and determine recruitment and training practices of a panel of 155 coaches with nationally placing teams in the FFA Livestock CDE. Using the Delphi technique, researchers identified 16 recruiting and selection factors as well as 15 training procedures used by successful coaches. Recruiting and selection factors that correlated highly with student scores were 1) competitiveness of team, 2) coachablility of students and 3) consistency. Training practices that correlated highly with student scores were 1) workout with college teams, 2) attendance at livestock judging camps, and 3) participation in practice contests. Researchers recommended that future research be focused on the identification of techniques used by successful coaches.

Bowling (2010) conducted a study using coaching behaviors identified by Coach John Wooden's pyramid of success (Wooden and Carty, 2012), to determine relationships between coaching behaviors and student rank in a state floriculture CDE. The study found the top five behaviors coaches utilized were reflective of motivation and included friendship, confidence, enthusiasm, team spirit and cooperation. The bottom five behaviors utilized reflected abilities of youth and included skills, industriousness, condition, poise and initiative. Bowling (2010) concluded that coaching behaviors have different levels of use and that coaches create a personalized system of coaching behaviors comprised of similar behaviors at different levels.

Many aspects of coaching have been examined in the context of youth sports. Studies include the role of the coach (Gilbert and Trudel, 2004); coaching philosophies and teaching strategies (Kenow and Williams, 1992); life skills development (Gould et al., 2006a, 2006b; Papacharisis et al., 2005; Petitpas et al., 2005); and positive youth development (Fraser-Thomas et al., 2005). Gould et al. (2006b) identified specific coaching strategies intended to foster life skill development in athletes. Through interviews of 10 exceptional high school football coaches, researchers developed a working model for understanding life skills coaching. The model included four elements of consideration when teaching life skills: 1) philosophical foundations, 2) specific skill development strategies, 3) coach-player relationship and 4) environmental consideration and resource utilization. Researchers recommended that future studies be conducted on coaches in varying disciplines and environments. As previously mentioned, the intent of 4-H and FFA CDEs is to facilitate life skill development in youth offering an excellent opportunity for further research on this topic.

Although multiple studies have addressed a variety of aspects regarding youth sport coaches' life skill development and coaching philosophies, there has been limited research in the context of CDE coaches. Furthermore, there are no known studies exploring promising practices of CDE coaches. This study aims to focus on and address this gap in the literature by identifying promising practices of expert CDE dairy, horse and livestock coaches in Indiana.

Conceptual and Theoretical Framework

The conceptual framework for this study is an applied version of Bandura's Social Cognitive Theory (Bandura, 1977) where continuous interactions between an individual and multiple aspects of their environment take place affecting outcomes and altering behaviors. To apply this theory influencing factors of the student and coach must be considered. Influencing factors of the student include talent, motivation, cost considerations, self-efficacy and others. Influencing factors of the coach include coaching competence, content competence, coaching principles, motivation, cost considerations, self-efficacy, as well as others. This study is examining the role of the coach in the context of CDEs and youth participants. Specifically this study will focus on the influencing factor of coaching practices.

The theoretical mainframe for the purpose of this study consists of symbolic interactionism (Blumer, 1969; Snow, 2001) as guidance for Bandura's (1977) Social Cognitive Theory and the Cognitive Apprenticeship Theory of Collins et al. (1987). Symbolic interactionism is based on four broad principles: 1) interactive determination, 2) symbolization, 3) emergence and 4) human agency (Snow, 2001). Interactive determination represents an understanding that analysis of objects is not only achieved through intrinsic qualities, but also through relationships and interactions. Symbolization as a principle represents embodiment of specific feelings and actions and is often embedded in cultural and organizational contexts, as well as systems of meaning. Emergence illuminates the continuous opportunity for change in feelings and actions as a result of transforming daily schedules, practices, or perspectives. The fourth principle, human agency, highlights understanding that humans are neither passive nor robotic responders of behavior, but consider structural and cultural constraints when responding to surroundings and conditions. Utilization of symbolic interactionism in the present study establishes the foundation for understanding coaches' philosophies and epistemology as they emerge into promising practices.

Bandura's (1977) social cognitive theory focuses on learning within a social context assuming learning is influenced by continuous reciprocal interactions. Bandura establishes that learning can be achieved through live, verbal, and/or symbolic observations. To practice observational learning, the modeling process should be considerate of an individual's attention, retention, reproduction, and motivation. Moreover, Bandura explains that learning can be reinforced intrinsically through pride, satisfaction, or a sense of accomplishment, as well as externally though environmental rewards. Bandura's social cognitive theory provides framework for this study regarding learning through reciprocal influencing interactions between coaches, youth and the youths' resulting performance.

Also providing framework for this study is the cognitive apprenticeship theory by Collins et al. (1987). The cognitive apprenticeship theory extends beyond Bandura's social cognitive theory emphasizing successful learning through modeling during novice-master interactions. This theory is based on a constructivist approach where the master of a specific skill teaches that skill to an apprentice or novice while utilizing instructional techniques prompting reflection and thought. Collins et al. (1987) explains that during transfer of a skill to an apprentice, a master often overlooks inherent processes involved in carrying out the skill successfully. Cognitive apprenticeship theory attempts to avoid this oversight by bringing light to all processes involved, allowing the apprentice to intricately learn the skill through observation, enactment, and practice. This theory establishes support for utilization of promising coaching practices to successfully transmit complex skills from coach (master) to youth (novice).

Purpose and Objectives

The purpose of this qualitative study was to identify promising practices of expert Indiana dairy, horse and livestock evaluation CDE coaches and which practices they perceive to be most important.

Materials and Methods

This study was reviewed by Purdue University's Institutional Review Board and was determined exempt as it posed very minimal to no risk to the participants. All participants provided verbal informed consent prior to participation in the study. Pseudo names were used to protect the identity of participants. Data for this study was collected using a combination of interview methods explained below. Multiple interview methods were utilized to provide comprehensive collection of data and to ensure saturation and congruency of promising practices.

Participants in this study consisted of 13 expert coaches for dairy, horse and livestock evaluation CDEs in Indiana. Coaches were identified as experts based their teams performances in state level CDE's from 2005 to 2010. Coaches must have had at least two teams placing in the top three placements in these Indiana state CDEs (diary, horse and livestock) to qualify for the population of expert coaches. Twenty-one coaches met the criteria to be considered an expert coach for this study. The six top ranking coaches in regard to frequency of top three team placements in Indiana state dairy, horse, or livestock CED's were selected for individual phone interviews. The remaining expert coaches in the population were selected to participate in the focus group portion of the study. These participants were contacted through email and those who did not respond to email received a follow-up phone call. Participants received a confirmation email and letter containing the date, time and location of their focus group.

Individual Phone Interviews

Of the six coaches that were contacted through email communications for participation in this study, five expert coaches chose to participate in the individual phone interviews and one did not respond. These coaches were given pseudo names and included one female and four males. Table 1 contains coach demographics:

Table 1: Coach Demographics

Pseudo Name	Years Coaching	Species Areas Coached	FFA and/or 4-H Team(s)
Anderson	27	Dairy, Horse, and Livestock	FFA
Brown	18	Dairy	4-H
Clark	23	Dairy	FFA and 4-H
Davis	15	Livestock	FFA and 4-H
Evans	8	Livestock	FFA and 4-H

In regard to being identified as an expert, three coaches earned the "expert" label from performance of livestock evaluation teams and two coaches earned the "expert" label from performance of dairy evaluation teams. Individual phone interviews were conducted using combined methods; a standardized open-ended approach was used to provide structure and consistency between interviews while the general interview guide approach allowed for flexibility and probing during questioning (Patton, 2002). The research team developed eighteen questions from relevant coaching literature (Cassidy et al., 2004; Gould et al., 2006a; Martens, 2004; McCallister et al., 2000) taking into account previous experience, coaching philosophy, coaching objectives, coaching style and advice. Questions were asked by a single researcher in the same predetermined order for all individual phone interviews. This assisted in comparing responses and reducing interviewer bias. Data was collected with audio-recordings along with interviewer journaling during and reflectively after each interview.

Focus Groups

Two focus groups were held at the 2011 Indiana State Fair, one focus group consisted of three participants and the other consisted of four participants. One coach was unable to attend either focus group and was interviewed individually following the same format and guidelines set forth for the other two focus groups. There were a total of eight participants between the three focus group interview sessions. Focus groups were guided by established focus group protocol and facilitated by the lead researcher with the aid of the unfolding matrix (Padilla et al., 1996). The unfolding matrix is a method of collecting data in which summary statements and quotes are written in a specific table format allowing for data to be recorded in an organized manner. Use of this method allowed for a greater degree of efficiency, organization, and saturation. The content discussed during the focus group was determined by categories and subcategories that arose from analysis of previous individual expert coach phone interviews. Focus group data was collected with audio-recordings, through completion of the unfolding matrix and lead researcher journaling during and reflectively after each focus group.

Analysis of Data

Inductive and deductive analyses of data were determined to be appropriate techniques for this study. Individual phone interview data were inductively analyzed with the desire of discovering categories, themes and/or patterns that would aid in the development of promising practices (Patton, 2002). Following phone interview data analysis, focus group data were deductively analyzed according to categories, themes and/or patterns that emerged from the inductive analysis of individual phone interviews. The purpose of this deductive analysis was to strengthen the identification and definitions of emerging promising practices. The coding procedures established by Corbin and Strauss (1990) were used to analyze the data.

Results and Discussion

Based on data from individual phone interviews (N=6, n=5) and focus groups (N=16, n=8) eight central tendencies were identified. Central tendencies were developed based on examination of consistency and association between promising practices identified and discussed throughout individual phone interviews and focus group interviews. Furthermore, during selective coding, a core central tendency was identified.

The eight central tendencies are outlined below in order of importance to the coaches participating in this study. Discussion of relevance to research questions, supporting literature, as well as dairy, horse and livestock CDE coaches follows. The central tendencies are:

Central Tendency 1: Expectations. The coaches have found it beneficial for guiding their programs to explicitly set expectations of themselves and for the youth; moreover, they define their expectation for success and allow that definition to embody the reputation of their program.

Central Tendency 2: Effective Coach. The coaches are dedicated and passionate which stems from being part of the youths' development. In return, coaches are driven and motivated to succeed.

Central Tendency 3: Experience. The coaches believe it imperative for success to have prior coaching or industry experience. Experience can also be gained through mentoring and advising relationships with other coaches and industry professionals.

Central Tendency 4: Goals. The coaches believe setting team and individual goals that align with their definition of success challenge youth to strive toward their potential, which in return motivates youth.

Central Tendency 5: Support. The coaches have found it beneficial to know the personality of each youth, as well as to have the support of parents and family.

Central Tendency 6: Foundational knowledge. The coaches believe teaching youth foundational knowledge about the particular judging event is vital and can often be enhanced through the utilization of mentoring relationships within the team.

Central Tendency 7: Positive environment. The coaches believe development of youth should occur in an environment promoting positive reinforcement and adaptability.

Central Tendency 8: Youth development. The coaches believe that youth develop their personal and life skills through participation in these CDEs; moreover, this development may enhance their abilities to successfully compete as a member of the judging team.

Central Tendency 1: Expectations

Coaches in this study have found it beneficial in guiding their programs to explicitly set expectations for themselves as well as the youth; moreover, they define their expectation for success and allow that definition to embody the reputation of their program. Coach Clark explained a coach should be expected to have adequate judging knowledge and if they are lacking in that knowledge, they should be assertive enough to ask for help. Moreover, the focus group participants agreed coaches should hold high expectations of themselves; they do not have to know everything, but should be willing to seek desired knowledge. In addition to expectations of themselves, coaches agreed youth should have expectations of being timely and exhibiting appropriate behavior. Furthermore, the coaches explained how coaches and youth should have clear expectations of success for individuals and teams. Coach Davis used performance at contests as a gauge for success, while others identified youths' potential and incremental accomplishments as expectations for success. Collectively coaches agreed that fulfillment of all expectations; coach, youth and overall success, contribute to the reputation of a program. A reflection of this concept was demonstrated in the statement, "People want to be a part of something that's successful." The coaches found that following through with personally appropriate expectations is imperative if they expect youth to do the same, along with attaining shared expectations for competitive performance success.

The following promising practices were identified by the researcher as being related to expectations: 1) coaches having expectations, 2) having expectations of the youth, 3) having expectations of success and 4) having a reputable program. Coaches having expectations was identified by coaches as a most important promising practice, as it is a catalyst for three other promising practices identified. Literature reinforces the practice of coaches having expectations through development and utilization of a personal coaching philosophy (Cassidy et al., 2004; Martens, 2004). Gilbert et al. (2001a) emphasized the importance of carrying out the practice of communicating clear expectations to youth. Additionally, literature supports the practice of setting measureable expectations of success as it increases youths' self-esteem, enjoyment and desire to participate in a positive manner (Scanlen et al., 1993).

Recommendations For Coaches. Coaches of dairy, horse and livestock CDEs should establish high and clear expectations of themselves, such as attaining adequate knowledge and being assertive in the acquisition of that knowledge. Additionally, coaches should be clear and concise in setting and communicating expectations for youth to follow, such as being on time to practices, contests and other related events. Coaches should hold high expectations for youths' behavior regarding respectfulness and courteousness to fellow teammates, coaches and other teams. In addition to those expectations, coaches should set clear expectations of success and its determinants, such as performance at contest or practice, or incremental achievements. Ultimately, the reputation of a judging program will benefit from the prolonged attainment of these expectations.

Central Tendency 2: Effective Coach

Coaches in this study are dedicated and passionate in regards to being a part of youths' development. Due to personal involvement in youth development coaches are driven and motivated to succeed. Coach Clark described dedication as being willing to spend time coaching youth. Focus group participants considered practice preparations, seeking out advice and resources and being an example for youth to be aspects of dedication. In order to maintain dedication, coaches emphasized the necessity of having a passion and interest in coaching. Coach Anderson said, "Passion is the key. You just have to want it." Moreover, the focus group participants added that passion is sometimes derived from effort someone put into you as a youth. All coaches believe they receive bountiful benefits in terms of seeing youth develop into confident young adults as a result of their dedication and passion. Coach Anderson shared that one of the greatest benefits he receives is the enjoyment of reading 'thank you' notes from past and present students. Dedication, passion and benefits are distinctive characteristics that help maintain the motivation to coach. Coach Davis explains his motivation is "watching students succeed." Along the same lines, Coach Brown is motivated by "watching kids develop" and Coach Anderson is motivated by "making a difference" in youths' lives. The focus group participants concurred, finding motivation

in seeing youth grow and mature, building confidence and self-esteem and receiving collegiate support from judging scholarships. These coaches have found dedication and passion to be of utmost importance to facilitate attainment of benefits from coaching as well as provide motivation for coaching.

The following promising practices related to being an effective coach were identified by the coaches: 1) dedication to coaching, 2) interest and passion for coaching and/or judging, 3) benefits in terms of student success and 4) maintaining motivation to coach. Three of these four practices (1, 2 and 4) were identified as most important promising practices by coaches as they are identified as a driving force for a coaches desire to be effective. In support of these practices, Barbour (2011) identified passion and student development as common motivational factors for coaches, as well as coaches' enjoyment from observing youth gain life skills. Additional support is provided by Vallee and Bloom (2005) who identified commitment to coaching to be a key attribute of a successful coach.

Recommendations For Coaches. Coaches of dairy, horse and livestock CDEs should evaluate their dedication and interest for coaching a judging team. Coaches should be willing to put in enough time to ensure youth are provided a quality experience. Additionally, coaches should identify what benefits they receive as a coach and determine if those benefits, coupled with their dedication and interest for coaching, are strong enough motivation for them to continue coaching.

Central Tendency 3: Experience

The coaches believe that for a coach to be successful, it is imperative to have prior coaching or industry experience. Experience can be gained through mentoring and advising relationships with other coaches and industry professionals. Coach Evans identified industry experience such as judging, breeding, or working with a specific species as being an attribute of a successful coach. Moreover, Coach Davis added that experiences from participating on a youth or collegiate team are useful, as well as observations of those coaches. If a coach lacks experiences, Coach Davis advised seeking out a mentor from industry or a fellow coach with more experience. Coach Evans explained that mentoring relationships allow for discussion regarding challenges and struggles coaches faces. Some challenges identified by coaches include conducting practices for all learners, accommodating busy lives and coaching large numbers of youth. Coach Clark wished young and new struggling coaches would seek mentoring relationships so they can gain the skills needed to assist their youth in becoming more competitive. The coaches from this study have found industry and coaching experience to be vital for success and advised coaches who lack in experience to actively seek out a mentoring relationship in an effort to address challenges they may face.

The following promising practices for experience were identified by the coaches: 1) prior experience judging, coaching and/or in industry, 2) establishing mentoring relationships with other coaches or industry professionals and 3) addressing coaching challenges through mentoring relationships. Coaches identified seeking mentoring relationships with other coaches or industry professionals and addressing coaching challenges through these relationships as most important promising practices. These two promising practices address frustrations and struggles of new and young coaches, as well as concerns of more experienced coaches. McCallister et al. (2000) likewise found the need for coaches to have prior experience related to coaching and the content taught. Literature supports the practice of seeking out and utilizing mentoring relationships as they benefit both the mentored and mentor (Bloom et al., 1998; Cassidy et al., 2004; Cosgrove, 1986; Merriam, 1983).

Recommendations For Coaches. Coaches of dairy, horse and livestock CDEs should have prior experience within the species industry for which they coach. Also, it is beneficial for them to have prior judging experience. If a coach lacks experience in either of these areas, he/she should actively seek a mentor to help facilitate the acquisition of knowledge and experience lacking. This mentor should be an industry professional or an experienced coach based on the needs of the coach and the availability of a mentor. A mentor can assist the coach in managing challenges he/she may face such as, accommodating various learning types, busy life styles, large youth involvement numbers and other frustrations regarding contests, practices and coaching.

Central Tendency 4: Goals

The coaches believe setting team and individual goals that align with their definition of success assist in challenging and motivating youth to strive toward their potential. One of the goals Coach Clark has every year is to have fun. Likewise, Coach Anderson believes judging should be fun, but also sets the goal of having a chance to win. The focus group participants elaborated regarding goals, explaining they serve the purpose of evaluating the team's present skills and where they ultimately want to be. Moreover, the coaches said goals should be specific, written down, committed to and evaluated. Coach Brown explained setting goals helps challenge youth as they strive for perfection. Additionally, Coach Davis found goals are motivating factors for youth because as

they achieve their goals, they gain new experiences and opportunities such as visiting new places and earning collegiate scholarships. Furthermore, Coach Brown found skill development and goal attainment contributed to youth motivation. These coaches have found setting goals to be a strategic tool for challenging and motivating youth.

The following goal related promising practices were identified by the coaches: 1) setting goals, 2) motivating youth and 3) challenging youth. Setting goals and motivating youth were identified by coaches as most important promising practices, as these promising practices help assess youths' current skill level and indicate where youth would like to be. Additionally, youth are motivated through attainment of their goals. Supporting these practices, Burton (2001) identified the practice of setting short term and long term goals as a strategy to motivate and challenge youth to do their best.

Recommendations for coaches. Coaches of dairy, horse and livestock CDEs should work with youth to evaluate current skill levels and knowledge, as well as identify what youth would like to achieve over a period of time. These goals should be specific, recorded, and evaluated. Coaches can use goals as a tool to challenge youth to strive for perfection in goal attainment. Moreover, coaches can use opportunities and experiences youth have as a result of striving for their goals as a motivating factor. These motivating factors can include visiting new places, receiving scholarships, and becoming more advanced in specific skills. However, coaches may need to help youth recognize these opportunities and experiences to increase their motivational effects.

