

(ISSN 0149-4910)



NACTA

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Vol. 57, No. 4 • December 2013



a publication of the NORTH AMERICAN
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Vol. 57, No. 4 • December 2013

NACTA Journal (ISSN 0149-4910) is published quarterly by the North American Colleges and Teachers of Agriculture (formerly the National Association of Colleges and Teachers of Agriculture). It is directed toward the scholarship of teaching and learning in agricultural, environmental, natural and life sciences by presenting articles covering topics that treat all aspects of teaching such as methods, problems, philosophy, and rewards at the college level. All manuscripts undergo double-blind peer review. An author's guide for manuscript preparation is available on the NACTA web page: <http://www.nactateachers.org/> or are available upon request. Page charges of \$75.00 per manuscript are waived if one of the authors is a NACTA member at the time of publication.

All manuscripts submitted to the NACTA Journal are submitted and reviewed electronically. To submit a manuscript to the NACTA Journal, go to this website: <http://nacta.expressacademic.org/>

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The Journal is published electronically/online and quarterly - March, June, September and December. The issues for the current year are available to NACTA members at this website: <http://www.nactateachers.org/journal.html>, a login and password obtained through membership is required.

Searchable past issues of the NACTA Journal are available to anyone at the same website – no login or password required.

A yearly hard copy of all four issues is printed in December.

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NACTA Journal

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

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Student Perceptions of Preparedness for Academic Success: The Impact of an Advisor Taught Orientation Course in Family and Consumer Sciences

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Abstract

This paper reports on data from a study assessing whether a first year orientation course taught by academic advisors influenced Family and Consumer Sciences students' perceptions of preparedness for success in college and their major. The orientation course was designed by academic advisors, in consultation with faculty, to target the skills students need to be successful in their major and throughout their college careers. Topics included careers in the chosen major, professional communication, registration readiness and problem-solving. Students completed surveys at the beginning and end of the course and these results were compared to test for significant differences. Results revealed that students rated themselves as feeling more knowledgeable and prepared after completing the orientation course.

Introduction

Unprepared students entering college is a growing problem. Many students admitted to four year institutions are taking remedial classes in order to progress in subjects such as Math and English (Haycock et al., 1999). In 2000, 28% of college students entering a four year program needed to take remedial coursework, with mathematics being the most problematic subject (Long et al., 2009). Many four year institutions have eliminated their remedial programs, opting to send students to community colleges in order to complete their coursework to catch up to their peers (Bettinger and Long, 2005). In a study conducted in Florida, \$118.3 million was spent on remedial education with both the state and the students enrolled sharing the burden of these costs (Long et al., 2009).

Unpreparedness can lead to a multitude of problems for student retention and graduation. Freshman dropout

rates are over 30% and many students are extending their graduation dates past the four year mark (Colton et al., 1999). Universities are working hard on finding ways to retain their students. Research shows that students who interact with faculty, staff and other students tend to be more secure with their environment and their college surroundings (Glass and Garrett, 1995; Murtaugh et al., 1999). One of the best options to address the problem of retention is to hold a freshmen orientation class for credit. Glass and Garrett (1995) state "an orientation is the single most effective intervention technique available to colleges for enhancing freshman success" (p. 119).

The first orientation course was offered in 1911 in Oregon and such classes increased in popularity during the 1980s (Bedford and Durkee, 1989). According to Barefoot and Fidler (1996), orientation courses educate incoming students about college expectations and provide resources to promote success. Previous studies have found that students enrolled in these orientation courses have higher rates of retention and earn better grades in their college coursework (e.g., Murtaugh et al., 1999). One of the most innovative orientation courses is University 101 at the University of South Carolina Columbia. Teachers for the course are both faculty members and work in student affairs (Shanley and Witten, 1990). Survival rates for freshman returning to sophomore year who completed University 101 ranged from 77.2%-84.5% while nonparticipants had a range of 73.2%-80% (Bedford and Durkee, 1989).

While most of the existing studies measure success in these freshmen orientation courses in terms of retention or GPA, the goal of the present study is to assess student perceptions of preparedness before and after the completion of an orientation course. Student perceptions

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play a key role in academic achievement. Santiago and Einarson (1998) explored student characteristics as predictors of student academic confidence and efficacy in new graduate students. They found that students' perceptions of academic preparedness positively predicted academic self-efficacy (beliefs about success). While not examined in this paper, the hope is that students' positive perceptions of academic preparedness will be linked to academic self-efficacy and achievement.

The Present Study

This study was conducted in the School of Family and Consumer Sciences (FCSC) in the College of Agriculture and Life Sciences (CALs) at a major southwestern university. FCSC offers two majors: Family Studies and Human Development (FSHD) and Retailing and Consumer Sciences (RCSC). Students in both majors are required to take a one-unit orientation course to better prepare them for success in college, their specific major and life after graduation. The orientation course (known as 197A) was designed by academic advisors in consultation with faculty to specifically target skills students need to succeed. Course topics include career opportunities in the students' majors, communication skills (including academic writing and professional email etiquette), registration and University-wide computer systems, problem-solving, critical-thinking and campus resources.

The purpose of this study is to evaluate student perceptions of preparedness before and after the completion of the mandatory orientation course. It was hypothesized, based on previous research on the effectiveness of such courses and the specificity of which the course targets students' needed skills, that students would rate their perceptions of academic preparedness higher after completing the orientation course.

Materials and Methods

Participants

Student participants were recruited from the FCSC orientation courses in the fall and spring semesters of an academic year. A total of 231 students were enrolled in these courses; 132 (124 females, 8 males) students answered both the pre- and post-test survey and are included in the present study. Although the gender distribution seems skewed, these numbers reflect the composition of the FCSC majors. There were 104 students majoring in FSHD and 28 majoring in RCSC. Forty-two percent of participants identified as freshmen, 35% as sophomores, 19% as juniors and 4% as seniors. Students ranged in age from 18 to 25 ($m = 19.4$, $sd = 1.6$). Sixty-seven percent self-identified as White, 24% as Hispanic/

Latino, 4% as African-American, 3% as Asian and 2% as American Indian.

Instruments

Prior to beginning the study, the University of Arizona Institutional Review Board approved the study protocol and all participants provided written informed consent. Students completed a pre- and post-test survey at the beginning and end of the orientation course. Students rated themselves on a five-point scale (1: strongly disagree to 5: strongly agree) on seven items to assess their perceptions of preparedness. The seven items were: "I am knowledgeable about my major," "I am knowledgeable about careers I can pursue with this degree," "I am confident with the quality of my resume," "I am confident about my ability to professionally communicate," "I am knowledgeable about resources on campus," "I am comfortable using the university online services," and "I am knowledgeable about pre-major requirements." Participants also rated themselves on three items on a scale of one to five (1: very unlikely to 5: very likely) on how likely they were to graduate from university, graduate with their current major and return to campus the next semester.

Procedure

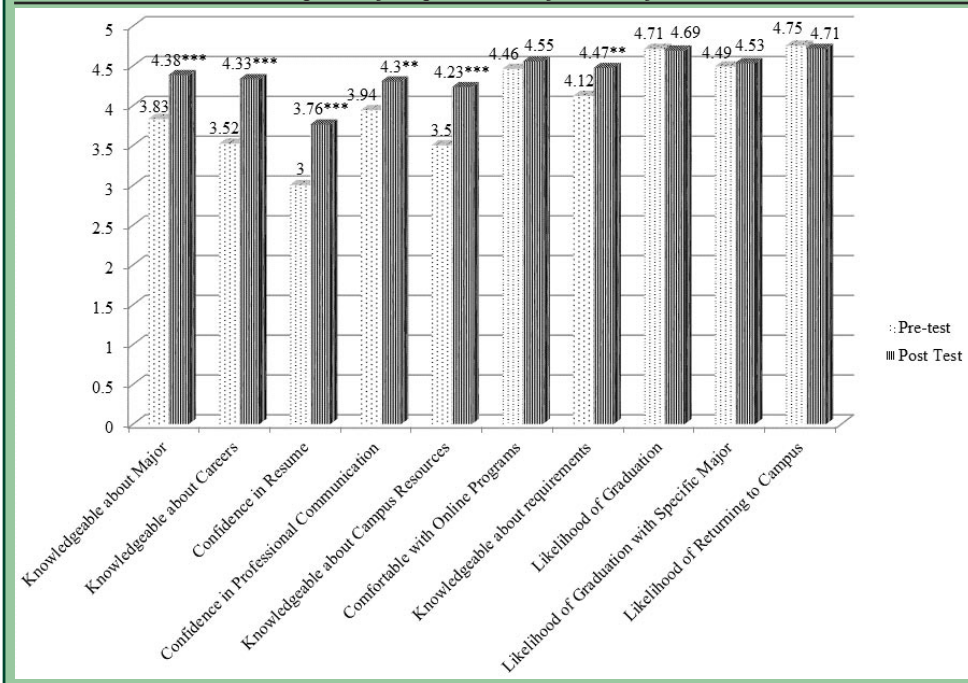
Students enrolled in the FCSC orientation courses were provided with a link to the pre-test survey during the first week of the semester. During the last week of the semester, students were sent an email inviting them to complete the post-test survey. Students were awarded extra credit in the class for completing both the pre- and post-test survey. In order to not coerce students into completing the survey, they were also offered an alternative extra credit assignment for the same amount of credit. The instructors were provided with a list of students who completed both the pre- and post-test survey, but no identifying link between individual results and student names.

Results and Discussion

Means were computed for the students' pre- and post-test data (Table 1). T-tests were then run to compare the pre- and post-test data to test whether student perceptions of preparedness had changed. With regards to preparedness, six of the seven items were significantly different. Students rated greater agreement on the post-test on knowledge of major ($t = -4.56$, $p < .001$), knowledge about careers related to major ($t = -6.50$, $p < .001$), confidence with quality of resume ($t = -5.08$, $p < .001$), confidence with professional communication ($t = -2.73$, $p < .01$), knowledge about resources on campus ($t = -5.57$, $p < .001$) and knowledge of pre-major requirements

Student Perceptions

Table 1. Students' Perceptions of Preparedness Before and After the Orientation Course



($t = -2.68, p < .01$). The only non-significant item was comfort using university online services. Participants also rated their likeliness to graduate from university, with their current major and return the following semester. None of these differences were significant.

The goal of this study was to explore whether a first year university course would affect students' perceptions of preparedness. By creating an orientation course designed to teach students both general university success skills and major specific knowledge, it was hypothesized that after completing the course, students would rate themselves as feeling more knowledgeable, prepared and confident about their college success. Results supported this hypothesis, as students rated themselves significantly higher on major knowledge, career knowledge, resume quality, communication skills, knowledge of campus resources and pre-major requisite knowledge.

There were some limitations to this study. First, there was survey attrition. Only 57% of students enrolled in the orientation course completed both the pre- and post-test survey. It is possible that students who felt more prepared and confident were more likely to complete both surveys. Second, as this study was not an experiment, there was no means of controlling for external variables that may have influenced student perceptions. It is not known how other courses, peers, or environmental factors may have played a role. Third, no significant differences were found in students' ratings of their likelihood to return to and graduate from the university and the major. The lack of these significant findings may be due to the students' very high initial pre-test ratings. For example, when

asked how likely they were to graduate from the university, the mean on the pre-test was a 4.71 (on a scale of 1 to 5).

In the future, it would be valuable to continue to study the effectiveness of first year orientation courses and their influence on student perceptions. The authors plan to add a component to their study that directly assesses knowledge in addition to exploring student perceptions. Also, it is important to follow students over time and track whether completion of the course and perceptions of preparedness are linked to retention and graduation rates. The present study adds to a growing body of research that

highlights the importance of orientation courses for college student success. Student preparedness and perceptions of preparedness should continue to be explored to increase student retention, graduation and success in the work force.

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Weekend Learning Experience for Turfgrass Students

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Abstract

With the number of distance education courses increasing in the university setting, it is crucial that students enrolled in these classes not receive any less of an education. In an introductory turfgrass class at the University of Florida, we have designed an interactive two-day learning experience where students enrolled in a hybrid distance education course in locations around the state are brought together to further engage the students with their peers and instructors. Through a series of problem solving, planning and budgeting exercises we have seen benefits from increased interaction between students and instructors. This two-day program also includes time when students get to visit intensively managed golf and sports turf facilities and ask questions of the staff. By taking part in this hands-on learning experience, the students further develop skills that are essential to future employment.

Introduction

Distance education courses are becoming more prevalent throughout the university system to increase enrollment and reach out to students in remote locations (Herrington, 2006; Powell et al., 2008) without requiring additional staffing (Latour, 2003). Distance education presents many advantages because of the flexibility and outreach it provides. Students benefit by being able to experience courses that are not normally available at their location. Instructors can also seamlessly integrate web videos, current articles, or guest speakers, providing the students with more current information that may not yet be in text books. Instructors also benefit by being able to provide a similar course with a lesser workload (Turgeon and Thompson, 2004; McKenney et al., 2010).

However, distance education courses may present several problems because of the delivery method(s) and the amount and type of interaction provided. Moore (1989) suggests that instructor-learner, learner-content and learner-learner interaction are all necessary for a successful course. In a distance education environment, it is more difficult to keep the same level of instructor-learner and learner-learner interaction that is provided in a resident setting because the students are not physically present. Students are not as easily able to interact with their classmates or instructors as they are in a face-to-face fashion. This has the potential to lead to a more impersonal environment that has the potential to adversely affect their educational experience. These problems were deemed unacceptable for the students taught by these authors and it was found necessary to address these shortcomings with a supplemental learning experience.

At the University of Florida (UF), Golf and Sports Turf Management (ORH4223) is a junior- and senior-level hybrid course that is team taught by Drs. Jason Kruse and J. Bryan Unruh. Dr. Kruse teaches content related to Sports Turf Management to students on the main UF campus in Gainesville, while Dr. Unruh teaches golf course management content to students at the UF Milton Campus (located in northwest Florida near Pensacola). The content taught at each location is then video teleconferenced using Polycom (Polycom Inc., 4750 Willow Road, Pleasanton, CA 94588-2708) to students at the other campus, as well as to additional UF locations across the state. The student demographic includes traditional undergraduate students majoring in turfgrass management, horticulture or agronomic

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majors and industry professionals seeking professional development opportunities. The course is also dual-listed for graduate credit. This delivery format provides somewhat more interaction because there are two locations with faculty members instead of the usual one; however, there are still students at other UF locations that receive less instructor-learner/learner-learner interaction. One way in which we have found to minimize this problem is by providing an interactive weekend where students from all distance education locations meet at a central site to put the knowledge obtained during the course to practical use.

In 2008, a “Weekend Learning Experience” was organized to allow students to take part in experiential learning exercises that allowed them to apply the knowledge gained during the lecture component of the golf and sports turf management course to practical, real-life situations. The program was designed to provide an enhanced experience for distance education students by incorporating active learning strategies (Williams, 2006).

The Weekend Learning Experience has two objectives: I) to provide students with a hands-on learning experience that will help them develop essential employment skills such as critical thinking, problem solving, communication and teamwork; and II) to allow students an up-close look at professional turfgrass facilities where they are able to observe and ask questions of professional turf managers.

Format/Structure

The format of this mandatory attendance learning experience includes several key activities spread over a two-day period. The first day (Friday), all students and instructors travel to a hotel in central Florida near Orlando (maximum travel distance is about 450 miles). Students from throughout the state meet and are able to see their classmates face to face – most for the first time. This program brings together students with varied backgrounds and experience levels and urges them to work together to solve turfgrass management issues. The hotel conference room serves as a classroom and provides a professional environment that is conducive to learning.

Students are tasked with several projects during the first evening. First, students are divided into small groups of three or four students and assigned management scenarios that encourage communication and teamwork. Group selection is done by the instructors and is based on several factors: I) the students’ affinity towards golf course management or sports turf management; II) background experience (i.e., traditional students paired with professionals); and III) intentional placement of

extroverted and introverted students together. Each group is given an outline of an unnamed golf or sports facility describing management area, equipment, staff, budget, usage and customer expectations. An additional component within each management scenario is related to employee relations (i.e., multi-cultural/ethnic/lingual work place). The learning groups are asked to create a one-year management plan for their assigned facility. An important goal of this experience is to get students to think creatively and work as a team. Students work to solve both typical and atypical problems that they may face on the particular job site outlined in their management scenario. All of the given information is derived from real-world Extension consultation with facilities within the state of Florida. Students work together to design a creative management plan within the specifications of their given facility.

The second exercise focuses on developing creativity, logic and problem-solving skills. Each group of students is given a one-page summary of a golf course or athletic facility case study. This summary outlines certain details about the course or facility and describes a specific problem or oddity that occurred. As with the management scenarios, all problems are real world and were derived from specific Extension consultations done by instructors’ work within the state. Students are required to design an action plan to solve the problem. This requires them to use knowledge learned in the lecture portion of this class and their academic careers, as well as their past experience in the turfgrass industry. Instructors serve as experts and can be called upon to answer certain questions or to provide additional information. As experts on the case, instructors have soil, tissue and water test results as well as a history of fertilizer, pesticide and irrigation inputs. This information is made available to the students only when it is asked for. This is intended to teach students to use their resources and ask questions that they may not know themselves.

The final exercise of the first evening of this learning experience mainly focuses on developing communication skills. Each group of students presents both their management and action plans to the rest of the class via an informal dialogue. The other students act as the greens committee, asking questions and requiring justification for the plan and money that will be spent. The group proposes strategies to address their specific issues and validate why this will be an effective plan of action. During this time students must justify cultural practices that are implemented and discuss why they chose to do or not to do something.

Logistically, the evening typically begins at 6:00 PM and often goes until midnight. The instructors cover the

Weekend Learning Experience

hotel expense (based on quad occupancy) for all students and a hotel that includes breakfast is selected.

The second day (Saturday) of the Weekend Learning Experience focuses on visiting two turfgrass facilities and talking with their management staff. The first visit is made to ESPN's Wide World of Sports (<http://espnwos.disney.go.com/>), a world class athletic field complex located at Walt Disney World that has soccer, football, baseball, softball and lacrosse fields. Students are able to see each of these fields and the equipment it takes to manage them. The turf management staff of the complex gives a tour and answers any questions the students have. The interactions between the students and the turf managers have led to several excellent discussions on management philosophies, facility organization, tool and equipment requirements, water usage, fertilization, staff management, unionized labor, managing clay, equipment preference and leasing vs. buying machinery. The instructors cover most of these topics during the lecture portion of the class, but being able to hear them first-hand from someone who deals with these issues on a daily basis really helps the students understand their importance.

The second visit is to Grand Cypress Golf Club (<http://www.grandcypress.com/golf/>) to meet with the superintendent and to tour two architecturally unique golf courses and the maintenance facility. This gives students the opportunity to see an operating golf course facility and everything that goes into maintaining it. Students seem interested to find out the amount of equipment, expense and time that it takes to run a quality golf course facility. Meeting with the superintendent gives the students another opportunity to learn from someone in the industry first-hand. At this location there have been great discussions about turf care, cultural practices, management style, facility organization, combating noise ordinances, player needs, landscape management, environmental impact and sustainability of the turfgrass system. This visit gives the students another perspective on turfgrass management, engaging them in discussion and challenging them to think about all the attributes of golf course management.

Discussion

One of the major benefits from this Weekend Learning Experience is the student-student and student-instructor interaction that does not occur as much during the lectures given the format of delivery. Students from across Florida are convened to work together, sharing their diverse backgrounds and experiences to solve common golf and sports turf management problems. Unlike the classroom setting, this learning experience

gives students some face-to-face time with classmates and the opportunity to learn from one another.

This learning experience was designed to develop essential employment skills that students will need when entering the work force and to give students an opportunity to meet and discuss turf issues with managers in the industry. Students benefit by developing planning and budgeting skills while developing their management plans. They experience what it is like to have only a certain amount of money and then decide what management practices are the most important. Many students are surprised to find out that some budgets do not even allow enough for completion of all basic agronomic practices.

The case study portion of this learning experience challenges students to think critically and solve specific problems. This serves as a culmination to what they have learned throughout the course and challenges them to pull all of the ideas together and come up with a solution to the problem. The presentation portion boosts students' communication skills by creating an opportunity for students to simulate a greens committee meeting and justify their management plan. The athletic field and golf course site visits are a great opportunity for students to observe functional facilities and see what goes into making them operate. Students also get to see the differences between managing an athletic field complex and a golf course facility – from the equipment required to staffing demands. Students are surprised to learn that during spring baseball season, multiple field crews often work 24 hours a day and individuals can work 40 hours overtime per week. On the golf course, however, employee overtime was strictly disallowed due to budget constraints.

Although the focus of the Weekend Learning Experience is to benefit the students, the instructors also benefit from the experience. One of the biggest weaknesses of distance education is that the instructor lacks a feel for the student's grasp of the information (Latour, 2003). Our Weekend Learning Experience looks to eliminate that feeling by allowing the instructors to get to meet all students face to face and challenge them to use the information taught during the course. Much of the instructor-student contact over the fifteen-week course is through the video telecommunication or email, a design that is not as conducive to the work environment as face-to-face learning. The learning experience occurs roughly halfway through the semester allowing students time to become familiar with the course material. The timing also allows students and instructors to become more familiar with each other, which leads to more involvement in discussions as the semester progresses. By getting students and instructors together over this two-

day period, it allows instructors to build relationships with the students in the course. Instructors can also continue to work on communication skills as they act as experts during the case study portion of the program. Instructors may also figure out a new way to solve a problem that had not been examined previously.

Several students wrote comments on their course evaluations regarding the learning experience. Out of the numerous positive comments one student wrote, "The weekend learning experience was much more interesting, informative and useful than I thought it would be. Thank you." A second student stated, "The field trip to Orlando was informative, interesting and helpful to see how things are managed in the industry." A third student wrote, "The 'Weekend Learning Trip' was awesome and I learned a lot. It must stay part of the program."

Summary/Conclusion

To make this learning experience stronger, we are always looking to incorporate ideas to make it more educational, enjoyable and successful. Having students fill out a survey after the conclusion of the program may be a beneficial addition in the future. Getting detailed feedback from the students will allow us to determine what works well and where there is room for improvement.

This two-day interactive Weekend Learning Experience has proven to work well bringing students together and increasing the amount of interaction in this distance education course. This program provides the students and instructors with an experience that cannot otherwise be facilitated through video teleconferencing. It was designed to increase the students' employability by helping them develop several key skill sets that are crucial to turfgrass managers. The visit to ESPN's Wide World of Sports offers a unique experience to see almost every type of athletic field common to the United States, while the visit to Grand Cypress Golf Club allows stu-

dents to see two golf courses and a maintenance facility in action and to discuss issues with the management team. The program as a whole has been shown to stimulate learning in an enjoyable environment. Since its inception, the Weekend Learning Experience has progressed into a valuable experience that is both highly beneficial and enjoyable for the students.

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Engaging Undergraduate Students through Academic Advising

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Abstract

Academic advising is an integral part of the college experience. Outcomes of academic advising may be more critical than realized by either advisors or advisees. Using a census of undergraduate students enrolled in a college of agriculture at a large land-grant institution, the engagement of undergraduate students through academic advising was measured. Findings were that students were generally not engaged in educational experiences with their advisors beyond their assigned coursework. Advisors generally did not discuss ideas from readings or classes with undergraduate students outside of class, nor did they tend to work with undergraduate students on research projects. In addition, students reported they had little support in their personal development. The relationships found between frequency of advisor contact per term and undergraduate students' perceptions of advising, indicated that the more students contacted their advisors, the more they were generally satisfied with the academic advising they received. Recommendations for the college included providing professional development for advisors to address opportunities to engage advisees through academic advising to promote their development as a whole student.

Introduction

Academic advising is an integral component of the college experience. Quality academic advising assists students in life and in career goal clarification, as well as in the short-term goals of course selection and problem-solving (Kozloff, 1985). Studies have been compiled to suggest that meaningful and developmental contact with advisors promotes student success (Johnson and Wang, 2011; Kuh, 2008; Tuttle, 2000) and forms the most critical relationship on campus for students. As Upcraft discussed in his 1995 study of advising, academic advising is a relationship and does not equate to merely scheduling courses. Upcraft advocated that

advisors needed to provide more engaging interaction with advisees beyond registering them for classes if they wished to cultivate positive development in students.

The role of academic advisors has evolved from simplistic beginnings of scheduling courses, to include a wide array of tasks and expectations that meet the growing needs of those being advised in today's higher education environments. "*Institutions of higher education are challenged now more than ever to focus on the needs of clients, especially its students*" (Jones, 2003) and advisors are the personnel on the frontlines who are frequently challenged to meet new and changing requirements. Faculty members are often engaged in academic advising to fulfill an institutional duty owed to students. Alas, a review of literature revealed that undergraduate students nationally are dissatisfied with their academic advising and an extensive need exists to educate and train academic advisors on methods of effective advising practices for engaging college students.

Theoretical Framework

Chickering's Theory of Student Development has been a prominent theory used in developmental advising over the decades. Grounding his theory of student development in the psychosocial realm, Chickering (1969) examined the content of development, the important issues people face as their lives progress and then identified seven vectors along which students continually develop. The seven vectors represent seven significant areas of challenge, development and growth throughout the college years. The first vector, achieving competence, focuses on students increasing their cognitive, affective and physical skills. Managing emotions is another vector, where students learn to "control impulses and to develop appropriate responses" (Pascarella and Terenzini, 2005, p. 21). Third

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is moving through autonomy toward interdependence. Students learn to be self-sufficient, responsible and make decisions without assistance. Developing mature-interpersonal relationships is the fourth vector. Students create and maintain diverse relationships in respect to others. The fifth vector focuses on developing a sense of self, shared by historical events, social and cultural conditions and issues from ethnic heritage (Pascarella and Terenzini). Development along the sixth vector occurs as an individual answers not only the question: “Who am I?,” but also, “Who am I going to be?” and “Where am I going to go?” (Pascarella and Terenzini). The seventh vector focuses on values and beliefs with the emerging identity of the student. Chickering argued that as students progress through the seven vectors, they become less dependent on others and promote their own development. Academic advisors who use developmental advising practices recognize these seven vectors and support students through their advancement of maturity.

Purpose and Objectives

Academic advising is an extension of the teaching role in higher education (Campbell, 2008; Eble, 1988; Hemwall and Trachte, 2003); and when designed, developed and assessed well, advising plays a critical role in connecting students with learning opportunities that support engagement and the attainment of higher student achievement. The National Research Agenda for Agricultural Education supports the need for establishing meaningful, engaged learning in all environments by actively and emotionally engaging students, resulting in high levels of achievement, life and career readiness and professional success (Doerfert, 2011). Engaging undergraduate students in meaningful learning environments will produce positive learner outcomes that are essential to properly educating the citizens of the 21st century (Doerfert).

Therefore, the objectives guiding this research study were to:

1. Describe College of Food, Agricultural and Environmental Sciences (CFAES) undergraduate students’ participation in engaging educational activities with academic advisors beyond the classroom.
2. Describe CFAES undergraduate students’ perceptions of personal development through academic advising.
3. Describe CFAES undergraduate students’ communication tendencies in regards to academic advisor contact.

Methods and Procedures

This descriptive census study (N=2294) focused on undergraduate students enrolled in the College of Food, Agricultural and Environmental Sciences at The Ohio State University during the 2012 spring academic term. Data were collected using an electronic survey instrument.

Instrumentation

Undergraduate students were asked to respond to 26 Likert-type scale items related to academic advising in the college. Twenty of the research questions in the survey instrument originated from the National Survey of Student Engagement (NSSE, 2012). NSSE is a nationally recognized assessment tool used by colleges and universities to measure undergraduate student engagement. The United States Department of Education (2006) suggested that the NSSE was a viable instrument for all types of institutions to measure and to demonstrate learning outcomes for all types of students. Therefore, the researchers deemed NSSE an established, valid and reliable instrument to employ for this research study. Standardized instruments come with the advantages of having already-established reliability and validity (Cuseo, 2008). Reliability and validity of the constructs were established by the NSSE instrument-design team. Cronbach’s alpha coefficients were reported for all constructs and ranged between .54 and .81 (NSSE, 2005).

Procedures

The researchers complied with the established protocol set-forth by NSSE and The Ohio State University to obtain the required approvals to use twenty identified NSSE items in the research study. Six demographic items were researcher-designed. The researchers modified the appearance of the original NSSE items based on the options provided through the online survey provider. The Ohio State University Institutional Review Board (IRB) approved the study protocol prior to implementation. The subjects were administered the survey via their university-provided email accounts during the spring academic term.

Data Collection and Analysis

Data were collected using Dillman’s (2000) Tailored Design Method, which was modified to fit the situation as follows. The study used three of the five parts of the tailored design method: (1) respondent-friendly questionnaire, (2) up to five contacts with the recipient and (3) personalized correspondence.

A pre-notice correspondence email was sent by the Associate Dean and Director of Academic Affairs for

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the College of Food, Agricultural and Environmental Sciences to undergraduate students enrolled in the college. The email informed students that an electronic survey would be arriving in their university-provided email accounts and encouraged them to participate. The researchers sent five emails through the online survey provider to students, encouraging them to complete the questionnaire. At the end of the data collection, a thank you email was sent to participants in the study. The researchers received a 30% response rate to the survey (n=685).

Descriptive statistics were used to analyze the data using SPSS. Population means and population standard deviations were rounded to the nearest 1/100th.

Controlling Nonresponse Error

The researchers were not attempting to generalize beyond the target population; however, the researchers wanted to ensure with confidence that the sample of students who responded to the survey were representative of all students in the college. To minimize nonresponse error, initially, the researchers utilized a modification of Dillman's (2000) Tailored Design Method to increase survey responses. Although Dillman's design was implemented throughout the study, the researchers wanted to minimize the concern of nonresponse error, the concept that those who did not complete the survey may be different in some dimension than those who did respond.

Miller and Smith (1983), suggested specific techniques for handling nonresponse issues. Among those techniques was the comparison of early to late respondents. "*Research findings suggest that late respondents are often similar to nonrespondents. Thus, one way to estimate the nature of the replies of nonrespondents is through late respondents*" (Miller and Smith, p. 48). The researchers randomly selected ten early respondents and ten late respondents who were compared statistically to determine differences, with late respondents assumed to be representative of nonrespondents. The researchers, a priori, set a 90% confidence band around response means to compare the two groups. No differences were found between characteristics of early and late respondents, thus the data were generalizable to the population of current undergraduate students in the College of Food, Agricultural and Environmental Sciences at The Ohio State University.

Limitations of the Study

The researchers acknowledged limitations in this study resulting from the methodologies and procedures employed. The first limitation recognized by the researchers was that the subjects used in this study were

a population of students in a college of food, agricultural and environmental sciences at a large, Midwestern land grant institution. It should be conceded that this limitation affects how the conclusions can be generalized to other populations.

Additionally, data were collected during the last quarter-based academic term in the university's history. Students were asked their perceptions of academic advising at the college and institutional levels, while preparing to make this significant academic transition. Some students may have felt apprehensive about the change from quarter-based terms to semester-based terms and their anxiety may not have reflected an accurate perception of their overall advising experiences. It should be acknowledged that the context and conditions of the academic environment during the data collection were unique to this monumental university transition. It should be disclosed that this limitation may have also affected the response rate of the survey.

The survey instrument provided an additional limitation for this study. Twenty items in the survey instrument were used verbatim from the National Survey of Student Engagement (NSSE). NSSE is a standardized instrument used nationally and globally to gather data on student engagement at institutions of higher education. The questions derived from NSSE are worded in general terms to accommodate the differences across a multitude of institutions. Thus, the wording in the survey instrument was not specific to The Ohio State University, nor the College of Food, Agricultural and Environmental Sciences.