Central Tendency 5: Support

The coaches have found it beneficial to know the personality of each youth, as well as to have the support of parents and family. Coach Evans stressed the notion that it is important to know youth on an individual level, because "no two kids learn the same and no two kids are encouraged the same." Moreover, Coach Brown continually emphasized how knowing the youth on his teams allowed him to meet individuals at his/her current skill level and build from there. Additionally, Coach Clark found value in getting to know not only youth, but also their parents. He found getting to know parents as a strategy that strengthened support for the youth. Coach Evans agreed that family support is important as parents are able to encourage youth to fulfill their expectations and strive for success. The focus group participants also found parent and family support important, especially for such things as encouraging youth and supporting the team through fundraising and volunteering. Furthermore, focus group participants gave examples relating judging events to sports events to help parents and family of youth understand the value and importance of participation. Coaches have found getting to know youth on an individual level as well as having the support of parents and family to be important factors in encouraging youth and their development.

The coaches identified the following "support" promising practices: 1) knowing youth and 2) support from parents and family. Moreover, support from parents and family was identified by coaches as a most important promising practice as it provides additional encouragement to youth from outside the judging team. In addition, Gilbert et al. (2001b) support the practice of encouraging support and involvement of parents through proactive strategies.

Recommendations for coaches. Coaches of dairy, horse and livestock CDEs should make every effort to get to know youths' personalities on an individual level. Coaches should use their knowledge of youths' personalities to encourage youth and help build skills and knowledge from their current level. Additionally, coaches should meet with parents to discuss expectations of youth, ways to encourage youth, and ways parents can provide support. Moreover, when addressing parents with little or no experience with judging events, coaches can relate benefits of judging events to sport events in an effort to explain the value and importance of youth participation.

Central Tendency 6: Foundational Knowledge

Coaches in this study believe teaching youth foundational knowledge about the particular judging event is vital and can often be enhanced by utilizing mentoring relationships within the team. Coach Clark explained how he provides youth with the basic information needed to be successful; he "keeps things simple." Coach Evans also stays close to the basics because "you can't assume anything" in regard to what youth know. Coach Brown teaches the basics from parts of the animal to filling out a score card. He believes a solid understanding on the basics can facilitate development of skill sets like decision making and trusting initial judgments. Focus group participants believe teaching the basics of evaluation provides youth with transferable skills and a foundation for understanding priorities, explanations, and defending placings. Coach Anderson explained how the use of peer mentoring relationships facilitates understanding of the basics. He has found older youth often guide younger youth in this regard. Coaches have found teaching basics important for success and benefits in allowing facilitation of learning through mentoring relationships between youth.

The following promising practices were identified by the coaches regarding foundational knowledge: 1) teaching the basics of evaluation and 2) utilizing mentoring relationships between youth. Both practices were identified by coaches as most important promising practices as they both contribute to understanding the basics of evaluation which is imperative for successful performance. Supporting the practice of utilizing mentoring relationships, literature identified mentor and mentee benefits through development and refinement of skills employed (Cassidy et al., 2004; Cosgrove, 1986; Merriam, 1983).

Recommendations For Coaches. Coaches of dairy, horse and livestock CDEs should not assume youth understand the basic knowledge of evaluation. Coaches should keep lessons simple and cover foundational knowledge such as parts of the animal, priorities, explanations and components of competing. Moreover, coaches should utilize mentoring relationships between youth to facilitate the acquisition of basic knowledge. Mentoring relationships can be established naturally or by pairing younger, inexperienced youth with older or more experienced youth.

Central Tendency 7: Positive Environment

The coaches believe development of youth should occur in an environment promoting positive reinforcement and adaptability. Coach Evans explained the importance of ensuring youth have a positive environment to learn as it facilitates an atmosphere that is positive and upbeat and builds a sense of team spirit. Moreover, Coach Brown emphasized a relaxed learning atmosphere where youth are praised for their efforts and embarrassment is minimized. Additionally, Coach Clark explained the importance of praising youth, the realization mistakes are inevitable and that mistakes should be considered opportunities for learning. The coaches have found that an environment promoting a positive, upbeat, team spirit in combination with positive reinforcement, flexibility and efficiency facilitate positive growth in youth.

The following promising practices related to a positive environment were identified by coaches: 1) foster positive learning environments, 2) utilize positive reinforcement and praise, 3) promote flexibility in learning and 4) utilize efficient coaching strategies. While these were not identified as most important promising practices there is little doubt that fostering a positive learning environment and utilizing positive reinforcement are important when working with youth. Literature supports these practices as collectively they promote high levels of morale and interest, as well as encouraging positive attitudes and motivation from youth (Burton, 2001; Gilbert et al., 2001a; Howe, 1993 in Gilbert et al., 2001a; Martens, 2004; Scanlan et al., 1993).

Recommendations For Coaches. Coaches of dairy, horse and livestock CDEs should be aware of the environment in which they coach youth and promote an atmosphere which encompasses a positive, upbeat team spirit. Coaches should utilize positive reinforcement and praise youth when deserving. Additionally, coaches should avoid situations that may embarrass youth. When youth make mistakes, coaches should use it as an opportunity to teach and reassure youth that mistakes are a part of learning. In an effort to ensure a positive environment coaches should be prepared for practices and utilize strategies that promote efficiency and timeliness.

Central Tendency 8: Youth Development

Coaches in this study believe youth develop personal and life skills through participation in CDEs; in return, this development may enhance youth abilities to successfully compete as a member of the judging team. Coach Clark discovered youth could gain life-changing experiences through participation in CDEs. Coach Brown and Coach Davis concur and explained, youth begin to recognize and see improvement in themselves allowing ability to gauge personal development. Focus group participants also consider youth development to be a high priority in coaching youth as it encompasses foundational knowledge gain and life skill development. Coach Clark observed many youth develop and utilize life skills like decision making, public speaking and teamwork from participation on his teams. Coach Brown observed similar results, seeing youth develop note taking skills, communication skills and confidence. Focus group participants have found development of life skills to be the quintessence of CDEs, often utilizing youths' interest in animals to develop life skills such as criterion placing and prioritizing. Coach Brown explained how development of life skills in youth will prompt competitiveness, especially when youth are motivated. Additionally, Coach Clark has found competition encourages further development of life skills. The coaches have found youth gain benefits from participating in evaluation events through personal and life skill development which often enhance competition.

The following youth development promising practices were identified by the coaches: 1) youth receiving benefits, 2) development of youth, 3) development of life skills, and 4) competitiveness of youth. Development of youth, development of life skills and competitiveness of youth were identified by

coaches as most important promising practices as these promising practices are the embodiment of CDEs and central to all seven previous central tendencies. Martens (2004) identifies youth development as being a central objective for coaches and within that, development of life skills and the nature of competitiveness play key roles. It is noteworthy that over-emphasizing competitiveness of youth shifts the objective onto winning and away from development (Cassidy et al., 2004). Benefits youth receive from preparing for competition and competing are often intangible and are revealed through personal and life skill development (Barbour, 2011; Cosgrove, 1986; Gould et al., 2006b).

Recommendations For Coaches. Coaches of dairy, horse and livestock CDEs should assist youth in recognizing benefits received in terms of personal and life skill development. Additionally, coaches should regard youth development as a high priority. In doing so, coaches should gauge the development of youth and re-teach concepts if necessary to foster this development. Coaches need to facilitate and be aware of life skills youth have the opportunity to develop such as decision making, public speaking, teamwork, note taking, criterion placing, prioritizing, communication and confidence. Moreover, coaches should utilize contests as an opportunity to practice and further develop life skills in youth participants.

Summary

This qualitative study was designed to identify promising practices perceived to be most valuable by expert coaches of dairy, horse and livestock CDEs in Indiana. Through inductive analysis of five individual phone interviews, 26 promising coaching practices were identified. Deductive analysis of three focus group interviews supported identification of the 26 identified promising practices and established 14 promising practices as most important to expert coaches. Among the 26 promising coaching practices, eight central tendencies were identified. These included 1) expectations, 2) effective coach, 3) experience, 4) goals, 5) support, 6) foundational knowledge, 7) positive environment and 8) youth development. Of these central tendencies, youth development was determined to be a holistic factor throughout all seven central tendencies, causing it to emerge as the core central tendency.

From this study, three overall recommendations emerged and were related to 1) coach training, 2) coaching resources and 3) future studies. First, the researcher recommends the development of structured opportunities for coach training. This need was highlighted in individual phone and focus group interviews of expert coaches who observed the need through interactions with other coaches. A second recommendation is the need to develop and make accessible resources for new and inexperienced coaches. This need was revealed through expert coaches' concern in regard to new coaches' lack of access to, and knowledge of where to seek coaching resources. Third, the researcher recommends future studies examining the implementation of promising practices identified in this study to determine their specific value to the student.

Literature Cited

Abraham, A., D. Collins and R. Martindale. 2006. The coaching schematic: Validation through expert coach consensus. Jour. of Sports Sciences 24(6): 549-564.

Barbour, J. 2011. Exploring coaching philosophies and coaching strategies within collegiate livestock judging programs. MA Thesis, Univ. of Kentucky, 1205 Hopkinsville St Princeton, Lexington, KY.

Bandura, A. 1977. Social learning theory. New York, NY: General Learning Press.

Becker, A.J. and C.A. Wrisberg. 2008. Effective coaching in action: Observations of legendary collegiate basketball coach Pat Summitt. The Sport Psychologist 22: 197-211.

Bloom, G.A., N. Durand-Bush, R.J. Schink and J.H.Salmela. 1998. The importance of mentoring in the development of coaches and athletes. International Jour. of Sports Psychology 29: 267-281.

Blumer, H. 1969. Symbolic interactionism: Perspective and method. Englewood Cliffs, NJ: Prentice Hall.

Bowling, A.M. 2010. Frequency of coaching behaviors used by agriculture teachers in relation to the state floriculture CDE team rank. MA Thesis, Univ. of Missouri, 801 Conley Ave, Columbia, MO.

Burton, D. 2001. Goal setting in sport: Investigating the goal effectiveness paradox. In: Singer R.N., M. Murphy and L.K. Tennant (eds.). Handbook of research on sport psychology. New York, NY: Macmillan.

Cassidy, T., R. Jones and P. Potrac. 2004. Understanding sports coaching: The social, cultural and pedagogical foundations of coaching practice. New York, NY: Routledge.

Collins, A., J.S. Brown and S.E. Newman. 1987. Cognitive apprenticeship: Teaching the craft of reading, writing and mathematics (Technical Report No. 403). BBN Laboratories, Cambridge, MA. Centre for the Study of Reading, Univ. of IL.

Corbin, J. and A. Strauss. 1990. Grounded theory research: Procedures, canons, and evaluative criteria. Qualitative Sociology 13(1): 3-21.

Cosgrove, T.J. 1986. The effects of participation in a

mentoring-transcript program on freshmen. Jour. of College Student Personnel 27: 119-124.

Croom, B. and J.L. Flowers. 2001. A question of relevance: FFA programs and services as perceived by FFA members and non-members. Jour. of Southern Agricultural Education Research 51(1): 6-19.

Croom, B., G. Moore and J. Armbruster. 2005. National FFA career development events: An introspective inquiry. In: Proc. American Association for Agricultural Education 2005 Southern Region Conference, Little Rock, AR, 4-7 Feb.

Fraser-Thomas, J.L., J. Cote and J. Deakin. 2005. Youth sport programs: An avenue to foster positive youth development. Physical Education and Sport Pedagogy 10(1): 19-40.

Gilbert, W.D., J.N. Gilbert and P. Trudel. 2001a. Coaching strategies for youth sports. Part 1: Athlete behavior and athlete performance. Jour. of Physical Education, Recreation and Dance, 72(4): 29-33.

Gilbert, W.D., J.N. Gilbert and P. Trudel. 2001b. Coaching strategies for youth sports. Part 2: Personal characteristics, parental influence, and team organization. Jour. of Physical Education, Recreation and Dance 72(5): 41-46.

Gilbert, W.D. and P. Trudel. 2004. Role of the coach: How model youth team sport coaches frame their roles. Sport Psychologist 18(1): 21-43.

Gould, D., Y. Chung, P. Smith and J. White. 2006a. Future directions in coaching life skills: Understanding high school coaches' views and needs. The Online Jour. of Sport Psychology 8(3): 28-38.

Gould, G., C. Collins, L. Lauer and Y. Chung. 2006b. Coaching life skills: A working model. Sport and Exercise Psychology Review 2(1): 4-12.

Hackman J.R. and R. Wageman. 2005. A theory of team coaching. Academy of Management Review 30(2): 269–287.

Jones, A. 2011. Motivational factors related to youth performance in a 4-H/FFA state horticulture CDE. MA Thesis, Department of Agricultural Education, Purdue University, 615 West State Street, West Lafayette, IN.

Kenow, L.J and J.M. Williams. 1992. Relationship between anxiety, self-confidence, and evaluation of coaching behaviors. The Sport Psychologist 6: 344-357.

Layfield, K.D. and T.R. Dobbins. 2002. Inservice needs and perceived competencies of South Carolina agricultural educators. Jour. of Agricultural Education 43(4): 46-55.

Leseure, M.J., J. Bauer, K. Birdi, A. Neely and D. Denyer. 2004. Adoption of promising practices: A systematic review of the evidence [Electronic version]. International Jour. of Management Reviews 5-6(3-4): 169-190.

Martens, R. 2004. Successful coaching. Champaign, IL: Human Kinetics.

McCallister, S.G., E.M. Blinde and W.M. Weiss. 2000. Teaching values and implementing philosophies: Dilemmas of the youth sport coach. Physical Educator 57(1): 35-46.

Merriam, S. 1983. Mentors and protégés: A critical review of the literature. Adult Education Quarterly 33: 161-175.

Mounce, A.R. and R. Terry. 2001. Students' perceptions of unethical practices in FFA competitions. Jour. of Southern Agricultural Education Research 51(1): 33-49.

Nash, S.A. and L.L. Sant. 2005. Life-skill development found in 4-H animal judging. Jour. of Extension 43(2). Retrieved from http://www.joe.org/joe/2005april/rb5.shtml

National FFA Organization. 2006. National FFA CDE Handbook. Retrieved from https://www.ffa.org/Documents/cde_handbook.pdf

Padilla, R.V., J. Treviño, K. Gonzalez and J. Treviño. 1996. The unfolding matrix: A dialogical technique for qualitative data acquisition and analysis. IN: Proc. Annual Meeting of the American Educational Research Association, New York, NY, 8-12 April.

Papacharisis, V., M. Goudas, S.J. Danish and Y. Theodorakis. 2005. The effectiveness of teaching a life skills program in a sport context. Jour. of Applied Sport Psychology 17: 247-254.

Patton, M.Q. (2002). Qualitative evaluation and research methods 3rd ed. Newbury Park, CA: Sage.

Petitpas, A.J., A.E. Cornelius, J.L. Van Raalte and T. Jones. 2005. A framework for planning youth sport programs that foster psychosocial development. The Sport Psychologist 19: 63-80.

Radhakrishna, R.H., L. Everhart and M. Sinasky. 2006. Attitudes of 4-H participants about 4-H competitive events. Jour. of Extension 44(6). Retrieved from http://www.joe.org/joe/2006december/rb3.php

Rayfield, J., S. Fraze, T. Brashears and D. Lawver. 2009. An assessment of recruitment and training practices used in a national FFA career development event. Jour. of Southern Agricultural Education Research 59: 81-93.

Russell, C.R., J.S. Robinson and K.D. Kelsey. 2009. Motivating agriculture students to participate in CDEs. Career and Technical Education Research 34(2): 103-118.

Scanlan, T.K., P.J. Carpenter, G.W. Schmidt, J.P. Simons and B. Keeler. 1993. An introduction to the sport-

commitment model. Jour. of Sport and Exercise Psychology 15: 1-15.

Smith, M.F. and E.E. Kirkpatrick. 1990. 4-H in Indiana: 1904 - 1990, a record of achievement. West Lafayette, IN: Purdue Research Foundation.

Snow, D.A. 2001. Extending and broadening Blumer's conceptualization of symbolic interactionism. Symbolic Interaction 24(3): 367-377.

Stone, B.G. and S. Bieber. 1997. Competencies: A new language for our work. Jour. of Extension 35(1). Retrieved from http://www.joe.org/joe/1997february/comm1.html

Talbert, B.A. and M.A. Balschweid. 2006. Career aspirations of selected FFA members. Jour. of Agricultural Education 47(2): 67-80.

Vallee, C.N. and G.A. Bloom. 2005. Building a successful university program: Key and common elements of expert coaches. Jour. of Applied Sport Psychology 17: 179-196.

Wooden, J. and J. Carty. 2012. The official site of coach John Wooden. Retrieved from www.coachwooden.com/index2.html

Framing an Undergraduate Minor through the Civic Agriculture and Food Systems Curriculum [1,2]

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Abstract

Society is facing new agricultural and food supply dilemmas that require visionary leaders and critical thinkers to solve them. Emerging interest in sustainable agriculture education among college-bound students continues to grow, giving institutions of higher education the opportunity to strengthen students' understanding of the connections among food, agriculture and community systems through interdisciplinary, experiential-based curriculums. This paper provides the backdrop to how the interdisciplinary, experiential-based minor in Civic Agriculture and Food Systems (CAFS) evolved within the College of Agriculture and Life Science at Virginia Tech. We specifically illustrate how the CAFS task force utilized the theory of civic agriculture and Heifer International's values-based model as the conceptual underpinnings to support the minor's academic focus. Funding was obtained incrementally, first through college support and then by a USDA Higher Education Challenge (HEC) grant. Collaborative processes, including an interdisciplinary curriculum task force and teaching teams informed the development and implementation of the curriculum. Pedagogical strategies unique to the CAFS minor include collaborative teaching, fieldwork, learning circles, project-based activities and electronic assessment portfolios. Learning experiences that intertwine research and pedagogy and student accomplishments are illustrated. Interdisciplinary, values-based, and experiential curriculums focused on solving relevant agricultural problems are necessary for advancing post-secondary agricultural education.

Introduction

The 21st century presents a number of agricultural challenges that are transforming the way we produce food, fiber and fuel. According to National Research Council (2010, p. 1), "agriculture is at a pivotal stage in terms of meeting societal demands for products while improving sustainability." Population growth, climate change, globalization and diet-related chronic diseases are some of the most imposing conditions that will affect our agricultural systems and the health of human populations worldwide. Society needs critical thinkers to find solutions to these unprecedented dilemmas. How will the world's growing population impact food supply (Godfray et al., 2010)? How will we balance environmental, economic and social demands placed upon our food systems (Foley et al., 2005)? Can we create viable policies and practices that genuinely promote viable systems? Finding answers to such complex questions can be viewed as imposing, or can be seen as opportunities to affect change in how we educate the next generation of college students. Thus, it is paramount that students have a solid understanding of the vast complexities of agricultural sustainability (Calder and

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[2]For more information about the CAFS minor, visit http://www.cals.vt.edu/prospective/majors/civic-ag-minor/index.html.

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Clugston 2005). Equally important are opportunities to learn how to critique and solve agricultural and food-based issues that are relevant to our communities. Institutions of higher education need to be prepared to lead the way through new program offerings and pedagogy that integrate interdisciplinary perspectives, experiential learning and community engagement. Such academic learning environments strengthen student capacity for civic engagement and ability to critically think about how to develop a more sustainable food system (Niewolny et.al. 2012; Rojas 2003).

According to Fischer and Glenn (2009), agricultural-food system sustainability with multidisciplinary teaching and hands-on experience is among the five emerging areas of study in higher education. According to the Association for the Advancement of Sustainability in Higher Education (AASHE) some 70 colleges and universities in the United States have a curriculum in sustainable agriculture education (AASHE 2012). The National Academy of Sciences (NAS) released a report pivotal to transforming agricultural and life science education in higher education to better address the nation's rapidly changing landscape of agricultural and food system needs (NRC 2009). A commonality across each of the nine recommendations in the NAS (2009) report is the need to improve or adapt agriculture education so that the teaching methodology is interdisciplinary, student-centered and contextualized. Specifically, these recommendations advocate connecting students with authentic learning experiences that emphasize real world issues and professional practice to address those issues.

Another report, AASHE's Sustainability Curriculum in Higher Education Call to Action, endorses developing a sustainability curriculum that enables students to learn and actually practice systems thinking by applying such thinking to actual world issues (AASHE 2010). By definition, systems thinking is a holistic approach that focuses on understanding the constituent parts of complex real-world situations (Meadows 2008). It is a way of understanding complexities that emphasizes the relationships among a system's parts such as those often encountered in sustainable food and farming systems (Meadows 2008). Coupled with these relevant reports, the Association of Public and Land-grant Universities also proposes the need for more experiential learning in agricultural programs that invests in the development of human capacity via civic engagement (APLU 2009; Schmidt 2009). Academies that embrace civic engagement do so by forging partnerships among academic institutions, students and community. Civic engagement facilitates a collaborative educational environment that empowers students, faculty and communities to collectively address the economic, environmental and social challenges emergent today (Simon, 2010). The most common civic engagement pedagogy is service-learning where academic study is purposefully and critically embedded within service aims identified by a community or community partner (Colby et al. 2003). When higher education assimilates a civically engaged mission through service learning, it exemplifies the land-grant university's historical traditions, values, and mission (Colby et al., 2003).

In response to and in alignment with these reports, undergraduate programs that prepare graduates for meaningful action around the rapidly changing agrifood landscape are beginning to surface across the continents (AASHE 2012; Colasanti 2009; Feenstra 2002; Fortuin 2010; Galt et al. 2012; Hammer 2010; Harmon et al. 2011; Ibanez-Carrasco and Riane-Alcala 2009; Jacobsen et al. 2012; Keating et al. 2010; Kolodinsky et al. 2012; NAL 2012; Rojas et al. 2007; SAEA 2012). In particular, land grant universities and colleges stand out as unique contributors towards this effort as their mission is to disseminate new research for citizens in agricultural practice. In this article, we describe how Virginia Tech (VT), a land grant university, developed the Civic Agriculture and Food Systems (CAFS) minor to fill growing student interest in sustainable agriculture education. In doing so, we illustrate two key frameworks used to develop the CAFS minor by referring to Heifer International's (HI) "values based" model of community development and Lyson's (2004) model of civic agriculture. Both approaches support sustainable community development. First, civic agriculture refers to a locally based agriculture and food production system that is linked to a community's social and economic development. This system of agriculture has been termed "civic" because it embodies a commitment to developing an economically, environmentally and socially sustainable system of agriculture that relies on local and regional resources, markets and community connections. Similar to Lyson's civic agricultural model, HI promotes a "values based" approach to development through the use of local resources and community assets for sustainable outcomes. From this perspective, we provide an overview of the funding, taskforce development and curriculum design that is grounded in core values and mirrors civic agriculture and HI's model of community development. Further, we describe how the student's educational journey engenders a community of learners through coursework, fieldwork, group activities and community-based projects. Lastly, we provide illustrations of student community-based projects and the approach used to guide students in envisioning their future and achieving mutual project goals with a community partner.

Table 1. Acronym Reference

AASHE	Association for the Advancement of Sustainability in Higher Education
AI	Appreciative Inquiry
ALS	Agriculture and Life Sciences
ASB	Alternative Spring Break
CAFS	Civic Agriculture and Food Systems
CALS	College of Agriculture and Life Sciences
CAP	Community-based Action Project
CBO	Community Based Organizations
CSA	Community Supported Agriculture
CT	Collaborative Teaching
ePortfolio	Electronic Portfolio
HEC	Higher Education Challenge
HI	Heifer International
LC	Learning Circles
NAS	National Academy of Sciences
USDA	United States Department of Agriculture
VT	Virginia Tech

Methods

An acronym table was developed for readership reference (Table 1).

Funding Development

Following an emerging call for transformation in undergraduate agricultural and life science education, VT's Climate and Action Commitment and Sustainability Plan directed the academy to incorporate sustainability concepts and issues across research, academics and outreach, helping to pave the way for pursuing new curricular efforts. The College of Agriculture and Life Sciences (CALS) administrative leadership supported a shift in the traditional educational paradigm through an internal funding call that aligned with its mission to provide an interdisciplinary approach to learning, discovery and citizen engagement in the fields of science and agriculture that make a positive difference in society. In response, the author applied for the CALS internal grant to facilitate an alternative spring break (ASB) to the HI Ranch in Perryville, Arkansas in 2008.

The ASB was used as an opportunity to teach students about HI, a non-profit humanitarian organization that provides training and education and livestock to limited-resource communities worldwide. Heifer's sustainable development model is values-based and gifts communities in need with a "living loan" in the form of livestock (Aaker 2007). The animal produces milk, money, meat, manure, muscle, materials and motivation to promote community development. Everyone receiving assistance promises to repay their living loan by donating one or more of their animal's offspring to another family in need. This ritual of "Passing on the Gift" ensures project sustainability and strengthens community. The HI values-based model is founded in appreciative inquiry (AI), which is a question-based visioning process that draws upon group strengths and lays out a holistic approach to community development (Aaker 2007; Cooperrider and Whitney 2005). The model promotes just and sustainable development, revolving around twelve values or cornerstones that spell the acronym of "Passing [on the] Gifts." Accountability, Sharing and caring, Sustainability and self-reliance, Improved animal management, Nutrition and income, Gender and family focus, Genuine need and justice, Improving the environment, Full participation, Training and education and Spirituality. Individually, each cornerstone represents a concept yet when each value is brought together it conveys self-perpetuating community development (Aaker 2007).

After the first ASB, students inquired about designing an experiential, interdisciplinary curriculum based upon HI's "values-based" model that focused on AI and agricultural community development. This student-driven interest also cultivated reciprocity between HI and VT concerning the development of ASB learning activities for college-aged students grounded in educational theory and research (Byker et al. 2012). Virginia Tech is one of the first universities to partner with HI to plan curriculum at the college level. Through additional engagement with VT and HI stakeholders, HI's model became the initial framework for planning and designing a new agricultural and food systems curriculum in CALS.

Initially, faculty from each CALS department, Dining Services, and YMCA staff were contacted to gauge interest in collaborating and building food system community capacity through this curriculum. Participation from the YMCA offered opportunities at their Community Gardens, as did Dining Services through their interest in a garden at the CALS-Kentland Farm. A central feature included paralleling HI's model (i.e., incorporating values and "Passing on the Gift") through didactic elements and experiential components around building community capacity, animal care/production, agroecology, nutritional and economic benefits. After recruiting interested stakeholders, Clark applied for a USDA Higher Education Challenge (HEC) grant in 2009 to develop a minor integrating HI's model.

The HEC grant program entitled "Restoring Community Foodsheds: A Multidisciplinary Curriculum Translating Science into Practical, Innovative and Sustainable Solutions for Economic Viability, Food Security and Health" was awarded (USDA HEC under Award No. 2009-38411-19770); its primary objective was to develop, implement and evaluate an interdisciplinary, experiential-based curriculum in sustainable agriculture and food systems.

Taskforce Development

Next, we formalized a curriculum taskforce comprised of diverse collaborators: interdisciplinary faculty, staff

Table 2. Virginia Tech (VT) Civic Agriculture and Food Systems (CAFS) Interdisciplinary Curriculum Taskforce Members and Activities

Taskforce Members	Curriculum Design	Collaborative Teaching
Faculty Departments, Other Units, Students		
Agricultural Education and Extension	✓	✓
Animal and Poultry Sciences	✓	✓
Biological Systems Engineering	✓	
Crops, Soils and Environmental Sciences	✓	✓
Dairy Science		Guest lecturer
Entomology		Guest lecturer
Food Science and Technology	✓	
Horticulture	✓	✓
Human Nutrition, Foods and Exercise	✓	✓
Plant Pathology, Physiology and Weed Science		✓
Center for Student Engagement and Community Partnership Staff	✓	
University Honors Staff	✓	✓
Undergraduate and Graduate Students	✓	✓
Principle Community Partners		
YMCA of Blacksburg	✓	✓
VT Dining Services	✓	✓
Heifer International		✓
College Kentland Farm	✓	✓

and undergraduate and graduate students from VT, academic and non-academic units and community partners (Table 2). Taskforce members were included in the process based upon interest, divergent perspectives and disciplinary expertise. Together these entities met bi-monthly to conceptualize the interdisciplinary, experiential-based undergraduate minor.

Curriculum Design

As previously discussed, the design of the CAFS curriculum was first influenced by HI's value-based model (Aaker 2007) through the ASB. The curriculum was further developed and refined by reviewing the current status of post-secondary sustainable agriculture education. With a social science orientation, the faculty agreed to draw upon the concept of "civic agriculture" (Lyson, 2004) to develop our sustainability-focused curriculum. Civic agriculture is a development model that provides a blueprint for creating and strengthening resilient, local and regional food systems. According to Hinrichs (2007), civic agriculture is often presented as a community development strategy that allows communities to gain greater control of their socioeconomic future while, at the same time, increasing their capacity for civic engagement and community problem-solving. It is this focus on community (or civic) engagement that positions the civic agricultural model as a sustainable alternative to the current industrialized agri-food system.

Instead of vertical integration, mass production, and transnational economic policies, civic agriculture refers to the "embedding of local agricultural and food production in the community" to engender socially just, ecologically sound and economically viable outcomes (Lyson, 2004, p. 62). Civic agriculture is best illustrated through a range of community-based initiatives, including community supported agriculture (CSA), farmers markets, community gardens, grower cooperatives, community-kitchens and farm-to-institution arrangements (e.g., farm-to-school and farm-to hospital). While civic agriculture has been applied in communities, nationally, as development paradigm, it has also supported sustainability-based curriculum in higher education to strengthen students' understanding of the complex connections among food, agriculture and community (Hinrichs, 2007; Niewolny et al. 2012; Wright 2006).

Together, Lyson's (2004) framework of civic agriculture and HI's value-based model (Aaker 2007) informed the conceptual process and collaborative ethic, ultimately shaping the curriculum and its formal name. We also scanned civic agriculture related job descriptions and requested input from potential employers in the field of food and agriculture to ascertain what skills and knowledge were most valued from prospective employers. Therefore, we approached the curriculum development using an interdisciplinary perspective that would prepare student to navigate a wide range of contemporary issues facing society today (Lattuca 2002). Shifting the program focus from single-discipline to interdisciplinary studies and integrating theoretical and experiential modes of learning lays the foundation to keenly educate students to learn about the critical social, political, economic, environmental and public health issues intertwined with today's food and agriculture system (NRC 2009). The taskforce thus embraced the concept of civic agriculture, HI's values-based model and began designing a curriculum with the capacity to engage students in integrative and experiential learning, community problem solving and systems thinking. Consequently, the taskforce deemed it logical to name the minor Civic Agriculture and Food Systems (CAFS).

Results and Discussion

The overarching curriculum goal was to provide students with foundational knowledge and skills to identify, examine, apply and incorporate agriculture and food system sustainability philosophies and activities into personal and professional practice. Therefore, CAFS is a minor that embodies a commitment to developing and strengthening an economically, environmentally

and socially sustainable agriculture and food systems through curriculum that builds community capacity, uses local resources and serves local and regional markets and citizens.

Values-Based Curriculum

Early in the conceptual process the taskforce mirrored HI's values-based model by identifying six core values that represent the definition of civic agriculture as related to local-regional food systems: 1) food security-sovereignty, 2) civic engagement and democratic participation, 3) strong local economies, 4) ecological stewardship, 5) healthy people and communities and 6) collaborative teaching and experiential learning (Table 3). These core values steered the formation of programmatic goals, student learning outcomes, course descriptions and pedagogical and evaluation strategies. The taskforce drafted a comprehensive assessment plan to ensure that high education standards are maintained. Although the CAFS design process preceded the NAS (2009) recommendations, the curriculum strongly aligns with eight of the nine recommendations for transforming agricultural education for the 21st century. Furthermore, engaging values across the curriculum life-cycle helps students recognize and act responsibly towards the educational community and to the wider society (APLU 2009; Galt et.al. 2012).

Table 3. Civic Agriculture and Food Systems Core Values

1. **Food Security/ Sovereignty**
   - Protects local community integrity, traditions, and well-being
   - Increases equal access to healthy, nourishing food to improve individuals and communities health and nutrition
   - Links local food to local populations, regardless of race, gender, and class
2. **Civic Engagement and Democratic Participation**
   - Supports local leadership
   - Enhances community problem-solving
   - Builds trust, relationships, and collaborative networks among a diversity of people
3. **Strong Local Economies**
   - Provides economically profitable opportunities for farmers and agricultural workers
   - Builds and maintains local wealth
   - Strengthens economic vitality within the food system while improving community and environmental well-being
4. **Ecological Stewardship (and Praxis)**
   - Preserves and enhances environmental quality
   - Promotes a multidisciplinary, systems-oriented approach to agricultural and natural resource management
   - Values locally adapted production systems that conserve ecological resources
   - Fosters the development of capabilities that allow students to learn, appreciate, and apply place-based knowledge and skills in their lives and work
5. **Healthy People and Communities**
   - Ensures health and well-being of all people
   - Links people and communities with the food system
   - Provide healthy and culturally appropriate food produced through ecologically sound and sustainable methods
6. **Collaborative Teaching and Experiential Learning**
   - Improves learning and development of communities of co-learners
   - Fosters critical reflection and social change
   - Values local knowledge and experience

Civic Agriculture and Food Systems Courses

To graduate in the CAFS minor, students complete 18 credits that include four required courses, each three credit: 1) 2204 Introduction to Civic Agriculture, 2) 3404 Ecological Agriculture: Theory and Practice, 3) 4204 Concepts in Community Food Systems and 4) 4214 Capstone in Civic Agriculture and Food Systems. Course objectives, descriptions and select assignments are found in Table 4. Students select the remaining six credits from a list of cross-disciplinary CALS departmental courses that complement the minor are tailored to their area of interest. The required courses are structured in a step-wise fashion to prepare for the experiential capstone course where students implement community-based action project (CAP) originally drafted in 2204. To date, three ALS courses (2204, 3404, and 4204) have been taught twice and the ALS 4214 capstone course once. Through grant support and the HI–VT partnership, students participated in value added experiential study opportunities (domestic and international) that have deepened students understanding about sustainable community development as it relates to the minor (Byker et al., 2012).

Experiential-Based Education

The minor is designed to promote academic enhancement, personal growth, and civic engagement through experiential-based education (Baxter Magolda 2002; AACU and CFAT 2004). In the historical tradition of John Dewey (1916), the curriculum is academically grounded in experiential learning theory, which fosters an engaged teaching and learning environment for both learners and educators. Dewey maintained that all learning must be put into context of prior knowledge and experience and that the key for an enhanced education was for students to "learn by doing." For half of a century, his educational theories have been employed widely in colleges of agriculture (Roberts, 2006). Experiential-based education helps students improve their academic performance, build leadership skills, strengthen their sense of community, gain professional and career advantages, foster personal development and cultivate a lifelong civic and service ethic (Eaton 2003; Enos 1996).

More recently, VT and other land grant institutions have advocated for an experiential learning approach that takes student learning beyond institutional walls by way of developing service-based fieldwork experiences through community-university partnerships (Galt et al., 2012; Niewolny et al., 2012; Wright 2006). Specifically drawing upon this educational perspective, the CAFS minor creates space where students are able to: connect skills and knowledge from personal experiences both

Table 4. Civic Agriculture and Food Systems Courses

Required Courses and Descriptions (3 credits each)	**Pedagogical Examples**
ALS 2204 Introduction to Civic Agriculture: Introduction to the economic, social, and ecological foundations of civic agriculture. Topics include industrialization, localized food systems, and citizen participation in civic agriculture. Emphasis will be given to a range of civic agriculture models, strategies, and hands-on approaches to establish, retain and strengthen community-based food and agriculture systems	*Activities and Assignments* ▪ Critical Reflections on Readings ▪ Group Dialogue and Discourse ▪ Foot Roots ▪ Community Needs Assessment ▪ Community Project Proposal ▪ Electronic Portfolio – Fieldwork log – Course reflection ▪ Fieldtrips: Farm tours, Dining Services
ALS 3404 Ecological Agriculture: Theory and Practice: This course examines the ecological foundations of sustainable agriculture practice. It surveys the principles of ecology and biology in the context of civic agriculture and food systems. It includes an overview of sustainable agriculture practices both historic and modern	*Activities and Assignments* ▪ Whole Farm Plan Project ▪ Weekly reading reflection ▪ Electronic Portfolio – Fieldwork log – Course reflection ▪ Fieldtrips: Farm tours ▪ Soil sampling and analysis
ALS 4204 Concepts in Community Food Systems: Examination of the economic, political, social, and cultural issues related to community food systems and agricultural practices. Topics include local and regional food systems development, food production and biotechnology, food sovereignty and security, and population and environmental health. Analyze models, strategies, and policies of national food systems	*Activities and Assignments* ▪ Learning Circles ▪ Case study analysis ▪ Policy Brief ▪ Personal Manifesto ▪ Electronic Portfolio – Fieldwork log – Course reflection
ALS 4214 Capstone: Civic Agriculture and Food Systems: Multidisciplinary, experiential community-based course focusing on civic agriculture-food systems. Working in partnership with community stakeholders, students propose viable solutions to real world issues revolving around civic agriculture and food systems. Students will connect with communities locally, regionally or globally	*Community Action Projects* ▪ Grape CSA[a,b] ▪ Tea Garden: Production & Marketing[b] ▪ Farmscaping[c] ▪ 16 Plot Garden Plot[c] ▪ Edible Demonstration Garden[c] ▪ Children's Wonder Garden[d] ▪ Student Campus Garden[e] *Other* Final Electronic Portfolio

[a]CSA: Community supported agriculture
[b]Stone Crop Farm
[c]Hale-Y Community Gardens
[d]Floyd Elementary and Plenty!
[e]Smithfield Plantation

formally and informally; apply theory to practice via service-based fieldwork or community projects; critically reflect upon agrifood issues and arguments; and apply newly learned concepts and practices to other problems and social settings. It is this rich foundation of experiential-based education that provides students with vital knowledge, skills and practical know-how about emerging agriculture and food system concepts and professional practice.

To complement the experiential-based approaches, the minor promotes a learning partnership between students, faculty and the community creating mutually beneficial outcomes (Jacoby 2003). Course lessons are designed to actively engage students with educators and community members in group dialogue and problem-based inquiry. This approach enables students to develop critical thinking by way of problem solving and question-posing with a range of stakeholders—all of whom obtain valuable knowledge and experience. When students learn to ask better questions it allows for deeper thinking and provides faculty with significant insight into the degree and depth of student understanding (Brooks and Brooks, 2001). The CAFS pedagogical approaches that illustrate this participatory philosophy include collaborative teaching, fieldwork, learning circles, project-based assignments, and electronic portfolios. These key instructional approaches used in the minor are described next.