Lastly, this study served as the foundation piece to propel future research investigations of academic advising practices in the College of Food, Agricultural and Environmental Sciences. Administrators in the college needed an up-to-date analysis of current academic advising practices in order to establish a basis for identifying target areas needed for additional research. The findings of this study were intended to be merely descriptive and allowed room for further investigation in order to successfully engage students through the seven vectors of Chickering's Theory of Student Development.

Results/Findings

Objective 1: Describe CFAES undergraduate students' participation in engaging educational activities with academic advisors beyond the classroom.

Students enrolled in CFAES reported that they never (42.8%) or sometimes (48.6%) discussed ideas from readings or classes with academic advisors outside of class (Table 1). Additionally, 7.4% of undergraduate students often discussed ideas from readings or classes

with academic advisors outside of class, while 1.2% of students did so very often. The mean score for occurrence level of discussing ideas from readings or classes with academic advisors outside of class (n=685) was 1.67 (SD=.66) on a 4-point Likert scale. The mode was 2.00 and the median was 2.00.

Table 1. Undergraduate Students' Participation in Engaging Educational Activities with Academic Advisors beyond the Classroom

		n	Percent (%)
Discuss ideas from readings or classes outside of class with advisors ¹	Never	293	42.8%
	Sometimes	333	48.6%
	Often	51	7.4%
	Very often	8	1.2%
Work with advisors on activities other than coursework ¹	Never	300	44.0%
	Sometimes	251	36.8%
	Often	86	12.6%
	Very often	45	6.6%
Intent to work on a research project with an advisor outside of course or program requirements ²	Not decided	182	26.9%
	Do not plan to do	277	41.0%
	Plan to do	162	24.0%
	Done	55	8.1%

¹Scores ranged from 1 (never) to 4 (very often).
²Scores ranged from 1 (not decided) to 4 (done).

Concerning the occurrence level of students working with academic advisors on activities other than coursework (i.e. committees, orientations, student life activities), 44% of students reported they never work with academic advisors in this capacity (Table 1). Thirty-six percent (36.8%) of students reported that they sometimes work with academic advisors on activities other than coursework, while 12.6% reported they often work with academic advisors on activities other than coursework. In addition, 6.6% of students reported that they very often work with academic advisors on activities other than coursework. The mean score for how often students worked with academic advisors on activities other than coursework (n=682) was 1.82 (SD=.89) on a 4-point Likert scale. The mode was 1.00 and the median was 2.00.

Students enrolled in CFAES reported they have not decided if they will complete a research project with academic advisors outside of course or program requirements (26.9%). Forty-one percent of students reported that they do not plan to work on a research project with an academic advisor outside of course or program requirements (Table 1), while 24.0% do plan to work on a research project outside of course or program requirements with an academic advisor. Eight percent of undergraduate students (8.1%) reported that they have already completed a research project with an academic advisor outside of course or program requirements. The mean score for level of intent to work on a research project with an academic advisor outside of course or program requirements (n=676) was 2.13 (SD=.90) on a 4-point Likert scale. The mode was 2.00 and the median was 2.00.

Objective 2: Describe CFAES undergraduate students' perceptions of personal development through academic advising.

Fourteen percent of undergraduates reported that the institution provided very little support for students to thrive socially (Table 2). Nearly thirty-eight percent (37.9%) of students acknowledged that the institution provided some support needed for students to thrive socially, while 28.7% of students perceived that the institution provided quite a bit of support for students to thrive socially. Additionally, 19.3% of students reported that the institution provided very much support for students to thrive socially. The mean score for institutional support to thrive socially (n=662) was 2.53 (SD=.96) on a 4-point Likert scale. The mode was 2.00 and the median was also 2.00.

Table 2. Undergraduate Students' Perceptions of Personal Development through Academic Advising

		n	Percent (%)
Level of support the institution provides students to thrive socially ¹	Very little	93	14.0%
	Some	251	37.9%
	Quite a bit	190	28.7%
	Very much	128	19.3%
Level of assistance the institution provides to develop a personal code of values and ethics ¹	Very little	125	18.8%
	Some	252	38.0%
	Quite a bit	196	29.5%
	Very much	91	13.7%
Level of help provided by the institution to cope with non-academic responsibilities ¹	Very little	251	37.9%
	Some	243	36.7%
	Quite a bit	118	17.8%
	Very much	50	7.6%

¹Scores ranged from 1 (very little) to 4 (very much).

When asked if the institution provided assistance to students to develop a personal code of values and ethics, 18.8% of students reported they received very little assistance (Table 2). Thirty-eight percent of students reported that they received some assistance, while 29.5% of students received quite a bit of assistance. Additionally, 13.7% communicated that they received very much assistance to develop a personal code of values and ethics. The mean score for assistance to develop a code of values and ethics (n=664) was 2.38 (SD=.94) on a 4-point Likert scale. The mode was 2.00 and the median was 2.00.

When asked if the institution helped students cope with non-academic responsibilities, including work and family, 37.9% of undergraduate students reported that the institution did very little, while 36.7% of students reported that the institution did some to help students (Table 2). Furthermore, 17.8% of students reported that the institution did quite a bit to help students cope with non-academic responsibilities and 7.6% of students reported the institution did very much to help students cope with non-academic responsibilities. The mean score for perceptions of institutional help with non-academic responsibilities (n=662) was 1.95 (SD=.93) on

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a 4-point Likert scale. The mode was 1.00, while the median was 2.00.

Objective 3: Describe CFAES undergraduate students' communication tendencies in regards to academic advisor contact.

Nearly eleven percent (10.8%) of students reported they contacted their academic advisor zero times per quarter (Table 3). Over half of undergraduate students (57.2%) contacted their academic advisor either one or two times per quarter. Over twenty percent (20.7%) of students contacted their academic advisor either three or four times per quarter. In addition, 5.3% of students contacted their academic advisor five or six times per quarter, while 6.0% of students contacted their academic advisor seven or more times per quarter.

Table 3. Undergraduate Student Contact with Academic Advisors per Quarter

Number of contacts per quarter	Frequency	Percentage (%)
0	70	10.8%
1-2	370	57.2%
3-4	134	20.7%
5-6	34	5.3%
7+	39	6.0%
	n= 647	100.0%

As seen in Table 4, undergraduate students enrolled in CFAES indicated that of the eight methods of communication listed on the questionnaire, email was the most frequently used method of communication students used to contact their academic advisor (91.8%). Over three-fourths (79.6%) of respondents reported they scheduled an appointment to communicate with their academic advisor. Thirty-eight percent (38.1%) of students communicated with their academic advisor during unscheduled appointments in the advisor's office and 30.5% of students communicated with their academic advisor during unscheduled, informal visits outside the advisor's office. Students also reported using phone calls (18.5%), texts (5.8%) and social media (2.8%) to communicate with their academic advisors. Of the methods of communication listed, hand-written correspondence was the least used by undergraduate students in CFAES (1.2%).

Table 4. Methods of Academic Advisor Communication Used by Undergraduate Students

Method of communication	Frequency	Percentage
Email	590	91.8%
Scheduled appointment	512	79.6%
Unscheduled appointment in advisor's office	245	38.1%
Unscheduled, informal communication outside advisor's office	196	30.5%
Phone call	119	18.5%
Text	37	5.8%
Social media	18	2.8%
Handwritten correspondence	8	1.2%

Moderate relationships were found between frequency of contacts per quarter and discussion of career plans with faculty members, relationships with faculty members, overall advising received from the institution and overall quality of advising received from the college (Table 5).

Table 5. Relationships between Frequency of Advisor Contact per Quarter and Undergraduate Students' Perceptions of Academic Advising

	Pearson's Product Moment Correlation Coefficient with frequency of advisor contact per quarter
Discuss career plans	.45**
Overall quality of institution advising	.35**
Quality of advising in college	.34**
Relationships with faculty	.31**

**P=0.01 level

Conclusion/Recommendations/Implications

Objective 1: Describe CFAES undergraduate students' participation in engaging educational activities with academic advisors beyond the classroom.

Faculty members generally did not discuss ideas from readings or classes with undergraduate students outside of class, nor did they tend to work with undergraduate students on activities other than coursework. In addition, undergraduate students did not intend to work on research projects with faculty members outside of course or program requirements. The researchers recommended further investigation using focus groups to delve deeper into why faculty members choose not to discuss readings or classes with students, or work with students on activities other than coursework. It is hypothesized that faculty members do not recognize these items as part of an academic advisor's responsibility.

Under the notion that advising is teaching (Crookston, 1972), advisors should engage and advocate for student educational achievement to the highest attainable standard both inside and outside of the classroom. Faculty members may not realize that when they accept a faculty position, they will be expected to advise students, formally and nonformally (Hunter and White, 2004). Often, teachable moments can arise when faculty members or advisors talk with students about their favorite classes or interests (Foushee, 2008). Encouraging faculty members to engage in conversations about classes and readings with students beyond the classroom can facilitate student development in all educational environments.

A lack of student-faculty interaction outside the classroom may affect what is going on inside the classroom. O'Banion (1972) found that when instructors volunteered for out-of-class activities with students,

they were likely to be better advisors and better instructors. Developing valuable relationships between teachers and students becomes an important form of teaching and advising (Gale Encyclopedia of Education, 2011). Engaging with students on activities other than coursework, provides opportunities to foster working relationships in all types of learning environments.

Advisors can provide a great service to their students and institutions by encouraging their advisees to engage in educationally purposeful activities, such as student-faculty research (Kuh, 2008). Expanding the opportunities for students to participate in educationally enriching experiences, such as working with faculty members on research projects, can mutually benefit both students and faculty members. If students do not plan to complete research projects with faculty members, then advisors need to encourage their students to get involved in these activities. Students are able to develop cognitive skills, acquire work-related skills and build professional connections by completing research projects with faculty members from whom they can learn.

Objective 2: Describe CFAES undergraduate students' perceptions of personal development through academic advising.

Over half of undergraduates perceived that the institution lacked in providing support for students to thrive socially. Chickering (1970) purported that academic goals, decisions and learning cannot be isolated from students' career goals, nor their social characteristics and environments. Chickering's Theory of Student Development amplified the importance of social skills in the growth of college students by including the vector, developing mature interpersonal relationships, as a critical area of development. The opportunity to interact with peers professionally and socially can play an important role in developing a well-rounded student. Academic advising is intended to enhance students' academic and social integration into the institution (Hale et al., 2009). Perhaps students in the college lack awareness of the many opportunities to become socially involved around campus. Students may simply need encouragement to become actively involved in social activities and organizations. Advisors should begin by asking guiding questions to determine students' strengths and interests (Bigger, 2005) and then urge students to join clubs and organizations that embrace their interest areas.

The institution also lacked assistance for a majority of undergraduate students to develop a personal code of values and ethics. Institutional academic advising programs must have an articulated vision for advising, promoting student learning and development and prescribing and practicing ethical behavior (King,

2008). When advisors assist students in developing their own code of values and ethics, it aligns academic advising to concepts of student engagement (Campbell, 2008). Development in higher education usually implies growth, or potential for growth, toward maturity or greater complexity (Pascarella and Terenzini, 2005). If students indicated that the institution provided only some assistance in developing a more complex sense of self through a personal code of values and ethics, then the institution has room for growth. Chickering's Theory of Student Development (1969) indicated that the final vector of student development was the area of creating one's own values, beliefs and integrity. This area of student development is critical, especially for upperclassmen that are more likely to be at this final vector of development before transitioning into the real-world. If students have a want or a need to develop a code of values and ethics, then the advisors should foster discussions with advisees to promote this area of development. Advisors should also practice using a code of values and ethics while interacting with students to provide an example of such behavior. The institution should consider providing professional development opportunities for advisors that addresses this area of development so that advisors can provide resources to promote this aspect of developing the whole student.

Lastly, the institution provided little help to undergraduate students to cope with non-academic responsibilities. The nature of academic advising and the knowledge necessary to address a wide-range of complex advising areas is challenging and training advisors to handle all situations is a significant concern (Tuttle, 2000). Academic advisors may be uninformed, untrained, or uncomfortable discussing topics with advisees outside the realm of academics. Rather than suggesting that faculty simply need to do better advising, institutions might ask whether it is even reasonable to expect that one individual can provide the full complement of functions that is suggested of quality academic advising (Allen and Smith, 2008). If students indicated that the institution provided little support with non-academic responsibilities, then the institution should provide and promote services that are offered on-and off-campus to students through academic advisors. If advisors have the knowledge of institutional resources to pass along to students, then students can take the initiative to follow-up with the necessary services.

Objective 3: Describe CFAES undergraduate students' communication tendencies in regards to academic advisor contact.

Undergraduate students were most likely to contact their academic advisors one or two times per quarter.

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A large majority of students used email or a scheduled appointment to communicate with their advisors. In addition, the relationships between frequency of advisor contact and undergraduate students' perceptions of academic advising indicated that students who had more frequent contact with advisors generally were more satisfied with the quality of advising received. These findings were consistent with the research literature (Hale et al., 2009; Kuh, 2008; O'Banion, 1972). Students who are encouraged to visit their advisors more frequently in college will have a higher likelihood of being more satisfied with advising services and will benefit from a quality advisor-advisee relationship.

Educational environments play an enormous role in the student's ability to progress from one area of development to the next. Academic advisors who have meaningful and engaged interactions with students, contribute to students' advancement. By acknowledging, appreciating and working with the unique phases of psychosocial development that students bring to the advisor-advisee relationships, advisors can enhance advising practices and can promote higher achievement among all students. Providing meaningful learning in all environments to promote student engagement, including academic advising environments, can result in high levels of student achievement, life and career readiness and professional success.

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Debates as a Pedagogical Tool in Agribusiness and Animal Science Courses: Various Perspectives at the Undergraduate and Graduate Levels¹

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Abstract

Debate style learning shifts the focus from the instructor as sole deliverer of course content to students contributing ideas, knowledge and differing perspectives revealed through active engagement with class material. Students shift from being passive receptors to active learners. In this paper, we examined the different approaches taken in debate style learning in two undergraduate and one graduate agricultural policy class and one graduate animal science course at Sam Houston State University. The organization, the set-up and the grading of class assignments are discussed based on their use in the fall and spring semesters 2011-2012. Overall, student feedback on the debate experience was positive, suggesting that debate style learning is an effective method for getting students engaged in the course material. Student engagement has been shown to enhance content learning and strengthen student professional skills.

Keywords: Debate, agriculture, critical thinking, classroom techniques, higher education

Introduction

There is no debating about it!

Using debate as a pedagogical tool in university classes is not new, but it may be an underutilized technique. Hall et al. (2003) reported on various tools

that could be used in undergraduate agribusiness capstone management courses and concluded that issue debates were an “*effective tool for integrating previous coursework and applying those concepts to contemporary issues*” (p. 54). Such debates require students to research, articulate and defend positions that may differ from their personal views on the subject. As a result, they can expand a student’s horizons and ease the understanding of differing perspectives in a more rational manner. Debates are a great way to engage students, diversify the course curriculum, transform students from passive to active learners and improve students’ critical thinking and presentation skills (Chang and Cho, 2010).

According to Bellon (2000), “*a debate is a complex, interactive experience that presents students with personally meaningful challenges and encourages intensive analysis*” (p. 9). Debate style learning has been shown to improve oral communication as well as public speaking. It has also been shown to increase both self-confidence in stating one’s view and the ability to maintain an open-mind towards the views of others.

The Cengage learning website (Econ Debate Online, 2012) provides many examples of debate topics for economics classes (economic fundamentals, microeconomics, macroeconomics and world economy) beyond policy classes. Education World (2009) provides instructions, debate rubrics, scoring sheets and many

¹The Sam Houston State University Institutional Review Board approved the study protocol. The survey was anonymous so no participant’s informed consent was necessary.

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ideas for debate topics. The web site is targeted at high school teachers but can be adapted to university curricula. At another institution, the following topics have been used for an Environmental Economics course: a) Are global warming facts too uncertain to guide government policy? b) Can the US continue to rely on oil as a major energy source? c) Do biofuels enhance energy security? d) Should the Arctic wildlife refuge be open for oil drilling? e) Should water be used for oil extraction in TX? f) Is wind energy green?

Scott (2008) evaluated the perceptions of 111 technology students on the debate process. Overall, the students believed that the debate process was a useful learning activity. The results of the questionnaire revealed that students believe that the debates helped them understand the topic better, learn new knowledge and gain an understanding of the debate process. Most would also rather prepare for a debate than take a test. In addition, students thought that the debates increased their critical thinking skills.

Alford and Surdu (2002) discussed using debates in computer science courses. They presented the advantages and drawbacks of various types of topics to assign, including topics discussed in depth during the course, topics discussed briefly during the course and topics not discussed in the course. They also indicated the advantages and disadvantages of the timing of assigning debate positions (i.e., whether the student or team is for or against the proposition) near the beginning of the course, later in the course but prior to debate day and at the time of the debate. The general structure of the debate (with or without audience interaction) and several debate formats (student team vs. student team, student team vs. faculty team and faculty team vs. faculty team) were also presented with the pros and cons of each. Additionally, they offered some recommendations for keeping the audience active, such as inviting students to grade or submit a critique of the debate.

This paper offers practical guidance on the “how to’s” in debate-style learning. It also discusses student perceptions of the benefits of using debates in the classroom by asking for a level of agreement with the following statements: 1) I learned new knowledge about the topic I debated. 2) I gained an understanding of the topic area of my debate. 3) I felt comfortable explaining my position in the debate. 4) The debate helped me know the difference between fact and opinion. 5) I was able to defend my position in the debate. 6) I was able to gain additional knowledge on subjects that I was not aware of by listening to the debates. 7) The debate process helped me increase my critical-thinking skills. 8) I prefer to prepare a debate rather than take a test.

Methods

Debate-style learning was implemented during two semesters of teaching an undergraduate agricultural policy class at the senior level at Sam Houston State University. Each course met twice a week for 80 minutes over a 15-week semester. During both semesters, the topics discussed were briefly covered during lectures (and sometimes on writing assignments with suggested references to get started), in alignment with the advantages presented by Alford and Surdu (2002). The topics discussed each semester were similar. However, during the second semester attention was given to narrowing the topics to allow for better and more specific rebuttal (which is part of the grading) and discussion. The topics used were:

1. “The US should offer Government Crop Insurance”
2. “The US should continue the Conservation Reserve Programs”
3. “The US should dissolve NAFTA”
4. “Checkoff programs should be eliminated”
5. “The US should stop ag assistance (other than food aid) to poor countries”
6. “The US should ratify the Kyoto Protocol”
7. “Country of Origin Labeling (COOL) should be required on all food packages (first semester only).”

During both semesters each proposition and opposition team was composed of four or five students. This number of students was chosen to ensure that each student would get a chance to speak during the debate. The team size was also chosen to allow for five or six debates per semester to avoid boredom from the audience and not take too much time from the lecture portion of the course. Each debate lasted about 30 minutes; therefore two debates could be scheduled during an 80 minute class period, if necessary.

The first semester, each team was assigned two debates. Given time constraints and based on students’ inputs, only one debate was assigned per team during the second semester. Assigning two debates per team gave teams the opportunity to practice and improve their performance the second time. It also meant the debates took longer, which increased the likelihood of a bored audience.

Teams were not assigned by the instructor; students self-selected their team members. Although not assigning teams meant that there could be some excellent teams and some mediocre teams, it put the responsibility on the students and not the professor, which served to limit complaints and headaches associated with balancing team aptitude. The first semester teams randomly picked the debate topic and their position (for or against) several weeks prior to the debate. The second semester teams were allowed to choose their topics but the positions

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were drawn the day of the debate and teams were given 5 minutes prior to the start of the debate to strategize. One of the benefits of choosing positions on the day of the debate is that it leads to less rehearsed positions. A second benefit is that students study both sides of the issue and therefore have a more complete understanding of the topic. However, students tended to split the duties, with half the team studying the pros and half the team the cons, leading to a less than ideal debate situation.

Debates were scheduled at the end of each semester after all the lectures were given. The advantage is that students understood policy fundamentals more fully by the end of the semester, which led to better debates. Another reason for scheduling debates at the end of a semester is that the debate topics cover lectures from the entire semester and therefore represent a good opportunity to review. Students were allowed to bring unlimited notes the first semester. The second semester, debaters were limited to one page of notes to discourage them from reading during the debate.

During the debates, the proposition team was allotted up to five minutes to give a brief introduction to the topic and provide some arguments supporting their position. The opposition team then had five minutes to refute those arguments and introduce new ones. The back and forth continued five minutes at a time for two complete rounds. At this point, the audience was allowed to ask questions and then the proposition team provided their conclusion followed by the opposition's final rebuttal. Five minutes were given for the audience and the professor to grade. The first semester, the instructor asked for students to assign in advance the order in which each would speak. The second semester, students were given more freedom to make such decisions on their own. The latter method allowed for more flexibility and a more active debate. However, shy students may be less likely to participate in such a format.

To increase audience participation, students in the audience are asked to evaluate the debaters using five rubrics on the same evaluation sheet as the instructor. Undergraduate students were also asked about the debates on the course final exam.

In the undergraduate Agricultural Policy course, debaters' grades were based on the audience's evaluation (20%) and the professor's evaluation (80%). The audience evaluated the debaters using a judging sheet available in Figure 1, without being graded on their evaluation by the professor. The judging sheet was accompanied by a grading rubric. The grading rubric is available upon request to the authors but is similar to those available online (e.g., Shoemaker, n.d.; Shanahan, n.d.).

In addition, the second semester, scores from students assigning full points to all debaters were excluded

Figure 1. Students' judging sheet for the undergraduate policy class and the graduate animal science class

Debate Judging Sheet	
Judge's Name: _____	
Topic: _____	
Proposition Team: Write the students' name in the order they are seating	
1 st : _____	Points: _____
2 nd : _____	Points: _____
3 rd : _____	Points: _____
4 th : _____	Points: _____
5 th : _____	Points: _____
Opposition Team: Write the students' name in the order they are seating	
1 st : _____	Points: _____
2 nd : _____	Points: _____
3 rd : _____	Points: _____
4 th : _____	Points: _____
5 th : _____	Points: _____
In my opinion, the Team that won the debate was the (circle one) PROP/OPP (2 bonus points)	
Use point rubric attached to tally points: Maximum points 40.	

from the grading scheme. In the second semester, 10% of the debater's grade was also based on the writing of ten multiple choice questions about the debate and the selection of an article on the subject (during the first semester); the writing as a team, of their list of arguments, for and against as well as their list of references (during the second semester). The list of arguments and references were extremely useful when assigning the final grades. Team members were also asked to grade each other using a student peer evaluation. This evaluation was considered, although not formulaically, when calculating the debater's final grade.

Debates in the graduate Agricultural Policy course were handled in a similar, yet distinct manner. The graduate level course met once per week for three hours during the 15-week semester. The debates were also planned for late in the semester, after the students had studied most of the base material in the course. The debate topics were similar to the ones used in the undergraduate course. Debates were held at the start of a class period, with a lecture and discussion typically following. Students were permitted to self-select three-person teams, which were maintained throughout the semester. Each team participated in two debates, one on the proposition side and one on the opposition side of the particular topic, using notes to help with the discussion.

Figure 2. Students' judging sheet for the graduate policy class

Debate Judging Form: # _____		
Grader's Name _____	Date _____	
Max 8 pts in each box. Comments are REQUIRED for each box! Use the back if needed.		
Points are for logic and presentation, but whose arguments convinced you? Circle: F A		
	FOR	AGAINST
Argument 1	5 min	5 min
Argument 2	5 min	5 min
Argument 3	5 min	5 min
Q&A	10 min	10 min
Rebuttal	8 min	8 min
Total Points:	FOR _____	AGAINST _____

All students not on the debating teams each week became formal graders using the professor-supplied judging sheet (Figure 2).

To ensure that non-participating students were engaged in the judging process, they were graded on the effort and depth of their judging comments. Additionally, time was allotted after the main arguments, but before the closing statements, when non-participating students could ask clarifying questions of the debate teams. Each of these students submitted general topic questions or ideas for possible questions to the professor prior to the start of the debate. This encouraged them to study the issues beforehand and come to the debates prepared, even though they were not “performing.”

Debate style learning was also utilized in the graduate level Contemporary Issues in Animal Agriculture course. This course is taught each fall semester and meets once per week for three hours during the 13 week semester. Students debated in teams of two (students chose their own teammate) and were on the Pro and/or Con side for each of the two debates. This gave the teams the opportunity to debate on the side of an issue that they may not have agreed with. The instructor believes that it is equally important to understand both viewpoints

to issues. Students are better prepared to defend their position if they understand the opposing side.

The teams were allowed to choose their debate issue, but were required to obtain instructor approval of the topic. Topics that have been debated include: Animal Rights and Welfare, Horse Slaughter, Animal Cloning and Xenotransplantation, Waste Management and the Environment and Food Safety. The debate teams were allowed to use note cards as a reference during the formal debates. Blatant reading off of the cards was not permitted.

The format of the debates consisted of the proposition team (speaker 1) taking 10 minutes to make a case for the motion of the debate. The opposition team (speaker 1) was then provided 10 minutes to present arguments against the case presented by the proposition team. Each supporting team member was provided 10 additional minutes to support the case presented by each of their respective members. This format allowed each student on each team equal time to participate in the debate. The rebuttal section of the debate was divided into 8 minute sections starting with the opposition and ending with the proposition. At this point in the debate, the non-debaters and instructor were given time to ask questions to the panel of debate teams.

The non-debate individuals were required to write at least eight questions over the debate topic and had to be prepared to ask those questions during this Q/A session. This assignment allowed the non-debaters to have prior knowledge and research the topic. Along with the instructor, the non-debate students evaluated and graded the individuals on the debate panel using a variant of the judging sheet in Figure 1. Points were allocated to each individual and the team as a whole. Feedback was provided to each individual from the instructor after the first debate. A summary of the judges' comments were emailed to each debater and the video recording of the debate was uploaded onto Blackboard. This information could be used by the student to improve their debate skills, since the second debate was worth more points towards their overall grade in the course.

Results and Discussion

On the last day of the agricultural policy classes in the spring 2012, the students were asked to fill out a questionnaire based on the questions asked by Scott (2008) and Alford and Surdu (2002). The first part of the questionnaire was composed of nine questions using a five-point Likert-type scale (1 = strongly disagree, 5 = strongly agree). Table 1 provides the statements and the mean responses from the students, divided by classification (undergraduate and graduate). Overall, students were pleased with their experience as indicated by

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the average ratings, all higher than 3. The undergraduate students rated the statement “I prefer to prepare a debate rather than take a test” the highest followed by “I gained an understanding of the topic area of my debate.” This latter statement was also rated second highest by the graduate students, but was preceded by the statement “I learned new knowledge about the topic I debated.” The statement rated the lowest by the undergraduate students on average was “The debate process helped me increase my critical-thinking skills,” while it was “I felt comfortable explaining my position in the debate” for the graduate students.

Table 1 Mean Scores of Students' Responses

Statement	Mean Undergraduate Ratings N=26	Mean Graduate Ratings N=9
I learned new knowledge about the topic I debated	4.00	4.67
I gained an understanding of the topic area of my debate	4.08	4.56
I felt comfortable explaining my position in the debate	3.69	3.89
The debate helped me know the difference between fact and opinion	3.65	4.00
I was able to defend my position in the debate	4.00	4.22
I was able to gain additional knowledge on subjects that I was not aware of by listening to the debates	4.00	4.33
The debate process helped me increase my critical-thinking skills	3.58	4.22
I prefer to prepare a debate rather than take a test	4.19	4.44

5 point Likert-type scale with 1 = strongly disagree, 5 = strongly agree

The mean scores were higher than the ones reported by Scott (2008). However, both here and in Scott’s findings, the results were lower for the statements “I felt comfortable explaining my position in the debate” and “The debate helped me know the difference between fact and opinion.” In contrast with Scott (2008), scores were lower here for the statement “The debate process helped me increase my critical-thinking skills.” Interestingly, for every statement the graduates expressed a higher level of agreement than the undergraduates.

Students were also asked open-ended questions related to what they liked and disliked about the debates in the class and whether they would recommend holding debates in the future. They also had opportunities to comment on what to change in the debate exercise (if anything), whether they would like for debates to be used in other classes and if so, which ones? With regards to these open-ended questions, students were supportive of using debates. In the undergraduate class, 23 of 26 students recommended holding debates in the course again, as did eight of nine graduate students. They mentioned liking group work, having a different assignment rather than regular projects or more exams and that it was a “fun way to learn” and a “break from lectures.” Seventeen of 26 undergraduate and six of nine graduate students recommended having debates

in other classes such as Marketing, Economics, Ethics, Government and Animals and Society. Seven of 26 undergraduate students mentioned that they would like to know their position (for or against) several days prior to the debate. In the graduate class, students were informed of their position with at least three weeks of prior notice, while the undergraduates did not find out their position until the day of the debate.

Summary

Overall, students indicated that they enjoyed the debates in the Agricultural Policy and Contemporary Issues in Animal Agriculture classes and believed that this type of assignment is transferrable to other classes. The set-up of the semester (rigid format or more flexible format, when to assign positions) and the grading of the debates are still decisions left up to the instructor. Most undergraduate students in the classes had never debated before, although several graduate students commented that they had used debates as a learning experience in other courses. In the authors’ opinion, there is a need for online instructional videos to help students understand better what a debate is all about. These videos would benefit students by demonstrating effective debate principles and techniques prior to engaging in an actual debate.

Debate style learning is a useful tool to put students in the driver’s seat of their learning experience with faculty members providing a supporting role in helping students learn. As indicated in the literature review, debate style learning has been successfully helping students prepare for lifelong learning and making them more adaptable to work in fields where they must acquire new skills and knowledge regularly.

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Effect of Class Standing, Gender and Academic Attribution on Resiliency and Goal-Setting Strategies among Animal Science Students¹

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Abstract

Development of the student as an autonomous learner is one of the primary goals of higher education. Self-regulated learning is dependent on a number of adaptive strategies, including student resiliency and effective goal-setting, concepts which have been relatively unexplored in the agricultural sciences. Therefore, the objective of this study was to evaluate perceptions of resiliency and goal-setting behavior among undergraduate students enrolled in an introductory animal science course. On the first day of class, students (n=157) completed an anonymous questionnaire related to goal-setting strategies, resiliency and academic attribution. Student gender and class standing (freshman, sophomore or junior) were also reported. Most (57.6%) students attributed academic success or failure to factors outside their control. Means for resiliency and goal-setting strategies were numerically highest for upperclassmen and in most cases differed statistically from those observed for freshmen or sophomores. Correlations between behaviors that facilitate goal attainment and capacity for change were positive and low to moderate in magnitude. Results from this study indicate opportunity for instructional intervention to improve goal attainment strategies and student resiliency, two factors associated with academic achievement and autonomous learning.

Introduction

The changing face of agriculture has prompted a re-examination of pedagogical practices in higher education (NRC, 2009; Estep and Roberts, 2011). New emphasis on agriculture's broad-based applicability to

solve societal challenges related to global food security, energy production and human, animal and environmental health necessitates educational programs that produce a more broad-based graduate, with transferable skills that allow for lifelong learning and continual adaptability to meet the demands of an ever-changing workplace. For many faculty members in the agricultural sciences, this represents a fundamental shift in practice (NRC, 2009; Stedman and Adams, 2012) from traditional instructor-centered teaching methods to a more constructivist, student-centered learning landscape in which students receive explicit instruction on how to develop successful habits of autonomous learning.

Self-regulated learning (SRL) is an adaptive strategy designed to facilitate learning goal attainment in dynamic social and physical environments. SRL describes processes necessary for the self to direct knowledge and skill acquisition (Zimmerman, 1989) and therefore promotes deep learning, higher-order thinking skills and mastery over subject matter. According to Pintrich (2004), effective self-regulated learners possess two main attributes: 1) they have some form of control and ownership over their behaviors, motivation and affect and cognition and 2) they are goal-oriented. As a result, central to SRL are concepts of attribution and goal-setting. For effective SRL, knowledge creation and skill acquisition must occur at least in part as an acknowledged result of the learner's actions as he or she attempts to achieve a predetermined goal. Effective goals are specific, parsimonious and consistent with one's motivation for achievement. Goals must be defined before students

¹This work was supported in part by the USDA-NIFA Higher Education Challenge Grant 320706. The anonymous reviewers are also thanked for their insight and comments.

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can become “metacognitively, motivationally and behaviorally active” in their attainment (Zimmerman, 1989). Goals focus learner effort, allow for realization of achievement and promote motivation and satisfaction. However, inappropriate goal-setting can have negative implications. Learning goals with too narrow a focus may be associated with inflexibility and ultimately limit success. Goals which are too distal or vaguely defined may decrease student motivation and effort. Demands for strict commitment to goal attainment can also disrupt school-life balance (Garavala and Gredler, 2002). Students coached in appropriate goal-setting behavior consistently demonstrate improved academic achievement (Zimmerman et al., 1992) and were more likely to exhibit self-efficacy, resilience and be classified as proactive, self-regulated learners.

Agricultural colleges offer unique contexts in which to study SRL, as they are largely grounded in a well-known learning model (i.e., the land-grant system of discovery, translation and dissemination) and traditionally rich in the use of constructivist, experiential learning paradigms for student education (Estep and Roberts, 2012; Splan et al., 2011a; Andreasen, 2004). Although relationships among goal-setting strategies and such constructs as resiliency and attribution have been generally described among undergraduate psychology or education majors, they are poorly characterized among student populations largely naïve to explicit instruction in metacognition, such as those in the agricultural sciences. Effective design of educational strategies to promote SRL and appropriate goal-setting is population-dependent; therefore, the objective of this study was to explore factors which influence self-reported goal-setting behavior and the closely-related constructs of self-efficacy and attribution, among students enrolled in an introductory course in the agricultural sciences.

Materials and Methods

Undergraduate students (n=157) enrolled in three consecutive semesters (Fall 2011, Spring 2012 and Fall 2012) of an introductory animal science course at a land-grant university were recruited for this study. The research protocol was approved by the Institutional Review Board and participant consent was implied from completion of the anonymous, self-report instruments. The selected course is required for all animal science majors and was chosen for its large class size, class level representation (81 freshmen, 34 sophomore and 42 juniors) and instructor amicability to student questioning. Four senior students were enrolled in the course but were eliminated from the final dataset due to small sample size. Eighty-three percent (n=130) of the students were female.

On the first day of class, students voluntarily completed questionnaires related to goal-setting strategies, resiliency and academic attribution. Student gender and class standing (freshman, sophomore or junior) were also reported.

Survey Instruments

Academic attribution: Academic attribution describes the reason(s) given by students to explain success or failure in a course or on a task after it has happened (Weiner, 1985). Attributions can be powerful determinants of student achievement and correlate strongly with task persistence, future effort, student mental health and self-esteem (Tavakolizadeh and Qavam, 2011; Weiner, 2010). In this study, students were asked to answer two open-ended questions relative to controllability of academic attribution: Think of the last time you did really well (poorly) in a class or course. What was the main reason for your success (failure)? Student responses were classified as to whether they attributed both their achievement and failure to factors over which they had control (e.g., effort, strategy) or to factors or those over which they had no control (e.g., inherent ability, task difficulty, instructor actions or characteristics which could not be manipulated). Data which could not be attributed clearly to controllability were excluded from analyses.

Goal-setting behavior: A self-reporting assessment of goal-setting was developed by Martinez-Pons (2000) in his Five-Component Scale of Self-Regulation. The modified version of this goal-setting instrument uses 15 questions answered on a four-point categorical frequency scale (never, sometimes, frequently, all the time) and has been more recently employed by Maclellan and Soden (2006) among first-year undergraduates majoring in primary education.

Resiliency: Resilience indicates an individual’s capability for positive transformation in the face of uncertainty or actual change (Lifton, 1993) or one’s ability to maintain, improve and recover mental health following stressful life events (Neill and Dias, 2001; Wolin and Wolin, 1993). Resilient individuals are marked by self-determination, emotional intelligence, adaptability, problem-solving and critical thinking skills and possess an internal locus of control, sense of humor and general hardiness (Connor and Slear, 2009; McMahon, 2006; Niell and Dias, 2001). College students with higher resiliency were more likely to persist to graduation (Donald et al., 2004) and demonstrate improved metacognitive development and academic performance (Harnish, 2005). A self-reporting resiliency instrument was developed and validated by Wagnild and Young (1993) and has been modified and shortened by

Effect of Class Standing

Niell and Dias (2001) to create a 15-item questionnaire (RS15). The instrument uses a seven-point Likert scale and has a high reliability (Cronach's $\alpha=.91$).

Mean differences for fixed effects of gender, class standing and student attribution were tested via PROC NPAR1WAY of SAS (SAS v9.2, Cary, NC) using Wilcoxon tests for pairwise comparisons and the Kruskal Wallis test for variables with more than two groups (e.g., class standing). Chi-square tests were performed to investigate relationships between categorical variables (e.g., academic attribution and gender). Relationships among the ordinal variables of goal-setting behavior and resiliency were investigated using Spearman rank correlations. Significance is reported at the $P<0.05$ level.

Results and Discussion

Academic Attribution

More than half of students tended ($p=0.089$) to see themselves as victims of their learning environment, with 57.6% of students attributing their academic success or failure to factors outside their own control. Whether or not students believed these factors were internal or external, stable or malleable, was not tested in this study and the question of attribution applied only to one instance, rather than to a general causal belief structure as described in other work (Weiner, 2010).

Relatively equal numbers of male students saw themselves as active ($n=9$) vs. passive ($n=11$) members of their learning communities ($p=0.655$), while a greater percentage of female students tended ($p=0.078$) to attribute academic outcomes to noncontrollable factors. Within the literature, there are mixed views regarding effects of gender on overall academic achievement. Although there is evidence that males tend to outperform females in specific disciplines and vice versa (Haynes Stewart, 2011), these data are not available for the animal sciences.

There was a significant effect of class standing ($p=0.049$) on academic attribution. Interestingly, while no differences in academic attribution were reported for freshmen or junior students ($p>0.617$), only 8 of 28 sophomores (29%) perceived academic success or failure to result from their own actions or strategies as a learner ($p=0.012$). It is unclear why this relationship exists, or if it was instead spurious; effects of class standing on academic attribution have not been previously addressed in the literature.

Significant positive correlations have been reported between academic locus of control and student grades (Cassidy and Eauchas, 2000; Cassidy 2007). Encouragingly, it appears

students' causal explanations of poor performance can be 'rewired' to promote development positive strategies for academic goal attainment (Weiner, 2010) and there is empirical evidence to support this argument (Haynes et al., 2009; Haynes Stewart et al., 2011; Perry et al., 1993). In students experiencing self-doubt, in which they attribute success to external factors and failure to their own unchanging deficiencies, reattribution training has resulted in improved academic performance and positive behavioral change (Wilson et al., 2002). This is consistent with Zimmerman's (1989) model of successful self-regulated learning, where higher-achieving students consider both failure and success to be due to malleable factors (Nokelainen et al., 2007).

Goal-setting

Means for self-reported frequencies of goal-setting behaviors (G1-G14) are reported in Table 1. Although such a questionnaire does not assume students benefit from, or appreciate the role of goal-setting in their learning efforts, study participants on average reported "frequently" setting goals to guide their academic work (G1). Behaviors with the highest frequencies included those related to setting goals that stretched the learner's capacity and understanding (G4, G5 and G8) and clarity of goals (G3 and G10). Goal-setting behaviors related to time management (G7 and G14) and organizational prowess (G12 and G13) were performed less frequently. Goal-setting strategies with the lowest reported frequencies were those that involved elements of social guidance, or checking with others such as peers, parents or tutors (G2, G6, G9 and G11).

Effect of gender and academic attribution: Male students tended (2.21 vs. 1.83; $p=0.054$) to check with others that goals were realistic on a more regular basis, while female students more often (2.71 vs. 2.35; $p=0.050$) set definite deadlines for goal accomplishment. In general, however, there were no significant effects of

Table 1. Self-reported goal-setting behavior frequency means, ordered from highest to lowest¹.

Goal-setting behavior	Mean (SD)
G8. I set goals that I think I have a good chance of achieving	3.24 (0.59)
G4. I set goals that go beyond what I have already achieved	3.19 (0.74)
G5. I set goals that present me with a challenge	3.18 (0.71)
G10. I am able to clearly distinguish my academic goals from one another	3.09 (0.75)
G3. I set clear goals that I can describe without difficulty	3.06 (0.73)
G1. When doing my academic work, I always set goals to guide my efforts	2.99 (0.75)
G12. I make sure that the numbers of goals I set for myself is manageable	2.92 (0.74)
G13. I organize my goals so that attaining one makes it easy to attain another	2.86 (0.80)
G7. I give myself plenty of time to achieve the goals I set for myself	2.80 (0.72)
G14. I set a definite deadline (date, time) for reaching each goal	2.67 (0.94)
G2. I check with others that the goals I set for myself are realistic	2.14 (0.90)
G11. I check with others that my goals involve objectives I have not yet attained	2.06 (0.89)
G6. I check with others that the goals I set for myself are clear	2.05 (0.88)
G9. I check with others that I give myself enough time to work on my goals	1.98 (0.82)

¹Responses scored on a Likert scale (1=never; 2=sometimes; 3=frequently; 4=all the time)

gender on frequency of goal-setting behaviors. Academic attribution of students did not appear to influence frequency of goal-setting strategies ($p>0.114$).

Effect of class standing: Class standing had a significant effect on most of the reported goal-setting strategies (Figure 1), with higher numerical means for juniors. Relative to freshman, juniors reported they set goals that presented them with a challenge (G5, $p=0.001$) and went beyond what they had already achieved (G4, $p=0.020$), set clear goals they can describe without difficulty (G3, $p=0.006$) and set definite deadlines for goal achievement (G14, $p=0.001$) to a higher degree, with no difference in means between freshman and sophomores ($p>0.160$) or between sophomores and juniors ($p>0.061$). Juniors were more frequent in distinguishing academic goals (G10, $p<0.038$), organizing goals so that attaining one makes it easier to attain another (G13, $p<0.015$) and making sure the number of goals set is manageable (G12, $p<0.035$) than either freshman or sophomores. Freshman reported setting goals for their academic work less frequently than either sophomores ($p=0.038$) or juniors ($p=0.001$), with no difference observed ($p=0.461$) between means for juniors and sophomores.

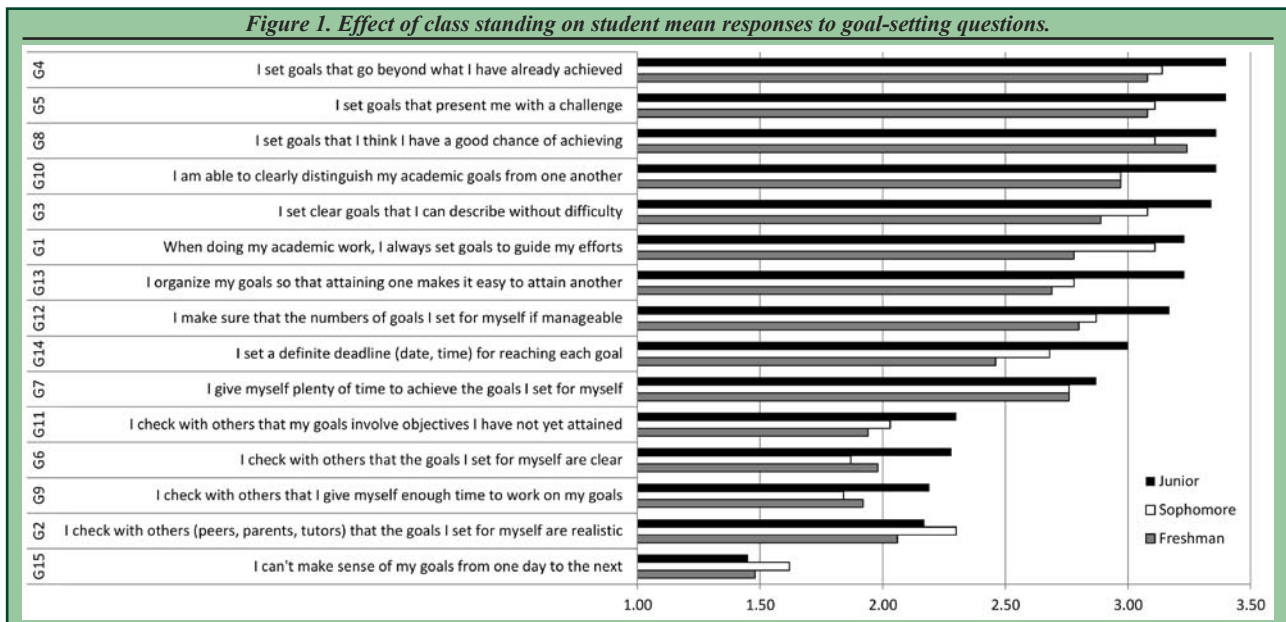
The benefits of goal-setting on student performance are widely known among educators (Boekaerts, 2002; Schunk, 2003) and it is accepted that goals designed and evaluated by students foster autonomous learning (Moeller et al., 2012). Despite this, research indicates most students are not explicitly instructed in goal-setting strategies (Bishop, 2003). Often, learning objectives or outcomes are designated solely by the instructor and rarely involve student input or encourage students to adapt such goals to their own personal interests and needs (Moeller et al., 2012) Results from this study indicate first-year students set academic goals less frequently and

were less organized, reflective and strategic in their goal-setting. From these data, it appears that students acquire “on-the-job” training to enhance goal-setting skills in the time between freshman and junior years, although the data do not account for student attrition, which may be high in first-year students. Further, it appears there is opportunity for explicit instruction in goal-setting for incoming undergraduate students and indeed, student’s at all academic levels. Learning goals set by the student and approved by the educator can capitalize on intrinsic motivation and allow students to better understand they are not just completing an assignment but also advancing toward their own career aspirations (Boekaerts, 2002; Moeller et al., 2012)

Resiliency

Resiliency means are shown in Table 2. Scores were highest for student determination (R7), pride in accomplishment (R3), general humor (R10) and life meaning (R13). In general, students reported lowest scores for their ability to handle many things at a time (R6), belief in themselves during hard times (R11), whether they usually take things in stride (R4) and ability to view situations from multiple perspectives (R12).

Effect of gender and academic attribution. Male students had higher resiliency scores for reported ability to manage one way or the other (R2, $p=0.051$), taking things in stride (R4, $p=0.025$), being friends with oneself (R5, $p=0.008$) and belief in oneself (R11, $p=0.038$). On the other hand, female students were more determined (R7, $p=0.005$) and tended to report more pride in self accomplishment (R3, $p=0.066$). These results are consistent with previous findings that males are more likely to attribute success to inherent ability, while female students generally tend to believe success is a



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Table 2. Self-reported resiliency means, ordered from highest to lowest².

Resiliency item	Mean (SD)
R7. I am determined	6.58 (0.71)
R3. I feel proud that I have accomplished things in my life	6.56 (0.72)
R10. I can usually find something to laugh about	6.46 (0.89)
R13. My life has meaning	6.45 (0.89)
R8. I have self-discipline	6.14 (1.09)
R14. When I am in a difficult situation, I can usually find my way out of it	6.11 (1.15)
R2. I usually manage one way or the other	6.07 (0.92)
R9. I keep interested in things	6.03 (0.99)
R15. I have enough energy to do what I have to do	5.90 (1.15)
R5. I am friends with myself	5.88 (1.21)
R1. When I make plans I follow through with them	5.86 (0.92)
R12. I can usually look at a situation in a number of ways	5.79 (1.17)
R4. I usually take things in stride	5.79 (1.13)
R11. My belief in myself gets me through hard times	5.63 (1.44)
R6. I feel that I can handle many things at a time	5.58 (1.21)
Average score	6.06 (0.64)

²Responses scored on a Likert scale (1=strongly disagree; 7=strongly agree)¹
 Responses scored on a Likert scale (1=never; 2=sometimes; 3=frequently; 4=all the time)

result of effort expended (Ames, 1992). In a previous study of 107 students enrolled in an introductory agricultural economics class (Splan et al., 2011b), male students scored themselves higher for R4 ($p=0.05$) than female students, but no other differences due to gender were observed. Effects of gender on resiliency scores have been mixed in the literature (Niell and Dias, 2001). Interestingly, students who attributed academic success to external factors were more likely to report that they take things in stride (R4, $p=0.005$) and say they can handle many things at a time (R6, $p=0.020$). Often we associate increased resilience and autonomous learning with a heightened internal locus of control (Fazey and Fazey, 2001; Kobasa, 1982). Results from this study indicate that students who let go of this internal locus of control may have an advantage in some aspects of resiliency, in essence allowing them to ‘roll with the punches.’

Effect of class standing. Similar to results reported for goal-setting, juniors had the highest numerical means for all resiliency items (Figure 2). Junior students were significantly higher than underclassmen for R6 ($p<0.044$), R14 ($p<0.029$) and overall average score ($p<0.015$), with no difference between freshman and sophomore means. In some cases (R1, R3, R4, R8), mean responses for juniors were significantly higher than those for freshman ($p<0.044$), but only tended to be different than those of sophomores ($p=0.053$ to $p=0.155$). Freshmen students were significantly lower than either sophomores ($p=0.018$) or juniors ($p<0.001$) in their reported ability to take things in stride (R2), while sophomores responded with less agreement than freshmen ($p=0.149$) or juniors ($p=0.023$) when asked if they believed their life had meaning.

Student attrition rates can be as high as 80% at some colleges and universities. Most student retention loss occurs in the first two years, with 75% of student losses occurring after their first year on campus (Braunstein et al., 1997). In this study, freshman often had lower resiliency scores than sophomores or juniors. This may indicate improved resiliency in individual students as they progress through the curriculum, or it may simply reflect the higher inherent resiliency of those students who persist. In a previous study of freshman, resiliency has been shown to be positively correlated with persistence to degree (Donald et al., 2004) and explicit training in resiliency improved academic performance, meta-cognitive development and student persistence to degree (Harnish, 2005). Thus, the lower resiliency scores among freshmen in animal sciences reported here may represent potential opportunity for positive intervention in the discipline through explicit coaching in resiliency and other self-efficacy factors, a pedagogical method not currently employed in most agricultural education programs.

Figure 2. Effect of class standing on student mean responses to resiliency questions.

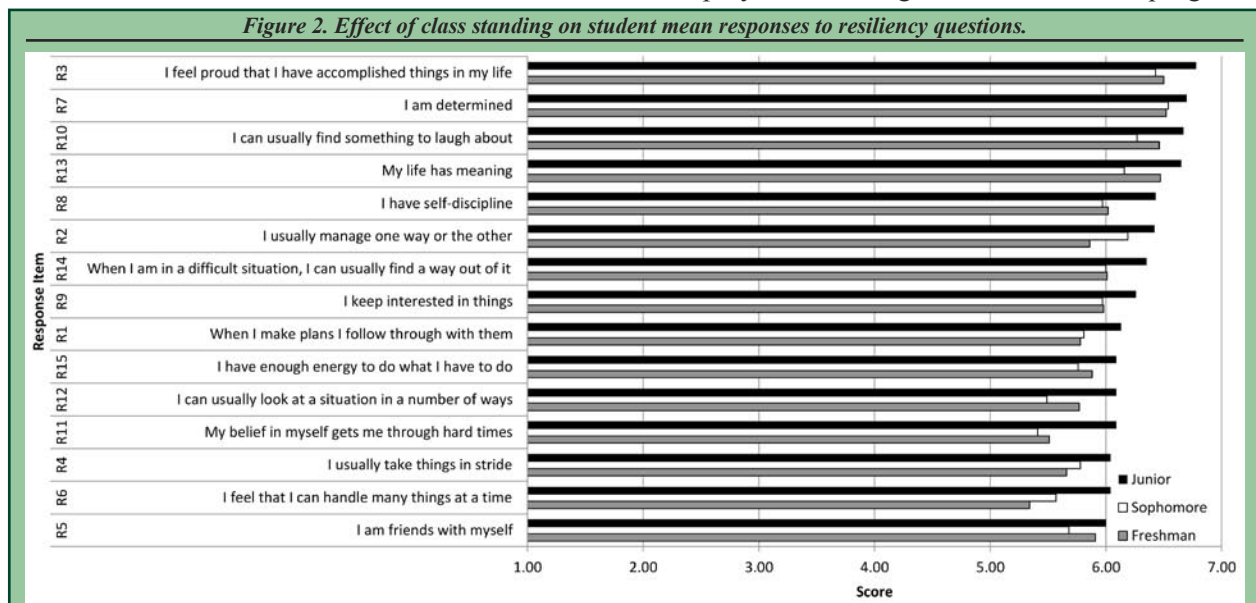


Table 3. Spearman rank correlations between goal-setting strategies and average resiliency, ordered from highest to lowest

Goal-setting behavior	r
G13. I organize my goals so that attaining one makes it easy to attain another	0.33***
G3. I set clear goals that I can describe without difficulty	0.31***
G7. I give myself plenty of time to achieve the goals I set for myself	0.31***
G9. I check with others that I give myself enough time to work on my goals	0.27***
G10. I am able to clearly distinguish my academic goals from one another	0.25**
G5. I set goals that present me with a challenge	0.24**
G14. I set a definite deadline (date, time) for reaching each goal	0.23**
G8. I set goals that I think I have a good chance of achieving	0.21**
G6. I check with others that the goals I set for myself are clear	0.21*
G12. I make sure that the numbers of goals I set for myself is manageable	0.20*
G4. I set goals that go beyond what I have already achieved	0.18*
G11. I check with others that my goals involve objectives I have not yet attained	0.17*
G1. When doing my academic work, I always set goals to guide my efforts	0.12
G2. I check with others that the goals I set for myself are realistic	0.11

*p<0.05

**p<0.01

***p<0.001

Correlations Between Goal-setting Strategies and Resiliency

Correlations among and between responses to goal-setting and average resiliency scores are shown in Table 3. As expected, all values were numerically positive, indicating behaviors that facilitate goal attainment are favorably associated with adaptability and capacity for change. The largest correlations were found between average resiliency and organizing goals ($r=0.33$; $p<0.001$), goal clarity ($r=0.31$; $p<0.001$) and checking with oneself ($r=0.31$; $p<0.001$) and others ($r=0.27$; $p<0.001$) to ensure adequate time to achieve goals, indicating more resilient students were also more organized in their approach to goal-setting. This higher level of organization and self-discipline has been shown to be a general characteristic of high-performing students (Komarraju et al., 2009), who also tend to be more resilient (Harnish, 2005). Non-significant correlations were found between average resiliency and both G1 (“when doing my academic work, I always set goals to guide my efforts”) and G2 (“I check with others that the goals I set for myself are realistic”).

Summary

Although some differences due to gender and perceptions of attribution were noted in self-reported goal-setting and resiliency responses among undergraduate students enrolled in an introductory animal science course, the greatest differences appeared to be due to class standing. Upperclassmen were more generally confident in their use of goal-setting strategies and displayed more resiliency than freshman or sophomore students. Explicit resiliency training or instruction in goal-setting are not part of the current curriculum in animal science at this particular university; thus it is encouraging to observe that student scores independently increase for goal-setting behavior and resiliency as they

progress through the curriculum. This may be due to necessity on the part of the student (self-directed learning), positive peer-influences, or perhaps students’ efforts to capitalize on myriad on-campus services aimed at career preparation or improving academic performance. However, given the relatively low mean scores reported for both resiliency and goal-setting, it seems students at all academic levels could benefit from instructional intervention that improves metacognition and learner autonomy. Given the indicated relationship in the literature between these factors and student achievement (Moeller et al., 2012), further research in this area is warranted.

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Selected College of Agriculture Students' Attitudes about Agriculture: Eurocentric Origins¹



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Abstract

Eurocentrism suggests European ideologies provide the only viable sets of beliefs for understanding the world. Such belief systems were carried to America, shared from one generation to another and may continue to unduly influence U.S. college students' beliefs about the world today. The purpose of this study was to determine college students' Eurocentric attitudes about North American and European agriculture. Results indicate that students had Eurocentric attitudes about agriculture. Upperclassmen held less Eurocentric attitudes than did underclassmen. Students generally agreed and sometimes strongly agreed with the 16 Eurocentric propositions about North American and European agriculture. Future research should include a longitudinal study of changes in the formation of Eurocentric attitudes about agriculture, as students advance from secondary to post-secondary education. Specific investigations are needed to determine if colleges of agriculture perpetuate Eurocentric ideals through their institutional foci and faculty body.

Introduction

Many careers in the U.S. agricultural industry are viewed as low-paying, hard-labor and menial jobs. Those misperceptions may be tied to European origins (i.e., pilgrims' puritan beliefs carried to America) and/or outdated traditionalistic family stories of life on the farm. Agricultural industry careers transcend traditional production functions found on farms and ranches.

Our future necessitates a well-trained workforce to address challenges in agriculture. In December 2012, the President's Council of Advisors on Science and Technology (PCAST), characterized those challenges as "...new pests and pathogens, controlling agriculture's environmental impacts, health and nutritional concerns and international food security" (Holdren and Lander, 2012, p. iii).

The PCAST Report to the President on Agricultural Preparedness and the Agriculture Research Enterprise included an admonition regarding the U.S. agricultural industry's image problem; "...the best students, particularly in the natural sciences, do not view agriculture, or agriculture-related research, as an attractive career option," which has the entire agricultural industry "facing a knowledge and workforce deficit" (Holdren and Lander, 2012, p. 41). Are American students' views about agriculture based on traditional production functions and/or European origins?

Eurocentrism creates a permanent core and a periphery from which socio-economic, cultural and political ideas disseminate into the world (Persaud et al, 2008). Fals-Borda and Mora-Osejo (2003) wrote that "*Eurocentrism proposes the western mode of life, economy and culture as a model to be adopted by the rest of the world, as the only solution to the challenges of our times*" (p. 32). Although Blaut (1993) rejected Eurocentrism, he argued that Eurocentrism is a label used to group all beliefs that Europeans are superior to non-Europeans.

¹Acknowledgement: This project was supported by Higher Education Challenge Grant no. 2006-38411-17081 from the USDA National Institute of Food and Agriculture, Hatch Act (H-8934) and State of Texas funds; it was produced through the Texas Agricultural Experiment Station, College Station, Texas.

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Selected College of Agriculture

Eurocentrism developed during the Enlightenment period when individuals perceived European traits as universal traits appropriately applicable to all humanity; once the idea was founded, “the rest of the world” mentality flourished (Peet, 2005). Blaut argued that Eurocentrism is embedded culturally and noted that believers still retain and propagate Eurocentric beliefs despite minimal rationale for why those beliefs are accepted. Eurocentrism beliefs are based on several myths that Anglo-Saxons and Americans have maintained for hundreds of years, as Caldwell (2006) suggested in writing,

Today there are many myths of American superiority and most Americans devoutly believe their nation to be superior to all others in countless ways. They are convinced of the superiority of America’s national culture, ideology and values. They are certain that American political, social and economic institutions are superior to all other systems and that the sum of it all, “the American way of life” will inevitably constitute the final destiny of mankind. (p. 139–140)

Hughes (2003) believed that national stories, or national myths, are created to explain why Americans express love toward and faith in the U.S. and “affirm the meaning of the United States” (p. 2). Resultingly, American myths and Eurocentric attitudes continue to be transferred to new generations. Such attitudes may be found in academia at many levels.

In a study of 701 college students, Clarke (2004) found that students’ perceptions of their own global awareness and attitudes about internationalism reflected ideas of Eurocentrism. A majority (71%) of students responded affirmatively to the statement that the U.S. was superior to other countries in the world; also, ethnocentrism increased with students’ ages. However, Persaud et al. (2008) found that Eurocentric attitudes of students enrolled in agriculture programs diminished with age. Persaud et al. found that freshman (1st year students) displayed higher levels of Eurocentric views than did seniors (4th year students).

Although many of today’s land-grant universities are known for their agricultural roots, many land-grant colleges of agriculture have fewer students with agricultural backgrounds now than in previous times (National Research Council, 1995). The National Research Council (1996) noted that broadening and diversifying programs in colleges of agriculture is important because it has a “*potential payoff for the colleges’ traditional agricultural clientele because expanding input and participation by diverse groups is an important means of broadening the constituency base for food and agricultural science and education*” (p. 25). One way colleges of agriculture are addressing

change in student populations is by offering a broadened curriculum that reflects the diversification and global changes in today’s agriculture sector (National Research Council, 1996).

Persaud et al. (2008) argued that the nationalistic notion of traditional farming production practices taught in agricultural education programs could lead to biased students at land-grant universities. Persaud et al. suggested that “*students’ Eurocentric views on agriculture are probably associated with socio-cultural conditioning embedded historically by precept and example in the (essentially neo-European) North American psyche as proposed by Hughes (2003)*” (p. 32).

Irani et al. (2006) noted that U.S. agriculture students exhibited limited international experience and backgrounds. “*Therefore, it is crucial that [U.S.] agriculture students become more knowledgeable about other countries, their cultures, economy and roles in world affairs*” (Zhai and Scheer, p. 40). U.S. students may or may not have nationalistic attitudes about American agriculture with less or more biased zeal than South African students have about South African agriculture. However, educators in colleges of agriculture (also known as Faculties of Agriculture) can help students separate fact from fiction when learning about and understanding basic premises such as “the soils in North America/Europe are more fertile than in the other continents.” Students can replace mythological belief with scientifically verified fact. This research is a first step in understanding the prevalence of students’ Eurocentric attitudes about agriculture.

Methods

The purpose of this study was to determine selected U.S. college students’ Eurocentric attitudes about agriculture. The research objective was to identify differences in college students’ Eurocentric attitudes when compared by grade classification. This study was deemed exempt under federal regulation 45 CFR §46.101(b).

The study population (N = 359) included underclassmen (1st and 2nd year students) and upperclassmen (3rd and 4th year students) enrolled in an introductory course about modern agriculture and natural, human and scientific resources in the College of Agriculture and Life Sciences at Texas A&M University. The study population included students from a variety of majors and classifications. The university e-mail system produced an accessible population (N = 166) from which a stratified random sample (n = 91) was derived. The sample was determined using Dillman’s (2007) methods for deriving a probability sample. The researchers used an 80/20 split with a 5% sampling error

Table 1. Sixteen Eurocentric propositions regarding North American/European Agriculture as proposed by Landes (1998) and reproduced by Persaud et al. (2008).