Collaborative Teaching Teams

Collaborative teaching (CT) is one of the six core values embraced in the minor that has also produced research scholarship. Each of the four main courses of the CAFS minor are collaboratively taught through a unique grouping of CALS faculty, staff, students and a community partner liaison who coordinates the Hale-YMCA Community Garden. While each teaching team looks and operates differently from each other, the common theme across all four courses is the focus on interdisciplinary CT. Specifically, each course team integrates unique disciplinary perspectives to guide curricular and student learning aims through an approach that consists of team teaching planning, instruction and student learning assessment. The CAFS minor approach to CT involves building relationships between and within different CALS departments and the students who participate in the courses. Drawing upon Jacoby's (2003) partnership framework, the CAFS teams construct their teaching teams as actual partnerships focusing on five main occurrences: (1) shared vision, values, and trust, (2) identification of clear benefits to each partner as critical, (3) integration of unified philosophy and mission, (4) mutual learning occurs and (5) fresh perspectives are gained.

As a result of this teaching innovation, members of the CAFS taskforce collaborated with VT educational researchers to conduct a campus wide, mixed-methods study of CT at VT that was funded through a CALS integrated internal competitive grant program (Bryant et al., 2012). This study explored how CT is currently utilized across the campus by faculty to characterize a "best practice" model for implementing CT more

successfully for both instructor and student outcomes. Many opportunities and obstacles were observed through collection of survey and focus group data. Faculty gaining new interdisciplinary knowledge and an increase in student engagement through successful models of collaboration were reported.

The potential benefits of CT were evident; however, challenges faced by those engaged in CT are also apparent. Some obstacles to CT were time and resource intensiveness, work load delegation and institutional challenges associated with teaching credit and recognition (Bryant et al., 2012). Additionally, it was learned that different models and definitions of CT exist, which can lead to misunderstandings about what is CT and its impacts on learning. Therefore, it is important to define CT in a manner that reflects the way both teaching responsibility and interdisciplinarity are involved. According to Lattuca (2002), viewing interdisciplinarity as a discourse community is helpful for complex teaching and learning arrangements. Here people explicitly discuss and share values, beliefs and existing knowledge schema to create both a social and cognitive learning experience within and among disciplines, which, in turn, influences the culture of the CT team.

Building on this mixed-methods research, an additional qualitative study was conducted at VT specifically inquiring about the teaching experiences of the CAFS minor teaching faculty (Helms et al., 2012). This research consisted of two focus groups of faculty and one community partner engaged in teaching and scholarship in the minor. The primary purpose was to identify intellectual outcomes of the CT team involved in the CAFS interdisciplinary, collaborative group. Faculty knowledge gains in the fields of agriculture and life science were an emergent theme. Faculty also reported that this knowledge gain reflected a paradigm shift from a reductionist view of science to "systems level" thinking of agricultural and food system issues. Furthermore, reciprocity between faculty learning and course curriculum development was identified as a productive process with mutual benefits to faculty, community partners, and students. The role of the community partner liaison in curriculum development was also identified as benefiting the collaborative teaching process by way of linking learning objectives through a service-learning framework that was grounded in authentic learning experiences.

Community Partnerships

Service-learning through fieldwork is incorporated across the CAFS curriculum. This service learning experience is based upon the development of community partnerships with several CAFS community stakeholders. In all CAFS courses, students are required to fulfill a minimum of 10 hours of fieldwork experience with a CAFS community partner. During scheduled fieldwork students follow a best practices protocol for community engagement created by the CT team. Guiding principles include: 1) identify, acknowledge and engage with stakeholder(s), 2) proceed with mutual respect and cultural understanding, 3) emphasize relationship building, 4) build community capacity for greater problem-solving and 5) work toward reciprocity. When students are asked to describe what components of the CAFS program they find most beneficial, fieldwork is consistently listed at the top of their responses.

In ALS 2204 Introduction to Civic Agriculture scaffolding of community engagement begins with five principle community partners: VT Dining Garden at Kentland Farm, Hale-YMCA Community Gardens, Smithfield Student Garden, Glade Road Growing Farm and VT Dining Services Farm to Fields option. In addition to the principal partners, the current community partner database includes thirty other community based organizations (CBOs). As the CAFS program builds community capacity through mutually beneficial service-learning opportunities it generates interest from other CBOs. Overall, fieldwork provides a platform for the development of student capstone projects, creates space for public dialogue, enhances students' problem-solving capacities and creates mutually beneficial learning opportunities for students, community partners and faculty involved in the minor.

Learning Circles

Learning Circles (LC) are one form of knowledge generation used in the CAFS 4204 Concepts in Community Food Systems course that promoted student engagement and accountability. By definition, a LC is a group of individuals with a common interest who meet regularly to learn from each other and others about a topic (Aksim 2005). Built upon the idea that every member has something to contribute and that every member has something to learn, they are intended to lead to action and change (Ravensbergen and VanderPlaat 2010). Common LC strategies include establishing and defining quality work together; identifying norm behaviors for classroom culture; and determining criteria for success. Ultimately, LC activities generate in-depth inquiry around the complex and value-laden issues confronting food and agricultural issues which fosters a community of learners.

In ALS 4204 Concepts in Community Food Systems, LC's are assembled with three to four students per grouping. Each LC is responsible for working as a team on a variety of assignments and activities such

as community food system case studies, fieldwork synopses and policy briefs. We found that the LC assignments engendered a camaraderie that produces creative quality work that enriched learning within the classroom. Course evaluations report positive attitudes towards LC and other group methodologies. In fact, last year this was reaffirmed when five students presented a roundtable discussion about their learning experience in ALS 4204 LC at the 4th National Sustainable Agriculture Education Association Conference (Rich et al., 2011).

Project-Based Assignments

All course assignments/activities (in and outside class) are purposely designed to examine community-based agrifood systems to meet respective CAFS course objectives, demonstrate interdisciplinary knowledge and perspectives, improve oral and written communication and practice community-based participation. Following this further, the CAFS's principles of community facilitate open/affirming communication, full participation, inclusion, relationship building, productive and accountable process and capacity building (Emery et al., 2006; Aakers 2007). Project-based activities are designed to exemplify these principles and foster a learner-centered environment in the classroom via experiential modes of learning. Although examples of course assignments are found in Table 4, a more in-depth explanation of the culminating final capstone project is warranted.

In the ALS 4214 Capstone in CAFS course, students apply the knowledge gained from their previous coursework and experiences to design and refine, implement, co-manage and evaluate a mutually agreed upon CAP in partnership with a community member or organization. They build upon the first drafts generated in the Introduction to Civic Agriculture (ALS 2204) course. These drafts are specifically modeled after a typical grant proposal. Refinements continue to be made in subsequent CAFS courses until the final proposal is implemented in capstone course. After revisions are made, students begin planning the project's methodology in detail. Due to the dynamic and iterative nature of the projects implementation spans a minimum of one semester. Throughout the process, students reflect and report out how the CAP complements the HI "values-based" model, both based upon AI framework (Aaker 2007; Cooperrider and Whitney 2005). Basing the CAP in AI requires students to practice asking questions that capture, anticipate, and heighten positive potential regarding the CAP project. During class, students collectively pose, ask and share responses to "positively framed questions" about the CAP progress. This gives way to innovation and reciprocal discovery, shared knowledge and ultimately, enables students to envision the future success of the project (Cooperrider and Whitney 2005; Galt et al., 2012; Rojas 2007). Intentional dialogue between students and the community about past and present capacities, i.e., achievements, assets, unexplored potentials, innovations, strengths, opportunities, benchmarks, high point moments, lived values, traditions, strategic competencies, stories and visions of the future builds and solidifies authentic partnerships.

In ALS 4214, students uphold the CAFS principles of community for all CAP assignments as well. Over the CAP life cycle, students periodically reveal personal and professional attributes that contribute to a quality product. In other words, this activity invites students to appreciate each other's collective history regarding project experiences and simultaneously gain constructive feedback from peers and community partners. To simulate real-world practice, project budget justifications are presented, ranked and then prioritized for funding. At the beginning of the semester, students creatively illustrate (visually and orally) a 'positive core' presentation that envisions what the project will look like at the end of the semester. Periodically, students use voice and photographs to depict CAP progress to describe how the project strengthens community capacity (built, financial, natural, cultural, political, social and human) and share CAP positive experiences and best practices (Emery et al., 2006; Wang and Burris 1997). Progress reports are also submitted at strategic intervals during the semester for project accountability. These include a detailed CAP plan with objectives/goals, timeline, evaluation and dissemination plan, budget justification if requested, potential impacts, community capitals/CAFS core values addressed and actions to date describing major changes in approach and reason(s) for the changes. The final progress report includes an abstract summary of the CAP and a dissemination plan. Similarly to HI, students are "passing on the gift" by sharing the CAP with internal and external community constituents. Fall semester 2011 was the first time the ALS 4214 was offered and six individual projects and one joint CAP were successfully completed. Specific CAP projects are listed in Table 4 under ALS 4214.

Electronic Portfolios and Assessment of Student Learning

Within the minor electronic portfolios (ePortfolio) serve a role for assessment of student learning and showcasing examples of student work. They are a purposeful collection of work that exhibits a student's efforts, progress and achievements in one or more areas (academic, experiential and professional) (Paulson

et.al.,1991). Students collect work over time; reflect on accomplishments; select work that highlights strengths; and connect by sharing work with a variety of internal (i.e., faculty writing recommendations) and external audiences (i.e., prospective employers, community partners, etc.).

Electronic-portfolio assignments are dispersed throughout each CAFS course and upon one another. In the Introduction to Civic Agriculture (ALS 2204) course students begin to construct the ePortfolios adding specific artifacts from each subsequent CAFS course. All current CAFS students have successfully completed ePortfolios.

The CAFS taskforce uses assessment data archived in ePortfolios to measure learning over time, recognize successes and make necessary improvements in teaching and curriculum. Furthermore, ePortfolios are an efficient and effective mechanism for showcasing a student's multidimensional academic progress and metacognitive growth. To date, the CAFS ePortfolio provides insight into student's perspective, knowledge, written reflective thinking skills and multimedia and technology skills regarding civic agriculture and food systems. Analysis of assessment data is yet another opportunity for CAFS taskforce scholarship.

In alignment with university requirements, a comprehensive program assessment plan was concurrently generated with the curriculum to ensure that high educational standards are maintained using ePortfolio technology. It encompasses classroom, course assessment, program assessment and institutional level assessment. The intent of the assessment plan is to inform the CAFS taskforce about what students know, what they can do with this knowledge and what they value as a result of this knowledge (Palomba and Banta 1999; Black 2003).

The instructional practices previously described in this article provide an avenue for gathering and analyzing information on student learning that faculty apply in a formative way. Examples of data collected to assess student learning include criteria and goal setting for projects, reflective journaling, self and group assessment, archiving assignments, course evaluations and student and faculty focus groups. The CT teams seriously review and discuss these sources to determine whether changes to the curriculum and instruction are necessary. To date, the CT teams have made minor modifications in course content and delivery strategies based on assessment data of the first program graduates.

Student Enrollment, Outreach Opportunities and Outcomes

University governance approved the two-year CAFS minor over a one-year timeframe and the first group of eighteen students representing majors from four colleges enrolled the following fall 2010 semester. The current student enrollment (n=52) now reflects all eight colleges within the university making it truly interdisciplinary (Table 5).

In May 2012, the first group of 8 CAFS students graduated. Prior to graduation five of these students were recognized for significant community outreach done as a result of the minor by either the University or a national organization. Specifically, one student was the recipient of the Aspire "Ut Prosim" (That I May Serve) Award, the University's most prestigious student honor. During the awards ceremony, it was explicitly acknowledged that this student's affiliation with the minor had provided the platform to civically engage and subsequently enhance both the campus and surrounding community's food systems. Another CAFS student majoring in landscape architecture was awarded the "Certificate of Honor" by the American Society of Landscape Architects Excellence in Landscape Architecture Studies. They

Table 5. Student Enrollment, Demographics, and Job Placement

Colleges	Number	Department / Major
Agriculture and Life Sciences	31	Agricultural and Extension Education (2) Agricultural and Applied Economics (4) Animal and Poultry Sciences (3) Biochemistry (1) Biological Systems Engineering (1) Crops, Soils and Environmental Sciences (7) Human Nutrition, Foods and Exercise (6) Food Science Technology (2 minors) Horticulture (5)
Architecture & Urban Studies	6	Environmental Policy and Planning (4) Landscape Architecture (2)
Engineering	1	Chemical Engineering (1)
Natural Resources Environment	2	Natural Resources (1) Geography (1)
Liberal Arts & Human Sciences	11	History (1) Humanities, Science, & Environ (3) Interdisciplinary Studies (1) Theater Arts (1) Science & Technology in Society (4) Sociology (1)
Business	(1)	Double Major with HIST
Total Enrolled	**52**	

2012 First Graduates Job Placement (n=8)
2 CAFS farm internships 1 Rodale Institute Internship (upon completion plans to attend graduate school) 1 University Campus Garden Coordinate 1 VA Tech Dining Sustainability Coordinator 1 Virginia Cooperative Extension Agent in Community Food Systems 1 Vista Volunteer for Food Security NGO 1 Seeking Landscape Architecture Internship around food systems

were acknowledged for how the student's CAP project favorably influenced their senior landscape design project.

The minor's commitment to advancing agricultural education has been exemplified through student involvement in multiple outreach opportunities that have resulted in leadership positions for them within the community. To date, students have successfully organized, managed and led the following events: National Food Day campus festivities, the first annual Appalachian Agriculture and Food Summit Conference, the CAFS Elective for the annual CALS Governors School for High School juniors and seniors and the Sustainable FoodCorps, a student organization that sponsors monthly community meals and facilitates student volunteers for local area fieldwork experiences.

Similarly to enrollment in the CAFS minor, the job market around civic agriculture and food continues to grow. According to the Labor Department, at least 3.1 million Americans are employed in green jobs, a sector that now accounts for about 2.4 percent of the nation's total employment (BLS 2012). Furthermore, the Green for All Report (2011) projects new job opportunities for 'greening' the food system across all sectors (production, processing, distribution, retail and waste). All eight students who have graduated from the CAFS program are engaged in a variety of post-baccalaureate jobs or related ventures (Table 5).

Summary

The CAFS minor continues to cross disciplinary boundaries through its community engagement focus as it cultivates the next generation of critical problem solvers who will become leaders in resolving the complex issues facing agrifood systems in the 21st century. The CAFS program contributes to the University's mission through the scholarship of learning, discovery and community engagement within the Commonwealth of Virginia, the nation and the world. It fosters interdisciplinary teaching and research collaboration among faculty that translate into interdisciplinary learning opportunities that augments students' understanding of the social, political, economic, environmental and public health concerns related to contemporary agriculture, food and sustainable practices. The minor holistically prepares students to critically examine the complex challenges facing agricultural systems from an interdisciplinary perspective. Simultaneously, it builds university-community capacity as students engage in authentic partnerships resulting in transformation for everyone (faculty, students and community partners). Students learn how to find practical, innovative and sustainable agrifood solutions that promote economic viability, food security and community and ecological health through community engagement. In turn, students acquire unique expertise in sustainable agricultural-food systems, which translates into a competitive edge within the growing green agrifood system career market.

What better way to conclude than paraphrasing a recent CAFS graduate's final ePortfolio reflection about the minor. *"The CAFS minor is not just an academic program—it's a community. Throughout my time in the minor, I've made connections with a community of passionate learners and crusaders that have included professionals, faculty, community members and students. This exposure to different paradigms, disciplines and pathways has helped me form a robust academic, personal and professional foundation in regards to agrifood systems and community development. I feel confident in my ability to synthesize information in order to make knowledgeable—and more importantly—feasible recommendations and synopses"* (Shultz 2012). This critical self-reflection reveals the three levels of cognitive processing, i.e., cognition, metacognition and epistemic cognition. Other student reflections are similar and reaffirm an "esprit de corps" within the CAFS community of learners. The undergraduate CAFS minor is a response to the NAS's (2009) call for transformation in agricultural education. It is relevant and prepares society ready graduates who are equipped to take responsible, meaningful action to improve civic agriculture and food systems. Future endeavors include conducting research that explores how a values-based, interdisciplinary, experiential-based curriculum and its pedagogical methods impacts student, faculty and community partner learning.

Literature Cited

Aaker, J. 2007. The heifer model: Cornerstones values-based development. 1st ed., Little Rock, AR: Heifer International.

Baxter Magolda, M.B. 2002. Teaching to promote holistic learning and development. New Directions for Teaching and Learning 2000(82):88-98.

Aksim, R.E. 2005. Learning circles basics. Online: http://www.askim.org. (June 5, 2012).

Association of American Colleges and Universities (AACU) and the Carnegie Foundation for the Advancement of Teaching (CFAT). 2004. A statement on integrative learning. Association of American Colleges and Universities and The Carnegie Foundation for the Advancement of Teaching. http://www.carnegiefoundation.org/dynamic/downloads/file_1_185.pdf. (June 20, 2012).

Association for the Advancement of Sustainability in Higher Education (AASHE). 2010. Sustainability

curriculum in higher education: A call to action. http://www.aashe.org/files/A_Call_to_Action_final%282%29.pdf. (May 17, 2012).

Association for the Advancement of Sustainability in Higher Education (AASHE). Sustainability-focused academic degree programs.http://www.aashe.org/resources/academic-programs. (August 7, 2012).

Association of Public and Land-Grant Univ. (APLU). 2009. Human capacity development. The road to global competitiveness and leadership in food, agricultural, natural resources, and related sciences (FANRRS). http://www.aplu.org/document.doc?id=1639. (June 11, 2012).

Black, P., C. Harrison, C. Lee, B. Marshall and D. William. 2003. Assessment for learning: Putting it into practice. Berkshire, England: Open University Press.

Brooks, J.G. and M.G. Brooks. 2001. In search of understanding: The case for constructivist classrooms. New Jersey: Merrill Prentice Hall.

Bryant, L., S. Clark, T. Broyles, K. Niewolny, C. Watson, P. Doolittle and K. Drezek- McConnell. 2012. Collaborative teaching at a large research university: Obstacles and opportunities. Proc. 3rd Annu. Mtg. Of Higher Education Pedagogy, Blacksburg, Virginia, 8 – 10 Feb.

Bureau of Labor Statistics (BLS), U.S. Department of Labor (2012). Occupational outlook handbook. http://www.bls.gov/ooh/farming-fishing-and-forestry/agricultural-workers.htm. (June 10, 2012).

Byker, C.,S. Clark, R. Enoch, T. Montgomery and E. Serrano. 2012. Heifer international alternative break: sustainable dietary impacts. Jour. of Hunger and Environmental Nutrition 7(2-3):122-136.

Calder, W. and R. Clugston. 2005. Education for a sustainable future. Jour. of Geography in Higher Education 29(1):7-12.

Colasanti, K.,W. Wright and B. Reau. 2009. Extension, the land-grant mission and civic agriculture: Cultivating change. Jour. of Extension 47(4):1-10.

Colby, A., T. Ehrlich E. Beaumont and J. Stephens. 2003. Educating citizens: Preparing America's undergraduates for lives of moral and civic responsibility. San Francisco, CA: Josey-Bass.

Cooperrider, D.L. and D. Whitney. 2005. Appreciative inquiry: A positive revolution in change. San Francisco, CA: Berrett-Koehler Publishers, Inc.

Dewey, J. 1916. Democracy and education: An introduction to the philosophy of education, 1966 Edition. Free Press, New York.