Explanation	Keywords
The climate of North America/Europe is more favorable for agriculture than are the climates of other continents.	Climate favorable
The climate of North America/Europe is better for human comfort than are the climates of other continents.	Climate comfortable
The soils in North America/Europe are more fertile than in the other continents.	Fertile soils
North America/Europe suffers less from natural disasters than do other continents.	Less natural disaster
North America/Europe was historically less ridden by human diseases than other continents.	Less disease-ridden
The stability of North American/European agricultural productivity can largely be explained by the differentiation of these continents into distinct ecological zones.	Ecological zone stability
Historically, North America/Europe avoided land degradation caused by overpopulation.	Land degradation / overpopulation
Culturally, North America/Europe avoided overpopulation because their capitalistic/free enterprise ethic counteracted such tendencies.	Overpopulation / capitalistic ethic
North American agriculture flourished because European immigrants were particularly inventive.	Inventive immigrants
North American agriculture flourished because European immigrants were particularly venturesome.	Venturesome immigrants
North American agriculture flourished because European immigrants were particularly capable of scientific thought.	Scientific immigrants
North American agriculture flourished because European immigrants held strongly democratic values.	Democratic values
North American agriculture flourished because European immigrants' family structure was particularly well suited to agricultural development.	Family structure
North American agriculture flourished partly because European immigrants brought with them free market institutions.	Free market
North American agriculture flourished partly because European immigrants brought with them the institution of private property rights.	Private property
The dominance of Christianity among European immigrants contributed significantly to North American agricultural development.	Dominance of Christianity

Note. Keywords adapted from those created by Persaud et al. (2008).

at a 95% confidence level (Dillman). All classifications — freshman, sophomore, junior and senior — of males and females, ranging in age from 18 to 25 were in the sample. Repeated e-mail contacts, using Dillman’s methods, produced a response rate of 68% (n = 62).

Data were collected with an online questionnaire that measured students’ Eurocentric attitudes about agriculture using a Likert-type five-point scale. Students responded whether they strongly agreed, agreed, had no opinion, disagreed, or strongly disagreed with 16 Eurocentric statements about agriculture (Table 1). The instrument was adapted from Persaud et al. (2008). Example statements include: The climate of North America/Europe is more favorable for agriculture than are the climates of other continents; and The soils in North America/Europe are more fertile than in the other continents.

Descriptive statistics, modeled after the procedures by Persaud et al. (2008), were used to analyze the data. Radar plots, also called spider charts, were created to show comparisons and/or commonalities between the Eurocentric statements about agriculture.

Results and Discussion

Participants’ included 44 underclassmen (1st and 2nd year students) and 18 upperclassmen (3rd and 4th

year students). Most (n = 48) reported themselves as White/Anglo-American. Thirty-five were female. Thirty-eight had never lived on a farm or ranch. Forty were in the college of agriculture; 21 were from other colleges in Texas A&M University. Figures 1 and 2 show students’ aggregated percentages of responses (positive, neutral and negative) for the 16 Eurocentric statements about North American/European agriculture (Landes, 1998).

Underclassmen (1st and 2nd Year Students) Beliefs

A comparison of aggregated differences for the 16 Eurocentric statements about agriculture when analyzed by underclassmen status is shown in Figure 1. Each Eurocentric statement is represented as a number within the radar plot and is labeled by the researcher-assigned keyword. Underclassmen agreed more than disagreed with the statements pertaining to favorable climates, comfortable climates, fertile soils, less natural disasters, less disease-ridden society and

dominance of Christianity; they agreed slightly more than disagreed with the statement about venturesome immigrants. Why are these beliefs prevalent among underclassmen?

The case can be made that underclassmen have not had their belief systems challenged to the degree that upperclassmen have; certainly core curriculum courses on climate, soils and social development would enlighten most about the fallibility of believing in North American/European superiority in such matters. It is unlikely that many underclassmen opposed or did not share parental views about Christianity, if they considered themselves Christians at the time of this research, therefore their agreement that the “dominance of Christianity among European immigrants contributed significantly to North American agricultural development” is understandable and would not be changed within the first few years of college experience. Likewise, their agreement with the statement that “North American agriculture flourished because European immigrants were particularly venturesome” may be a debatable belief (Figure 1).

For all other statements (6, 7, 8, 9, 11, 12, 13, 14 and 15), underclassmen had greater levels of disagreement than agreement. Persaud et al. (2008) found similar results, noting that underclassmen exhibited higher levels of Eurocentrism. However, some inconsistencies

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exist in underclassmen's levels of Eurocentrism about North American/European agriculture. For example, why would underclassmen not have similar attitudes about inventive or scientific immigrants as they did for venturesome immigrants? That is not to say that because one is venturesome he/she is also inventive or scientific, yet one who is inventive or scientific may be viewed as

someone who is venturesome. The land-grant college/university experience should inform and/or change belief systems, particularly pertaining to science and innovation (inventions). More research is needed to better understand underclassmen's disconnect between these beliefs.

A similar incongruent outcome was noted for differences in underclassmen's beliefs between dominance of Christianity (agreed) versus family structure and democratic values (disagreed).

Again, we do not attribute one's agreement with the dominance of Christianity (dominance of Christianity among European immigrants contributed significantly to North American agricultural development), as being disconnected (disagreement) with beliefs about family structure (North American agriculture flourished because European immigrants' family structure was particularly well suited to agricultural development) and democratic values (North American agriculture flourished because European immigrants held strongly democratic values). Can one have opposing ideals, that is, to be in agreement with Christian beliefs, which typically promote family structure and democratic values (e.g., social norms, rules, etc.), but disagree with statements about the role of family structure and democratic values playing a role in the advancement of North American agriculture?

Many reasons may contribute to explaining inconsistencies in belief systems; agriculture educators at the university level should continue to investigate these matters, especially how such beliefs may affect learners' attitudes toward science and technology-related issues. We need to better understand how these underlying beliefs may impact the teaching and learning processes.

Upperclassmen (3rd and 4th Year Students) Beliefs

Overall, upperclassmen tended to disagree more than agree with the

Figure 1. Radar plot comparing aggregated percent of underclassmen who agreed (circles) or disagreed (diamonds) with 16 Eurocentric propositions (Table 1) about North American and European agriculture. Students who neither agreed nor disagreed with the statements were aggregated into both categories.

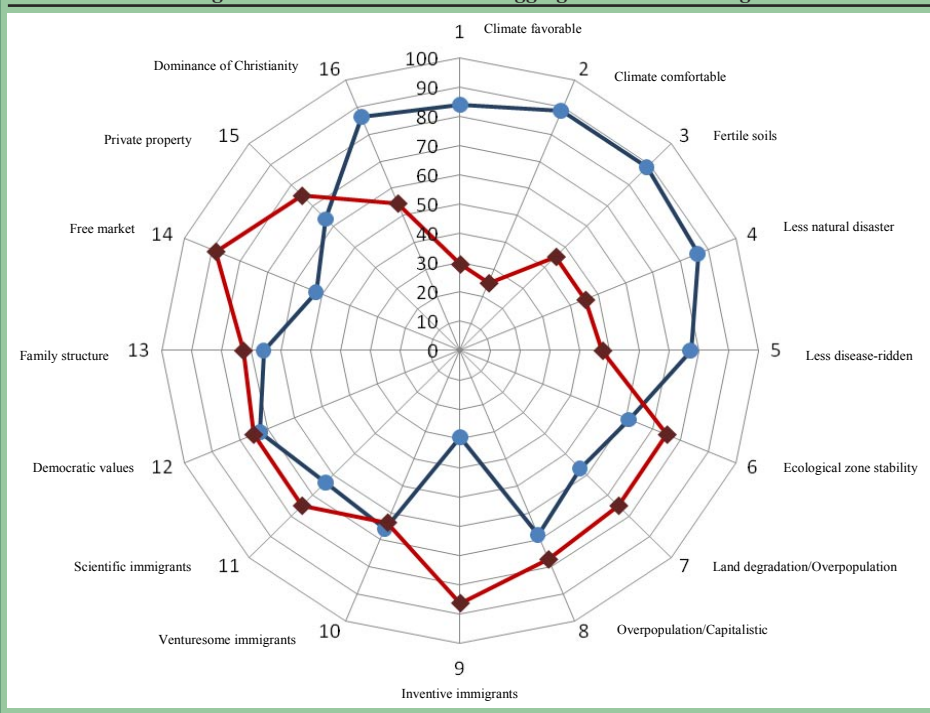
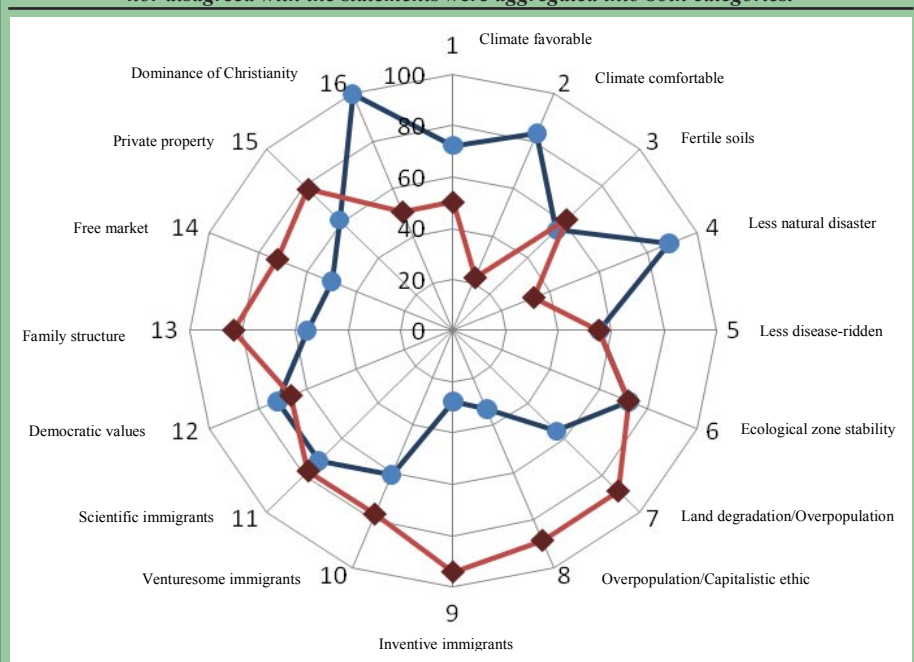


Figure 2. Radar plot comparing aggregated percent of upperclassmen who agreed (circles) or disagreed (diamonds) with 16 Eurocentric propositions (Table 1) about North American and European agriculture. Students who neither agreed nor disagreed with the statements were aggregated into both categories.



proposed Eurocentric statements about North American/European agriculture (Figure 2). More upperclassmen agreed, rather than disagreed, with statements pertaining to favorable climates, comfortable climates, less natural disaster and the dominance of Christianity. Although there are similarities to underclassmen's beliefs, upperclassmen had less variability in all 16 statements (Figure 2). Several reasons, including age, maturity levels, coursework and broadened perspectives through interaction with peers and professors could explain these results. According to our data, we need to stress how climatic conditions worldwide are favorable for different crops in each geographic region and how the climate of North America/Europe may not be more or less favorable for human comfort than it is in other world regions.

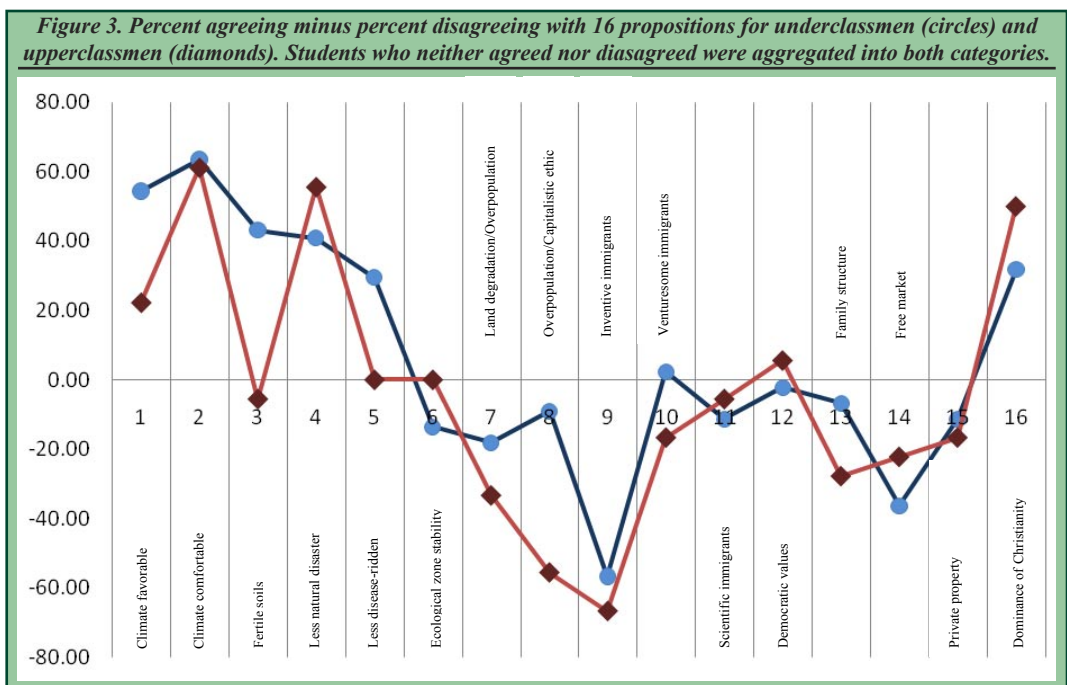
Upperclassmen tended to disagree more than agree with most of the other statements (7, 8, 9, 10, 13, 14 and 15). Persaud et al. (2008) found a narrowed representation of Eurocentric attitudes among upperclassmen in their study. Narrowed views, for any particular subject, may not be the most desired effect of a college education, especially if it is to facilitate or encourage lifelong learning. Do land grant colleges of agriculture reinforce, rather than broaden, students' pre-college views of American agriculture through curricula or instructors' beliefs about the American agricultural industry? Research into these factors may help college of agriculture educators' better understand and adjust, curricula and presentation of their own beliefs to provide a balanced approach to students of agriculture.

Students' Agreement/Disagreement with Eurocentric Statements about Agriculture

The percentage differences between agreement and disagreement levels for underclassmen and upperclassmen was examined (Figure 3). More agreement than disagreement was plotted above the zero line, while more disagreement than agreement was plotted below the zero line. Distances above or below the zero line represent the magnitude of that difference. Underclassmen and upperclassmen generally held the same beliefs for each statement (Figure 3).

The intensity of differences (agreed vs. disagreed) was greater for both groups when examining the statements for favorable climates, fertile soils, less disease-ridden society and overpopulation/capitalistic ethic. Climatic, soil and societal differences were described earlier, however the overpopulation/capitalistic ethic statement (Culturally, North America/Europe avoided overpopulation because their capitalistic/free enterprise ethic counteracted such tendencies) is notable in that most underclassmen may not have considered European population densities and/or confused their home counties in Texas when responding to this statement. Had underclassmen considered those two factors separately, they would have been hard pressed to agree more than disagree because European population densities (38/44 countries with >36 people/sq.km., Index Mundi, 2012) exceed Texas' mostly rural landscape (35.88 people/sq.km., Worldatlas.com, 2008).

This minimal difference of Eurocentric attitudes between percentages of agreement and disagreement for underclassmen and upperclassmen was seen in others' research (Persaud et al., 2008; Zhai and Scheer, 2004). Persaud et al. found that freshmen's (1st year students) differences followed the same trends as those of seniors (4th year students), with seniors tending to fall below the zero line. Zhai and Scheer (2002) posited that agriculture students had moderate global perspectives. These findings supported others (Bruening and Frick, 2004; Irani et al., 2006; Zhai and Scheer, 2002) who found that certain elements of ethnocentrism increased as students became older. Insights into the causes for these outcomes should be investigated in future studies.



Conclusions

Did college of agriculture students have Eurocentric views about American agriculture? Did traditional production function views about agriculture exist in college of agriculture classrooms? Did students believe that North American/European agriculture was superior to other regions' agriculture? For the students participating in this study, the answer is yes to all questions. Now, how can college of agriculture educators change these answers to avoid Holdren and Lander's (2012) warning (the best students, particularly in the natural sciences, do not view agriculture, or agriculture-related research, as an attractive career option)?

Future research with larger, more representative samples, to determine the specific origins of students' attitudes about agriculture, particularly how those attitudes may be aligned with mythological and/or romanticized views of bucolic European agricultural scenes, is needed. The more we know about students' attitudes of agriculture, especially if those attitudes are fixated on "production only functions," the better we can modify curricula to express unique agricultural contributions from other world regions. The National Research Council (1996) advised colleges of agriculture to offer students broadened curricula focused on global changes in the agriculture sector to help students think about the agricultural industry beyond traditional images of agricultural production.

There is a possibility that college students' attitudes about agriculture are influenced by faculty teaching those students. Despite scientific facts (i.e., worldwide soil types' production potential) that contradict mythological views (e.g., soils in North America/Europe are more fertile than in the other continents), faculty may be perpetuating their own Eurocentric attitudes. Additional research on faculty members' attitudes, especially as it relates to Eurocentrism, will expand our understanding of why such attitudes about agriculture continue to persist in highly educated professors and scientists of agriculture.

Selected students' Eurocentric attitudes about agriculture differed slightly between underclassmen and upperclassmen. Two statements (fertile soils and overpopulation/capitalistic ethic) showed more intense differences in agreement and disagreement between classifications. This observed change supports the ideas proposed by Caldwell (2006), who argued that many Americans are certain that American political, social and economic institutions are superior to others.

We did not attempt to determine specific factors influencing students' Eurocentric attitudes about agriculture. Course curriculum, maturity and socio-economic background could be influencing factors.

Students' non-classroom experiences such as study or research abroad programs, internships, etc., could be influencing their attitudes, cultural values and beliefs about American agriculture. Agricultural employers need globally-minded, culturally aware employees who can help the industry remain competitive in global markets. Therefore, additional research is needed on the student's complete collegiate experience, especially as it pertains to shaping one's attitudes about the agricultural industry. Clarke's (2004) research (foreign language study, frequency of visits abroad, study in courses of non-Western civilization and involvement with a person from another country) provides a good starting point.

Irani et al. (2006) found that agriculture students had limited international exposure and argued that these students needed to become more knowledgeable and versed in agricultural economics, affairs, cultures, etc. Thus, future research should include a longitudinal study of changes in the formation of Eurocentric attitudes about agriculture as students advance from secondary to post-secondary education. How much is known about the impact on students' Eurocentric attitudes about agriculture from their participation in the National FFA or 4-H international youth programs? Research is needed to understand the role those programs could play in helping students develop global-minded attitudes about American agriculture.

When possible, FFA and/or 4-H international youth programs and curricula should be introduced as international agriculture components earlier in the educational system. For example, middle or high school science or agricultural education teachers could invite international students from colleges of agriculture to speak in their classes. University students from non-North American/European countries could present talks about agriculture in their homelands. The National Research Council (1996) noted that diversifying pre-college agriculture education programs begins with incorporating participation from diverse groups because it broadens the scope of constituents of agriculture science and education. As such, including samples of pre-college students in future studies would help researchers more effectively test familial factors affecting students' Eurocentric attitudes about agriculture.

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Country Club Management and Self-directedness: Implications for Academics and Practitioners of Leadership

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Abstract

Leadership orientation is an important component of students' leadership development and helps inform the creation and understanding of more advanced models of leadership. Students' level of self-direction must be understood in order to better serve their instructional and leadership needs. The researchers examined leadership style and self-directedness of undergraduate students enrolled in two separate agricultural leadership courses. Data was collected through a combined instrument measuring students' location on the Blake and Mouton Leadership Grid and level of self-directedness. The findings indicated a strong correlation between a people orientation leadership style and self-directedness. The majority of respondents had a country club leadership style. Developing a comprehension of students' previous leadership experiences may provide more insight into their location on the leadership grid and level of self-directedness. Gaining a deeper understanding of self-perceived skills or behaviors of agricultural leadership majors or those minoring in leadership would be beneficial for agricultural leadership educators.

Introduction

Although original studies on leader behaviors and styles originated in the late 1950s, industry, leadership educators and leadership students still rely on those measures when engaging in leadership development activities. Understanding one's natural leadership orientation is also a basis for more advanced leadership models, such as contingency, situational and authentic leadership (Bass and Bass, 2008). Because leadership behavior models are integral in the development of leaders, it is imperative to understand how they correlate with other models of learning and development.

Blake and Mouton's (1964) Managerial Grid (later changed in 1991 by Blake and McCanse to the Leadership Grid) is a model of task and relationship orientation for leaders. Building upon the research line of leadership behaviors proposed by the University of Michigan and Ohio State, Blake and Mouton created a grid system, which associates managers' people (relationship) orientation to their concern for production (task). Utilizing the scores from the Managerial Grid Questionnaire, participants of this study can be classified as one of five leader types; (1) Authority-Compliance (high production, low people), (2) Country Club (low production, high people), (3) Middle of the Road (moderate on both measures), (4) Impoverished (low production, low people), or (5) Team (high production, high people). A further revision by Blake and McKee (1993) expands the original leader descriptors.

Blake and Mouton theorize leaders have a dominate style which is the one used most often and in varying situations. They also conclude other styles can and will be utilized by leaders if and only if their dominate style is not perceived as effective and the leader is reflexive enough to see a disconnect and change his/her style (Blake and Mouton, 1964). Subsequent studies by Hall (1984), Blake and Mouton (1985) and Blake and McCanse (1991) found leaders who self-identified as 9,9 or Team Leaders were more effective and were more likely to advance to higher leadership positions within their organizations.

Business can improve productivity by developing an understanding of leadership styles. The change of corporations from hierarchical, national and shareholder-oriented structures to networked, international and stakeholder-focused environments creates a need to

understand what leadership means and how followers react to leadership (Maak and Pless, 2006). A business leader's style, whether in terms of a single project or companywide, can affect organizational performance and different styles are needed in various situations (Müller and Turner, 2007). Supervisors must understand how their leadership style influences employee satisfaction. Managers' leadership styles shape organizational success, as well as employee job satisfaction, commitment and productivity (Rad and Yarmohammadian, 2006). The business world has changed in its approach to leadership with a shift from a more autocratic style to one that is more engaging and encourages employees to get personally involved (Lenhardt et al., 2011)

Research has shown task and relationship oriented leadership behaviors can have an effect in situations important in the business world. Madlock (2008) indicated a mixture of both task and relationship leadership styles leads to higher employee satisfaction. Taberner et al. (2009) found task-oriented leaderships had a positive effect on the creation of transactional normative contracts and higher group accomplishment, while relationship-oriented leadership had a positive effect on the creation of relational normative contracts and no difference in group accomplishment.

As leadership development encompasses leadership training and education, it is imperative to understand how leaders learn (Brungardt, 1996). Adult education has traditionally revolved around a classical teacher-student relationship with the goals of increasing subject knowledge in the student and also to foster skills that will continue to aid the student after the completion of the course (Dyan et al., 2008). Self-directed learning (SDL) is a concept that challenges the classical theory. SDL is a learning strategy where the individual assumes the responsibility and initiative for pursuing the individual's own learning needs and goals (Knowles, 1975). Candy (1991) extended the concept of SDL to education by positing that SDL environments fostered a more fundamental understanding of the subject material as opposed to rote memorization.

Achieving SDL by the student engenders fundamental knowledge that enhances both the skills required for the course and future life experiences. The emergence of a stronger SDL approach to adult education has called into question the efficacy of the traditional role of the teacher (Montgomery, 2009). The SDL framework has become increasingly used in contemporary educational research to address new modes of educational delivery. Irby and Strong (2013) found that students had relatively high willingness to engage in a new education mode like mobile learning. The increased use of technology and asynchronous education delivery systems has facilitated

the incorporation of SDL techniques into modern curriculae (Teo et al., 2010).

Classic SDL theory approaches self-directed learning as the responsibility of both the instructor and the student (Stockdale and Brockett, 2011). Specific characteristics have been attributed to college students exhibiting greater degrees of SDL. Students exhibiting greater levels of self-management, a desire for learning and self-control have been found to express greater levels of self-directedness (Fisher and King, 2010). SDL as an educational framework has the ability to significantly increase student learning when the student demonstrates high levels of motivation, self-management, learning desire and self-control (Abar and Loken, 2010). Students must be prepared to embrace SDL characteristics for effective self-directed learning to occur.

Encouraging students to engage in SDL learning techniques when the students are not ready can lead to inconsistent results and a reduction of classroom efficacy (Yuan et al., 2012).

The traditional teaching style adopted by most university classrooms revolves around the traditional teacher/classroom model in which teachers provide instruction and results are evaluated with assignments (Loyens et al., 2008). Conventional classroom instructional methods naturally inhibit the ability of students to become more self-directed. Courses designed with improving SDL in mind have been shown to increase student levels of SDL (Dyan et al., 2008). Educators should use the curriculum to prepare students for future jobs by moving students from dependence to self-directedness (Pennington, 2004). Strong et al. (2012) found a correlation with students' leadership style and level of self-directed learning. Blake and Mouton's (1964) and Grow's (1991) theories were used to scaffold this study to better understand factors that influence leadership in order to enhance the practice of student leader development.

Materials and Methods

The purpose of this study was to gain an understanding of factors that may influence leadership styles levels of agricultural leadership students. More specifically, the study sought to:

1. Describe students' leadership style;
2. Describe students' self-directed learning levels;
3. Examine the relationship between students' leadership style and self-directed learning levels; and
4. Examine the relationship between students' location on Blake and Mouton's Leadership Grid and level of self-directed learning.

Opening the Doors

This study used a quantitative research paradigm with survey research as the design for the study. This study was descriptive in nature as it was a census. The population (N = 93) consisted of undergraduate students in two separate agricultural leadership courses from a land-grant institution. The study was conducted during the Fall of 2012 with leadership students in two courses. One course focused on leading and training adults and had forty-three (n = 43) students. The course objectives were to:

1. Define teaching and learning and describe the process of each.
2. Identify the steps and processes related to Instructional Design and the ADDIE Model.
3. Describe and give examples of active training.
4. Identify and distinguish between the different components of an adult training program.
5. Design, develop and evaluate an adult training program.

The other course (course acronym) centered on leadership application and had fifty (n = 50) students. Team Leadership, is a junior-level leadership application course at Texas A&M University. The students in this course are agricultural leadership or university studies-leadership studies majors who have completed at least one course in leadership theory. The course objectives were to:

1. Complete a service-learning project with a community value of at least \$1,000
2. Identify group member roles within their team with 90% accuracy
3. Diagnose stages of the team development process with 90% accuracy

Survey questionnaires were hand delivered to the sample. Eighty-six (n = 86) of the 93 students responded yielding a response rate of 92.47% and two responses were eliminated due to incomplete answers. Therefore, the study produced (n = 84) usable responses.

Leadership style focuses on what leaders do versus what leaders may be. Blake and Mouton's (1964) leadership grid questionnaire, used in this study, was composed of 18 items that assessed two orientations to leadership: people and task. Researchers and practitioners of leadership at Texas A&M University found the Blake and Mouton's leadership style instrument to have content validity for the research objectives in this study. Anchors in the instrument were: 0 = Never, 1 = Seldom, 3 = Often, 4 = Almost Always and 5 = Always. Odd numbered items in the instrument related to the concern for people leadership orientation. Concern for people is the extent a leader considers the interests of team members when

choosing to achieve a goal (Blake and Mouton, 1964). Even numbered items were associated with task oriented leadership. Odd and even numbered scores were summed separately. In order to assess the scoring interpretation of Blake and Mouton's leadership grid, a researcher sums the total of the odd numbered or people oriented responses that result in a single number. The researcher then sums the total responses provided for the task orientation in the even numbered statements with a single number that is produced from the summation. The first number, the people orientation score is identified along the left side of Blake and Mouton's (1964) leadership grid and the second number, the task orientation score, is identified on the bottom of the leadership grid. The two scores are plotted on the grid representing a singular location. The singular location represents the leadership style of the respective individual; (1) Authority-Compliance (high production, low people), (2) Country Club (low production, high people), (3) Middle of the Road (moderate on both measures), (4) Impoverished (low production, low people), or (5) Team (high production, high people). The internal consistency was $\alpha = .86$ for the leadership style instrument.

Richards' (2005) developed an instrument aligning Grow's (1991) Staged Self-Directed Learning Model to ascertain students' perceived level of self-directedness. A team of adult learning researchers at Texas A&M University found Richard's (2005) instrument to have content validity suitable for this study. Richard's (2005) instrument included 24 items to assess students' level of self-directed learning and included anchors: 1 = Strongly Disagree, 2 = Disagree, 3 = Agree and 4 = Strongly Agree. The internal consistency of the self-directed learning scale was $\alpha = .85$. The internal consistency of each construct was reliable according to (Cronbach, 1951) and therefore, deemed acceptable to administer in order to answer the research questions in this study.

The first and second objectives were measured using descriptive statistics. Fraenkel et al. (2012) indicated descriptive statistics enable researchers to illustrate the data's location around a grand mean and standard deviation. The third and fourth objectives were measured with correlation coefficients. Correlations imply the track and scale of variable relationships between -1.00 and +1.00 (Davis, 1971).

The majority of students were male (n = 49, 58.33%), were seniors (n = 55, 65.50%), were between 21 and 23 years old (n = 72, 85.71%), were an FFA or 4-H member (n = 61, 72.62%) and worked at least a part-time job (n = 65, 77.38%). The findings from this study can only be generalized to the sample of students enrolled in the two leadership courses at Texas A&M University and cannot be generalized beyond the target population. However,

the data provided insight on additional factors that can be examined to develop a better comprehension of variables that influence leadership style.

Results and Discussion

The first objective was to describe students' leadership style. Students' leadership styles were examined in terms of task (Table 1) and relationship (Table 2) orientation. The overall mean for students' people orientation was ($M = 3.10$, $SD = .94$). The highest scoring item was "I encourage my team to participate when it comes to decision making time and I try to implement their ideas and suggestions." ($M = 3.41$, $SD = .90$). The lowest scoring item was "I enjoy reading articles, books and journals about training leadership and psychology and then putting what I have read into reading them." ($M = 2.58$, $SD = 1.01$).

Table 2 illustrates students' task oriented leadership styles. The overall mean for students' relationship orientation was ($M = 3.11$, $SD = .95$). The highest scoring item was "I honor other people's boundaries." ($M = 3.83$, $SD = .93$). The lowest scoring item was "It frustrates me when I have to deal with others' personal issues." ($M = 2.49$, $SD = 1.19$).

The second objective of the study was to describe students' self-directed learning levels (Table 3). The overall mean for students' level of self-directed learning was ($M = 2.00$, $SD = .61$). The highest scoring item was "I prefer individual work or a self-directed study group as the teaching delivery method." ($M = 2.26$, $SD = .65$). The lowest scoring item was "I prefer that the instructor provide direction only when requested." ($M = 1.57$, $SD = .68$).