Eaton, M. and J. Patton. 2003. Reflection, civic engagement and learning communities. In: MacGregor, J. (ed.). Integrating learning communities with service learning, American Association of Higher Education.

Emery, M., S. Fey and C. Flora. 2006. Using community capitals to develop assets for positive community change. CD Practice 13:1-13. http://www.comm-dev.org. (July 1, 2012).

Enos, S.L. and M.L. Troope. 1996. Service-learning in the curriculum. In: Jacoby, B. and Associates (eds.). Service-learning in Higher Education: Concepts and Practices. San Francisco, CA: Jossey-Bass.

Feenstra, G. 2002. Creating space for sustainable food systems: Lessons from the field. Agriculture and Human Values 19(2):99–106.

Fischer, K. and D. Glenn. 2009. 5 College majors on the rise. http://chronicle.com/article/5College-Majors-On-the-Rise/48207. (May 17, 2012).

Foley, J.A.,R. DeFries, G.P. Asner, C. Barford, G. Bonan, S.R. Carpenter, F.S. Chapin, M.T. Coe, G.C. Daily, H.K. Gibbs, J.H. Helkowski, T. Holloway, E.A. Howard, C.J. Kucharik, C. Monfreda, J. Patz, I.C. Prentice, N. Ramankutty and P.K. Snyder. 2005. Global consequences of land use. Science 309(5734):570-574.

Fortuin, P.J. and S.R. Bush. 2010. Educating students to cross boundaries between disciplines and cultures and between theory and practice. International Jour. of Agr. Sustainability 11(1):19-35.

Galt, R., D. Parr, and J. Jagannath. 2012. Facilitating competency development in sustainable agriculture and food systems education: a self-assessment approach. International Jour. of Agr. Sustainability DOI:10.1080/14735903.2012.683569.

Godfray, H.C.J., J.R. Beddington, I.R. Crute, L. Haddad, D. Lawrence, J.F. Muir, J. Pretty, S. Robinson, S.M. Thomas and C. Toulmin. 2010. Food security: The challenge of feeding 9 billion people. Science 327(5967):812–818.

Green for All. 2011. Green jobs in sustainable food systems.http://greenforall.org/wordpress/wp-content/uploads/2012/05/GreenJobsinFoodSystem-Final.pdf. (July 16, 2012).

Hammer, J. 2010. Community food systems and planning curricula. Jour. of Planning Education and Research 23(4):424-434.

Harmon, A.,J. Lapp, D. Blair and A. Hauck-Lawson. 2011. Teaching food system sustainability in dietetic programs: Need, conceptualization, and practical approaches. Jour. of Hunger and Environmental Nutrition 6(1):114-124.

Helms, J., K. Niewolny and S. Clark. 2012. Collaborative teaching: Exploring faculty experiences in the Civic Agriculture and Food Systems minor at Virginia Tech. Proc. 58th Annu. Mtg. Of North American

Colleges and Teachers of Agriculture, River Falls, Wisconsin, 26 – 29 Jun.

Hinrichs, C.C. 2007. Introduction: Practice and place in remaking the food system. In C.C. Hinrichs and T.A. Lyson (eds.). Remaking the North American food system: Strategies for sustainability. Lincoln, NE: University of Nebraska Press.

Ibanez-Carrasco, F. and P. Riane-Alcala. 2009. Organizing community-based research knowledge between universities and communities: Lessons learned. Community Development Jour. 46(1): 72-88.

Jacobsen, K., K. Niewolny, M. Schroeder-Moreno, M. Van Horn, A. Harmon, Y. Chen Fanslow, M. Williams and D. Parr. 2012. Sustainable agriculture undergraduate degree programs: A land-grant university mission. Jour. of Agriculture Food Systems and Community Development 2(3):13-26.

Jacoby, B. and Associates (ed.). 2003. Building partnerships for service-learning. San Francisco, CA: Jossey-Bass.

Keating, M., V. Bhavsar, H. Strobel, L. Grabau, M. Mullen and M. Williams. 2010. Engaging agriculture and non-agriculture students in an interdisciplinary curriculum for sustainable agriculture. NACTA Jour. 54(4):24-29.

Kolobdinsky, J., N.K. Fukagawa, E. Roche, C. Belliveau and H. Johnson. 2012. Walking the talk of food systems at a small land-grant university: Overcoming process barriers to a transdisciplinary approach. Jour. of Agriculture, Food Systems, and Community Development 2(3):149–159.

Lattuca, L.R. 2002. Learning interdisciplinarity: Sociocultural perspectives on academic work. Jour. of Higher Education 73(6):711-739.

Lyson, T.A. 2004. Civic agriculture: Reconnecting farm, food, and community. Medford, MA: Tufts University Press.

Meadows, D.H. 2008. Thinking in systems: A primer. White River Jct., VT: Chelsea Green Publishing.

National agriculture library (NAL). 2012. Educational and training opportunities in sustainable agriculture directory. 20th ed. http://www.nal.usda.gov/afsic/pubs/edtr/. (August 6, 2012).

National Research Council (NRC). 2009. Transforming agricultural education for a changing world. Washington, D.C.: National Academies Press.

Niewolny, K.L., J.M. Grossman, C.B. Byker, J.L. Helms, S.F. Clark, J.A. Cotton and K.L. Jacobsen. 2012. Sustainable agriculture education and civic engagement: The significance of community-university partnerships in the new agricultural paradigm. Jour. of Agriculture, Food Systems and Community Development 2(3):27–42.

Palomba, C. and T. Banta. 1999. Assessment essentials: Planning, implementing, and improving assessment in higher education. San Francisco, CA: Jossey-Bass.

Paulson, F.L., P.R. Paulson and C.A. Meyer.1991. What makes a portfolio a portfolio? Educational Leadership 58(5):60-63.

Ravensbergen, F. and M. Vanderplaat. 2010. Learning circles: One form of knowledge production in social action research. McGill Jour. of Education 45(3): 339-350.

Rich, J., J. Helms, L. Hightower and S. Misyak. 2011. Teaching for change: Nurturing civic engagement in the next generation of social change agents for the local food system. In: Proc. 4th Mtg. Of Sustainable Agriculture Education Association, Lexington, Kentucky, 3 – 4 Aug.

Roberts, T.G. 2006. A philosophical examination of experiential learning theory for agricultural educators. Journal of Agriculture Education 47(1):17-29.

Rojas, A., L. Richer andJ. Wagner. 2007. University of British Columbia food system project: Towards sustainable and secure campus food systems. EcoHealth 4(1):86-94.

Schmidt, P. 2009. Many at colleges feel students get too little civic education, survey finds. http://chronicle.com/article/Many-at-Colleges-Feel-Students/48639/. The Chronicles of Higher Education. (June 1, 2012).

Shultz, J. 2012. Electronic portfolio. https://scholar.vt.edu/osp-presentation-tool/viewPresentation.osp?id=1A3B8AC521AA9CE53FF812E3DEFC0ACD. (July 17, 2012).

Simon, L.A.K. 2010. Engaged scholarship in land-grant and research universities. In Fitzgerald, H.E, Burack, C., Siefer, S.D. (eds.). Engaged scholarship: Contemporary landscapes, future directions. Lansing, MI: Michigan State University Press.

Sustainable Agriculture Education Association (SAEA) 2012. Academic programs. http://sustainableaged.org/Resources/AcademicPrograms/tabid/86/Default.aspx. (July 26, 2012).

Wang, C. and M.A. Burris. 1997. Photovoice: Concept, methodology, and use for participatory needs assessment. Health Education Behavior 24(3):369-387.

Wright, D.W. 2006. Civic engagement through civic agriculture: Using food to link classroom and community. Teaching Sociology 34(3):224-235.

Impact of Adding Food Defense Modules to Three Different Undergraduate Curricula

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Abstract

The concept of Food Defense is relatively new and focuses on shielding the food supply from intentional contamination making it different from food safety which focuses on unintentional contamination. The purpose of this study was to assess student satisfaction, level of awareness, teaching efficacy and knowledge gained by the inclusion of Food Defense teaching modules across three different undergraduate curricula. Undergraduate curricula were chosen to encompass the entire food chain of animal based products; animal science (AS), food science (FS) and hotel and restaurant management (HRM). Regardless of curriculum, students found the material was easy to understand, presented in a logical sequence and at the appropriate level for the course. Students enrolled in cross-listed courses found the food defense information a valuable addition to the course. FS students self-reported the modules increased their awareness of food defense and these students also felt they could assess food defense risks, describe the steps in developing a food defense plan, create a plan for a specific situation and determine a response plan. Students in all curricula gained knowledge of food defense as evidenced by an increase between pre- and post-test scores with the largest magnitude of increase among HRM students.

Introduction

The former secretary of the U.S. Health and Human Services, Tommy Thompson, mentioned in his departing statement in December 2004 that the threat of terrorist attack on the U.S. food supply was one of his main worries. U.S. agriculture is vulnerable to an attack because it is concentrated. Factors associated with production and processing concentration that increase food supply risk include the increased susceptibility of livestock disease, rapid movement over broad geographies and insufficient agriculture related security and surveillance (Crutchley et al., 2007). There have been 21 attacks on agriculture or the food supply recorded globally since 1952 (Turvey et al., 2007). In 2004, the USDA Food Safety and Inspection Service proposed a rule requiring federally inspected establishments to develop food defense plans that protect food against intentional contamination. In response to this proposed rule, the meat and poultry industry asked for voluntary adoption of food defense plans. In 2010, 74% of all federally inspected establishments have functional food defense plans (FSIS.USDA.gov). The only required food defense plans for the USDA are for those vendors wanting to participate in the federal feeding programs. However, the passage of the FDA Food Safety Modernization Act in late 2010 requires food production facilities under inspection of the Food and Drug Administration to have functional food defense plans.

Previous findings from research focused on consumers reported after food recalls showed that consumers have decreased confidence in food defense systems and they perceive government and manufacturers as being the most responsible for food defense (Stinson et al., 2008). Therefore, graduates of AS, FS and HRM programs need to be familiar with recent government directives and industry initiatives that deal with food

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defense for animal products to be more competitive and such knowledge will ultimately help the food and animal industries become more prepared for the upcoming changes related to the FDA Food Safety Modernization Act. Because food defense is an emerging area that during the course of this study was not required by any federal or state agency, food defense plans had been introduced to the food industry but had not yet been introduced into undergraduate curricula. The approach used was to introduce food defense through a series of one to two lecture or laboratory modules placed in a variety of courses that covered the farm to fork continuum focusing on animal based food products.

Previous research related to food defense education has focused on the education of individuals already employed by the food or allied industry. Shutske et al. (2008) reported on educating public and private sector food professionals through a series of lectures, table top exercises and field trips. Shutske et al. (2008) reported a progression of learning starting with increased awareness of food defense and ended with the participants being able to identify vulnerabilities when touring food plants. Additionally, participants increased their knowledge as determined by pre- and post-test scores (Shutske et al., 2008). Harrison et al. (2010) trained first responders in agrosecurity issues through a series of eight modules presented state wide by extension agents who had attended a "Train the Trainer" course and received curriculum materials and specific dialogue for each module. The first responders increased awareness and found the training helpful (Harrison et al., 2010).

Purpose and Research Questions

The purpose of this study was to describe and explain the overall effectiveness (satisfaction with curriculum and instruction) of incorporating food defense modules in to undergraduate curriculums (AS, FS and HRM) that span the entire food chain for animal-based food products. The following research questions guided this study:

1. What are the differences in students' level of satisfaction toward the food defense curriculum and instruction among academic courses?
2. What are the differences in food defense awareness and efficacy (self-assessment of student ability in food defense) among participants of various academic courses?
3. What are the differences in students' achievement scores and effect size by academic course?

Methods

Curriculum modules (n = 9) with test questions and/or homework (n = 6) were developed to be used as 50 minute lectures or 110 minute laboratories depending on the structure of the class. Curriculum modules consisted of lecture materials in the form of slides with instructor notes and scenarios of a variety of food production examples ranging from animal production to a farmer's market which provided a starting point for discussion and working through a food defense plan. When homework was employed, students were asked to develop food defense plans specific to the course. Instructors for this material were active participants on the grant, involved with the development of the materials used in order to minimize variation in content delivery. The curriculum modules were implemented in three undergraduate, senior-level production courses in AS (beef production, swine production and poultry production), two senior level quality courses in FS (food product development and food quality assurance), one junior level (principles of meat science) and one senior level (processing muscle foods) processing courses that were cross listed in AS and FS, and two freshmen level culinary courses in HRM (culinary fundamentals and topics in hotel and restaurant management) between 2007 and 2009. These courses were chosen because they, in totality, explore the entire food continuum related to animal production and products and because they are taken by students likely to find employment in either animal or food production.

A researcher-developed instrument (paper questionnaire) was used to determine student satisfaction with instruction and curriculum, awareness of food defense and food defense efficacy. A five-point Likert scale (1 = strongly disagree, 2 = disagree, 3 = neither agree nor disagree, 4 = agree and 5 = strongly agree) was used for all nine questions. To determine satisfaction with instruction, students were asked if the materials were presented in a way that was clear and easy to understand, if the materials were presented in a logical sequence and if the materials were at a level appropriate for the course. To assess satisfaction with curriculum, students were asked if the materials were a valuable addition to the course. Awareness of food defense was assessed by asking for level of agreement/disagreement with the statement, "The increased awareness of food defense issues will be an asset to me in my future career." To determine food defense efficacy students were asked if they were able to assess food defense risks, to describe the basic steps of developing a food defense plan, create a food defense plan for a specific situation and determine a plan for response in case of a suspected incident. In areas where more than one question was used the responses were averaged by participant. A test consisting of nine multiple choice questions about general knowledge of food defense was developed and administered before and after the food defense materials were delivered to

assess knowledge gained. Homework was completed outside of class and turned in during class. All other assessments were completed by students in the classroom. This was deemed exempt by the University of Missouri Institutional Review Board.

Data were analyzed using SPSS 15.0. Means, standard deviations and frequencies were generated to summarize the data. Effect size was calculated for determining differences using Cohen's d (Cohen, 1988) with d values of where, small effect size (d = 0.20); medium (d = 0.50); large (d = 0.80 or larger). Only students completing the pre- and post-tests were used in data analysis.

Table 1: Comparison of Students' Satisfaction Levels of Curriculum by Academic Course[a]

	Academic Course[b]											
	AS			AS & FS			FS			HRM[c]		
Satisfaction	n	M	*SD*	n	M	*SD*	n	M	*SD*	n	M	*SD*
Instruction	167	4.12	.66	96	4.42	.49	40	4.23	.71	148	4.22	.66
Curriculum	120	3.17	.83	47	4.09	.78	46	4.09	.83	-	-	-

[a]1 = strongly disagree, 2 = disagree, 3 = neither agree nor disagree, 4 = agree, 5 = strongly agree
[b]AS = Animal Science, FS = Food Science, HRM = Hotel and Restaurant Management
[c]Curriculum satisfaction was not assessed for HRM courses

Table 2. Comparison of Students' Level of Awareness and Efficacy by Academic Course[a]

	Academic Course								
	Animal Science			Animal Science & Food Science			Food Science		
	n	*M*	*SD*	*n*	*M*	*SD*	*n*	*M*	*SD*
Increased My Food Defense Awareness	120	3.67	.97	47	3.94	.84	46	4.04	.70
Food Defense Efficacy	120	3.90	.50	47	3.93	.60	46	4.05	.52

[a]1 = strongly disagree, 2 = disagree, 3 = neither agree nor disagree, 4 = agree, 5 = strongly agree

Results and Discussion

Regardless of undergraduate curricula, students felt that the food defense instructional materials were clear and easy to understand, presented in a logical sequence, and at the level appropriate for the course (Table 1) based on mean combined scores higher than 4. These results are similar to those reported by Shutske et al. (2008) who used modules to train food industry professionals. Additionally, students in cross listed classes thought the materials were a valuable addition to the course (4.09) whereas students in animal science and food science courses had no opinion (3.71 and 3.98, respectively) about the value the material. This may have been due to the fact that the cross listed classes are meat science classes where the current government regulations are discussed in the context of the comprehensive food system as opposed to courses where food defense might not be as integrated into the course objectives. When students were asked if an increased awareness of food defense would be an asset to their future career only food science students (4.04, Table 2) agreed. However, students in animal science and cross listed classes had no opinion (3.67 and 3.94, respectively). These answers were given prior to the passage of the Food Safety Modernization Act so food defense was not a required regulatory element of food production at the time.

Food defense efficacy was a self-assessment by students about their ability to assess risks, describe and create a plan, and develop a response plan. Food science students agreed that they were able to complete the tasks above (4.05, Table 2) whereas animal science and cross listed classes had no opinion (3.90 and 3.93, respectively Both food science and animal science students completed an assignment related to food defense and the animal science students received higher scores on the assignment (94.15% vs. 88.74%) but that did not translate to increased confidence in their ability to complete a food defense plan. Shutske et al. (2008) reported that "site visits with hands-on learning experience" was considered one of the most valuable parts of their learning experiences and lead to a majority of participants (89%) being able to apply their knowledge.

Instructional materials are strong enough to increase knowledge in all curricula (Table 3). In all undergraduate classes, students increased their knowledge as evidenced by an increase in the mean test scores of 38.1% between the pre- and post-tests. All undergraduate curricula showed a large increase in scores between pre- and post-tests with HRM and cross listed students having the largest increase (2.49 and 2.35, respectively). These results are similar to those reported for agrosecurity training of first responders (Harrison et al., 2010). When food industry professionals were given pre- and post-tests there was no significant change in scores due to high levels of basic awareness of food protection and defense (Shutske et al., 2008). Students also felt more confident in their knowledge as evidenced by a 37.6% decrease in the use of "do not know for sure" between the pre- and post-tests. This underscores the need for education on emerging regulatory issues at the college level to prepare students for positions in all aspects of a comprehensive food industry. Course modules are available for use at http://extension.missouri.edu/fooddefense/.

Table 3. Comparison of Performance Scores and Effect Size by Academic Course

		Pre-Test Score		Post-Test Score		
Course	n	M	*SD*	M	*SD*	Cohen's
Animal Science	168	2.88	2.08	5.99	1.49	1.72
Animal Science & Food Science	96	2.54	1.79	6.59	1.65	2.35
Food Science	34	3.62	2.05	5.68	1.82	1.06
Hotel & Restaurant Management	150	1.57	1.15	5.43	1.87	2.49

Summary

Regardless of the curriculum, all students increased their test performance, awareness of food defense and ability to assess risks based on the modules taught. Students also found the level of curriculum and instruction appropriate. Based on the findings of this study, adding emerging regulatory issues to current, industry relevant upper level undergraduate courses is a viable option to creating new course offerings.

Literature Cited

Cohen, J. 1988. Statistical power analysis for the behavioral sciences (2nd ed.) Lawrence Erlbaum Associates.

Crutchley, T.M., J.B. Rodgers, H.P. Whiteside, Jr., M. Vanier and T.E. Terndrup. 2007. Agroterroism: where are we in the ongoing was on terrorism? J. Food Protection. 70(3): 791-804.

FSIS.USDA.gov. 2012. http://www.fsis.usda.gov/food_defense_%26_emergency_response/food_defense_plan_survey_results/. Accessed on 9/20/2012.

Harrison, J.A., R.D. Hamilton and K.S.U. Jayaratne. 2010. Agrosecurity awareness curriculum design, delivery and evaluation with first responders to agricultural and food emergencies. Food Protection Trends. 30(6): 340-345.

Shutske, J.M., J. Pierquet, L. Michel, R. Rasumussen and D. Olson. 2008. Evaluation of food protection and defense outreach education programs. J. Food Sci. Ed. 7(4): 69-77.

Stinson, T.F., K. Ghosh, J. Kinsey and D. Degeneffe. 2008. Do household attitudes about food defense and food safety change following highly visible national food recalls? Amer. J. Agr. Econ. 90(5): 1272-1278.

Turvey, C.G., B. Onyango, W. Hallman and S.C. Condry. 2007. Consumers' perception of food-system vulnerability to an agroterrorist attack. J. Food Distribution Research. 38(3): 70-87.

Comparison of Factors Influencing the College Choice of Matriculant and Non-Matriculant Students into a College of Agriculture

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Abstract

Nationwide colleges of agriculture have struggled to meet the need for qualified graduates to fill jobs in the food, renewable energy and environmental industry sectors. Even with increasing enrollment in some disciplines, colleges of agriculture and natural resources are estimated to provide only 54% of the graduates needed to fill the expected job openings between 2010 and 2015 (Goeker et al., 2010). This creates a need for colleges to improve recruitment efforts and utilize financial resources more efficiently. This study examined recruitment efforts as they relate to the college-choice decisions of matriculant and non-matriculant students entering a college of agriculture. Results showed no notable difference existed in academic performance between matriculants and non-matriculants. Differences did exist when examining the racial composition of the two groups. When examining recruitment practices, both groups reported the most useful sources of information to be visits to campus, participation in student events on campus, and personal conversations with faculty. Findings also suggest that web-based information is critically important to the decision making process. Parents and/or guardians were found to be the most influential people in respondents' college-choice decision, followed by their high school agriculture teachers.

Introduction

Nationwide colleges of agriculture have struggled to meet the need for qualified graduates to fill jobs in the food, renewable energy and environmental industry sectors. Even with increasing enrollment in some disciplines, colleges of agriculture and natural resources are estimated to provide only 54% of the graduates needed to fill the expected job openings between 2010 and 2015 (Goeker et al.,2010). The remaining positions are expected to be filled by graduates from allied fields, such as science, engineering and business. Employers have expressed a preference for graduates from colleges of agriculture and life sciences as they tend to have stronger interests and work experience related to careers in food, renewable energy and the environment more so than those from allied fields of study. This preference is expected to continue (Goeker et al., 2010).

In an effort to meet the need for more qualified graduates, colleges of agriculture commit a great deal of time, energy and financial resources to their outreach and recruitment programs (Washburn et al., 2002). This has created a situation in which university administrators are looking to increase and improve recruitment efforts and utilize financial resources more efficiently in hopes of attracting more students.

Many institutions are still uncertain about which outreach and recruitment processes are effective (DesJardins et al.,1999). In some cases, administrators have begun to question the value of outreach activities that have traditionally been sponsored and coordinated by colleges of agriculture. Typically the decision to conduct such activities is based on tradition rather than empirical evidence. Acknowledging that a student's college-choice strongly influences his or her professional career (Hossler and Stage, 1992), colleges of agriculture should evaluate strategies to effectively attract students

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in an effort to continue producing the future professionals needed by the industries they serve.

To conceptualize the college-choice decision process of students, the researcher examined the literature related to student recruitment into colleges of agriculture. Participation in on-campus programs and events and conversations with a professor were found to be the most influential on the college-choice process of postsecondary agriculture students (Washburn et al., 2002). The same study also supported earlier findings by Cole and Fanno (1999) and Scofield (1995) that campus visits were beneficial to students during their selection process. In 2006, Burns found additional support for the usefulness of campus visits in a study of African American students entering a college of agriculture. Findings by Scofield (1995) and later by Cole and Thompson (1999) identified printed recruitment literature as being helpful in students' decision-making processes. Hossler et al., (1999) indicated that students gave college guides and college fairs low rankings, but considered visits to their high school by college admission representatives to be more helpful. Previous studies have identified parents as the strongest influence on students' decisions regarding post-secondary education (Cole and Thompson, 1999; Scofield, 1995; Washburn et al., 2002). While many of these studies provide insight into the information sources used by students to select an institution, these studies have not examined the decision-making process of those students who chose to attend another institution. This is an area of research that may provide the greatest benefit, as it might help improve the college's recruitment program and better utilize their limited financial resources. Herein lies the motivation for this study, which seeks to not only identify the factors that influenced students who chose to attend a college of agriculture, but also the factors influencing those students who chose to matriculate elsewhere.

Chapman's (1981) model of student college-choice served as the theoretical basis for this study. Chapman's model suggests that significant persons such as parents, friends, role models and school personnel influence students' perceptions of a college. The model also identifies the fixed college characteristics that are meaningful in students' college-choice decisions. These fixed characteristics include cost, availability of financial aid, location and availability of particular academic programs. The fixed characteristics of the college combined with the influence of significant people and the college's efforts to communicate with the student have been found to have significant impact on students' expectations of college life at a particular institution, thereby impacting their final choice of institution. Adapted to this study, Chapman's model would suggest that gaining a better understanding of the role of influential people, the effectiveness of recruitment practices, and the institutional characteristics important to prospective students would enable colleges of agriculture to more efficiently use their recruiting resources.

Purpose and Objectives

The purpose of this study was to examine recruitment efforts as they relate to the college-choice decisions of undergraduate student applicants to the Jordan College of Agricultural Sciences and Technology (JCAST) at California State University, Fresno. The following research objectives guided the study:

1. Determine whether matriculants and non-matriculants differ based on cumulative grade point average, race, and selection of major.
2. Determine if a difference existed between matriculants and non-matriculants in terms of their use of information sources and their perceived level of usefulness of those sources.
3. Determine if a difference existed between matriculants and non-matriculants in terms of the influence of degree program characteristics, institutional characteristics, and selected individuals on their college-choice.

Methods

This descriptive census study focused on a target population that consisted of all undergraduate applicants to the Jordan College of Agricultural Sciences and Technology at California State University, Fresno for the fall 2011 semester (N = 1907). The population was divided for comparison based on those students who matriculated (n = 481) and those students who chose to attend another university or non-matriculants (n = 1426).

Data were collected using an instrument modified from a Washburn et al. (2002) questionnaire, used to assess the use and usefulness of recruitment information sources and to examine when students began and finalized their college decisions. To establish face and content validity, the instrument was reviewed by an expert panel consisting of college of agriculture admissions personnel and teacher educators. A pilot test of 34 predominately sophomore agriculture students who were not involved in the study was then conducted to determine the internal consistency of the instrument (Washburn et al., 2002). A Spearman-Brown Split-half reliability analysis was performed resulting in a reliability of .70 (coefficient alpha).

For this study, the questionnaire consisting of 74 items was administered online and participation was requested via email to all students in the population.

After the initial email request directing students to the questionnaire URL, two additional follow-up email messages were sent at two-week intervals. A total of 275 usable instruments were received, resulting in a response rate of 14.4%. Non-response error was controlled by comparing non-respondents with respondents on student information obtained a priori (Linder, et al., 2001; Miller and Smith, 1983). A comparison of cumulative grade point average reflected that non-respondents (M = 3.12, SD = .49) were practically the same as the respondents (M = 3.20, SD = .45). Additionally, the non-respondent group had no notable differences when compared to respondents on race or selected major.

Results

To assess objective one, student data were collected from a report available from the University's student advising system. Evaluation of student data revealed that virtually no difference existed between matriculants and non-matriculants with regard to their cumulative grade point average. Matriculants (n = 169) had an average cumulative grade point average of 3.24 (SD = .46), while non-matriculants (n = 106) had an average cumulative grade point average of 3.14 (SD = .58).

A comparison of student race was also completed using the University's student data for respondents. An analysis of the data showed notable differences in the proportions of the specified ethnicities (Table 1). The majority of matriculants were Caucasian (60.9%) while non-matriculants appear to represent a more ethnically diverse group based on the higher percentages of minority students; however Caucasian students still represented 44% of the non-matriculant respondents.

Table 1. Summary of Matriculant and Non-matriculant Respondents' Race

	Matriculants (n = 169)		Non-matriculants (n = 106)	
Race	f (rank)	Percent	f (rank)	Percent
Caucasian	103 (1)	60.9	47 (1)	44.3
Hispanic	43 (2)	25.4	35 (2)	33.0
Asian	9 (3)	5.3	7 (4)	6.6
Not Reported	8 (4)	4.7	11 (3)	10.4
African American	5 (5)	3.0	3 (5)	2.8
Other	1 (6)	0.6	2 (6)	1.9
Native American	0 (7)	0.0	1 (7)	0.9

Table 2. Summary of Matriculant and Non-matriculant Respondents' Majors

	Matriculants (n = 169)		Non-matriculants (n = 106)	
Major	f (rank)	Percent	f (rank)	Percent
Animal Science	54 (1)	31.9	23 (1)	21.7
Agricultural Business	28 (2)	16.6	15 (3)	14.2
Child Development	23 (3)	13.6	16 (2)	15.1
Agricultural Education	18 (4)	10.7	6 (7)	5.7
Food and Nutritional Science	16 (5)	9.5	12 (4)	11.3
Plant Science	12 (6)	7.1	5 (8)	4.7
Enology	6 (7)	3.6	8 (6)	7.5
Agricultural Communication	4 (8)	2.4	2 (10)	1.9
Viticulture	3 (9)	1.8	4 (9)	3.8
Industrial Technology	2 (10)	1.2	5 (8)	4.7
Family and Consumer Science	2 (10)	1.2	10 (5)	9.4

To accomplish the final part of objective one, a comparison was made between the academic majors of the matriculant and non-matriculant groups. In doing so, the researcher found the distribution of majors in each group to be similar (Table 2). Animal Science majors were the most prevalent in both groups with 32% of the matriculants and 22% of the non-matriculants. Agricultural Business ranked second with 17% of the matriculants and third with 14% of the non-matriculants. Child Development followed with 14% of the matriculants and 15% of the non-matriculants.

In objective two the researcher set out to answer two questions. The first being to determine if a difference existed between matriculants and non-matriculants in regards to the sources of information they most frequently utilized when deciding to attend the University. Secondly, the researcher examined whether any differences existed between matriculants and non-matriculants in terms of the level of usefulness of the sources of information. In the questionnaire, both groups of students were asked to indicate whether they had or had not used each of seventeen different sources of information. Additionally, respondents indicated the level of usefulness they attributed to each source of information they had used.

As shown in Table 3, "University information on a website," "visit to campus," and "degree program information on a website" were found to be the three most commonly used sources of information by matriculants. Non-matriculants reported the same three sources of information as their most commonly used, however the rank order differed slightly. Non-matriculants also used "University information on a website" the most, followed by "degree program information on a website" and "visit to campus." All 17 of the sources of information were used more frequently by the matriculant group than the non-matriculants. The most notable being the three items that were reported to be the most used sources of information, "visit to campus" used by 27% more matriculants than non-matriculants (84% vs. 57%), "participation in student activity event on campus" used by 24% more matriculants than non-matriculants and "personal conversation with a professor" which showed the greatest differential with 48% more matriculants using this source than non-matriculants (71% vs. 23%).

When examining the level of usefulness of the 17 sources of information, matriculants identified the three previously mentioned sources as the most useful: "visit to campus," "participation in student activity events on campus" and "personal conversation with a professor." Non-matriculants identified the same three sources, however the top two differ in rank with "participation in

Table 3. Summary of the Information Sources Used and Level of Usefulness

	Matriculants (n = 169)			Non-matriculants (n = 106)		
	Used[z]	Usefulness[y]		Used[z]	Usefulness[y]	
Source of Information	Percent	M (rank)	SD	Percent	M (rank)	SD
Visit to campus	83.5	4.25 (1)	1.04	56.7	3.98 (2)	1.23
Participation in student activity events on campus	60.4	4.20 (2)	1.07	36.0	4.13 (1)	1.31
Personal conversation with a professor	71.2	4.11 (3)	1.15	23.4	3.81 (3)	1.60
Participation in an on-campus recruitment program	61.2	3.99 (4)	1.08	24.5	3.47 (8)	1.48
Degree program information on a website	82.7	3.98 (5)	1.06	74.8	3.71 (5)	1.20
University information on a website	85.6	3.96 (6)	1.01	78.3	3.67 (6)	1.20
Information mailed and/or emailed from a professor	61.8	3.90 (7)	1.22	26.1	3.34 (11)	1.65
College information on a website	67.6	3.88 (8)	1.09	36.0	3.40 (9)	1.41
Participation in athletic events on campus	43.2	3.88 (8)	1.04	18.9	3.38 (10)	1.69
Personal conservation with a University admissions/outreach representative	60.4	3.73 (9)	1.22	29.7	3.27 (12)	1.55
Information mailed and/or emailed from a University admissions/ outreach representative	69.7	3.73 (9)	1.15	48.9	3.47 (8)	1.30
Information mailed and/or emailed from a College representative	54.6	3.67 (10)	1.24	27.0	3.23 (13)	1.46
Personal conversation with a College representative	56.8	3.63 (11)	1.10	20.1	3.21 (14)	1.60
Printed University publications	70.5	3.63 (11)	1.11	54.1	3.47 (8)	1.32
Visits by College representative to your school	43.8	3.62 (12)	1.36	14.4	3.50 (7)	1.70
Visits by University representative to your school	54.7	3.58 (13)	1.33	33.3	3.76 (4)	1.34
TV, radio, newspaper, or magazine advertisements.	46.0	2.95 (14)	1.34	24.5	2.79 (15)	1.57

[z]Percentage of "Yes" responses for scale: Yes or No
[y]Mean reported for scale: 5 = Very Useful … 1 = Not Useful

student activity events on campus," "visit to campus" and "personal conversation with a professor" as their most useful sources of information. Both groups indicated the least useful source of information was "TV, radio, newspaper, or magazine advertisements."

Regarding the usefulness of information, the most notable differences were on the following: "participation in athletic events on campus" (matriculants M = 3.88 vs. non-matriculants M = 3.38), "information mailed and/or emailed from a professor" (matriculants M = 3.90 vs. non-matriculants M = 3.34) and "participation in an on-campus recruitment program" (matriculants M = 3.99 vs. non-matriculants M = 3.47). Only one of the seventeen sources of information, "visits by university representative to your school," was rated more useful by non-matriculants than their matriculant counterparts.

Objective three sought to determine if a difference existed between matriculants and non-matriculants in terms of the influence of degree program characteristics, institutional characteristics and selected individuals on their decision to attend the University. An examination of the seven degree program characteristics showed that both groups reported similar degrees of influence (Table 4). In both the matriculant and non-matriculant groups, the availability of career opportunities was identified as the most influential characteristic in their selection of an academic major. The only difference between the two groups was in their ranking of "quality of facilities" and "quality and reputation of the faculty." Non-matriculants ranked quality of facilities over faculty, whereas the matriculant group ranked quality of faculty above facilities.

Table 5 presents the level of influence that institutional characteristics had on students' college-choice. Matriculants and non-matriculants were found to share three of their top four institutional characteristic influences. These included "opportunities after graduation," "variety of majors offered" and "cost." Looking beyond those three common influences the researcher found very notable differences. Non-matriculants ranked "city in which campus is located" as the most influential institutional characteristic of all 17 items, however matriculants ranked this item 10th. Although non-matriculants were most influenced by the city the institution was located in, they were much less

Table 4. Summary of Level of Influence of Degree Program Characteristics

	Matriculants (n = 169)		Non-matriculants (n = 106)	
Characteristic	M[z] (rank)	SD	M[z] (rank)	SD
Career opportunities available	4.25 (1)	1.04	3.86 (1)	1.36
Quality and reputation of courses	3.97 (2)	1.21	3.69 (2)	1.36
Quality and reputation of the faculty	3.89 (3)	1.18	3.57 (4)	1.38
Quality of facilities	3.87 (4)	1.22	3.58 (3)	1.29
Quality and reputation of the students	3.50 (5)	1.33	3.22 (5)	1.36
Size of classes	3.41 (6)	1.29	3.10 (6)	1.43
Number of students in major	3.28 (7)	1.40	3.05 (7)	1.41

[z]Mean reported for scale: 5 = Very Influential … 1 = Not Influential

influenced by the distance it was from their home. Non-matriculants ranked "distance from home" as their 11th most influential characteristic of the institution, whereas matriculants ranked it higher as their 4th most influential. Both groups were influenced the least by the same five characteristics: "availability of financial aid," "size of classes," "campus safety and security," "competitiveness of admissions standards" and "prominence of university athletic teams." Overall mean responses for 16 out of 17 items were greater for matriculants than for non-matriculants. The most notable difference being "distance from home" (matriculants M = 3.82 vs. non-matriculants M = 3.25) and "opportunities after graduation (matriculants M = 4.00 vs. non-matriculants M = 3.56). The only institutional characteristic that was more influential for non-matriculants was "city in which campus is located" (non-matriculants M = 3.75 vs. matriculants M = 3.55).

Table 5. Summary of Level of Influence of Institutional Characteristics

	Matriculants (n = 169)		Non-matriculants (n = 106)	
Characteristic	M^z (rank)	SD	M^z (rank)	SD
Opportunities after graduation	4.00 (1)	1.17	3.56 (3)	1.41
Variety of majors offered	3.89 (2)	1.30	3.71 (2)	1.38
Cost	3.83 (3)	1.25	3.50 (4)	1.44
Distance from home	3.82 (4)	1.34	3.25 (11)	1.63
Preparation for employment	3.80 (5)	1.26	3.46 (6)	1.37
Quality of facilities	3.79 (6)	1.12	3.45 (7)	1.27
Quality and reputation of the faculty	3.78 (7)	1.13	3.48 (5)	1.28
Academic reputation of the university	3.75 (8)	1.13	3.50 (4)	1.30
Availability of other financial aid	3.56 (9)	1.42	3.29 (10)	1.51
City in which campus is located	3.55 (10)	1.41	3.75 (1)	1.46
Quality and reputation of the students	3.43 (11)	1.26	3.42 (8)	1.28
Scholarships awarded	3.42 (12)	1.44	3.25 (11)	1.47
Campus safety and security	3.42 (12)	1.34	3.24 (12)	1.38
Prestige of the university	3.39 (13)	1.18	3.38 (9)	1.27
Size of classes	3.19 (14)	1.29	2.96 (13)	1.38
Competitiveness of admission standards	3.14 (15)	1.28	2.95 (14)	1.42
Prominence of university athletic teams	2.40 (16)	1.50	2.22 (15)	1.47

[z]Mean reported for scale: 5 = Very Influential … 1 = Not Influential

Table 6. Summary of Level of Influence of People in the Selection of the University

	Matriculants (n = 169)		Non-matriculants (n =106)	
	M^z (rank)	SD	M^z (rank)	SD
Parent or guardian	3.71 (1)	1.33	2.98 (1)	1.56
High school agriculture teacher	3.37 (2)	1.62	2.92 (2)	1.59
Relative who attended the University	3.35 (3)	1.66	2.30 (9)	1.57
Friend in college	3.34 (4)	1.51	2.68 (3)	1.63
College faculty and/or staff	3.01 (5)	1.59	1.98 (11)	1.51
Current College student	2.99 (6)	1.62	1.82 (12)	1.28
Friend in high school	2.94 (7)	1.49	2.62 (4)	1.63
High school guidance counselor	2.93 (8)	1.54	2.39 (8)	1.40
Community college instructor	2.81 (9)	1.65	2.40 (7)	1.62
Other high school teacher	2.80 (10)	1.60	2.54 (5)	1.60
Graduate of College	2.79 (11)	1.66	1.57 (13)	1.14
Community college counselor	2.54 (12)	1.61	2.46 (6)	1.56
High school science teacher	2.42 (13)	1.59	2.19 (10)	1.40

[z]Mean reported for scale: 5 = Very Influential … 1 = Not Influential

Parents or guardians were found to be the most influential people for both matriculants and non-matriculants in this study. However, there was a notable difference found between groups with matriculants reporting a mean of 3.71 (5 point scale), while non-matriculants had a mean of only 2.98 (Table 6). High school agriculture teachers were the second most influential people for both groups with the matriculant group again having a higher mean than the non-matriculants (matriculants M = 3.37 vs. non-matriculants M = 2.92). The least influential people for matriculants were their high school science teachers, while the non-matriculants felt that graduates of JCAST influenced them the least.