The third objective of the study was to examine the relationship between students' people orientation and self-directed learning levels (Table 4). The items "I encourage my team to participate when it comes to decision making time and I try to implement their ideas and suggestions." ($r = .74$) and "The more challenging a task is, the more I enjoy it." ($r = .71$) had Very Strong ($r \geq .70$) correlations to self-directed learning level. The items "Counseling my followers to improve their performance or behavior is second nature to me." ($r = .57$) and "Breaking large projects into small manageable tasks is second nature to me." ($r = .54$) had Substantial ($.50 \geq r \geq .69$)

Table 1. Descriptive Statistics for Students' People Orientation to Leadership (N = 84)

Items	N	M	SD
I encourage my team to participate when it comes to decision making time and I try to implement their ideas and suggestions.	84	3.41	.90
When seeing a complex task through to completion, I ensure every detail is accounted for.	84	3.36	.80
I closely monitor the schedule to ensure a task or project will be completed on time.	84	3.34	1.11
I manage my time very efficiently.	84	3.17	.93
Breaking large projects into small manageable tasks is second nature to me.	84	3.17	.84
The more challenging a task is, the more I enjoy it.	84	3.09	.88
I enjoy analyzing problems.	84	2.91	1.05
Counseling my followers to improve their performance or behavior is second nature to me.	84	2.83	.93
I enjoy reading articles, books, and journals about training leadership, and psychology and then putting what I have read into reading them.	84	2.58	1.01

Note. Overall $M = 3.10$, $SD = .94$. Scale: 0 = Never, 1 = Seldom, 3 = Often, 4 = Almost Always, and 5 = Always

Table 2. Descriptive Statistics for Students' Task Orientation to Leadership (N = 84)

Items	N	M	SD
I honor other people's boundaries.	84	3.83	.93
Nothing is more important than building a team.	84	3.37	.84
I encourage my followers to be creative in regards to their jobs.	84	3.26	.87
I enjoy coaching people on new tasks and procedures.	84	3.22	.84
Nothing is more important than accomplishing a goal or task.	84	3.20	1.14
I enjoy explaining the intricacies and details of a complex task or project to my followers.	84	3.01	.81
I find it easy to carry out several complicated tasks at the same time.	84	2.97	.86
When correcting mistakes, I do not worry about jeopardizing relationships.	84	2.64	1.06
It frustrates me when I have to deal with others' personal issues.	84	2.49	1.19

Note. Overall $M = 3.11$, $SD = .95$. Scale: 0 = Never, 1 = Seldom, 3 = Often, 4 = Almost Always, and 5 = Always

Table 3. Descriptive Statistics of Students' Level of Self-directed Learning (n = 84)

Statements	N	M	SD
I prefer individual work or a self-directed study group as the teaching delivery method.	84	2.26	.65
I am willing to take responsibility for my own learning.	84	2.19	.57
I use resources outside of class to meet my goals.	84	2.07	.49
I am capable of assessing the quality of assignments that I submit.	84	2.06	.84
I set my own goals for learning without the help of the instructor.	84	2.03	.45
I learn best when I set my own goals.	84	1.95	.52
I have prior knowledge and skills in the subject area.	84	1.88	.71
I prefer that the instructor provide direction only when requested.	84	1.57	.68

Note. Overall $M = 2.00$, $SD = .61$. Scale: 1 = Strongly Disagree, 2 = Disagree, 3 = Agree, 4 = Strongly Agree

Table 4. Correlations between the People Orientation and Level of Self-directed Learning (N = 84)

Items	N	r	p
I encourage my team to participate when it comes to decision making time and I try to implement their ideas and suggestions.	84	.74	.00*
The more challenging a task is, the more I enjoy it.	84	.71	.00*
Counseling my followers to improve their performance or behavior is second nature to me.	84	.57	.00*
Breaking large projects into small manageable tasks is second nature to me.	84	.54	.00*
I enjoy analyzing problems.	84	.35	.00*
I manage my time very efficiently.	84	.32	.00*
I closely monitor the schedule to ensure a task or project will be completed on time.	84	.09	.09
I enjoy reading articles, books, and journals about training leadership, and psychology and then putting what I have read into reading them.	84	.07	.22
When seeing a complex task through to completion, I ensure every detail is accounted for.	84	.03	.24

Note. Magnitude: $.01 \geq r \geq .09$ = Negligible, $.10 \geq r \geq .29$ = Low, $.30 \geq r \geq .49$ = Moderate, $.50 \geq r \geq .69$ = Substantial, $r \geq .70$ = Very Strong (Davis, 1971).

* $p < .05$.

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correlations to self-directed learning level. The items “I enjoy analyzing problems.” ($r = .35$) and “I manage my time very efficiently.” ($r = .32$) had Moderate ($.30 \geq r \geq .49$) correlations to self-directed learning level.

The fourth objective of the study was to examine the relationship between students’ location on Blake and Mouton’s Managerial Grid and level of self-directed learning. The majority of students had a country club management leadership style ($n = 41$). Team management was second ($n = 17$) and impoverished management ($n = 14$) was third. Middle-of-the-road management was next ($n = 11$) and authority – compliance management earned the fewest scores ($n = 2$). Country club management was the only grid area that had enough responses to test for a relationship with students’ level of self-directedness. The data indicated country club management had a Very Strong ($r \geq .70$) correlation to level of self-directedness ($r = .71$).

Summary

The findings are limited to the population in this study. However, the data does offer insight into individual characteristics that influence leadership styles. Country club management was the only leadership style to be tested for a correlation with self-directedness because no other leadership grid had at least 30 members in the sample. Students scored highly in the areas of country club and team management because their experiences and their generational category of Millennials have put a premium on relationships. Holistic educational pedagogies used by many agricultural instructors cater to the Millennials need for socialized learning and relationship building utilizing team projects (Dunkel et al., 2011). The academic environments students have existed in so far are just as oriented to relationships (through socializing and working in group environments) as they are to tasks (completing assignments and tests). For leadership students, this environment makes pedagogical sense, but educators should be cognizant that Lehman (2011) found students who are high achieving prefer working also on directed tasks. The lack of professional exposure for students where task oriented environments may take precedent may explain their relationship orientation. It is also important for leadership educators to understand the leadership skill make-up of their students. This will allow the instructors of leadership education courses to create assignments that will engage and challenge the students to become more self-directed in their learning.

Students who engage in leadership education courses are more likely to leave the university with proficiency in the “soft” skills needed to be successful in today’s work environment (Brungardt, 2011). These “soft” skills include leader behavior and self-directed learning.

As Williams et al. (2005) found, Blake and Mouton’s Leadership styles were remembered and utilized by students years after they completed a leadership theory course, therefore making it a good model to use when teaching and learning about leadership styles.

The findings of this study are consistent with those of Lewis and Jobs (1993) who looked at leadership behaviors, group performance and situational control. They found task-oriented leaders on the Blake and Mouton scale perform better in a high control situation while relationship-oriented leaders, specifically Country Club leaders, are more successful in moderate control situations because they are more likely to engage in collaboration to accomplish the needed task. Students who are more self-directed are more likely to thrive in a moderate control environment where they can engage in learning on their own terms. Popper (2013) studied the implications of perceived distance between leaders and followers and psychological theories of leadership. Popper found those leaders who are perceived to be more distant, or task oriented, felt a higher need to create specific “schemas and leadership prototypes” (p. 5) for their followers to learn; thus making learning less self-directed.

Brungardt (1996) indicated leadership development includes leadership training and education. The task orientation was significant with self-directedness (Strong et al., 2012). The data in this study suggested individuals with high people orientations toward leadership styles are more likely to be self-directed learners. Blake and Mouton (1964) suggested individuals should have equal amounts of a people or task orientation depending on the situation that calls for the respective type of leadership. Those leaders who are team managers (9,9) were found to be more effective by their followers. The combination of this study with that of Strong et al. (2012) suggest that those leaders who are high in task and relationship also tend to be more self-directed in their learning. Regardless of the leadership orientation, having a higher level of self-directedness benefits the learner and the trainer (Grow, 1991). Fisher and King (2010) found students exhibiting greater levels of self-discipline and a desire for learning expressed greater levels of self-directedness.

A larger sample is needed to determine the effect of other areas of the leadership grid having a relationship with self-directedness. The sample may include enough individuals with team management, impoverished management, middle-of-the-road management and authority – compliance management in order to appropriately examine the potential relationship between the leadership styles and self-directedness. Sampling students, who are not majoring in leadership, or other social sciences, potentially would give more diverse responses for

leadership behaviors and skills. A larger sample would also provide data with more power regarding country club management and self-directedness.

This study should be replicated with business leaders. Practicing leaders in a for-profit arena may provide congruent or different results than a student population. The sample in this study included individuals who were a part of the millennial generation. A study involving business leaders may produce parallel or dissimilar results if the sample is composed primarily of participants that are not in the millennial generation.

A study involving previous leadership experience could be beneficial. This study found a majority of the sample were members of FFA or 4-H. This study did not ascertain if the sample participated in any leadership experiences within each of the youth organizations. Developing a comprehension of students' previous leadership experiences may provide more insight into their location on the leadership grid and level of self-directedness.

Gaining a deeper understanding of self-perceived skills or behaviors of leadership majors or those minoring in leadership would be beneficial for agricultural leadership educators. As programs are developing across the country, evaluative measures and possible accreditation leads us to the need for a more comprehensive picture of our leadership graduates. Leadership skills are important to employers but are not always learned through traditional leadership activities (Berle, 2007). As Colvin (2003) notes, the purpose of leadership education is to produce "leaders in social, economic, religious and political realms" (p. 28).

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College Entrance Examination Score Deficits in Ag-Intensive, Rural, Socioeconomically Distressed North Carolina Counties: An Inherent Risk to the Post-Secondary Degree Attainment for Rural High School Students

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Abstract

The emphasis on college entrance examination scores for college admissions by land grant institutions can be detrimental to rural high school students interested in pursuing higher education in agricultural degree programs. Rural high school students from agriculturally intensive and socioeconomically distressed counties often demonstrate lower college entrance examination scores than their urban counterparts. Through looking at the North Carolina top ten farm cash receipt counties, students residing in these counties exhibit significant score deficits on the SAT and ACT when compared with the students in the urban counties comprising Research Triangle Park (RTP). The three variables observed in this study: agricultural intensity, rural designation and level of socioeconomic distress negatively impacted student scores on the SAT and ACT college entrance examinations.

Introduction

Undergraduate college admissions committees consider a multitude of factors when determining the admissions status of prospective undergraduate applicants. One of the most highly considered factors for a student's admission status at a land-grant institution is his/her performance on SAT and/or ACT college entrance examinations. College entrance examinations, such as the SAT and ACT, are often used for standardization of students

and are also important for measuring the cognitive skills that will often lead to positive educational outcomes (Mattern, 2011). Specifically, either SAT or ACT scores are used by admissions committees as a tool to compare academic achievement of applicants and to draw inferences about the likelihood of a student's future success at the university level (Lane, 2009). Previous studies have found that low college entrance examination scores often disqualify students from admissions (Buchmann, 2012, p.438). Since many colleges and universities rely heavily upon ACT or SAT scores, many students interested in pursuing higher education in agricultural fields are denied admissions to agricultural degree programs within land grant universities. The denial is a direct result of poor performance on college entrance examinations.

A large majority of students applying to undergraduate agricultural degree programs reside in agriculturally intensive, rural, socioeconomically distressed counties. The histories of agricultural and rural communities have been "closely intertwined" (Smithers, 2005, p.281). Furthermore, the intimate relationship between agriculturally intensive and rural communities is clearly demonstrated when examining the top ten North Carolina counties 2009 farm cash receipts. The top ten North Carolina counties that lead the state in farm cash receipts for livestock and crop production are all classified as rural

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counties (Webb, 2011; N.C. Economic Development Center, Inc., 2012; North Carolina).

The rural/non-rural difference in college enrollment has largely been attributed to differences in socioeconomic and demographic backgrounds of students residing in these areas (Byun, 2011). Historically, rural areas have the highest poverty rates in America as persistently poor counties (Lichter, 2007) and their rural students typically have lower socioeconomic statuses. Socioeconomic status has been found to be highly influential in rural-urban differences, noted in educational outcomes (Fan, 1999). As a result, there are unequal deviations between rural and urban schools' availability of resources. The variations of resources include: books, computers, art and science supplies, course offerings and adequately heated and cooled buildings (Fan, 1999).

When compared with urban students, rural youth have lower educational and career aspirations (Griffin, 2011). Eighteen percent of U.S. students attend rural schools (Hardé, 2007) and often times these students are behind their non-rural counterparts when it comes to college enrollment and degree attainment, which many researchers have attributed to their lower socioeconomic background (Byun, 2011). Scores from the SAT college entrance examination are so highly correlated with family income and parents' education that the predictive power of the SAT actually reflects socioeconomic status (Atkinson, 2009). Similarly, students from metropolitan areas have exhibited higher performance than rural students in mathematics, reading and science on the ACT college entrance examination (Fan, 1999). Therefore, socioeconomic status is highly correlated with test scores; these youth from the top socioeconomic tiers are in a far better position to be accepted into these highly selective institutions (Alon, 2009).

Many professional test preparation companies charge hundreds of dollars for their test preparation services; thus more privileged students are able to benefit from college entrance examination coaching which they can afford (Mattern, 2011). Students from these high socioeconomic statuses can also utilize expensive test preparation activities such as private classes or tutors which put them at a marked advantage over low socioeconomic students in their access to postsecondary education (Alon, 2009). College applicants living in urban areas were also more likely to retake the SAT a second, third, or fourth time, as compared with rural students (Vigdor, 2003). The expenses associated with taking college entrance examinations and test preparation can be more easily absorbed by socioeconomically advantaged families (Buchmann, 2012). Enrollment in private test preparation courses corresponds to a SAT score gain of around 30-40 points which, in turn,

increases a student's chances of "getting into the nation's most selective colleges and universities" (Buchmann, 2012, p. 455). Ultimately, high socioeconomic status (SES) leads to higher test scores through knowledge of test taking strategies (Sackett, 2009). In contrast, "students from disadvantaged backgrounds are unaware of preparation options, or are financially constrained from taking advantage of them and will be less likely to use test preparation" (Buchmann, 2012, p. 440). Today, education is a primary means for success as an adult; therefore, the challenges that rural youth face when trying to enroll in postsecondary education corresponds to an apparent obstacle to social mobility (Crosnoe, 2002).

Study Area

The focus of this study is on the top ten farm cash receipt counties within North Carolina (Table 1) which is based upon the 2009 Agricultural Statistics Book by the North Carolina Department of Agriculture and Consumer Services (Webb, 2011). The top ten counties upon which this study has been conducted are the following: Duplin, Sampson, Union, Wayne, Robeson, Bladen, Wilkes, Johnston, Nash and Randolph (Webb, 2011).

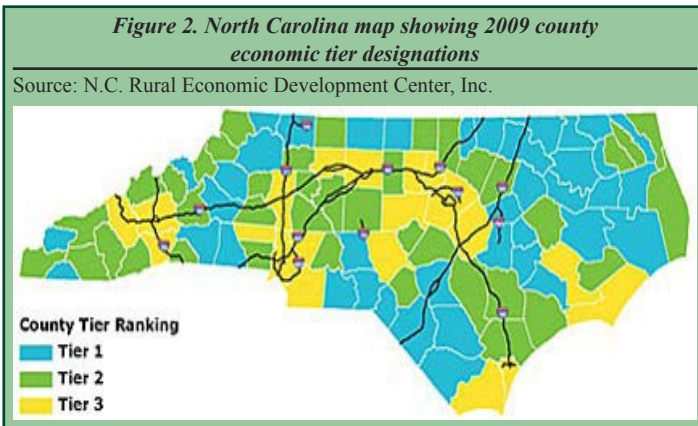
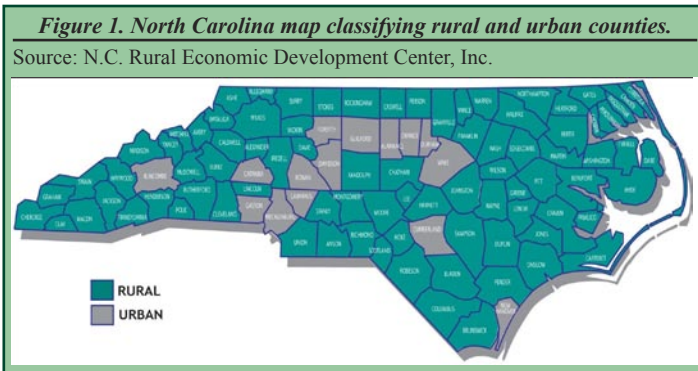
Next, the top farm cash receipt counties in North Carolina (n=10) were classified as rural vs. urban (Figure 1). According to the North Carolina Economic Development Center's

Table 1. The 2009 top ten NC counties in total farm cash receipts.

County	Thousand Dollars worth of farm cash receipts
Duplin	876,984
Sampson	841,595
Union	419,882
Wayne	336,947
Robeson	333,624
Bladen	295,088
Wilkes	259,885
Johnston	237,316
Nash	198,926
Randolph	196,837

classification of rural and urban, a county is classified as rural if it has a "population density of no more than 250 people per square mile at the time of the 2000 U.S. Census" ("NC Economic Development Center, Inc.", 2012). It can be noted that out of the ten top agriculture producing counties in North Carolina, all are classified as rural. From the aforementioned counties (n=10), the N.C. Economic Development Center Inc. has deemed Duplin, Sampson, Union, Wayne, Robeson, Bladen, Wilkes, Johnston, Nash and Randolph counties as rural ("N.C. Rural Economic Development Center, Inc.", 2012).

The N.C. Department of Commerce annually ranks the state's 100 counties based upon their economic well-being and then assigns each county a tier designation (Figure 2). The 40 most socioeconomically distressed counties in the state of North Carolina are classified as being Tier One, the next 40 as Tier Two and the 20



Statistics – 2009 Annual Statistics Book” (Webb, 2011). The North Carolina Rural Economic Development Center Inc.’s list of urban and rural counties in North Carolina was also used to designate whether these ten counties were classified as urban or rural (Figure 1). Counties analyzed in this study were considered rural if they had a population density at the 2000 U.S Census of no more than 250 people per square mile (“N.C. Rural economic Development Center, Inc.”, 2012). Finally, the North Carolina Department of Commerce’s Economic Development 2009 Tier Rankings (“North Carolina Department of Commerce,” 2009) were utilized to denote the socioeconomic status of each of the counties examined in this study (Figure 2). The Department of Commerce classifies the state’s 100 counties based on their economic well-being and then annually assigns each county a Tier designation. The state’s 40 most distressed counties are labeled as Tier One, the next 40 most distressed counties as Tier Two and the least 20 distressed counties are designated as Tier Three (“North Carolina Department of Commerce”, 2011).

Results

The mean score for the top ten North Carolina counties in total farm cash receipts was 952.8 on the SAT and 19.9 on the ACT (Table 2). North Carolina’s urban counties had a higher mean score, with an SAT score of 1007.9 and an ACT score of 21.4 (Table 2). Within Research Triangle Park (RTP), the college entrance examination scores increased even more. The RTP’s mean SAT score was a 1056.7 and 22.7 on the ACT (Table 2). When statistically analyzing the top ten counties against the RTP counties and NC urban counties, it can be noted that a significant statistical difference* ($p < 0.05$) in scores on the SAT and ACT is observed.

When looking at socioeconomic status it was noted that increased economic distress and college entrance examination scores were inversely correlated. The NC Rural Tier 1 counties had a mean score of 923.23 on the SAT and 19.23 on the ACT (Table 2). As we improve socioeconomic status and observe the Tier 2 NC Rural counties, the scores increase on the SAT and ACT, with respective scores of 980.97 and 20.57 (Table 2). The least economically distressed, Tier 3 counties had the highest overall mean scores, with 1022.45 on the SAT and 21.9 on the ACT (Table 2). After analyzing the scores between the tiers, it can be noted that there are statistical significant differences* ($p < 0.05$) between the scores for the three different tiers.

The data clearly shows that students from rural counties exhibited significant score deficits on their SAT and ACT college entrance examinations in comparison to urban students from RTP and that the

least socioeconomically distressed counties are then designated as Tier Three.

The levels of socioeconomic distress of the top farm cash receipt counties ($n=10$) in North Carolina were then examined. The most socioeconomically distressed counties were identified as Tier One (Wayne, Robeson, Bladen and Wilkes); an additional four counties were designated as Tier Two (Duplin, Sampson, Nash and Randolph); leaving only two (Union and Johnston) as Tier Three (“N.C. Rural Economic Development Center, Inc.”, 2009).

Methods

We analyzed the 2009 scores on the SAT and ACT for North Carolina high school students to compare students from agriculturally-intensive, rural and socioeconomically distressed demographics against Research Triangle Park urban high school students (North Carolina State Board of Education, 2009). We then compared these two distinct student populations’ scores with the fall 2009 freshman incoming class at North Carolina State University (NCSU). The fall 2009 NCSU freshman class data was accessed from North Carolina State University’s 2009 Freshman Profile (North Carolina State University, 2012).

The agriculturally-intensive counties examined in this study (Table 1) were selected based on their status as being in the top ten North Carolina counties for farm cash receipts according to the North Carolina Department of Agriculture and Consumer Services’ “Agricultural

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lower socioeconomic statuses found within these rural counties is associated with students' performance on SAT and ACT college entrance examinations.

A comparison of the 2009 NCSU fall freshmen averages on the SAT and ACT with students from the top ten NC farm cash receipt counties shows these students have significant lower scores. Due to the limitation of only one observation for the 2009 NCSU fall freshmen's college entrance examinations, a statistical analysis could not be performed. However, you can numerically compare the 2009 NCSU freshmen averages against the aforementioned counties (n=10) and see the educational

hindrance that these rural and socioeconomically distressed students must face. The 2009 NCSU freshmen had a mean score of 1184 on the SAT and 26 on the ACT in comparison with the top ten NC farm cash receipt counties' scores of 952.8 on the SAT and 19.9 on the ACT. This reveals that the NC farm cash receipt top ten counties were facing a score deficit of 231.2 points on the SAT and 6.1 points on the ACT (Table 2).

Discussion and Conclusions

Due to the aforementioned educational challenges that many students from agriculturally-intensive, rural and socioeconomically distressed counties face, we hypothesized that students residing in counties with these designations would exhibit significant score deficits on the SAT and ACT when compared with the averages of the urban counties comprising Research Triangle Park (RTP). Statistical analysis of the data collected in this study confirmed that the three variables examined: agricultural intensity, rural designation and level of socioeconomic distress negatively impacted student performance on both the SAT and ACT college entrance examinations.

An analysis of the data indicated that the NC top ten farm cash receipt counties had lower scores on the SAT and ACT when compared with the 2009 NCSU freshman average. These students also scored lower than their urban counterparts' average from the Research Triangle Park. It was further noted that regardless of which variable was examined, rural designation or agricultural intensity, as socioeconomic distress levels increased (moving from Tier Three to Tier One) the average scores on the SAT and ACT continued to drop.

The significant deficits in college entrance examination scores of agriculturally intensive counties raises a severe challenge for land grant universities to carry out their original mission to "teach agriculture, military tactics and the mechanic arts, as well as classical studies, so that members of the working classes could obtain a liberal, practical education" (Cornell University, 2010). If land-grant institutions are to remain true to their original undertaking, they must make themselves accessible to the students within the states they serve.

Currently, a large majority of students from agriculturally-intensive counties in North Carolina who wish to pursue higher education in agricultural fields of study are not competitive for admissions to land grant institutions offering such degree programs

Table 2. Comparison of 2009 SAT and ACT scores between NCSU Fall 2009 Freshman Class, State Average of North Carolina students, Research Triangle Park Urban students, students from the Top Ten Farm Cash Receipts, and Tier 1, 2, & 3 in NC.

Counties	SAT (CR + M)	NCSU Average SAT Score Differential	ACT	NCSU Average ACT Score Differential
NCSU Fall 2009 Freshman Averages	1184	0	26	0
North Carolina	1006	-178	21	-5
Rural North Carolina	948	-236	20	-6
Urban North Carolina	1007.93	-176.07	21.4	-4.6
Research Triangle Park in NC	1056.67	127.33	22.6	-3.4
Top 10 Farm Cash Receipts	952.8	-231.2	19.9	-6.1
Tier 1 Top 10 Farm Cash Receipts	939	-245	19	-7
Tier 2 Top 10 Farm Cash Receipts	932	-251	19	-7
Tier 3 Top 10 Farm Cash Receipts	1022	-162	22	-4
Tier 1 Rural North Carolina	923.23	-260.77	19.23	-7.77
Tier 2 Rural North Carolina	980.97	-203.03	20.57	-5.43
Tier 3 Rural North Carolina	1022.45	-161.55	21.91	-4.09

*Note: The combined SAT critical reading (CR) and math (M) sections are scored on a 1,600 point scale and the ACT is scored on a 36 point scale

Table 3. Comparison of 2009 SAT scores between Rural North Carolina students, Urban North Carolina students, students from the Top Ten Farm Cash Receipt Counties, Tier 1, 2, & 3 in NC, and Research Triangle Park Urban students.

Group	SAT	Standard Error
NC Urban	1007.93	13.99
Research Triangle Park	1056.67	31.30
Rural Tier 1 North Carolina	932.23	8.68
Rural Tier 2 North Carolina	980.97	9.16
Rural Tier 3 North Carolina	1022.45	16.35
Top Ten NC Counties for Farm Cash Receipts	952.8	17.15

*Note: The combined SAT critical reading (CR) and math (M) sections are scored on a 1,600 point scale.

Table 4. Comparison of 2009 ACT scores between Rural North Carolina students, Urban North Carolina students, students from the Top Ten Farm Cash Receipt Counties, Tier 1, 2, & 3 in NC, and Research Triangle Park Urban students.

Group	ACT	Standard Error
NC Urban	21.4	.38
Research Triangle Park	22.67	.85
Rural Tier 1 North Carolina	19.23	.24
Rural Tier 2 North Carolina	20.57	.25
Rural Tier 3 North Carolina	21.9	.44
Top Ten NC Counties for Farm Cash Receipts	19.9	.47

*Note: The ACT is scored on a 36 point scale.

because of score deficits on the ACT and SAT. As a result, many traditional agricultural degree programs are downsizing or even closing due to limited undergraduate student populations. This poses a direct threat to the future development of agriculture across the U.S.A.

Within each land-grant institution (Cornell, 2010) a Cooperative Extension System provides educational programming in five key areas: sustaining agriculture and forestry, protecting the environment, maintaining viable communities, developing responsible youth and developing strong, healthy and safe families (NC Cooperative Extension, 2012). If the Cooperative Extension System is going to achieve the goals of each of these five key areas, it is imperative that the next generation of Cooperative Extension leaders help to bridge the deficit in SAT and ACT test scores in rural and socioeconomically distressed counties. The Cooperative Extension System can help develop future agricultural students in these communities by removing the current college entrance examination score roadblock that prevents many students from such areas from gaining admissions to land-grant universities. This goal can be accomplished through supplemental education from these institutions.

North Carolina State University and the North Carolina Cooperative Extension Service are partnering to provide an opportunity for students who are interested in pursuing a Bachelors Degree in agricultural and/or life science degree programs who live in agriculturally intensive counties. To help these students increase their ACT College Entrance Examination Scores and improve their chances of being accepted into college, a special program, ACT Supplemental Preparation in Rural Education (A.S.P.I.R.E.) has recently been launched through the College of Agriculture and Life Sciences at North Carolina State University and the North Carolina Cooperative Extension System. The purpose of A.S.P.I.R.E. is to raise scores on the ACT College Entrance Examination in order to increase the number of rural high school students pursuing higher education in agriculture. The North Carolina Extension agents, who will teach this program, will be trained through a Master Trainer Course offered through the Princeton Review. These agents will be instructed on how to teach the skills, strategies and tactics for tackling the ACT. After the A.S.P.I.R.E. agents are trained, they will teach the ACT test preparation skills to rural high school students across the state of North Carolina. The A.S.P.I.R.E. program is a new approach and after completion of the program, the results will be analyzed to determine the efficacy of implementing ACT preparation to rural high school students through the use of North Carolina Extension agents.

Summary

The importance of college entrance examination scores for admissions by land grant institutions are often the leading factor for students not being accepted into college. Rural high school students from agriculturally intensive counties are more likely to have a lower socioeconomic status which further impedes their access to resources that could improve their SAT or ACT scores. With increased scores these students, from the aforementioned counties, could achieve a potential higher acceptance rate to colleges and universities. Land grant institutions must assist students from rural, socioeconomically distressed and agriculturally intensive counties in bridging deficits on college entrance examination scores in order to improve their chances of gaining admissions to post-secondary education in agricultural fields.

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Potential Factors Contributing to Undergraduate Enrollment in Agricultural Economics and Agricultural Business and Management at Land-grant Institutions

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Abstract

This study examines factors that affect undergraduates' enrollment in agricultural economics and agricultural business and management (AEABM) studies at land-grant institutions using a cross sectional demand model. Data for students enrolled in agribusiness, ethnicity, and sex were collected through Food and Agricultural Information Education Systems (FAIES). In-state tuition and financial aid data were obtained via the Integrated Post Education Data System (IPEDS) on the basis of land-grant institutions. The sample size is comprised of 53 land-grant institutions that offer undergraduate degree in AEABM. We utilize a cross section model to identify factors that influence enrollment in AEABM as a major and discuss future implications for 1890 and 1862 land-grant institutions and the recruitment of prospective students. Preliminary results indicate that there are more males enrolled in agricultural economics and agricultural business and management studies than females. Further, Caucasian enrollment is more than any other ethnicities at land-grant institutions as we anticipated. Finally, preliminary findings show that financial aid/scholarships may have a positive influence on enrollment in AEABM studies.

Introduction

Recruitment and retention of undergraduate students in the field of agricultural economics and agricultural business and management (AEABM) studies at land-grant institutions has proven to be challenging. Ensuring that these institutions supply well-qualified students in the field of study is an important step in increasing and enhancing the quality of agricultural programs at

land-grant universities. According to Perry (2010), both the number of undergraduate students in standalone agricultural economics and the number of departments offering the program have declined constantly over the years. The number of baccalaureate degrees awarded in standalone agricultural economics decreased from 1541 in 1991 to 545 in 2006. Although the overall number of degrees awarded in schools and colleges of agriculture in the United States has increased by 37% between 1991 and 2006, the number of minority undergraduates' enrollment has also remained low. Further, the number of undergraduate degrees awarded in resource and applied economics, a major growth discipline under agricultural economics' closely related fields, has increased only by 17% as compared to other fields within the agricultural and natural resources sciences. In addition, enrollment growth in colleges of agriculture and natural resources has outgrown all other degree programs in agricultural and natural resources sciences (Perry, 2010).

Several recruitment and retention programs have been established in attracting these students; however, it has remained a challenge to increase enrollment. Further, land-grant universities reported to have a placement ratio between 90 to 98 % within six months of graduation. Understanding students' influences in selecting a major can help schools and colleges of agricultural sciences to design programs that will not only attract high achieving students but will also keep them until they complete the degree. For the last decade, the number of undergraduates in standalone agricultural economics programs has reduced drastically whereas at the higher education level, the trend remains steady

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Potential Factors Contributing

due to an increase in international students' enrollment (Blank, 1998).

Several studies have been conducted regarding factors that affect enrollment rate in agricultural economics. In 1998, Blank conducted a study examining agricultural economics enrollments and programs from period 1985 to 1996. After surveying 44 schools in North America, Blank (1998) found that the number of enrollment in agricultural economics is declining. Moreover, Blank (1998) added that the enrollment rate of undergraduate students in the agriculture program has decreased by 17% for academic year 1975-1984 to 1985-1996. During the same period, Blank (1998) reported an overall decline of 14% in the average number of enrollment in both undergraduates and graduates in agricultural economics programs. Results also indicated a change in the characteristics of students in the program. Blank (1998) indicated a decline of students in agricultural economics with farm background and an increase in females' enrollment in the program. Blank (1998) also pointed out that several universities changed their curriculum and names of the department programs to reflect the changing characteristics of students. Over the years, agricultural economics programs have changed names to Applied Economics, Resources and Applied Economics, or Applied Economics and Agribusiness to meet the needs of the agricultural industry and to make AEABM studies more marketable to prospective students.

Various studies have identified factors that affect the demand for college education, in particular, the relationship between student enrollment (dependent variable) and income and tuition (independent variable; Bezmen and Depken, 1998; Campbell and Siegel, 1967; Kim, 1984; Yang, 1998; Leslie and Brinkman, 1987; Hossler et al., 1998; Dynarski 1999; Beggs et al., 2006; Shin and Milton, 2008). These studies reveal that tuition is a normal good, implying that as student income or financial aid rises, enrollment in a college or university also rises. They also disclose that there is an inverse relationship between enrollment and tuition; that is, as tuition rises, enrollment in a college or university declines.