Several other differences did exist between the two groups in this area, the most obvious of which was the level of influence of "relative who attended the University." Matriculants reported that relatives that attended the University were the third most influential people, while the non-matriculants ranked this group of people ninth. Other notable differences were found in the influence of JCAST faculty and staff (matriculants M = 3.01 vs. non-matriculants M = 1.98) and current JCAST students (matriculants M = 2.99 vs. non-matriculants M = 1.82). Overall matriculants indicated higher levels of influence from all 13 categories of people.

Conclusions/Recommendations/ Implications

The purpose of this research was to examine the influence of recruitment efforts and establish if differences exist between admitted students to JCAST who matriculated and those who chose to attend another institution. In terms of their academic performance and their major, no notable differences were found between matriculants and non-matriculants. Interestingly, notable differences did exist when examining the racial composition of the two groups. It appears that non-matriculants represent a slightly more diverse group of students than those that chose to attend the University, which is evident in Table 1, where the matriculant group is comprised of 60.9% Caucasian students to only 44.3% in the non-matriculant group. The non-matriculant group had 33.0% Hispanic students, while the matriculants were only 25.4% Hispanic. These findings do warrant further investigation given the University's desire to improve its recruitment efforts and create a more diverse student body. Additional research may be needed to examine the

possible ethnic, cultural and/or background influences that affect students' decision to matriculate. Future research may help the College to better understand what other influences may impact minority students' decision to attend the University.

In terms of the effectiveness of the recruitment practices used by JCAST addressed by this study, the researcher found that nearly 84% of the matriculants visited campus while only 57% of non-matriculants made a visit. Additionally, on-campus student events were used by over 60% of the matriculant group compared to only 36% of the students who did not matriculate. These findings do lend support to the college-choice literature, which consistently states the important role of campus visits in the college-choice process (Cunningham and Fickes, 2000; Walters, 1997; Yost and Tucker, 1995; Carnegie Foundation for Advancement of Teaching, 1986). Similarly, 71% of matriculants had a personal conversation with a professor while only 23% of non-matriculants had such a conversation. Together these findings highlight the essential nature of campus visits, on-campus events and student contact with faculty as recruitment practices and it further demonstrates the significant impact these activities have on a student's decision to attend the University. In working with JCAST administration, the need for support of student events on campus, such as FFA contests, 4-H field days, high school class field trips, and student tours of the University farm laboratory is demonstrated by these findings. Given this information, further support is warranted to sustain and in some cases increase the number of students visiting campus for events and provide them with opportunities to have a dialogue with faculty.

Further examination of the most used and useful sources of information showed that websites played an important role for both groups of students. This finding suggests that web-based information is critically important to prospective students. Drawn from this finding is a recommendation that the University, JCAST, and departments take a critical look at their websites and make sure that adequate resources are available to make their websites as information rich and user friendly as possible. The web provides many prospective students their first impression of the institution, therefore websites and web resources should be given the attention needed to ensure that this is a positive experience.

In terms of the institutional characteristics that most influenced matriculants and non-matriculants, both respondent groups reported that they were concerned with the availability of career opportunities after graduation, the variety of majors offered by the University and the cost of their education. However, the most notable finding in this area wasn't the similarities found, but rather the differences. Results showed an obvious difference existed between non-matriculants, who ranked the "city the campus was located in" as their most influential characteristic, and matriculants, who ranked the item 10th. This finding does create a problem for the University's outreach staff since relocating the University is not an option. In this case, the best course of action would be greater effort being placed on improving prospective students' perception of the community and location of the institution. Promotional materials, advertising and correspondents to applicants should include messages that focus a positive light on the strengths of the University's location, giving mention to the local attractions, close proximity to travel destinations and recreational areas and the prevalence of student internships and career opportunities in the region's agricultural industry.

Interesting findings were gleaned from the comparison of matriculants and non-matriculants in terms of the role other people have in their college-choice process. The strong influence of parents and guardians in the college-choice process is well documented in the literature (Broeckemier and Seshadri, 1999; Rosato, 1993; Hossler and Stage, 1992). However, in this study the high school agriculture teacher seems to have had a notable impact. In both groups of students, high school agriculture teachers were found to play a major role in the college-choice decision. This is particularly intriguing when considering the non-matriculant group, which as a group felt their high school agriculture teacher was nearly as influential as their own parent ($M = 2.98$ vs. $M = 2.92$). These findings have strong implications for practitioners as they show that recruitment practices targeting parents and guardians are justified; however high school agriculture teachers should be treated as equally important. When compared to the small degree of relative influence students reported regarding high school guidance counselors and other high school teachers, the role agriculture teachers play is further highlighted. Agriculture teachers should be made aware that among all high school personnel, they have the greatest potential to influence their students' college choice. Agriculture teachers should also be the targets of recruitment materials and information from colleges of agriculture. As a front line of information for their students, agriculture teachers have the opportunity to be very influential when equipped with current and accurate information about colleges of agriculture and potential majors for students to consider.

Literature Cited

Burns, M.J. 2006. Factors influencing the college choice of African-American students admitted to the College of Agriculture, Food and Natural resources. Master's Thesis, University of Missouri. Retrieved from https://mospace.umsystem.edu/xmlui/handle/10355/4646?show=full

Broekemier, G.M. and S. Seshadri. 1999. Differences in college choice criteria between deciding students and their parents. Jour. of Marketing for Higher Education 9(3): 257-259.

Carnegie Foundation for Advancement of Teaching, 1986. Parents: A key to college choice. Change 18(6): 31-33.

Chapman, D.W. 1981. A model of student college-choice. Jour. of Higher Education 52(5): 490-505.

Cole, L. and W. Fanno. 1999. Survey of early leavers: Implications for recruitment and retention. NACTA Jour. 43(1): 53-56.

Cole, L. and G.W. Thompson. 1999. Survey of current students: Implications for recruitment and retention. NACTA Jour. 43(3): 15-20.

Cunningham, S. and P. Fickes. 2000. Non-matriculant survey report, 1998. Williamsport, PA: Pennsylvania College of Technology. (ERIC Document Reproduction Service No. ED 439755).

DesJardins, S.L., H. Dundar and D.D. Hendel. 1999. Modeling the college application decision process in a land-grant university. Economics of Education Review 18: 117-132.

Hossler, D., J. Schmidt and N. Vesper. 1999. Going to college: How social, economic, and educational factors influence the decisions students make. Baltimore, MD: John Hopkins Univ. Press.

Hossler, D. and F.K. Stage. 1992. Family and high school experience influences on the postsecondary educational plans of ninth-grade students. American Educational Research Jour. 29(2): 425-455.

Goeker, A.D., P.G. Smith, E. Smith and R. Goetz. 2010. Employment opportunities for college graduates in the food and agricultural sciences, United States, 2010-2015. United States Department of Agriculture and Purdue University.

Lindner, J.R., T.H. Murphy and G.E. Briers. 2001. Handling nonresponse in social science research. Jour. of Agricultural Education 42(4): 43-53.

Miller, L.E. and K.L. Smith. 1983. Handling nonresponse issues. Jour. of Extension 21(5): 45-50.

Rosato H.J. 1993. An investigation of the choice stage for a postsecondary educational institution. PhD Diss., Indiana University, Bloomington, IN.

Scofield, G.G. 1995. College of agriculture new student profile. In: Proc.49th Annu. Central Region American Association of Agricultural Educators Research Conference, St. Louis, Missouri, 1-10, 21-23 Feb.

Walters, D.L. 1997. Is this college for me? The campus visit as seen by student and parent. AIR 1997 Annual Forum Paper. (ERIC Document Reproduction Service No. ED 410893).

Washburn, S.G., B.L. Garton and P.R. Vaughn. 2002. Factors influencing college-choice of agriculture students college-wide compared with students majoring in agricultural education. In: Proc. 29th Annu. National Agricultural Education Research Conference, Las Vegas, Nevada, 11-12 Dec.

Yost, M. Jr. and S.T. Tucker. 1995. Tangible evidence in marketing a service: The value of a campus visit in choosing a college. Jour. of Marketing for Higher Education 6(1): 47-67.

NACTA Reprint

A Course Every Department Can (Should?) Teach–Graduating Senior Survey

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Abstract

A Graduating Senior Survey course has been required of Agricultural Business majors at Iowa State University since 1997. Specific course goals include collecting valuable outcomes assessment information while, at the same time, assisting graduating seniors with various graduation issues. The format of this course is intended to facilitate the administration of an academic program rather than to disseminate specific, subject-matter knowledge. As such, experiences and observations from past offerings of this course should have widespread appeal and relevance.

Introduction

Over the years, this NACTA Journal has promoted the professional advancement of college-level teaching in agriculture through the sharing of ideas in published articles dealing with, among other things, not only innovative teaching techniques but also new and interesting courses. The goal of this article is to add to the literature dealing with innovative course offerings.

A number of course-related articles in this journal over the past decade have dealt with discipline-specific courses. Examples have included an agricultural cooperative business course (Raven, Bishop, and Wright, 1994), an international agribusiness management course (Akridge, Erickson, Boehlje, and Kazragyte, 1996), an integrated course in agricultural biology (Ferguson and Chapman, 1996), an animal science discovery course for freshmen (Kesler, 1997), an introductory food science course (Murano and Knight, 1999), a graduate animal breeding course (Herring, Thomas, and Enns, 2001), and an undergraduate plant science course (Tignor, Wilson, and Wilson, 2002).

Other course-related articles over this same time period have described courses that have focused on subjects and topics that are more generic in nature and could be taught within most, if not all, disciplines in colleges of agriculture. Examples have included a job-search skills course (Stephens, Brockman, and Davis, 1992), a capstone course (Wright, 1992; Zimmerman, 1997; Andreasen and Trede, 2000), and an orientation course (Zimmerman, 1999). This article will describe a Graduating Senior Survey course that fits into the generic category.

Course Background

For every semester beginning fall 1997, the Department of Economics at Iowa State University has required graduating seniors majoring in Agricultural Business to take an R-credit Graduating Senior Survey course. The R-credit designation means that it is required for graduation while carrying zero semester credit for academic purposes. The four main goals of this course are 1) to assist students with graduation and career placement, 2) to collect outcomes assessment information, 3) to help prepare students for alumni life, and 4) to enhance student relations. The remainder of this article will discuss these course goals along with related procedures and observations.

With the exception of a resume assignment, students are able to complete all course-related assignments in class. Students who miss a class for any reason are required to complete all in-class assignments for that day outside of class. There are no required readings for the course. The course meets for an hour five times during the semester (one time each during the first week and the last four weeks of the semester). The daily class agendas have typically been as follows:

Class #1: Course introduction, overview, and objectives, including:

- Review graduation requirements
- Discuss the current job market outlook
- Explain alternative job search procedures
- Collect current plans after graduation information

Class #2: Students provide outcomes assessment information by completing various in-class, written surveys.

Class #3: Selected faculty members listen to student's oral comments about their educational experiences and to respond to students' questions or concerns.

Class #4: A certified financial planner discusses issues related to financial management and planning after graduation, including opportunities and expectations regarding alumni.

Class #5: Review college convocation and university graduation procedures, including

- Collect information on students' plans after graduation
- Collect resumes from students
- Administer any other desired written surveys
- Recognize graduating seniors individually and present each a gift
- Conclude with a reception

Assisting Students with Graduation and Career Placement

One of the goals of the Graduating Senior Survey course is to assist students with last-semester plans for graduation and career placement. Most of the first class session is devoted to attaining this goal. Students are given a course administration hand out as is typically done on the first day of most classes. At this time it is important to explain course goals and their importance, maybe more so than usual, as many students come into the class not understanding fully why they are being required to take a class for which they receive no credit. Graduation requirements and important forthcoming graduation-related dates are reviewed. As students begin what is intended to be their last semester, many of them are somewhat nervous and apprehensive about graduating. They want to make double sure everything is in order and that they will indeed graduate. This first class session is a great way to put students' minds at ease and help them understand all final steps and procedures leading up to their graduation. In some cases, unmet graduation requirements have been caught early enough as a result of this class session to allow for remedial action so as not to delay the students' graduation.

Each student completes a Student Information Survey listing their current campus contact information, current job status, and career interest areas. This information is shared with academic advisors and the college career services office to facilitate the matching of job candidates with job openings as the semester proceeds. The college career services office director is invited to class to give a status report on the current job market and to explain policies and procedures for using that office in the job search process either as a current graduating senior or as an alumnus. Students are reminded of some potential sources of information and assistance on various aspects of the job search process including resume preparation and interviewing. This information has helped students understand more fully the process of seeking employment offers.

Collecting Outcomes Assessment Information

A second goal of this course, and the main reason it was created, is to gather outcomes assessment information from soon-to-be alumni. Miller et. al. (1998) correctly suggest that outcomes assessment is needed in higher education for accountability and program improvement purposes. Huba et. al. (2000) define assessment as gathering and discussing information from diverse sources in order to determine what students have learned from their educational experiences and what they can do with that knowledge. Surveys of alumni as well as surveys of employers have been popular methods used by many departments to provide feedback on the strengths and weaknesses of academic programs. Collecting this type of information from all graduating seniors in a formal course setting has been found to be easier and less time consuming than attempting to collect it utilizing mail surveys and/or exit interviews. In addition, this method of data collection helps achieve a response rate approaching 100 percent which is not likely with other methods.

Students are asked to complete a number of different surveys (available upon request) in class during the second-class session. These have included 1) a Program Evaluation Survey which consists largely of open-ended questions asking students to recommend program changes including course requirements for the major, to suggest changes in departmental advising-related services, and to identify the best courses they have taken inside and outside of the department; 2) a Senior Survey which asks students to indicate the extent to which they agree or disagree with approximately 30 different questions related to the program; 3) an Instructor Evaluation form which lists all of the instructors in the department and asks students to evaluate each instructor they have had for at least one course on a scale ranging from very poor to very good; 4) an Advisor Evaluation form which lists all of the advisors in the department and asks students to evaluate each advisor they have worked with in an advising capacity on a scale ranging from very poor to very good; 5) a Self Assessment form on which students are asked to evaluate their own ability to perform various tasks or to demonstrate selected skills which are regarded as desirable educational outcomes for graduates of our program; 6) an Economic Literacy Test which is a short multiple choice test over basic economic concepts and principles; and 7) an Employer/Employment Survey which asks students to rank various factors influencing their job choice decision and to rate selected business firms on specific job-related criteria.

Results from the Program Evaluation Survey and the Senior Survey have been shared with faculty in the department. The department has used results from these surveys as a sounding board for student reaction to the status quo as well as to possible changes. New questions have been added to the survey almost every semester for this reason.

Departmental curriculum committee members have been particularly interested in this information and have used it to make some student-recommended changes in requirements for the major. Examples of such changes have included offering new courses, increasing electives by reducing the number of required courses, and adding lab sections to existing courses. Some possible program changes have not been pursued as a result of student feedback from these surveys.

Summary results from the Senior Survey are also shared with students at the beginning of the third class session that is devoted entirely to having a faculty/student oral discussion about the program. Advisors and administrators in the department typically attend this session. Students are invited to comment on anything they liked or disliked related to their experiences as students in the program. This class session functions like one large exit interview with most graduating-senior students in attendance. The students are encouraged to do most of the talking and many have been more than willing to speak up on various issues. There have been some very spirited discussions.

Faculty members in attendance mainly listen and take notes which are summarized shortly after the meeting. Students quickly learn that not all of their peers agree with them on some issues. For example, students often learn that other students actually liked and learned a lot from a class that they felt differently about. This helps students to understand and appreciate some of the difficulties faced by the department in developing and administering the major, and that is quite impossible to satisfy all students all of the time. A potential problem with this class session is to have a few outspoken students dominate the discussion in order to voice their grievances. To ensure a balanced discussion containing a cross section of views and opinions, it is important to have a designated faculty member lead the discussion to get the more reserved students to speak out and to elicit positive comments so the class session does not deteriorate merely into a gripe session. In addition, during this session, faculty intentions and goals regarding the academic program can be clarified for the benefit of students.

Results from the Instructor Evaluation and the Advisor Evaluation forms are shared with the departmental chairperson. These results represent an additional source of information about the effectiveness of instructors and advisors in the department and have been used to make changes in the assignments and/or salary of individual staff members. These results are different from standard course/instructor evaluations in that they are completed by all students (not just those in attendance on course evaluation day). Graduating seniors should be in the best position to reflect on the relative effectiveness of instructors/advisors because they have had the most experience working with these faculty members within the department. How these faculty evaluation results are to be summarized, distributed, and used are potentially sensitive issues that should be agreed to in advance by the faculty members in the department.

The Employer/Employment Survey results have been shared with the faculty, the college career services office director, and representatives of the selected business firms included in the survey. These results have identified factors that are important to students in evaluating job offers, sources used by students to obtain information about jobs, and student perceptions of different companies. This information is being used by recruiters to evaluate their campus image as well as their hiring practices and procedures. Sharing this kind of information with company representatives has helped to strengthen working relationships between industry and the universityan additional benefit of offering this course.

During the last class period, students are asked to turn in an updated resume and complete a Plans After Graduation Survey. On this survey, students provide information about positions accepted, salary offers received, and levels of satisfaction with both. This data provides information on the ability of graduates to obtain meaningful employment, which is often looked at as an important assessment measure of program effectiveness. This information is summarized and also used in recruiting new students. This information would be much more difficult to collect if the department attempted to collect it through alumni surveys. Students who have not yet taken positions by the last class period are given stamped, self-addressed post cards and asked to return them to the department after they do take a job. The updated resumes are filed in each student's advising folder and is an excellent summary of a student's accomplishments while in school and may be used for reference purposes later.

Preparing Students for Alumni Life

A third objective of the course is to assist students in preparing for life as alumni. The fourth class session is dedicated to this goal. A representative of the university's alumni office explains procedures, costs, benefits of becoming an official member of the university's alumni association. About ten minutes have been allotted to this presentation. The rest of this class is spent discussing all aspects of financial planning and management after graduation with a certified financial planner. Savings and retirement plans, paying off loans, buying versus renting houses, buying versus leasing cars, and managing credit cards are typical financial topics discussed. Students will hopefully be better able to deal with personal financial matters after college as a result of this free financial counseling class session. Numerous,

unsolicited student comments indicate that they often appreciate the free financial advice.

Enhancing Student Relations

A fourth objective of the course is to improve student relations and to generate feelings of good will on behalf of the students toward the department. Alumni are more likely to be supportive of their former department if they left feeling good about their program of study. Satisfied alumni are more likely to be supportive alumni who will help recruit future students, come back to campus to talk to classes and clubs, offer jobs to current students, and financially support departmental programs. Giving students ample opportunities to provide feedback in both written and oral forms as described above is intended to let students know that the department cares about them and values their opinions. During the last class period, students are also treated to a reception, introduced individually, and given a small graduation gift from the department (e.g. a departmental coffee mug, pen, letter opener, calculator, etc.). A representative of the department also addresses the group, thanks them for having been a student in the department, gives them a few words of advice, wishes them well, and encourages them to keep in touch.