Purpose and Objectives

The purpose of this study is to identify factors that influence enrollment in AEABM as a major and to discuss the implications for 1890 and 1862 land-grant institutions. Understanding the challenges in recruiting and retaining students in AEABM can be partially done by identifying factors that influence an individual to select agribusiness as a major. Therefore, the objectives are as follow: (1) to identify the factors that influence

enrollment in AEABM as a major and (2) to discuss the future implications for 1890 and 1862 land-grant institutions and the recruitment of prospective students.

Materials and Methods

We estimate the demand for enrollment in AEABM using previous studies on the demand for higher education model. Our model follows that of Barkley and Parrish (2005), a study which identifies determinants of the selection of a major field of study. Barkley and Parrish (2005) evaluate sociodemographic (gender, age), high school experience (GPA, high school activities, and class size), prior high school experience (4-H activities, agricultural courses), mentors (parents, teachers), agricultural academic programs, and career oriented variables as factors potentially influencing the selection of a major using primary data. However, our model will be estimated using secondary data on student enrollment, tuition, financial aid, ethnicity, the number of farms, and sex.

Data

Data were collected from various sources. The dependent variable denotes the 2007 fall enrollment in AEABM data and was obtained from the Food and Agricultural Information Education System (FAEIS) database (U.S. Department of Agriculture – Food and Agricultural Information Education System, 2012a). Only 1890 and 1862 land-grant institutions are considered in this research. The independent variables, sex and ethnicity are also extracted via the FAEIS database using time period of 2007. Tuition costs and grants for financial aid data are retrieved through the Integrated Postsecondary Education Data Systems (IPEDS) for year 2007 (U.S. Department of Education, 2012). The number of farms within the respective states with our included universities was obtained from the 2007 Census of Agriculture (U.S. Department of Agriculture, National Agricultural Statistics Service, 2007). Data were analyzed using SPSS 20 with a significance level of 5% and 10% (IBM® SPSS® Statistics 20.0. 2011).

Empirical Model

In this study, we take a closer look at land-grant institutions and potential factors influencing undergraduate student enrollment. According to the Association of Public and Land-Grant Universities, "*a land-grant college or university is an institution that has been designated by its state legislature or Congress to receive the benefits of the Morrill Acts of 1862 and 1890.*" The passage of the First Morrill Act (1862) and the Second Morrill Act (1890) provided a higher education curriculum outside that of liberal arts studies

to agricultural and industrial workers. The distinction between 1862 and 1890 land-grant institutions extended separate institutions for blacks (1890s) located primarily in southern states (APLU, 2012). Trends reveal that minority enrollment in AEABM studies have increased over the past decade among Hispanic and non-U.S. citizens; however, African American enrollment has been on the decline (U.S. Department of Agriculture – Food and Agricultural Education Information System, 2012a). In order to gain insight on influences of undergraduate enrollment, we identify factors that affect enrollment at 1890 and 1862 years land-grant institutions offering AEABM programs in the U.S. There are seventeen 1890 land-grant institutions in addition to Tuskegee University; therefore, we collapsed both land-grant institution categories. Ordinary Least Squares is used in the study to compute the analysis with a sample size of 53 land-grant institutions and colleges offering AEABM as a major at the undergraduate level. We estimate our cross sectional demand equation found below:

$$EAGB = f(\text{ETHN}, \text{SEX}, \text{TUIN}, \text{FARM}, \text{FIAD})$$

Where: EAGB = agricultural economics/agribusiness enrollment at 1862 and 1890 land-grant institutions, ETHN = dummy variable, 0-other ethnicities (minority) and 1-Caucasian (majority), SEX = dummy variables, 0-females and 1-males to differentiate gender of students enrolled, TUIN = in-state tuition paid at the university, adjusted for inflation in year 2007, FARM = number of farms within the respective university's state, and FIAD = number of grant aid dollars received by undergraduate students at each institution during year 2007.

The ethnicity (ETHN) dummy variable represented minority and majority enrollment at 1862 and 1890 land-grant institutions. If the institution was categorized as an 1862 institution with a majority Caucasian population, then the institution was assigned 1.0 and 1890 institutions with a greater percentage of minorities enrolled were assigned a 0.0. The sex (SEX) dummy variable represented institutions with a greater percentage of males enrolled versus those with greater percentages of females enrolled in AEABM. The tuition (TUIN) variable denoted in-state tuition paid by students at each respective institution in 2007 adjusted for inflation. Due to the inclusion of the number of farms (FARM) within the respective university's state into the dataset, we adjusted corresponding data on the basis of the most current Census of Agriculture,

which is published every 5 years. The financial aid (FIAD) variable denoted the number of grant aid dollars received by undergraduate students at each institution during 2007.

Results and Discussion

The descriptive statistics for this study are presented in Table 1. Each variable's mean, standard deviation, minimum and maximum are generated and presented for the analysis. Explanatory variables are ethnicity, sex, tuition, number of farms and financial aid. The sample size of this study utilized 53 land-grant institutions that offer AEABM academic programs. Enrollment in agribusiness had a mean of 152 pupils enrolled with a minimum of three enrolled, a maximum of 717 and a standard deviation of 146, which exhibited high variation among all land-grant institutions, which may be a result of the differences in smaller 1890 AEABM academic programs versus larger 1862 AEABM academic programs.

Table 2 shows the representation of males and females enrolled in agribusiness in 2007. The results indicate that there are more males (86.8%) enrolled in AEABM program at land-grant institutions than females (13.2%) in 2007. Shrestha et al. (2011) and Overbay and Broyles (2008) highlighted that an increasing number of females are enrolling in schools and colleges of agriculture. After examining the undergraduate enrollment in AEABM at 1862 and 1890 land-grant institutions from year 2006 to 2010, the U.S. Department of Agriculture – Food and Agricultural Education Information System (2012b) reported that male enrollment in the program has increased by 14.8% in 1862 land-grant universities and by 13.7% at 1890 institutions. On the other hand, female enrollment has grown rapidly especially at 1890 land-grant institutions (24.8%) between 2006 and 2010. For the same years, 1862 institutions have also experienced an increase of 11.6% of female enrollment in the program. Overall, both male and female enrollment has increased; however, the number of male enrollment in AEABM still outweighs those of females, which may be attributed to increases in the Hispanic and/or non-U.S. citizen populations.

Table 2 also represents Caucasians and other ethnicities in this study. In addition, Caucasians represent 84.9% of enrolled undergraduates compared

Table 1. Descriptive Statistics of Variables

Variables	N	Minimum	Maximum	Mean	Std. Deviation
Enrollment in Agribusiness	53	3.00	717.00	152.3962	146.06721
Ethnicity	53	.00	1.00	.8491	.36142
Sex	53	.00	1.00	.8679	.34181
Tuition	53	1723.00	34600.00	5681.0000	4591.20315
Farms	53	2550.00	247500.00	54363.2075	47272.61684
Financial Aid	53	470918.00	162436101.00	60209318.7170	46621316.44828

Potential Factors Contributing

Table 2. Enrollment of Undergraduates by Gender and Ethnicity

	Female	Male	Total	Caucasian	Others	Total
Frequency	7	46	53	45	8	53
Percent	13.2	86.8	100	84.9	15.1	100

Table 3. Enrollment of Undergraduates at 1862 and 1892 Institutions by Gender for 2007

	1862		1890	
	Frequency	Percent	Frequency	Percent
Female	1	2.4	6	50
Male	41	97.6	6	50
Total	42	100	12	100

Source: U.S. Department of Agriculture – Food and Agricultural Education Information System, 2012b

to other ethnicities (15.1%). These findings are similar to those in previous studies (Beggs et al., 2006; Dyer et al., 1999).

The number of females (50%) enrolled in AEABM at 1890 land-grant institutions is equal to the number of males (50%; Table 3). This may be due to the changing demographics of students enrolling in the program. According to U.S. Department of Agriculture – Food and Agricultural Education Information System (2012b), female enrollment (19.9%) surpassed male enrollment (9.1%) from 2009 to 2011 in agricultural programs as a whole. In addition, female enrollment in AEABM was reported to increase by 27.8% from 2004 to 2011 compared to male enrollment, which grew by 27.0%. The total enrollment of undergraduate students enrolled in AEABM at 1890 land-grant universities in 2007 is 189 with African-Americans representing 87%, Caucasians 11%, Hispanics 1%, and Native American 1% of this population. The findings revealed that female enrollment in agribusiness represented 2.4% compared to male enrollment, which is 97.6% at 1862 Land-grant institutions in Table 3. The total enrollment of undergraduate students within AEABM at 1862 land-grant institutions in 2007 is 7,251, where Caucasians make up 89%, African Americans 4%, Hispanics 3%, Asian 3%, and Native American 1% of this population.

Preliminary results revealed that student enrollment was weakly but positively correlated with financial aid/scholarships, ethnicity, and sex (Table 4), although financial aid/scholarships showed an insignificant correlation with student enrollment. Stronger, positive and significant correlations were found between student enrollment and tuition. This suggests that an increase in tuition is associated with an increase in student enrollment. Traditionally, when tuition increases, enrollment decreases and vice versa. A possible explanation might be that as long as students have access to loans or financial aid, then a weak increase in tuition will not have a strong impact on enrollment (Shin and Milton, 2008). Shin and Milton (2008) pointed out that

students might not be so sensitive to a change in tuition if the cost of education is still lower than of competing majors or if they can pay for their own tuition. Shin and Milton (2008) explained that an individual will be willing to pay a higher price on education if the expected return is higher. For example, Shin and Milton (2008) found that students are responsive to a price change in tuition in majors such as Physics, Biology, and Business; but not in Engineering, Math, and Education. Another explanation for the positive relationship between tuition and enrollment might be due to the affordability of tuition at public universities compared to private institutions.

Regression analysis is another method of examining factors that are associated with undergraduates' enrollment in AEABM studies. The preliminary findings of the cross sectional demand model explained 56% of the variation for student enrollment in AEABM with tuition, number of farms, ethnicity, sex and financial aid as prospective determinants affecting student decisions to enroll. The summary of the regression analysis transformed in natural logarithm is presented in table 5. The coefficient of ethnicity is positively associated with student enrollment at a 10% level of significance and indicates that a 1% increase in Caucasian population is associated with an increased enrollment in AEABM by .667%. The coefficient of sex is also positively associated with student enrollment with at a 1% level of significance. A sex coefficient of 1.449 implies that a 1% increase in male enrollment is positively associated with enrollment in AEABM program by 1.449 %. The elasticity of student enrollment with respect to tuition is positively associated with enrollment in AEABM by .239 % and is statistically insignificant with student enrollment. As found in other studies, tuition has been found to be inversely related to student enrollment. The

Table 4. Correlation of Student Enrollment and Decision Contributors in AEABM

	Enroll	Tuition	Finaid	Farm	Ethnicity	Sex
Enroll	1	0.485 P = <0.01	0.025 P = 0.850	-0.002 P = 0.988	0.347 P = <0.01	0.301 P = <0.05
Tuition		1	0.0254 P = <0.05	-0.178 P = 0.169	0.199 P = 0.125	0.146 P = 0.263
Finaid			1	-0.002 P = 0.990	0.110 P = 0.397	-0.044 P = 0.737
Farm				1	-0.036 P = 0.781	-0.082 P = 0.530
Ethnicity					1	0.632 P = <0.01
Sex						1

Table 5. Regression Analysis Estimations of Student Enrollment in AEABM

Variables	Estimate	Standard Error	t-value	P-value
Constant	-7.222	2.599	-2.778	.008
Ethnicity	.667	.357	1.870	.068
Sex	1.449	.364	3.985	.000
LnTuition	.239	.228	1.050	.299
LnNumberof Farms	.438	.117	3.740	.001
LnFinancial Aid	.189	.101	1.861	.069

zMSE= 0.606, SSE = 28.487, DF = 52, and R-Square = 0.559

number of farms is positively associated with the number of students enrolled in AEABM programs (.438) and is statistically significant at a 5% level of significance. The elasticity of enrollment with respect to financial aid suggests that 1% increase in the number of financial aid awarded is positively associated with the number of enrollment in AEABM programs by .189% at a 10% level of significance.

Limitations

The preliminary findings of this study suggest that there are possibly many other factors that may influence students' decisions to enroll in AEABM programs. Several factors have been identified by other researchers as important factors influencing students' decisions (Shrestha et al., 2011; Herren et al., 2011). However, these were beyond the purview of this study and should be investigated further. We collapsed both land-grant institution categories and this placed constraints on the empirical analysis; however, it did provide insight on factors contributing to land-grant enrollment overall and provided descriptive statistics for implications in overall enrollment including majority and minority enrollment. Data limitations resulted in financial aid dollars reflective of the entire institution rather than dollars received by schools and colleges of agriculture. Although there is no evidence to indicate that tuition and financial aid/scholarship are significant factors contributing to enrollment in AEABM studies, these preliminary findings provide a basis for further research. Other limitations involved not including 1994 land-grant institutions, which could provide more insight on the American Indian/Native American population, and other non-land grant institutions offering agricultural sciences. Also, using farm data from the 2007 Census of Agriculture restricted a trend analysis over a longer period of time.

Summary

The status of agricultural economics and agricultural business and management (AEABM) studies is a concern, especially at land-grant institutions. Several land-grant institutions have eliminated programs due to budget cuts and low productivity. In this study, we examined the factors that affect undergraduates' enrollment in agricultural/economics at land-grant institutions. We evaluated determinants such as ethnicity, sex, tuition, the number of farms, and financial aid as factors that may contribute to a prospective student's decision to enroll in AEABM. Based on the analysis, Caucasians represent 84.9% of students enrolled in undergraduate programs as compared to other ethnicities (15.1%). It appears that the struggle to attract minorities in the AEABM

program will probably continue. Several strategies such as changing curriculum, partnering with agribusiness firms, organizing various workshops to educate students about the AEABM field are already in place to increase enrollment. These initiatives have been effective in increasing enrollment, but not drastically. On the other hand, results showed that the independent variables considered in this study were not strong factors that contributed to increase enrollment in the programs. This can possibly be explained by evaluating an individual's sociodemographic and attitudinal choices to enroll in the program.

In future research, it may be worthwhile to investigate associations of financial aid/scholarships and enrollment. Prospective targets for land-grant institutions might include both female and male, Hispanics, Asians, and Native Americans. Overall results showed that at 1890s, the number of female enrollment is equal male enrollment in 2007. Traditionally, males have outweighed females in enrolling in AEABM program. Due to the changing demographics of students and the increasing number of minorities, 1890s can still attract more students in AEABM program at these institutions by targeting both female and male. Since these schools are noticing more and more females enrolling in the program, they are encouraged to continue to recruit this group. In addition, the majority of students entering agribusiness programs at 1890s are African-Americans (87%); this implies that administrators can increase the number of minorities' enrolled by providing funding/financial aid. That is, the majority of 1890 land-grant institution populations seek financial aid/scholarship or further assistance. The preliminary findings indicate that Caucasian enrollment is about 11% at 1890s. This suggests that 1890 land-grant universities can continue to target this group and other minorities such as Hispanics and Asians.

Contrary to 1890 land-grant institutions, 1862 land-grant universities have more diversity in AEABM programs. At the same time, they can also increase enrollment of minority by targeting Native Americans, Asians, Hispanics, and African Americans. The majority of students enrolled at 1862 is Caucasian (89%), which outweighs any other ethnicity. In closing, agricultural leaders should continue to improve their recruitment and retention efforts to attract prospective undergraduate students at land-grant universities in AEABM academic programs.

Potential Factors Contributing

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A Course Focused on the Critical Issues in Agriculture: Students' Acceptance and Use of Mobile Learning

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Abstract

Higher education has adopted innovative teaching strategies and devices to influence student learning to meet the demands of a technology-driven society. Mobile learning is the use of mobile technology to access educational content. Agricultural leadership educators have studied technology use, preferences and level of acceptance from instructor and student perspectives. Quantitative methods were used to measure the effects of personal characteristics on students' likely acceptance of mobile learning. Students (n=84) enrolled in a critical issues in agricultural leadership course at Texas A&M University completed questionnaire to assess their level of performance expectancy, effort expectancy, behavioral intention and self-efficacy toward mobile learning. A majority of students agreed mobile learning would be easy to use, be used in the near future, contribute positively to their performance and influence their learning in school. Findings in this study indicate students are ready and accepting of mobile learning as a viable tool for learning; however agricultural leadership educators should be aware that successful technological incorporation includes feasibility and the alignment with course learning outcomes. Further research should include replication with a larger sample size, investigation of the impact of mobile learning in the classroom and examination of the relationship between mobile learning use and leadership skills and competencies.

Introduction

Over the last several decades the number of technological advancements has grown exponentially. Individuals use technology to stay abreast with current events, communicate with others and as forms of entertainment. Businesses rely on technology to conduct meetings, gain competitive advantages and monitor their

market shares. Students are no exception and are attached to their digital cameras, cell phones, PDAs, video, mp3 players and i-devices. They use the technology to gather information, play games, shop, socially network and learn (Hanson et al., 2011).

Higher education has quickly adopted innovative teaching strategies and technological devices to influence student learning (Laird and Kuh, 2005; Renes and Strange, 2011; Sherer and Shea, 2011). The millennial generation, also known as the "connected" generation, presents educators with new challenges of engagement and high impact learning. Educators have developed distance learning programs to meet students' increasing technological savvy. Whole degree programs are offered online due to the advent of eLearning. Colleges and universities are now relying on social media, the use of applications and creating practical simulations in Second Life (Allen et al., 2010; Leggette et al., 2012).

In agricultural and leadership education, several scholars have researched technological use, perceptions and efficacy from instructor and student perspectives. Alston et al. (2003) found instructors had a favorable perception in regards to the future use of technology in the agricultural classroom. Rhoades et al. (2008) surveyed undergraduate students concerning their use of technology in and out of the classroom and their preferences for increased use in podcasts, ePortfolios, RSS (Rich Site Summary) feeds, iPods or mp3 players and blogs and found instructors have made little progress in adopting these technologies. A recent study assessed students' varying acceptance of Second Life, Twitter and content management systems and found the technology should be presented to students in a manner which clearly conveys its educational benefits (Murphrey et al., 2012). A majority of students using tablet computers

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in agriculture and biology courses reported positive impacts on their learning environments (Shuler et al., 2010).

Using technology in the classroom also prepares students for the demands of their future careers. Boyd and Murphrey (2002) found computer-based simulations have the potential to increase student's learning of leadership concepts. Agricultural education undergrads indicated Web-enhanced courses taught them real-world skills in technology use, provided problem solving opportunities and enabled collaborative online communication forums (Alston and English, 2007). Another study found a video production assignment "*allowed [students] to learn both in a different way and also learn skills that could be used as a leader in the future*" (Guthrie, 2009, p. 134). Educators should remain cognizant of the career skills and abilities innovative teaching strategies and delivery tools provide for enhanced practical learning.

Leadership is a relational process between two or more members of a group working toward goal attainment (Bass, 1990). Leaders across all contexts adjust their leadership style to meet the needs of their followers and style flexibility is a critical component of situational leadership, leader-member exchange and transformational and transactional leadership. In organizations, leaders use a variety of facilitation strategies, support and training and technology incorporation methods to meet the needs of organizational members. A few studies have empirically researched leadership and its effect on information technology acceptance and use. Devaraj et al. (2008) found the five-factor model of personality, a trait approach to leadership, to be a useful predictor of users' attitudes and beliefs toward technology. Schepers et al. (2005) found that the transformational leadership style positively influences followers' perceived usefulness of technology. Charismatic leadership was also found to positively influence follower performance expectancy and effort expectancy scores related to technology (Neufeld et al., 2007).

Despite the number of studies of instructional strategies and device acceptance, little research exists in the literature investigating mobile learning in agricultural leadership education. Mobile learning is the use of mobile technology, in the form of a smartphone or tablet device, to allow learners the ability to access educational context at any time or place (Peng et al., 2009). Mobile learning can engage students in the classroom to work with one another and collect and evaluate information instantly. Mobile technologies can create more collaborative learning environments (Alexander, 2004).

As leaders in the classroom, agricultural leadership educators should investigate innovative means to engage students and create impactful learning experiences.

Mobile learning may be a means to create more significant learning experiences. This study served to investigate students' likely acceptance of mobile learning as a viable educational mode in an agricultural leadership education course.

Theoretical Framework

The theoretical framework for this study was based on technology acceptance and self-efficacy. Davis (1989) developed the theory of reasoned action to explain individual's acceptance and use of technology. Venkatesh et al. (2003) constructed the Unified Theory of Acceptance and Use of Technology (UTAUT) to expand the theory of reasoned action by delineating individual's behavioral intention to use technology. The four factors of the UTAUT are performance expectancy, effort expectancy, social influence and facilitating conditions. The social influence and facilitating conditions factors embody behavioral intention.

Performance expectancy is the extent an individual believes using technology will improve their likelihood to accomplish an objective (Venkatesh et al., 2003). The level of ease associated with the use of technology is the effort expectancy factor. Social influence is the degree an individual perceives the value of using a specific piece of technology over another. Venkatesh et al. (2003) indicated facilitating conditions is the degree an individual believes the infrastructure exists to use the technology.

Venkatesh et al. (2003) UTAUT has been used to frame numerous studies associated with students' acceptance and usage of technology. The UTAUT was utilized as the theoretical framework for Lin and Anol's (2008) study of students' acceptance and use of instant messaging to deliver course content. Shin et al. (2011) employed the UTAUT as the framework in their study with students' acceptance of smartphones as learning devices. The UTAUT was incorporated to study the adoption of technology for informal learning environments (Straub, 2009). A few studies using the UTAUT investigated the influence of demographic variables such as gender, age and prior technology experiences. Marchewka et al. (2007) implemented the UTAUT to support a study of college students' acceptance and usage of course management software. The study found that age and gender did not have a significant effect on Blackboard usage. Pardamean and Susanto (2012) framed their study on mathematics students' acceptance of blog technology with the UTAUT. The researchers found no significant differences between males and females or the level of experience for blogging acceptance. Murphrey et al. (2012) used the UTAUT to frame their study of students' acceptance of Second Life, Twitter and content

management systems. The study found female students accepted the technologies more than males. Irby and Strong (2013) used UTAUT and self-efficacy to examine mobile learning acceptance in agricultural leadership students.

Self-efficacy theory was developed by Bandura (1977) to explain an individual's perceived capacity to reach a specific outcome. Self-efficacy is derived from four types of experiences: performance accomplishments or personal mastery; vicarious experience or observation of other's mastery; verbal persuasion through other's positive feedback; and emotional arousal or how one feels. Bandura found that individuals with developmental experiences increase the likelihood of higher self-efficacy and will encourage themselves to seek out challenging objectives. Individuals with low self-efficacy tend to avoid perceived difficult endeavors. Self-efficacy is a predictor of individual's potential to seek out and accomplish internal or external responsibilities. Tschannen-Moran and Woolfolk Hoy (2001) suggested studying individual's self-efficacy is a simple line of inquiry but powerful in terms of how data may be used to assist in improving current and future teaching strategies.

Diverse leadership researchers have incorporated self-efficacy as the theory to scaffold studies. Increased self-efficacy can enhance students' transformational leadership skills (Fitzgerald and Schutte, 2010). McCormick (2001) used self-efficacy to frame a study focusing on effective leadership traits. Villanueva and Sánchez (2007) utilized self-efficacy in the theoretical framework to study students' emotional intelligence. Walumbwa et al. (2011) implemented self-efficacy theory to examine the role between ethical leadership and employee performance. Self-efficacy was identified as a factor in follower's leadership effectiveness (van Knippenberg et al., 2004). Choi et al. (2003) studied the effect of self-efficacy's role in different leadership teams. The study investigated the participant characteristics and found no effects of age, gender, or race.

Purpose and Objectives

The purpose of this exploratory descriptive study was to examine the level of mobile learning acceptance of undergraduate students enrolled in a course covering critical issues in agricultural leadership in the Agricultural Leadership, Education and Communications department at Texas A&M University. More specifically, the study addressed the following objectives:

1. Describe agricultural leadership students' level of performance expectancy, effort expectancy, behavioral intention and self-efficacy focused on mobile learning; and

2. Determine relationships between performance expectancy, effort expectancy, behavioral intention and self-efficacy based on student characteristics (gender, grade classification, GPA and employment status).

Methodology

Survey research was the approach for this study. The target population was all undergraduate students in the agricultural leadership degree program at Texas A&M University. The accessible population was students (N = 99) enrolled in a critical issues in agricultural leadership course at Texas A&M University. Data was collected through the use of paper survey administered during class. Although a census study, the course selection was used as a slice in time (Oliver and Hinkle, 1981) sampling of students due to the variability in participant demographics and representativeness of the target population. Fraenkel et al. (2012) suggested census studies enable researchers to eliminate potential sampling errors and to generalize findings to a target population.

The critical issues course is an introductory class for new students entering the agricultural leadership program at Texas A&M University. The purpose of the course is to help students identify personal goals and learning skills that promote academic and career success in college. Students also research the skills and competencies employers seek in new hires. They identify, name and describe career settings for a degree in agricultural leadership; plan a course of study; and create developmental plans for fulfilling professional and personal goals.

This study implemented the UTAUT scale created by Venkatesh et al. (2003) to assess mobile learning acceptance. The UTAUT constructs examined in this study were performance expectancy, effort expectancy and behavioral intention. Facilitating conditions and social influence were not examined as these constructs did not fit the study objectives. Mobile learning acceptance was measured on the UTAUT's seven-point summated scale: 1 = strongly disagree, 2 = moderately disagree, 3 = somewhat disagree, 4 = neutral (neither disagree nor agree), 5 = somewhat agree, 6 = moderately agree and 7 = strongly agree.

A modified version of the Teacher Sense of Efficacy Scale (TSES) developed by Tschannen-Moran and Woolfolk Hoy's (2001) was used to assess students' self-efficacy of mobile learning. Tschannen-Moran and Woolfolk Hoy developed the Teacher Sense of Efficacy Scale based upon Bandura's (1977) self-efficacy theory. The TSES utilized a nine-point summated scale for each item with anchors: 1 = nothing, 3 = very little, 5 = some influence, 7 = quite a bit and 9 = a great deal. Participants'

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gender, grade classification, grade point average and employment status were the personal characteristics examined by the researchers.

The researchers employed a 28 item combined instrument including the UTAUT scale, TSES and questions related to participants' personal characteristics. Content validity of the combined instrument was assessed by a team of researchers from Texas A&M University. The reliability coefficients for each construct were calculated ex post facto. The internal consistency of the performance expectancy construct was $\alpha = .94$, effort expectancy $\alpha = .92$, behavioral intention $\alpha = .98$ and self-efficacy $\alpha = .95$. Each construct had acceptable reliability coefficients (Cronbach, 1951).

To address objective one of the study, descriptive statistics were implemented to describe agricultural leadership students' level of performance expectancy, effort expectancy, behavioral intention and self-efficacy. Agresti and Finlay (2009) postulated that descriptive statistics uncover characteristics of dissimilar groups in order to measure their attitudes toward a distinctive factor. Descriptive statistics are techniques to arrange, summarize, calculate and describe a dataset. Mean and standard deviation were two descriptive statistical measures used in the study. The mean is the average score of a distribution and standard deviation represents the spread of a distribution (Fraenkel et al., 2012).

The second objective of the study was to determine if significant differences existed between performance expectancy, effort expectancy, behavioral intention and self-efficacy based on student characteristics (gender, grade classification, GPA and employment status). Agresti and Finlay (2009) indicated a t-test reveals whether the difference between two means is statistically significant. The researchers employed t-tests to determine if significant differences existed among gender and performance expectancy, effort expectancy, behavior intention and self-efficacy. Differences between GPA and performance expectancy, effort expectancy, behavior intention and self-efficacy were assessed with t-tests due to two dominant student GPA categories.

Eighty-four ($n = 84$) participants responded to the questionnaire resulting in an 84.48% response rate. The majority of respondents were male ($n = 53$, 63.10%), juniors ($n = 46$, 54.76%), worked part-time ($n = 46$, 55.4%) and had a GPA between 2.99 and 2.50 ($n = 33$, 39.80%). The limitations of this study are the population as they were students enrolled in a single course in the Agricultural Leadership, Education and Communications department at Texas A&M University. However, the results do offer agricultural leadership education academics insight on factors that affect students' acceptance and use of mobile learning.

Findings

The data is presented as means and standard deviations as the data was normally distributed indicating kurtosis and skewness were not apparent in the dataset. The first objective of the study was to describe agricultural leadership students' level of performance expectancy, effort expectancy, behavioral intention and self-efficacy. The item earning the highest mean for the performance expectancy construct was "Using mobile learning enables me to accomplish tasks more quickly" ($M = 5.40$, $SD = 1.67$). "If I use mobile learning, I will increase my chances of getting a good grade" ($M = 4.81$, $SD = 1.60$) earned the lowest performance expectancy score (Table 1).

Table 2 illustrates the descriptive statistics for the effort expectancy construct of the UTAUT. The highest means occurred for the items "It would be easy for me to become skillful at using mobile learning" ($M = 5.26$, $SD = 1.52$) and "Learning to operate mobile learning is easy for me" ($M = 5.21$, $SD = 1.64$). The lowest mean was associated with the item "My interaction with mobile learning would be clear and understandable" ($M = 4.95$, $SD = 1.64$).

Table 3 illustrates the descriptive statistics for the behavioral intention construct of the UTAUT. The item earning the highest score was "I predict I will use mobile learning in the next 12 months" ($M = 5.24$, $SD = 1.63$).

Table 1. Descriptive Statistics for the Performance Expectancy Construct (N = 84)

Items	N	M	SD
Using mobile learning enables me to accomplish tasks more quickly.	84	5.40	1.67
I would find mobile learning useful in school.	84	5.26	1.75
Using mobile learning increases my productivity.	84	5.01	1.57
If I use mobile learning, I will increase my chances of getting a good grade.	84	4.81	1.60

Note. Overall: $M = 5.13$, $SD = 1.50$. Scale: 7 = strongly agree, 6 = moderately agree, 5 = somewhat agree, 4 = neutral, 3 = somewhat disagree, 2 = moderately disagree, 1 = strongly disagree.

Table 2. Descriptive Statistics for the Effort Expectancy Construct (N = 84)

Items	N	M	SD
It would be easy for me to become skillful at using mobile learning.	84	5.26	1.52
Learning to operate mobile learning is easy for me.	84	5.21	1.64
I would find mobile learning easy to use.	84	5.08	1.68
My interaction with mobile learning would be clear and understandable.	84	4.95	1.64

Note. Overall: $M = 5.12$, $SD = 1.47$. Scale: 7 = strongly agree, 6 = moderately agree, 5 = somewhat agree, 4 = neutral, 3 = somewhat disagree, 2 = moderately disagree, 1 = strongly disagree.

Table 3. Descriptive Statistics for the Behavioral Intention Construct (N = 84)

Items	N	M	SD
I predict I will use mobile learning in the next 12 months	84	5.24	1.63
I plan to use mobile learning in the next 12 months.	84	5.11	1.56
I intend to use mobile learning in the next 12 months.	84	4.99	1.63

Note. Overall: $M = 5.10$, $SD = 1.55$. Scale: 7 = strongly agree, 6 = moderately agree, 5 = somewhat agree, 4 = neutral, 3 = somewhat disagree, 2 = moderately disagree, 1 = strongly disagree.

“I intend to use mobile learning in the next 12 months” earned the lowest score (M = 4.99, SD = 1.63) in the behavioral intention construct.

Describing students’ level of self-efficacy was a part of the first objective (Table 4). The two items earning the highest scores were “How much does mobile learning help you to follow course objectives?” (M = 5.96, SD = 2.10) and “How much can you do with mobile learning to learn effectively?” (M = 5.90, SD = 1.67). “How much does mobile learning help you value learning?” (M = 4.87, SD = 1.85) earned the lowest score within the self-efficacy construct.

The second objective of the study was to determine if significant differences existed between personal characteristics and performance expectancy, effort expectancy and self-efficacy. There was a significant difference in gender, $F(1, 81) = 6.84, p < .05$ and effort

expectancy (Table 5). The effect size was medium ($\eta^2 = .30$). Tukey’s post hoc analysis was conducted to determine if differences existed in gender. There was a significant difference ($p < .05$) between females (M = 5.71, SD = 1.15) and males (M = 4.85, SD = 1.54).

There was a significant difference in gender, $F(1, 81) = 4.30, p < .05$ and performance expectancy. The effect size was small ($\eta^2 = .24$). Tukey’s post hoc analysis was performed to determine if differences emerged in gender. There was a significant difference ($p < .05$) between females (M = 5.61, SD = 1.27) and males (M = 4.90, SD = 1.57).

There was a significant difference in gender, $F(1, 81) = 3.99, p < .05$ and self-efficacy. The effect size was small ($\eta^2 = .23$). Tukey’s post hoc analysis was implemented to determine if differences occurred in gender. There was a significant difference ($p < .05$) between females (M = 5.85, SD = 1.56) and males (M = 5.10, SD = 1.66).

There was a significant difference in GPA, $F(1, 69) = 3.89, p < .05$ and performance expectancy (Table 6). The effect size was negligible ($\eta^2 = .17$). Tukey’s post hoc analysis was employed to determine if differences existed in GPA. There was a significant difference ($p < .05$) between students with GPAs from 3.49 to 3.00 (M = 5.53, SD = .62) and students with GPAs from 2.99 to 2.50 (M = 4.91, SD = 1.32).

There was a significant difference in GPA, $F(1, 69) = 3.64, p < .05$ and effort expectancy. The effect size was negligible ($\eta^2 = .14$). Tukey’s post hoc analysis was conducted to determine if differences existed in GPA. There was a significant difference ($p < .05$) between students with GPAs from 3.49 to 3.00 (M = 5.59, SD = .86) and students with GPAs from 2.99 to 2.50 (M = 4.73, SD = 1.32).

Table 4. Descriptive Statistics for the Self-efficacy Construct (N = 84)

Items	N	M	SD
How much does mobile learning help you to follow course objectives?	84	5.96	2.10
How much can you do with mobile learning to learn effectively?	84	5.90	1.67
How much does mobile learning help you assist your peers with educational content?	84	5.43	2.16
How much does mobile learning help you focus on educational content?	84	5.40	2.10
How much does mobile learning help you use evaluation strategies?	84	5.33	1.90
Does mobile learning help you evaluate your own learning?	84	5.26	2.10
How much does mobile learning motivate you to learn educational content?	84	5.07	1.83
How much does mobile learning get you to believe you can do well in school?	84	4.93	1.76
How much does mobile learning help you value learning?	84	4.87	1.85

Note. Overall: M = 5.35, SD = 1.65. Scale: 9 = a great deal, 7 = quite a bit, 5 = some influence, 3 = very little, 1 = nothing.

Table 5. Results for t-tests with Effort Expectancy, Self-efficacy, Performance Expectancy and Gender (N = 83)

Constructs	N	M	SD	F	p	Effect Size
<i>Effort expectancy</i>						
Females	30	5.71	1.15	6.84*	.01	.30
Males	53	4.85	1.54			
<i>Performance expectancy</i>						
Females	30	5.61	1.27	4.30*	.04	.24
Males	53	4.90	1.57			
<i>Self-efficacy</i>						
Females	30	5.85	1.56	3.99*	.04	.23
Male	53	5.10	1.66			

Note: * $p < .05$.

Table 6. Results for t-tests with Performance Expectancy, Effort Expectancy, and GPA (N = 71)

Constructs	N	M	SD	F	p	Effect Size
<i>Performance expectancy</i>						
3.49 to 3.00	32	5.53	.62	3.89*	.03	.17
2.99 to 2.50	39	4.91	1.39			
<i>Effort expectancy</i>						
3.49 to 3.00	32	5.59	.86	3.64*	.04	.14
2.99 to 2.50	39	4.73	1.32			

Note: * $p < .05$.

Conclusions

This study examined undergraduate agricultural leadership students’ perspectives of mobile learning. For the construct of performance expectancy, a majority of students agreed that mobile learning would contribute positively to their performance. A majority of students studying critical issues in agriculture agreed that mobile learning is at a level that would be easy to use. The construct of behavioral intention indicates whether or not students intended to use mobile learning in the near future and students agreed they intended to use mobile learning soon. A majority of students believed mobile learning could influence their learning in school.

Females had higher levels of agreement with mobile learning and believed mobile learning would contribute positively to their performance, would be easy to use and believed that mobile learning could positively influence

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their learning. Students earning higher GPAs believed mobile learning would enhance their performance and be easier to use in courses as compared to students' perceptions with lower GPAs. While the limitations of this study are the dataset and population from a single course, the results do offer insight on factors that influence the mobile learning perceptions and beliefs of students studying critical issues in agriculture.

Implications

The framework for this study was Venkatesh et al. (2003) Unified Theory of Acceptance and Use of Technology (UTAUT) and Bandura's (1977) self-efficacy theory. The UTAUT attempts to explain the factors involved in an individual's behavioral intention to use technology. Findings from this study indicated that students in a course covering critical issues in agricultural leadership were willing and able to utilize mobile learning in an educational context. Students indicated mobile learning could positively influence their performance. Mobile learning allows students to access content for educational purposes at any point in time or place (Peng et al., 2009). With the immediate accessibility of information through a mobile device, students can quickly access pertinent information to support in-class learning resulting in improved classroom participation and productivity. Agricultural leadership students also believed mobile learning is easy to use and stated their intention to use mobile learning soon. Students believed they could develop mobile learning skills and learning to use mobile learning is straightforward.

Self-efficacy theory posits an individual with high self-efficacy will view difficult tasks as something to accomplish rather than avoid (Bandura, 1977). In this study, agricultural leadership students suggested mobile learning could influence their learning. Students with high mobile learning self-efficacy believed mobile learning could be used to accomplish more complex tasks in the classroom. Likewise, students believed the use of mobile learning could motivate them to learn effectively, assist them in learning leadership concepts and help them teach their peers about leadership. The results of this study infer the majority of agricultural leadership students in a critical issues course would persevere and engage in mobile learning successfully.

When it comes to smartphones and tablet devices, students are knowledgeable and their use is becoming a norm in this day and age (Hanson et al., 2011). Students witness their peers, family and faculty using mobile technology in their everyday lives and for various purposes. Self-efficacy is determined not only by personal competence but through critical evaluation from other credible sources, individuals' emotional reactions

to a task and direct observation of task completion (Bandura, 1977). Thus, before implementation, agricultural leadership educators should consider student's accessibility to mobile learning devices and their emotional responses when using such technology. Educators should also evaluate their personal mastery and their ability to model mobile learning effectively.

Recommendations

This study expands our understanding of the relationships between students' acceptance of mobile learning and their personal characteristics. Agricultural leadership students indicated their acceptance and readiness for mobile learning use. This supports research that indicated agricultural students' preference for increased use of technology (Rhoades et al., 2008). Practitioners should consider incorporating mobile learning in the classroom but be aware that successful technological incorporation includes feasibility and the alignment with course learning outcomes. Although viewed favorably, Alston et al. (2003) stated that agricultural educators found cost of technology as a potential barrier to the future use of instructional technology. The potential barriers to mobile learning implementation should be evaluated within agricultural leadership programs, respectively. Furthermore, agricultural leadership educators should be aware that differences exist among gender and use of mobile learning. Differences also exist between GPA and mobile learning acceptance. Consideration should be given to the purposeful design of course content using mobile learning for diverse audiences.

Despite potential barriers, agricultural leadership educators should provide higher level learning outcomes to challenge students in their thinking. Mobile learning may be a way to enhance this learning. The use of tablet devices and smartphones can create positive learning environments giving students the opportunity to increase interactions with their classmates and the instructor to collaboratively solve complex problems (Shuler et al., 2010). Several studies aforementioned indicated the importance of leadership development through the use of innovative teaching strategies (Alston and English, 2007; Boyd and Murphrey, 2002; Guthrie, 2009). Instructional delivery methods in agricultural leadership courses impact a student's learning environment and their capacity to develop leadership proficiency. The use of mobile learning in the classroom could be a potential teaching approach in agricultural leadership education preparing students for personal and occupational success.

Given the limitations of the research design, the study should be replicated with a larger sample of agricultural

leadership students. Replication with a randomized sample of students can provide additional insights and allow the researcher to generalize to the target population (Fraenkel et al., 2012). While significant differences were found among the variables of gender and GPA, more research should look into why these differences exist. Further research should also be conducted to empirically investigate the impact of mobile learning in the classroom environment and evaluate the readiness and acceptance of mobile learning from the practitioner's perspective. Future research should compare these students' responses with students in other majors at this institution and others across the nation. Additionally, attention should be directed to research the relationship between mobile learning use and leadership skills and competencies. Leadership is an applied discipline (Bass, 1990). Students learn from the ability to directly transfer classroom knowledge to leadership experiences. Mobile learning could be one method agricultural leadership educators can use in connecting students to different contexts of leadership and aid in bringing in examples from outside the classroom.

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Self-efficacy and Task Value Motivation of Students Based on Classroom, Instructor and Student Variables¹

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Abstract

This study sought to descriptively explore the motivation (self-efficacy and task value) of students enrolled in college of agriculture courses. Students ($n = 208$) were assessed on self-efficacy and task value motivational indicators in relation to classroom, instructor and student variables. Results indicated higher self-efficacy for elective courses, smaller class sizes, courses with female instructors, instructors age 50-59 and female students. Regarding task value, participants indicated higher task value motivation for required courses, class sizes 60-89, courses taught by professors, courses taught by females, instructors age 50-59 and female students. Small and medium effect sizes were observed between group means offering insight as to the magnitude of the observed differences. In all measures of student motivation, female students evidenced higher mean scores. Results generated clues as to the stability and development of self-efficacy and task value motivation in selected college of agriculture students. Further research is recommended giving additional consideration to confounding and extraneous variables, increased sample size, probability sampling and the role of gender and student motivation.

Introduction

As agricultural educators, it is imperative to understand the motivational tendencies of the students

enrolled within a college of agriculture. Research examining the motivational beliefs of students enrolled in college of agriculture courses can enable agricultural educators to recognize and improve the success of students and establish a basis for more effective teaching. Furthermore, examining the motivational differences in relation to instructor variables will enable agricultural educators to better shape the learning environment to maximize student motivation.

Expectancy-value motivational theories have shown tremendous opportunities for improving student academic and personal growth (Schunk et al., 2008; Eccles, 2005; Wigfield and Eccles, 2002). Despite the growth in both motivational and educational psychology, there remains very little research directed towards the motivational assessment of students enrolled in colleges of agriculture. This present research is intended to lay a descriptive foundation for the self-efficacy and task value motivation of students enrolled in a college of agriculture.

The theoretical foundation for this research was grounded in the Social Cognitive Theory (self-efficacy) developed by Albert Bandura (1986) and the Expectancy-Value Theory (task value) espoused by Atkinson (1957), Lewin (Weiner, 1992) and Wigfield and Eccles (Eccles, 1983; Wigfield, 1994).

¹The Ohio State University Institutional Review Board approved the study protocol and all participants provided informed consent prior to participation in the study.

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Self-efficacy and Task Value

Self-efficacy

In 1986, Albert Bandura developed the Social Cognitive Theory to highlight his view that motivation was a result of interactive agency, also referred to as triadic reciprocity—a reciprocal relationship based on personal determinants, action and environmental factors (Bandura, 1986). Once Bandura resolved that individuals have and exercise control over their thoughts, feelings and actions, he began developing a theory to address people's beliefs in their own ability to succeed in a task. Bandura conceptualized his ideas as the Theory of Self-Efficacy (Bandura, 1986). Bandura (1986) defined self-efficacy as being, “. . . concerned not with the skills one has but with judgments of what one can do with whatever skills one possesses” (p. 391).

Since its inception in 1986, self-efficacy has been linked to many educational benefits including gains in student achievement and student effort (Bandura, 1997; Zimmerman, 2000), student persistence and skill acquisition (Schunk, 1991) and academic performance and persistence (Multon et al., 1991). Multon et al. (1991) examined 39 different self-efficacy studies and concluded that, “. . . across various types of student samples, designs and criterion measures, self-efficacy beliefs account for approximately 14% of the variance in students' academic performance and approximately 12% of the variance in their academic persistence” (p. 34). Zimmerman (2000) highlighted the importance of environmental and situational factors in the determination of self-efficacy beliefs and stated, “. . . self-efficacy is assumed to be responsive to changes in personal context and outcomes, whether experienced directly, vicariously, verbally, or physiologically” (p. 88).

Task Value

Very little research has been conducted in agricultural education related to task value. Therefore, there is a need to begin examining the potential implications of students' task value beliefs. Eccles (2005) defined task value as, “. . . a quality of the task that contributes to the increasing or decreasing probability that an individual will select it” (p. 109). According to Eccles (2005) and Wigfield and Eccles (2002), subjective task value can be subdivided into four components: attainment value, intrinsic or interest value, utility value and cost value.

Eccles (2005) defined four major assumptions related to attainment value. First, individuals will view tasks as important when they view engagement in a task as central to their core sense of self. Second, allowing individuals to engage in many tasks, will, over time, establish within the individual a sense of task value corresponding to and strengthened by, their belief of self. The third assumption is that individuals tend to place

greater value in tasks that fulfill their self-image and are consistent with their long-range goals. The fourth assumption is that individuals are more likely to accept tasks with high subjective value as opposed to tasks with low subjective value (Eccles, 2005).

Intrinsic or interest value can be defined as simply, “. . . the inherent, immediate enjoyment one gets from engaging in an activity” (Eccles et al., 1983, p.89). Eccles, (2005) likened intrinsic value to Csikszentmihalyi's concept of flow. Intrinsic value results from being immersed in and overcome with, the natural enjoyment of a given activity (Csikszentmihalyi, 1997).

Utility value is “. . . determined by the importance of the task for some future goal that might itself be somewhat unrelated to the process nature of the task at hand” (Eccles, 1983, pp.89-90). For instance, a student may place utility value on a specific course, not for the sake of the course, but rather for the sake of the job obtainment possibilities presented by successful graduation.

Identification of the level of student motivation in relation to classroom, instructor and student variables will better enable educators to address and improve the motivation of students as well as provide clarity for future research. Research which clarifies the self-efficacy and task value motivation of college of agriculture students may provide a basis for improving student academic success, facilitating career choice, encouraging career persistence and enhancing the use of both cognitive and metacognitive strategies (Bandura, 1997; McKeachie, 1990; Pintrich and DeGroot, 1990). This present inquiry was intended to provide a descriptive basis on which to begin assessing the self-efficacy and task value of students enrolled in colleges of agriculture.

The purpose of the study was to examine the self-efficacy and task value motivation of students enrolled in two selected college of agriculture courses. The research was guided by three main research objectives:

1. Describe student self-efficacy and task value for learning based on classroom variables.
2. Describe student self-efficacy and task value for learning based on instructor variables.
3. Describe student self-efficacy and task value for learning based on student variables.

Materials and Methods

The target population for this descriptive-exploratory study consisted of college students enrolled in two selected agricultural courses within a large university. A purposive sample was selected and assessed from two of the largest non-major specific agriculture courses offered by the college. According to Ary et al. (2006), a

purposive sample is one in which, “. . . sample elements judged to be typical, or representative, are chosen from the population” (p. 174). The two courses in which the assessment was administered were identified and selected based on class size, accessibility and enrollment of a diverse variety of majors.

The selected courses comprising the purposive sample were perceived to contain a relative mix of freshman, sophomores, juniors and seniors. Both courses were deemed to be most closely representative of the entire college. However, based on the nonprobability method of collection, no attempt was made to generalize the results beyond the respondents (Ary et al. 2006). Data were collected from the two selected courses in which students were asked to assess their personal motivation in the class they had attended immediately previous to the class in which collection occurred. While the data utilized in this study were part of a larger study, the current research focused strictly on the classroom, instructor and student variables relating to student self-efficacy and task value motivation.

Instrumentation

Each student was given the opportunity to complete two assessment instruments: the Self-Efficacy for Learning and Performance and the Task Value portion of the Motivated Strategies for Learning Questionnaire (MSLQ) created by Pintrich et al. (1991, 1993). In addition, participants were asked to provide demographic data pertaining to class rank, student gender, course type, class section, class time, class size, instructor type, instructor gender and instructor age.

The Self-Efficacy for Learning and Performance instrument consisted of eight Likert-type questions similarly scaled from 1 (Not at all true of me) to 7 (Very true of me). Previous Cronbach reliability for the self-efficacy portion of the MSLQ was 0.93 (Duncan and McKeachie, 2005). For the purposes of this research, the scale descriptors (Not at all true of me) and (Very true of me) were modified to read (Strongly disagree) and (Strongly agree). For instance, when answering the question, “I expect to do well in this class,” participants were asked to rate their responses on a Likert-type questionnaire scaled from 1 (Strongly disagree) to 7 (Strongly agree). A panel of experts in Agricultural Education, consisting of graduate students and professors, were asked to assess the validity of such a change and all questions with the new scale descriptors were deemed valid. A pilot study with the modified descriptors revealed a Cronbach’s reliability coefficient of 0.96 ($n = 27$). A post hoc Cronbach’s reliability analysis was 0.96 ($n = 208$).

The Task Value measurement chosen for the research was the Task Value component of the Motivated Strategies

for Learning Questionnaire (MSLQ). The Task Value measure contained six Likert-type questions scaled from 1 (Not at all true of me) to 7 (Very true of me). Previous administrations of the Task Value segment of the MSLQ yielded a reliability coefficient of 0.90 (Duncan and McKeachie, 2005). For the purposes of this research, the scale descriptors (Not at all true of me) and (Very true of me) were modified to read (Strongly disagree) and (Strongly agree). For instance, when answering the question, “I am very interested in the content area of this course,” participants were asked to rate their responses on a Likert-type questionnaire scaled from 1 (Strongly disagree) to 7 (Strongly agree). A panel of experts in Agricultural Education, consisting of graduate students and professors, were asked to assess the validity of such a change and all questions with the new scale descriptors were deemed valid. The MSLQ with the modified scale descriptors was administered to college students and the pilot study ($n = 27$) revealed a Cronbach’s reliability coefficient of 0.83. The post hoc Cronbach’s reliability was 0.93 ($n = 208$).

Data Collection

The target population and subsequent purposive sample consisted of students enrolled in two colleges of agriculture courses. Both courses had a combined enrollment of 250 students. Of the 250 possible respondents, 208 returned useable questionnaires resulting in a sample size of 208. As a result of the nonprobability sampling technique, no efforts were made to generalize the results past the respondents.

The institutional review board protocol for this study prevented the researchers from recording specific student names. As a result, the researchers were unable to take any class roll or attendance measures. Thus, the researchers were only able to report the number of returned questionnaires and, because there were no individual identifiers, calculation of nonresponse rate was difficult. The only conclusions concerning completion rate were based on the course enrollment and those students completing instruments. The enrollment for one course was 105 students, with 85 students returning completed questionnaires, for a response rate of 81%. The enrollment for the second course was 145 students, with 123 completing usable instruments, for a response rate of 85%. No attempt was made to follow up on nonrespondents.

Data Analysis

Data were analyzed using SPSS 17.0 statistical software package. Descriptive data relating to the research objectives were analyzed to further describe student self-efficacy and task value perceptions. Cohen’s

Self-efficacy and Task Value

d (Cohen, 1988) was also used to measure the effect size of the mean values. Cohen defined effect sizes as small (.20-.50), medium (.50-.80) and large (>.80). Effect sizes were calculated on mean values and those values evidencing a small, medium or large effect size were noted. Confidence intervals were established a priori at 95% and reported throughout the manuscript in conjunction with effect sizes. The data utilized in this research were part of a larger research study.

Results

A demographic overview indicated 208 respondents reported assessing 50 course prefixes. Of the 50 course prefixes, the largest categories were chemistry (n = 23, 11.1 %) and math (n = 20, 9.6%) followed by animal science (n = 15, 7.2%), biology (n = 14, 6.7%) and rural sociology (n = 14, 6.7%). The remaining 45 course categories evidenced a fairly even distribution with no one category accounting for more than 5% of the respondents. The students identified 20.7 % of the classes as elective and 78.4 % as required. In terms of year in school, Freshman (21.6%) Sophomore, (23.6%) Junior (33.7%) and Senior (21.2%) participants displayed a relatively heterogeneous mix representing each year in school.

Objective 1 sought to describe student self-efficacy and task value for learning based on classroom variables. The classroom variables examined included course type, class section, class time and class size.

Students indicated higher self-efficacy for elective courses and lower self-efficacy for required courses (Cohen's $d = .46$, $t(204) = 2.441$, $p = .015$, 95% CI [.10, .99]). The task value for elective courses was slightly lower than the task value for required courses. Class section showed little variation among self-efficacy and task value means and class time yielded slightly higher self-efficacy means for courses taken in the middle of the day and late afternoon. The task value means were relatively stable regardless of class time. Regarding class size, self-efficacy scores were higher for smaller class sizes and decreased as class size increased. The largest self-efficacy mean value difference was between class sizes of 30-59 and 90-119 (Cohen's $d = .80$, $t(54) = 2.553$, $p = .014$, 95% CI [.18, 1.53]). Task value mean scores varied somewhat based on class sizes with students indicating the greatest task value in classes containing 60-89 students and the lowest task value mean in classes containing 90-119 students (Cohen's $d = .68$, $t(42) = 2.088$, $p = .043$, 95% CI [.03, 1.70]). Table 1 identifies the mean self-efficacy and task value scores in relation to classroom variables.

Objective two sought to describe student self-efficacy and task value for learning based on instructor

Table 1. Student Perceived Self-efficacy and Task Value in Relation to Course Type, Class Section, Class Time, and Class Size

		n	Self-Efficacy		Task Value	
			M	SD	M	SD
Course Type	Elective	43	5.52 (1.06)		4.72 (1.34)	
	Required	163	4.96 (1.35)		4.82 (1.51)	
Class Section	Lecture	153	5.10 (1.32)		4.84 (1.48)	
	Laboratory	20	5.19 (1.40)		4.77 (1.61)	
	Recitation	32	4.99 (1.32)		4.84 (1.49)	
Class Time	Early Morning	81	4.96 (1.30)		4.89 (1.39)	
	Middle of the Day	82	5.23 (1.35)		4.84 (1.60)	
	Late Afternoon	34	5.26 (1.17)		4.82 (1.50)	
	Evening	8	4.01 (1.26)		4.40 (.89)	
Class Size	0-29	75	5.06 (1.32)		4.90 (1.49)	
	30-59	38	5.47 (1.19)		4.84 (1.57)	
	60-89	28	5.38 (1.26)		5.21 (1.42)	
	90-119	16	4.61 (.96)		4.35 (1.10)	
	120-149	15	5.02 (1.63)		4.46 (1.72)	
	>150	33	4.66 (1.39)		4.73 (1.47)	

Note. Scale: 1 = strongly disagree to 7 = strongly agree.

Table 2. Student Perceived Self-efficacy and Task Value in Relation to Instructor Type, Gender, and Age

		n	Self-Efficacy		Task Value	
			M	SD	M	SD
Instructor Type	Professor	159	5.10 (1.32)		4.87 (1.46)	
	Graduate Student	46	4.98 (1.30)		4.61 (1.50)	
Instructor Gender	Male	149	5.05 (1.32)		4.77 (1.50)	
	Female	59	5.18 (1.30)		4.99 (1.40)	
Instructor Age	20-29	45	4.99 (1.39)		4.61 (1.50)	
	30-39	42	4.93 (1.40)		4.55 (1.68)	
	40-49	45	5.10 (1.23)		4.61 (1.43)	
	50-59	59	5.27 (1.19)		5.31 (1.18)	
	60-69	14	4.98 (1.72)		5.04 (1.46)	
	70 or more	1	5.75 (--)		2.00 (--)	

Note. Scale: 1 = strongly disagree to 7 = strongly agree.

variables. The researchers assessed instructor type, gender and student perceived age.

Student mean values based on instructor type were very similar. The main differences can be seen in that both student self-efficacy and task value were lower for graduate student instructors. Instructor gender evidenced slight mean value differences with students indicating greater self-efficacy and task value in courses taught by female instructors. Instructor age displayed the largest mean value differences for both self-efficacy and task value for instructors between 30-39 and 50-59. Self-efficacy effect sizes, based on instructor age, while non-significant, yielded a Cohen's $d = .26$ ($t(99) = -1.284$, $p = .202$, 95% CI [-.86, .18]) and task value effect sizes were Cohen's $d = .52$, ($t(99) = -2.694$, $p = .008$, 95% CI [-1.33, -.20]). Table 2 contains the mean values for self-efficacy and task value.

Objective 3 sought to describe student self-efficacy and task value for learning based on student variables of class rank and gender. Self-efficacy mean values increased yearly from freshman to senior standing and the task value means increased through the junior year and then decreased. Gender results varied between male and female with male students reporting lower self-efficacy and task value scores than female students. The task value mean difference between males and females

Table 3. Student Perceived Self-efficacy and Task Value in Relation to Class Rank and Student Gender

		n	Self-Efficacy		Task Value	
			M	SD	M	SD
Class Rank	Freshman	45	4.67 (1.27)		4.74 (1.45)	
	Sophomore	49	5.04 (1.30)		4.87 (1.41)	
	Junior	70	5.23 (1.26)		4.91 (1.50)	
	Senior	44	5.33 (1.40)		4.74 (1.56)	
Student Gender	Male	132	5.00 (1.42)		4.64 (1.48)	
	Female	76	5.23 (1.09)		5.16 (1.41)	

Note. Scale: 1 = strongly disagree to 7 = strongly agree.

produced a Cohen’s d of .36 ($t(205) = -2.507, p = .013, 95\% \text{ CI} [-.94, -.11]$). Table 3 lists the self-efficacy and task value mean scores.

Discussion

The comparisons between the demographic variables and the respondent mean values of self-efficacy and task value produced several important clues as to the nature of both self-efficacy and task value. Based on class rank, self-efficacy means increased from freshman through senior standing. Freshmen reported a mean value of 4.67 (SD = 1.27) increasing to a senior mean of 5.33 (SD = 1.40) yielding a small effect size of $d = .49$ ($t(87) = -2.298, p = .024, 95\% \text{ CI} [-1.21, -.09]$). This observation is in line with the underlying theory and prior research of self-efficacy (Eccles and Midgley, 1989). Namely, students are influenced by mastery experiences, vicarious experiences, verbal persuasion and physiological and affective states (Bandura, 1997). The researchers would also assume that college students may be more sensitive and receptive to mastery experiences offered in college classes and the social aspects of self-efficacy generation. Further, social influence is particularly high during the college years, leading to an increased receptivity toward vicarious experiences. Lastly, college students are in the midst of developing an independent sense of their own physiological and affective moods. Conceivably, the development of physiological and affective states increases during the college years, resulting in an increase in self-efficacy.

The mean values for task value followed a very logical and intuitive pattern. Freshmen increased in task value throughout their junior year and then decreased in task value for their senior year. Seniors often display less task value in certain subjects, a phenomena which some refer to as “senioritis.” The task value mean scores support the notion that seniors may tend to lessen the task value of curricular tasks (Eccles et al., 1983).

Class section showed a slightly higher self-efficacy mean for laboratory classes and little to no difference between lecture, laboratory and recitation in relation to task value. The role of class time in respondent self-efficacy revealed increased self-efficacy mean values based on class time through late afternoon classes (=

5.26, SD = 1.17) with a substantial drop in self-efficacy for evening classes (= 4.01, SD = 1.26). It is important to recognize the number of respondents indicating evening classes. Quite possibly, the evening category is not representative of what the results would be with a larger, more diverse sample. Task value appeared relatively unchanged based on class time with a slight decrease in the mean scores for the evening class respondents.

Instructor age mean values varied slightly for self-efficacy and task value determinations. The respondents indicated higher mean scores in both self-efficacy and task value for instructors age 50-59. Further research should be conducted to examine the possible confounding variables which may influence the observed difference. Perhaps class size might be a confounding variable, or there may be some other influencing factors which result in students with instructors in the 50-59 year age category evidencing increased self-efficacy and task value.

The mean values for self-efficacy and task value varied somewhat in relation to student gender. In all measures of student motivation, female students evidenced higher mean scores. Female students were slightly higher in self-efficacy ($1 - 2 = .23$) and noticeably higher in task value ($1 - 2 = .52$). The reasons for the difference in female scores remain obscure. Perhaps female students, once they reach certain levels, tend to perceive themselves as more capable, or perhaps they are simply more sensitive to their own self-efficacy. Female students, in this study, value tasks at a greater level than the male students. Once again, the observed differences should be analyzed in conjunction with research pertaining to societal roles as well.

In an effort to further examine the differences between males and females, the researchers split the student gender file and compared self-efficacy and task value means relating to student class rank. Consistently, with but one exception, female students ranging from freshmen to seniors had higher self-efficacy and task value scores. The one exception is senior female students who rated themselves lower on self-efficacy ($= 5.17, n = 17, SD = 1.37$) than the senior males ($= 5.43, n = 27, SD = 1.44$). Future research may want to consider examining student self-efficacy and task value motivation in relation to student gender, content area, age, class rank and prior experiences.

Instructor gender showed slight differences in student self-efficacy and task value. Participants reported female instructors had higher mean values for self-efficacy ($= 5.18$ for females and $= 5.05$ for males) and task value ($= 4.99$ for females and $= 4.77$ for males). Further research should examine the relationship between instructor gender and student motivation.

Self-efficacy and Task Value

A basic understanding of the self-efficacy and task value motivation of selected students enrolled in a college of agriculture provides insight into possible motivational trends and encourages further, more detailed examination. Potential confounding variables need to be identified, controlled for and researched. Caution should be applied to the selection or development of appropriate instruments and consideration should be given to the future assessment of a probability sample. Further research needs to examine self-efficacy and task value at multiple academic locations in an effort to detect potential extraneous variables related to geographic location. Hopefully, through systematic analysis, further insight can be gained regarding student motivation. Additional insight will allow educators and researchers to facilitate an optimal learning and motivational environment.

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GUIDEBOOK

For Evaluating Teaching

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Abstract

Part I of the Guidebook contains four sections: a general description of intended use, some thoughts on defining good teaching, considerations for evaluating teaching, and the general approach (or model) followed in the Guidebook. Thus, Part I is a synthesis of "where we are coming from," and it provides a framework from which we critique and recommend specific strategies for the evaluation of instruction in Parts II, III, and IV which will be published in the March, June and December, 1984 issues of the NACTA Journal.

Section 1: Use of this Guidebook

This guidebook is about the evaluation of faculty teaching performance and competence. Teaching as used in this book includes a faculty member's performance and competence in the classroom, in structuring and organizing a course, in curriculum development, and in advising students. A distinction between two purposes of evaluation — personnel decision and improvement — is emphasized. These two purposes are to be viewed as complementary. Conflicts that emerge by simultaneously evaluating faculty for both purposes need to be recognized and dealt with; but if evaluation is properly designed and handled, both purposes can be served with a minimal amount of conflict and with increased efficiency and effectiveness.