Conclusions

While organized mainly for the purpose of teaching discipline-specific subject matters, there are a number of other related important tasks that academic departments can, and probably should, do with and for their students as they near graduation during their last semester on campus. For example, departments can 1) help students graduate and find employment; 2) collect outcomes assessment information from graduating seniors; 3) assist students in preparing for life after college; and 4) enhance relations with current students and by so doing, hopefully, enhance alumni relations. How to accomplish these tasks often is a monumental administrative challenge and viewed by many as a time-consuming, logistical, paperwork nightmare. A Graduating Senior Survey course offers a mechanism by which these tasks can be performed in an organized manner with a minimal investment of faculty time and cost.

Literature Cited

Akridge, J.T., S. P. Erickson, M. Boehlje, and A. Kazragyte. 1996. Teaching agribusiness management in Lithuania: Developing an international perspective for undergraduate teachers. NACTA Jour. 40(2): 15-19.

Andreasen, R.J. and L. D. Trede. 2000. Perceived benefits of an agricultural capstone course at Iowa State University. NACTA Jour. 44(1): 51-56.

Ferguson, N. H. and S. R. Chapman. 1996. An integrated course in agricultural biology. NACTA Jour. 40(4): 13-16.

Herring, A. D., M. G. Thomas, and R. M. Enns. 2001. Development of a multi-institutional, Web-based, graduate animal breeding course. NACTA Jour. 45(1): 11-17.

Huba, M. E. and J. E. Freed. 2000. Learner-centered assessment on college campuses. Boston: Allyn and Bacon.

Kesler, D. J. 1997. Teaching an animal science discovery class to freshmen. NACTA Jour. 41(1): 42-47.

Miller, W. W., D. L. Williams, V. A. Bekkum, and R. W. Steffen. 1998. The follow-up survey as a student outcome assessment method: Some procedures and examples. NACTA Jour. 42(3): 40-46.

Murano, P. S. and T. D. Knight. 1999. Determination of learning styles in an introductory food science course. NACTA Jour. 43(4): 50-53.

Raven, M. R., D. Bishop, M. D. Wright. 1994. An agricultural cooperative business course. NACTA Jour. 38(2): 26-28.

Stephens, G. L., T. Brockman, and J. T. Davis. 1992. Teaching job-search skills to agricultural seniors. NACTA Jour. 36(2): 41-42.

Tignor, M. E., S. B. Wilson, and P. C. Wilson. 2002. Development of an undergraduate plant science course promoting environmental awareness, native flora and critical thinking skills. NACTA Jour. 46(1): 26-32.

Wright, A. 1992. An interdisciplinary capstone course in agricultural production systems. NACTA Jour. 36(4): 4-6.

Zimmerman, A. 1999. Developing and teaching an orientation course for students at a technical college. NACTA Jour. 43(1): 25-31.

Zimmerman, A. P. 1997. A capstone problem solving course revisited. NACTA Jour. 42(3): 41-47.

Sarcomere in the Classroom: Learning with Undergraduate Group Projects

In most major universities today, there are many classes that assign few, if any, group projects or engage in peer to peer interaction of any kind. The reasons for this may vary and sometimes they are as simple as a large class size prohibiting effective use. However, when class size and other factors permit, group projects can be valuable teaching tools both in and out of the classroom. Currently there is a trend toward classroom teamwork, which has been stimulated by students and prospective employers of college graduates (Colbeck et al., 2000). The benefits of a group project are numerous and the project itself can have great effects on the confidence of the participating members. In most situations where a group project is assigned there are a variety of reasons for participation. Some students will want to gain experience on the subject, while others will simply focus on just getting the best grade possible (Colbeck et al., 2000). In an introduction to skeletal muscle physiology class (Dodson, 2001), maxing out at a mere 16 students of mainly upper classmen, the perfect environment for a team project was presented, and as such, a voluntary venture was assigned.

Initial Undertaking

In reality, the subject of skeletal muscle physiology can be rather dry to some and fascinating to others. One of the most important components of skeletal muscle is the sarcomere and one must know which proteins are present where, how they interact with each other and other proteins, and what the combined effects of those interactions are. The prompt for this project consisted of two major components: creating a large scale graphical representation of a sarcomere with all identified proteins correctly drawn according to their molecular shape, as well as submitting a paper containing the location, structure, function, and regulation of each protein with a copy of all sources of information. All of the information to be used in the project was required to be collected from credible, peer-reviewed scientific-based papers or journal articles. Aside from these few requirements, students were given free rein with the optional project, and if the product was up to par, participants would be rewarded with extra credit.

However, differing goals led to varying levels of motivation among team members. Without specific guidance from our instructor about how to share leadership and process management roles amongst ourselves, those with high motivation became leaders and those with low motivation had the temptation to become slackers (Colbeck et al., 2000). As such, it soon became obvious as to who were team players, and who would be the less productive members. Of course, the vast variety of tasks that needed to be done, such as collecting reading materials, drawing the sarcomere or z-disc, and combining everyone's written work into one collaborative paper, ensured that every member was given the opportunity to contribute. Under the guidance of our student volunteered team captain, we were able to efficiently determine our expected roles and the project began to gradually take form.

Approach to Researching

The benefits of working in a group eliminated the need to individually research and write about all fifty-two sarcomeric proteins. Instead, we were able to reduce the workload of each person by efficiently dividing the collected list of proteins into approximately three to four proteins per person, with the project leaders willingly taking on as many as six proteins. Researching each protein took a considerable amount of time and effort and having to sift through thousands of relevant and irrelevant articles was an arduous task. To complicate matters more, it was often necessary to combine the information from multiple sources for each protein since some did not cover the structure, function, regulation, and location on the sarcomere in a clear manner. As the stack of collected information began to reach the ceiling, some students were shocked to find out that this process of sifting and uniting had to be repeated up to five times. However, the most frustrating, and time consuming, component of the project was finding an accurate graphical depiction of each protein, as the majority of the proteins were in obscure locations in the z-disc of the sarcomere or were too simple to have an actual shape.

Researching each protein took a fair amount of time and proved to be a task worth putting extra effort into. Since a few team members were unable to make the out of class meetings to work on the sarcomere model, they instead focused on the research or writing portion of the assignment. Those who spent a considerable amount of time researching papers, reading journal articles and applying what we discovered to our collective paper of

protein definitions even implicated doing more complex research projects in the future. This implies that the project itself influenced students' perspectives on how to apply what was learned to what future internships, graduate programs, or careers may entail.

Approach to Team Component

When an instructor assigns group work there are those students that are quite happy to work in a group. Sometimes it's because they work better in a social group and see that the ability to bounce ideas off of other members working towards the same goal is beneficial. Then there are those individuals that dread group work because they have been exposed to conflicts of opinions, perspectives or backgrounds and motivations, as well as the fact that typically as the size of the team increases, the potential for slacking also increases (Colbeck et al., 2000). Group projects, especially those that incorporate an out of class component, can be difficult to initiate due to the fact that individual members have different class schedules and previously made social events that prevent a collaborative meeting time. Our group was not immune to this fact, and as a result, most members of the group could not meet to work on the sarcomere model outside of class until well into the second week, thus having to focus on researching their assigned proteins first. Of course, if people did not utilize this time to research and write out their definitions, other problems could potentially be created rather than resolved.

Consequently, our group definitely had mixed feelings about working together in a troupe of thirteen and apprehensions about the difficulties that could be faced while working with the majority of a class began to surface. However, these insecurities dissipated as we learned how to best approach individual learning with doing. Once members realized their role within the group and how to effectively work together for a common goal, the haphazardly put together collection of classmates became a productive team.

Rainbow of Proteins

To display our behemoth of a project, we purchased a large tri-fold poster board to create our model of the skeletal muscle sarcomere. The center of the board exhibited a large interpretation of the macro structure of the sarcomere and cytoskeleton, while the side panels sported 3D drawings of specifically selected proteins drawn by each student in our group. In addition, an extensive drawing of the z-disc of the sarcomere was added to display the proteins not visible on the macro structure. Most students contributed to the poster board by drawing their assigned proteins on the central sarcomere or junctional complexes located on the z-disc drawing. Of course for some, the word "drawing" had more power to cause emotional turmoil than the words "group project" or "pop quiz", as some members saw art as their downfall rather than strong point. In fact, thoughts of potentially screwing up a fantastic looking sarcomere drawing with their hideously drawn, permanently affixed proteins were downright overwhelming. On the other hand, there were a select few talented artists who had no anxiety over drawing. These students stepped up within their roles and were more than willing to assist the other group members who were unable to draw.

After the initial sarcomere skeleton was completed, permanent markers were used to color each section of the display, with each protein assigned to a different color. However complicated it may sound, this use of a color code made it possible to unify the macro structure with the additional 3-D and z-disc drawings organized around the panels of the tri-fold. Since fifty-two proteins were the focus of this project, our resulting masterpiece was the ultimate rainbow of proteins.

Conclusion

The comprehension of the three-dimensional visualization was the solution to making our expanded view of the sarcomere. The sheer number of junctional, myofibrillar, regulatory and structural proteins required us to utilize various methods of visualization, thus, enabling us to create a mostly accurate and complete model of the sarcomere. This physical model enhanced the learning experience by providing a visual compilation of the proteins we had researched that was far more detailed than the average "textbook" version and gave us tangible proof of our accomplishment. The project also had an additional benefit. Aside from learning more about each respective protein, the drawing itself was often referenced by some as a means to study the sarcomere prior to a test. Participation in this group project improved communication, conflict management, and problem solving skills even when we received minimal guidance about how to work together (Colbeck et al., 2000) and were striving toward completion before a deadline.

At the beginning of the project, most people were motivated only by the promise of extra credit, but no matter their field of interest, whether it was veterinary medicine, zoology, animal management, or human medicine and therapy, the majority agreed in the end that expanding our knowledge on the skeletal muscle sarcomere would ultimately benefit all of us by providing a universal application of what we had learned in class to our future careers. This end revelation was possible as a result of the group project and is one of many important benefits of working as a group (Colbeck et al., 2000).

In reality, people became sick, papers were accidentally deleted, and no one wanted to take the poster board home, but with a few days designated as a cushion, the apocalypse was averted by the time the due date rolled around. As the impending date approached, people were stressed and hunting for the color coding key, but overall, when the project was completed and dumped on our professor's desk, everyone shared a sense of relief and an even greater sense of accomplishment.

Working together in a large group may have had its benefits and setbacks, but ultimately it became an excellent way for individuals to gain knowledge on their own without wasting class time. Each student fueled individual interest in the subject and simultaneously made the material more interesting. Students discovered that there were many ways to solve the same problem, while having to organize their work, learn time management, and collaborate effectively in order to complete the tasks on time. Group, or class, projects provide an excellent way for instructors to introduce hands-on learning to their students and encourage out of class collaboration, which helps students understand the subject at their own pace and in their own unique way.

References

Colbeck, C.L., S.E. Campbell, S.A. Bjorklund. 2000. Grouping in the Dark: What College Students Learn from Group Projects. The Journal of Higher Education 71(1):60-83

Dodson, M.V. 2001. Being a balanced teacher. NACTA 54(4):41-45

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Teaching Undergraduate Researchers: Eliminating the Drinking from the Fire Hose Effect

Including undergraduates in research is an increasing trend in many programs of agriculture and natural resources across the United States. As teachers we struggle with how to introduce the most important concepts without overwhelming students in the process. Aavudai Anandhi, an assistant professor of agronomy at Kansas State University, developed a technique to understand complex topics when reading secondary research. She developed this technique in order to help her when researching for her dissertation, but she has continued using the technique herself and teaching students in her lab the technique too. She has noticed that students grasp the major concepts quicker and are able to interpret what they are reading better. This has resulted in her ability to keep students working in her lab for longer, because they feel empowered by understanding the purpose in what they are doing.

In fall of 2012, Anandhi shared this technique with Lauri M. Baker, an assistant professor in agricultural communications at Kansas State University. She adapted the technique and implemented it with her undergraduate students working on her research and those completing independent studies in research. Baker noticed the same results. Students grasped concepts quicker, they referred back to the technique throughout the research process, and were able to demonstrate greater understanding of the material. This success in a social science setting indicated to Anandhi and Baker that the technique works well for researchers at multiple levels of expertise and in a variety of disciplines. This inspired the pair to share this as a teaching tip with NACTA members in this format.

The technique itself is simple, but clearly effective. The process begins with students gathering all of the scholarly articles they can find on an assigned topic. The teacher will need to introduce the student to the concept of scholarly articles and show them how to find them within the university system. Next, the teacher asks the students to spend no more than five minutes reading each article. This is a "skim" reading for the most important points. As the student skims these articles, they put information about the articles into a research chart. The titles of the columns in this chart will vary by discipline, but columns may include: article title, subject, method used, specific subject and/or region investigated, theoretical base, intext citation, jargon used, etc. It may be beneficial to you and the student to break the chart up into multiple sessions. A possible suggestion for how to break this up is by weeks. For example in week one the student could just read the abstracts of the articles and fill in the following:

Article Title	Purpose/Objectives/Hypothoses	Method	In-text Citation

Then, the next week the student could proceed to filling in more of the chart. This time the student would move beyond the abstract to find the following information (still spending no more than five minutes spent reading each article):

Region	Population	Method Details/ Sampling	Analysis	Theories Used or Jargon/Key Terms

After the student has completed the chart, they look back at the results and are able to realize what has been studied on a particular topic in the past and what methods have been used to address the subject. This process clearly outlines where there are gaps in research and where there are common themes of methods utilized and jargon specific to this subject area. Next, students are encouraged to research any terms they don't understand, including methods of analysis that are a mystery. From this chart, the student is now asked to go back and read the articles in their entirety. This time around the students are not overwhelmed because they now know the terms and concepts. After reading all articles thoroughly, the student is ask to make any updates to the chart. Now, the student can begin writing a review of literature with confidence, while referring to the chart. At this point in the process, students are able to identify research objectives or questions based on gaps in the literature. The students are also able to begin working on a faculty member's research, knowing the purpose and direction of the research through this technique.

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Student-centered Teaching through Experiential Learning and its Assessment

Experiential learning is defined as "the process whereby knowledge is created through the transformation of experience. Knowledge results from the combination of grasping and transforming experience" (Kolb, 1984). Research shows that students are better able to effectively apply principles when instruction is combined with experiential learning. To better prepare the students of agriculture for future, faculty must teach skills that tackle complex situations, and experiential learning is one of the best ways to teach such skills. Moreover, students also demand more experience based projects as observed through course feedbacks.

Often experiential learning is incorrectly equated with *only* hands-on or the "do it" part of the process ignoring the other equally important components of the learning cycle. The current experiential learning project was designed in such a way as to ensure that students actually participate in all the four stages of the Kolb's Experiential Learning model as described below. Additionally, several assessment tools were designed to evaluate the effectiveness of each step of the experiential learning model, which further added to uniqueness and strength of this project.

According to this model, in order to gain genuine knowledge from a learning experience, the students must go through the following **4 steps**:

1. **"Do It":** actively involve in doing something **(Concrete Experience);**
2. **"What":** reflect on what happened; what were the results **(Reflective Observation)**.
3. **"So What":** analyze what do these results imply; how do they influence the outcome **(Abstract Conceptualization)**; and
4. **"Now What":** problem solve and decide what they will do differently next time based on ideas gained from the experience **(Active Experimentation)**.

The Experiential Learning Project: A comprehensive Cover Crop and Vegetable Management Project was introduced in a junior level crop production course incorporating all the four steps of the experiential learning model and its assessment through various tools. The students worked in pairs and managed 13 different cover crops and 6 vegetable crops throughout the semester. They were actively involved in planting, weeding, caring for, and harvesting their crops **(Step 1: "Do It")**. During the project, students recorded crop growth and soil quality parameters **(Step 2: "What")**, reflected on their observations of their own crop plots as well as those of others, and synthesized concepts **(Step 3: "So What")**. Students also documented issues they faced, how they addressed those issues, what decisions they made in their efforts to grow the best possible crop, and what they would do differently if they grew the same crop again **(Step 4: "Now What")**.

The Assessment: Assessment of any new teaching method is critical to ensure that students' learning objectives are met. A number of exercises were developed to evaluate impact of this project on student learning of conceptual and applied knowledge as well as critical thinking and problem solving. The quizzes included i) Students' pre- and post-self-assessment of conceptual knowledge, ii) Instructor assessment of conceptual knowledge, iii) instructor assessment of applied knowledge , and iv) instructor assessment of application. In addition, students recorded what they believed were the most important lessons they learned from this project, including commentary on how the project reinforced the concepts learned in the classroom. Results indicated that the experiential learning project

improved both the conceptual knowledge of the students and their ability to synthesize and apply the concepts learned.

Reference:

Kolb, David A. 1984. Experiential Learning: Experience as the Source of Learning and Development. Prentice-Hall, Inc., Englewood Cliffs, N.J

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Undergraduate Teaching Philosophy

- The primary reason I chose an academic career is because **I enjoy teaching** and **genuinely care** for students' well-being, and I am very much interested in helping students to be successful in their studies.
- My overriding teaching philosophy is that '**students come first**' because colleges and universities exist because of and for students.
- Teaching is an **important part of my job** and I take it very seriously and strive for excellence in all aspects of teaching.
- I get very **excited about teaching**; once I am done preparing notes, I cannot wait to deliver the lectures. I have a great enthusiasm for teaching, which gets students excited in learning.
- Establishing good rapport with students is very important. Toward this goal, I follow an **open-door policy**, and **go the extra mile** to help students in every possible way.
- I am a strong **advocate of active class participation** and firm believer that teaching and learning is a **two-way communication** that provides opportunities for class discussions.
- The most important goal I set for myself and for my students is that **all students excel in their studies** because the primary reason they came to the university is to get a good education.
- To improve students' performance, I focus on the following points: thorough preparation, good organization of lectures and course, sound explanation of the material, clear oral and written presentations, keep abreast of new developments in the subject matter, encourage class discussion, and motivate and stimulate students' interest in the subject.
- As a teacher, I want to **contribute to the students' learning** process and impart the skills and knowledge needed for students to be successful. When they do well in their studies and get good grades, it will be easier for them to find jobs.
- I encourage students to understand the subject matter, succeed in the class, **think critically**, gain experience, and accomplish their academic goals.
- I ensure that **learning is fun, interesting**, and helps accumulate knowledge. At the end of the semester, students should feel they not only learned a lot but also enjoyed the course.
- I assist students to achieve well-defined educational and career goals and to grow as matured and well-rounded students so that they can **stand on their own legs**.
- I train students to become good team workers, collaborators, and **highly motivated**.
- I monitor students' academic performance, **am aware of their needs**, provide accurate and specific information, offer timely feedback, and am courteous to students.
- I **focus on each one's strength** to maximize their potential, intellectual, and personal growth, and academic performance.
- I assist students with further studies and **job searches**.
- Since **teaching is one of the integral parts of the land grant mission**, I strive to achieve excellence in my teaching responsibilities.
- It is important for me that students learn from my courses and make use of their knowledge in their future employment.
- It gives me great pleasure when my students succeed in their goals. I would like to see my students make significant progress by showing positive growth and development.
- I want my students to **enjoy, value, and treasure their experience in undergraduate studies at the university**.
- I reward top performing students by taking them to lunch.
- I recommend deserving students for honors, awards, and scholarships. **I take great pride in my students' awards**, honors, and achievements.

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