The guidebook is organized into four parts for purpose of this publication. The ways of collecting information about teaching are organized around the five common sources of information — students, colleagues, self, alumni, and records. For each source, a discussion of the technical quality of the evaluative information that can be collected from each source, examples of techniques and instruments, and a list of suggestions for using information from these sources for both personnel decision making and improvement are included.

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While developing this guidebook, the authors were members of the Measurement and Research Division, Office of Instructional Resources, University of Illinois, Urbana, IL 61801.

PART I:

Rationale and Principles

This guidebook was written for three major audiences: (a) departmental and college administrators who have the responsibility to evaluate faculty for annual salary increases and for promotion and tenure, (b) departmental advisory and executive committees, and (c) faculty who desire to collect more and better information about their competence both for personnel decisions and for improving their own teaching.

If you are a college or departmental administrator or member of a committee with the responsibility for evaluating teaching for salary and/or promotion and tenure, the sections headed by "Suggestions for Personnel Decision" and the two latter sections in Part IV are the most relevant sections. If you wish to learn of possible ways to evaluate teaching for improvement, sections headed by "Suggestions for Improvement" are the most relevant.

Section 2: Defining Good Teaching

Based on a review of the research on teaching at the collegiate level, no universal definition of effective or good teaching exists. The history of research on teaching is rich and complex, and the net result of the research reflects a diversity of conclusions as much as a consensus. Thus no one definition is advocated as the standard against which all teaching is to be compared. In general, the evaluation of instruction can be divided by its emphasis on product (i.e., what do students learn or accomplish in the course?) or process (i.e., what do teachers and students do in a course?) A closer look at each emphasis should reveal that effective teaching is defined differently by the emphasis placed on product or process.

Product:

If product is emphasized, the basis for judging effective teaching is amount of student learning. Although this definition has great appeal, there are two major problems in linking student learning to conclusions about effective teaching. First, the measurement of student performance must be done in such a manner that confidence can be given to the test results. Do the tests adequately tap what students learn in a course? Second, student ability, motivation, and

prior knowledge influence what students learn in a class. Thus these and other factors need to be taken into account in judging the effectiveness of an instructor. Because of these problems, student learning is seldom used as the sole basis for judging teaching competence.

Process:

If process is emphasized, the focus is on what the instructor does both in the classroom and in organizing and managing the course. The questions relevant to process include: What does the instructor require of the students (e.g., assignments, workload); how does the instructor behave in the classroom (e.g., lecture, discussion); and how does the instructor relate to the students both in and out of the classroom? The basis for judging effective instruction centers around teacher rather than student behaviors. However, the linkage between how an instructor behaves and amount learned by students is not always clear and thus sole reliance on process factors is also not recommended.

Despite the problems inherent in defining good teaching, certain generalizations about teaching can be made:

Teaching is related to student learning and deals with establishing conditions for facilitating learning. Thus evaluating teaching is best accomplished by including both product and process factors.

No single instructional strategy is always superior to any other. Faculty who lecture are not necessarily better teachers than faculty members who use discussion techniques.

Good teaching means more than good performance in front of the class.

Instructors have different skills, abilities, and preferences, and they should be aware of them and be encouraged to use them.

Section 3: Evaluating Teaching: Some Considerations

Evaluation serves many purposes and functions. The three primary purposes are: (a) assist individual instructors to improve as teachers, (b) provide information to colleagues and administrators for decisions about promotion, tenure, and annual salary increases, and (c) provide information to students for course selection. The purpose of an evaluation is the cornerstone of an evaluation program. It may influence the type of information collected, the analysis and portrayal of the information, and the dissemination and use to be made of the information. Because of the importance of purpose, considerations for a formal evaluation program are presented separately for personnel decisions and for improvement.

For Personnel Decisions

1. **An inherent paradox in evaluation can not be avoided.** The paradox centers around an individual's quest for excellence, which is central in the life of a faculty member. On the one hand, faculty interested in improving their instruction specify goals and receive feedback about their progress towards achieving them. On the other hand, faculty value and need freedom to explore and to fail, while not continuously being judged by others. Both approaches for striving for excellence are valid but in conflict. While faculty have an obligation to demonstrate their accountability to those who support them, they also need autonomy and freedom. The major question to ask is: How can evaluation be designed so that the institution can fulfill its responsibility and faculty still have sufficient autonomy?

2. **The linkage among performance, the evaluation of performance, and reward for quality of performance is necessary for an evaluation program to have any utility.** If no contingencies exist among performance, evaluation, and rewards, then evaluation loses its potential and becomes an unnecessary expense in time and effort. Furthermore if only negative consequences result from an evaluation, then evaluation is doomed to fail. Those evaluated will probably resent the process and seek ways to subvert and discredit the evaluation. The consequences in the linkage between performance, evaluation, and rewards do not need to be solely tied to external rewards, such as salary increases or promotion although these extrinsic rewards are often more important than is admitted publicly. Knowledge that one is doing good work is a condition for high internal motivation. The major question to ask is: Does the evaluation lead to any positive consequences?

3. **Evaluation with criteria, standards, and types of evaluative information to be collected is a powerful means by which the faculty learn of departmental or institutional expectations.** Evaluation cannot be ignored, because policies, values, expectations about goals, workload, and excellence are dealt with in evaluation. The determination of criteria, standards, and types of evaluative information to be collected and used is a departmental faculty matter, and one which is often not without controversy and disagreement. In designing an evaluation program, it should not be so explicit that faculty feel the need to behave in certain ways in order to "look good" on an evaluation. If so, evaluations may be usurping a general working principle of academe — faculty are basically interested in their work, and they receive considerable satisfaction from doing their work well. A reward system that replaces reliance on internal motivation with dependence on tangible external rewards may result in ultimately reducing rather than increasing faculty productivity. Thus a balance between communicating

expectations through evaluation and allowing faculty freedom to pursue their own interests must be made. The major question to ask is: Does the evaluation tend to encourage the faculty member to “look good” as opposed to “being good?”

4. The evaluation procedures need to be incorporated into the departmental and institutional policies for awarding promotion, tenure, and salary adjustments. The measures and types of information used by the departments as indicators of instructional quality need to be consistent with the policies and communicated to the faculty in advance. The major question to ask is: Do faculty know what information is accepted as legitimate and appropriate evaluative information?

5. Evaluation must have credibility to both the faculty and to the administration. Credibility is largely a political matter. Gaining credibility requires the support of both the administrators and faculty, especially the senior faculty. Furthermore those implementing the program must remain impartial and respect the prerogatives of the individual instructor, and establish guidelines regarding the confidentiality of evaluations. The major question to ask is: Does the evaluation have sufficient credibility?

6. Information used in evaluation must be fair. Fairness refers to the extent to which the information adequately represents both the criteria used to evaluate instruction and the complexity of the teaching activities. Criteria are often difficult to specify, but instructors being evaluated need some understanding of the basis on which they are judged. Furthermore, if the information to be collected does not accurately mirror the activities of the instructor or student learning, the information is incomplete. The major question to ask is: Does the information used in evaluation adequately represent the teaching efforts of each faculty member?

7. Information used in an evaluation must be of sufficient technical quality. Technical quality refers to the extent to which the information is comprehensive, reliable, and valid. At a minimum, the administrative procedures, the instruments, and methods used in the data collection need to be consistent for all faculty. Student, course, and instructor characteristics (e.g., class size, type of course, elective/required status) also often need to be taken into account when the information is interpreted for assessing competence. The major question to ask is: Is the information accurate, trustworthy, and properly used for the purpose for which it was intended?

8. Evaluation must be based on acceptable legal principles and practices in personnel appraisal. Evaluation procedures need to be based on how well faculty members fulfill their responsibilities in teaching, justifiable methods of data analysis and interpretation, and needs to incorporate “due process” into the evaluation. In general, the courts have not

dictated the contents (i.e., selection of criteria or standards of quality) but have focused on procedural due process (i.e., how the evaluation was carried out). The key question to ask is: Does the evaluation process — the specification of criteria, collection and interpretation of the information, and dissemination — follow legal principles?

9. Levels of review built into the program make the evaluation more comprehensive, fair, and credible. Multiple interpretations of the information are superior to a single person’s judgment of teaching quality. Furthermore, factual errors are more apt to be detected and corrected if opportunities for review are built into the process. On the positive side, a consensus achieved through multiple reviews helps make the evaluation more credible and fair. The major question to ask is: Can errors and misinterpretation be detected and corrected before a final assessment is communicated to the faculty member being evaluated?

10. Evaluation is as much a social and human activity as it is a technical undertaking. Evaluation often is sensitive and deeply personal, especially to faculty who are not yet tenured. Thus the manner in which evaluative information is communicated is a key factor in an evaluation. Personal communication of feedback by a departmental administrator in an annual review has been rated as especially effective by faculty because it provides opportunities for a faculty member to respond to an evaluation and to discuss their career. The question to ask is: How are evaluations communicated to the individual faculty member?

11. Alternative evaluation procedures can be examined for their benefits to the institution. A comprehensive set of procedures, while meeting most of the previous considerations, may not be feasible due to lack of time and financial resources. The major question to ask is: How realistic is the evaluation; i.e., which procedures must be included and which can be altered or eliminated?

For Improvement

1. Information collected for improvement is collected for the instructor only. Instructors may wish and generally can benefit by sharing information with a colleague, but the instructors should be able to do it at their discretion. This restriction is necessary so that instructors have the freedom to ask questions about problems and that the asking of them cannot be used against them in making personnel decisions. The major question to ask is: Do faculty have the freedom to collect evaluative information for their private use?

2. Information can be frequently and informally collected. Since the information is not intended for personnel decisions, any type of evaluative information can be immediately examined to help the instructor in assessing a course. The trustworthiness of the information does, of course, depend on the reliability

and validity of the data. The major question to ask is: Are faculty collecting enough information to monitor their progress?

3. **Evaluation tied to self development maximizes its long range utility.** Minimally, a faculty member needs to think of evaluative information as a starting point for further analysis and problem solving. Evaluation, professional development, and improvement in instruction are inseparable. The major question to ask is: Does the faculty member accept the principle that self evaluation of teaching is a necessary condition for change and growth?

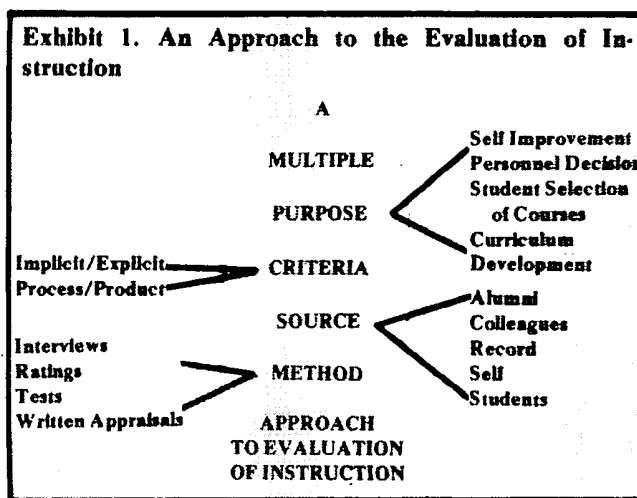
4. **Information collected that is highly detailed, diagnostic, and focused on specific teaching behaviors and course characteristics (e.g., tests, text) increases the usefulness of the information.** Information about specific teacher behavior and course features that need improvement is very helpful before specific changes can be considered. Specific information does not result from asking students or colleagues general questions like "Did you like this course." Instead written comments to specific questions or responses to highly diagnostic scaled items are needed. The major question to ask is: From the information collected, does the instructor know specific strengths and weaknesses?

5. **Information shared with another often increases the usefulness of the information.** A consultative relationship between an instructor and another faculty member or a professional staff member trained in faculty development and evaluation is beneficial for many reasons. The relationship allows the instructor to work through some of the personal reactions to evaluations, especially the negative ones. The consultative relationship also provides an opportunity to both learn about and explore alternative teaching strategies. To improve, a teacher often needs to know more than they are "fair," "average," or "bad" in their teaching. Based on research on the utility of student feedback during the semester, faculty who received feedback within a consultative arrangement improved their teaching (as measured by student ratings at the end of the semester) more than did professors who only received responses from ratings or written suggestions. The major question to ask is: Do faculty who desire to discuss their teaching have opportunities to receive consultative assistance?

Section 4: An Approach For Evaluating Teaching

Evaluation is ultimately a subjective undertaking. Evaluation is more than description; it requires judgments and interpretation. In this guidebook, the key principle is that competence in teaching can best be evaluated if it is assessed from a variety of perspectives. To incorporate this principle a "multiple purpose, criteria, source, method approach" is advocated. This approach, as displayed in Exhibit 1,

serves as the conceptual framework for this guidebook. Each element in this approach is briefly described below.



Multiple Purpose: As noted in Section 3, evaluation is undertaken for a variety of reasons. Four major purposes for evaluating instruction are to provide information to:

1. The instructor for his/her improvement as a teacher.
2. Colleagues for any decisions about the future of a faculty member; e.g., promotion, tenure, termination, special salary adjustments, and annual salary increases.
3. Students to guide their course selection.
4. Colleagues involved in course and curriculum development.

The first two purposes are the primary functions of instructor evaluation. Giving information to students for course selection has not worked very well since the information is often too terse and incomplete and not all faculty or courses are included in a published list. The fourth purpose of evaluation for curriculum development focuses primarily on course rather than instructor evaluation. However, this focus is too often unheeded, especially for courses which are prerequisite or a part of a series of courses in a field of study. Much of the information collected for improvement is appropriate for curriculum evaluation. Instructors who are part of a curriculum committee or team very often can collect information to satisfy these two purposes.

The remainder of this guidebook will focus on the first two purposes. Exhibit 2 presents major features of these two types. Two features are worth noting: the purpose affects data to be collected and how the information is to be disseminated. If the purpose is for personnel decisions, then information that measures overall competence is preferred. If the purpose is for improvement, then highly detailed diagnostic information in which strengths and weaknesses of the instructor are described and assessed is preferred.

The purpose of the evaluation also influences the dissemination of the evaluative information. If the

Exhibit 2. Major Features of the Two Major Functions of Evaluation

Feature	Evaluation for Personnel Decisions	Evaluation for Improvement
Primary Use	Institutional Accountability	Personal Development
Primary Audience	Decision Makers	Faculty Member
Primary Types of Information	Judgments of Quality Global Integrative Assessments High Inference	Descriptions of Behavior Diagnostic, Detailed Specific Low Inference
Primary Evaluation Strategy	Formal, Standardized, Legal	Informal, Frequent
Primary Other Person in the Evaluation	Administrator of Unit	Trusted Colleague, Consultant
Primary Type of Information Communicated	Judgments of Worth and Value to Institution	Suggestions for Alternative Ways

for an evaluation. As such they are often regarded as the most logical and rational approach to assessing value. On the other hand, implicit criteria, such as colleague judgments based on classroom observation, are more qualitative in nature. They are often regarded as subjective because no tangible observable pieces of data are collected. Instead, judgments based

purpose of the evaluation is for **personnel decisions**, then those responsible for the decisions will have access to the data; e.g., department head, promotion committee. If the purpose is for **improvement**, then only the instructor and colleagues working with the instructor on a consultative basis should have access to the information.

Multiple Criteria: Judgments about the value or worth of an instructor and/or course are based on certain criteria. Criteria are dimensions or characteristics that are used for assessing the effectiveness of instructor and/or course. A number of criteria can be used in judging instructor effectiveness. For example, one is student knowledge of common concepts in a subject matter. Others are the instructor's ability to communicate effectively, rapport with students, appropriateness of sequence of the course topics, and clarity of the course objectives. In thinking about criteria, it is important to differentiate between the selection of criteria and selection of indicators or measures of a criterion. For example, instructor ability to communicate effectively can be measured by several indicators — student ratings, colleague assessments through observation, and review of lecture notes.

In selecting criteria, it is helpful to distinguish between **process** or **product**. Is the focus on how well instructors are performing or how much students have achieved? The selection of process and/or product criteria should reflect the importance given to each in defining effective instruction. If teaching effectiveness is defined as the amount of progress students make, then student learning and accomplishments are the primary criteria. If teacher behavior is considered the most relevant factor, then the instructor's teaching skills and ability to design a course should be used as criteria. The emphasis on process and product depends on the values of the discipline and a department's view of good teaching.

Criteria also vary in the extent to which they are specified, described, and measurable. Explicit criteria, like student test scores and attendance, are directly observable. If these are used, everyone knows the basis

on experience are used to assess value or worth. Both types of criteria are often needed in an evaluation since they complement each other and thus expand the diversity of information collected in an evaluation. If a multiple perspectives approach is adopted, then a variety of criteria are recommended.

Multiple Sources: Information about an instructor can be collected from a number of different sources, since not everyone judges an instructor in exactly the same way. Sources include **self, alumni, students, records, and colleagues** (which include other faculty members, departmental administrators, and professional staff trained in faculty development and evaluation).

Multiple Methods: The final step in the multiple perspectives approach is selecting methods or techniques for collecting the information that best serves as indicators of the selected criteria. A number of ways can be used to collect information about teacher competence and course quality — **achievement tests, ratings and surveys, written appraisals** (comments and critiques in response to open-ended questions), **interviews, and observations**. The selection of a method is essentially a measurement task; i.e., what procedure or technique should be chosen to obtain the most reliable and valid information?

CONCLUSION: PART I

In sum, the approach outlined in this guidebook emphasizes the importance of multiple perspectives. Information collected from a number of sources and by a variety of methods, each reflecting a diversity of criteria, is the ideal for obtaining a fair and credible assessment of the teaching competence of a faculty member. However, adopting this approach in its entirety is seldom feasible. Selections must be made. In the next section, some of the more common source/method combinations are described, including the importance and appropriate use, technical quality of the information collected by the combination, and suggestions for collecting and using the information. This material will be in the March issue of **NACTA Journal**.

Using Remind101 as a Classroom Communication Tool

Introduction

Effective student-teacher communication is critical for success in any class (Dobransky and Frymier, 2004). Far too often, students and instructors communicate at a minimal level and that can create major problems. One important element within a student-teacher relationship is out-of-class communication and when levels of out-of-class communication increase, so will student learning (Dobransky and Frymier, 2004).

Today's students are digitally literate (Roberts, Newman and Schwartzstein, 2012). Many students carry multiple electronic devices and use various communication methods to make sure they are always connected to friends, events and information (Papp and Matulich, 2012). In fact, 99.8% of college students reportedly own one or more mobile phones (Truong, 2010). Furthermore, 97% of students report they use SMS as their main form of communication (Truong, 2010). Because students rely on using text messages as their primary communication tool and are moving away from e-mail in their personal lives (Lenhart et al., 2011), instructors may need to rethink the most reliable ways to stay in touch with their students (Kolowich, 2011).

While it is possible to manually send text messages to students, the process is cumbersome and involves the students giving the instructor their mobile phone number, which can lead to privacy issues (Nielson and Webb, 2011). An alternative approach is to select a group texting tool, which students can choose to opt-in if they wish to receive messages from the faculty member via SMS. This type of service can build the bridge between teacher to student communication and allows them to stay connected no matter which device(s) they are using. Remind101 is exactly that type of service: "A safe way for teachers to text message students and stay in touch with parents" (Remind101, 2012). This idea can assist agricultural educators in developing "meaningful, engaged learning in all environments" (Doerfert, 2011, p. 21).

Procedure

Instructors can register for a free account at www.remind101.com (Remind101, 2012). Each instructor is

assigned a phone number, to which a student will text to subscribe. After registering a class, instructors are given a PDF with instructions they can print out or post on course websites. This makes for quick and easy sign up for both students and teachers. This is an opt-in service, which means that students have to enter a confirmation code to state that they do want to be contacted through Remind101.

It's obvious that students are using mobile phones to communicate, but privacy concerns become an issue when instructors and professors are involved. Remind101 keeps phone numbers hidden so that the parties cannot see other's numbers (Remind101, 2012). Once subscribed, Remind101 will ask for the students' name via text so the instructor can identify them by name only. Students may choose to receive messages via email if they prefer.

Remind101 also allows for pre-planned communication to occur. Instructors can go online to create messages and schedule them to go out at a later date/time (Remind101, 2012). The message history shows when and to whom a message was sent. The available iPhone/Android app makes Remind101 even more versatile since instructors can use any smart phone to send reminders on the go when a computer isn't available.

Assessment

Remind101 was implemented in two agricultural communications courses and one student organization at Texas Tech University and Oklahoma State University. Registering for the Remind101 list was optional and Table 1 describes the level of participation in each of the student groups.

The class instructors and organization adviser used Remind101 to send messages to students with reminders and announcements. Below are a few example messages sent to the students:

Table 1. Student Participation in Remind101 Class Lists

Group	Total Student	Remind101 Students	%
Upper-level design course	26	20	76.9
Upper-level writing course	30	25	83.3
Student organization	25	23	92.0

Teaching Tips/Notes

Instructor 1: Flyer 2 peer review during class today. Bring your first draft (as complete as possible) to class and be ready to give and receive feedback.

Instructor 2: Remember: No class. Career Fair today. 12:30-4:30 GIA. Take copies of your amazing new résumé. Research the cos. before you talk to them

Organization: Hey guys- Don't forget to wear your polos to training today for pictures.

In an evaluation survey, students (N = 39) indicated their agreement with statements about Remind101 on a Likert-type scale (1 = strongly disagree to 5 = strongly agree). Participants said they agreed they prefer using Remind101 to communicate ($M = 4.49$, $SD = .72$) and they wished more instructors used the service ($M = 4.62$, $SD = .63$). When talking about remind101, one student said "It was easy to use, fast and helped keep me on track. So far I haven't forgot about an assignment b/c of it!" Another student said "It's a nice reminder through my phone, which I have *all* the time." One student who did not opt-in to the service said, "I fear this program takes away part of the responsibility aspect of college."

Advice for Others

The following tips may help instructors who wish to use Remind101:

- Instructors should post remind101 messages in other places (such as class websites) since all students may not have a phone or may choose not to opt-in to Remind101.
- Instructors and students should be aware that Remind101 messages are part of a one-way conversation. Students would like to respond to text messages, but cannot via Remind101.
- Instructors are unable to send Remind101 messages directly from the SMS application on a cell phone. Rather, an instructor must log into the Remind101 website or use the iPhone/Android application.
- Instructors must keep their messages brief and stay under 140 characters, which is the message limit for non-iPhone users.
- This service is not only for homework updates or reminders. Instructors should get fun with it; try trivia contests, motivation, school spirit, or "fast facts" before tests/quizzes.

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The Frustrations of Learning How to Write a Scientific Paper

Abstract

Undergraduate students typically learn to write an English research paper by the ninth grade. However, most undergraduate students are not exposed to writing scientifically until at least their junior year. An English research paper and a scientific paper are two different things. A research paper written for an English class can contain “folksy” words and can be long and elaborate. On the other hand a scientific paper demands the author be succinct, create densely packed paragraphs with facts, all of which must be properly cited. Essentially, a scientific paper is tedious to read, but filled with only the important facts and details. Learning to write such a style of paper can be exceptionally frustrating, especially considering the lack of formal education available to undergraduate students. There is a need to incorporate learning to write scientifically in early undergraduate writing courses as it would benefit the scientific community as a whole.

Introduction

A recent endeavor [1] and writing my first major scientific paper proved both educational and exceptionally frustrating [2]. The major frustration of writing this paper didn't stem from a dislike of the topic, a lack of available information, or the time to work on the paper. The major frustration came from learning how to write the paper scientifically. As an undergraduate student, I have taken several English courses during the course of my academic career. Needless to say I have been taught how to write opinion articles, English research papers, narratives, short stories and poetry, but none of my courses have remotely mentioned how to write a scientific paper. Scientific writing is a writing style all its own, not unlike learning to speak a new language, it is designed to convey relevant data in the most efficient and reproducible manner possible. It demands that the author's thoughts be composed into well written, data filled paragraphs that are arranged in a set order and with strict formatting guidelines. Scientific writing contains only the most important information and conveys this information in a straight forward, data rich method. Unnecessary adjectives and adverbs are to be excluded as well as “folksy” words. Most writing styles taught in an English class encourage long elaborate paragraphs filled with an abundance of unnecessary adjectives and adverbs, essentially words that enrich the opinion, message, or story being conveyed. To make matters worse, scientific writing is not only a totally different writing style, but it is also accompanied by strict formatting rules as well. There

are no fancy fonts or headings, large unneeded spaces or figures placed in text. In addition, each academic journal has set guidelines for how to format a scientific document, so when writing a scientific document one must also take into account the formatting required by the publisher. Taking all of this on at once and being tasked to write one's first major scientific paper can be daunting and overwhelmingly frustrating [1, 2].

Abounding Frustrations

Beginning the endeavor of writing my first major scientific paper, I had little knowledge of how to write scientifically and no proper instruction or course to learn from. I also was not familiar with how the journal expected the format of the paper. To make matters worse the scientific paper was to be written by a team of writers, of which almost none had any experience writing scientifically. This led to many hours of indecisive time wasting and uncertainty. The initial few drafts of the paper were rough and not even remotely written scientifically to say the least. As the paper began to come together and a draft was sent to faculty co-authors for review and input, it became quite evident that the paper needed grammatical and scientific revision. Attempting to rewrite the paper scientifically yielded frustrating results as the writing team still had almost no idea how to write scientifically. Many hours were spent reading over the paper, revising sentences and cutting out unnecessary words. The frustration of learning to write scientifically also made it difficult to find motivation to work on the article and was sometimes deterrence, as it was always a struggle to get the information composed in the proper manner. This only adds to the frustration because the paper needed to be written, but was difficult to correctly compose.

The final draft of the article sent to a faculty co-author still yielded frustrating results pinpointing the lack of understanding about writing scientifically. It can be very discouraging for an undergraduate student when an article that consumed many hours of valuable time fails to bring satisfactory results of a quality article worthy of recognition as a good entrance to scientific writing. In time scientific writing will become easier, but for now it remains a frustrating, though exceptionally beneficial, skill to have to learn. With little formal instruction to draw from, learning to write scientifically ultimately comes down to teaching oneself.

Proper Instruction

Typical undergraduate students have taken several English courses prior to admittance into a university and upon entering a university, are commonly required to take an introductory English course as part of a general

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education requirement. However, for the most part there is limited to no instruction on proper scientific writing in any of these courses. There is an abundance of instruction on how to write poems, personal narratives, English research papers, opinion articles, short stories, but scientific writing seems to be ignored. For students intent on pursuing a scientific career, publications in peer reviewed academic journals are inevitable and as such the ability to write scientifically is required. Proper instruction and background on scientific writing in English courses would benefit students immensely by giving students a foundation to begin building their scientific writing skills.

Universities typically provide courses on how to write scientific papers, but most are reserved for junior or senior level students. By then it is too late. Exposing undergraduate students to instruction on writing scientifically early on in their academic career could reduce the amount of frustration experienced when writing a scientific paper. This could potentially increase the amount of valuable scientific material that is published and available for the academic community. Additionally, it may help alleviate the frustrations that professor's experience when serving as mentors to undergraduate students undertaking their first scientific publication. This could also help professors be more willing to work with undergraduate students who wish to pursue scientific publications. Scientific writing takes practice to get better at and can be frustrating to learn, but earlier formal exposure to the writing style can help undergraduate students achieve their first scientific publication with fewer frustrating events and potentially career changing discouragements.

Conclusion

Scientific writing is definitely different than any other style of writing. It is centered on conveying information in a logical and efficient manner. As such, the writing style is designed to provide data in a logical, data rich fashion and as succinctly as possible, only including the pertinent information. Learning to effectively write scientifically can be exceptionally frustrating to learn and can be a deterrence when writing one's first scientific paper. There is often little official instruction on writing scientific papers for most undergraduates until their junior or senior years. Earlier exposure to writing scientific papers would be beneficial to the scientific community as it has the potential to increase the amount of publications and knowledge available. The successful completion of one's first scientific paper can be a rewarding experience to the frustrations after learning the important skill of scientific writing.

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Peer Groups and Pairs: Many Benefits for the Online Setting!

Introduction

Exchanging papers with a classmate is very common in most college classrooms (Wolfe, 2004). It encourages interaction between students which has been known to improve student learning. The teaching technique which is one of many is used primarily in face-to-face classrooms. In contrast, most present-day instructors are faced with the need to enhance student interaction in online settings especially since the number of online settings has increased. Over the past several years, online enrollments have been growing substantially faster than overall higher education enrollments (The Sloan Consortium, 2013), for instance, almost 3.5 million students were taking at least one online course during the fall 2006 term; a nearly 10% increase over the number reported the previous year. As instructors are being expected to increase and assess student learning outcomes in higher education, it is important for these same instructors to address online students.

To address this need, a teaching technique is being used often in the online setting which is "peer groups or pairs." Wolf (2004) conducted a study that examined how an online peer review system affects the student learning process. He found there were many advantages to online peer reviews and groups such as students' role playing as the "teacher." As a result, students: gained better knowledge for the course's grading process, did not have to wait on the teacher to grade papers and who knew more about the assignment instructions were able to help their peers who may have been struggling. And, it resulted in less work for the teacher. Wolfe also

noticed that students seemed to work harder to impress their peers and accepted the feedback better from them as well. However, he pointed out a few disadvantages were experienced such as, possible harsh comments in some reviews, easily open for cheating, late/missing work, students may do more than what is required and students may/may not understand the basics of web technology. Similarly, Ertmer et al. (2007) reported that student discussions play a huge role during online settings, allowing students to exchange ideas, offer explanations, share perspectives and clarify understandings especially during blogging. If the use of peer feedback can reduce the teacher's workload in an online course yet help maintain a high quality of postings, peer groups and pairs would be an effective strategy for learning in an online course.

Most importantly, instructors are encouraged to use various teaching techniques in the online setting since many students reside in different cities, states and even countries, still preferring to have a more personal learning experience with their peers; basically, it is a way for them to "connect with one another."

Procedure

To implement the peer learning environment, instructors will need to assess their classes' needs and available resources. Wolfe provides the following steps for implementing a peer group assignment,

1. Provide instructions to students for completing the assignment(s);
- 2- Instruct student to post assignments to the course website/platform;
- 3- Remind students to log in, accesses list of URLs for the other students and review the posted assignment(s); and
- 4-Inform students they must submit a score and answer questions/leave constructive comments (immediately available for the receiving student). Another technique is discussion boards tailored to course content. For example, students are instructed to respond to a discussion question with a response to a question provided by the instructor and also respond to another students' post. Lastly, Ertmer et al provided an activity were two discussion questions were students post weekly responses and feedback defined as:
 1. Assigning a numerical score (0-2) based on Bloom's taxonomy;
 - and 2. Providing descriptive comments supporting the score and the quality of the post.

Assessment

Ultimately, peer groups and pairs improves student learning especially writing skills; for example, in a study conducted by Liang and Tsai (2010) that assessed the use of writing via online peer assessment, found that students gained progressively higher scores; and significantly improved their science writing in terms of

both the expert's and peers' evaluations. When students engage in peer reviews, the practice of peer assessment may help them identify their own writing weaknesses. Or, when reviewing peers' work, students have more opportunities to carefully read examples of superior writing by their peers (Liang and Tsai, 2010). In the end, if the use of peer feedback can reduce the teacher's workload in an online course, yet help maintain a high quality of postings, this would be an effective strategy for learning in an online course (Ertmer et al., 2007), and should be considered.

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Blending the Three-Part Mission of the Land Grant University

Introduction

The core of the land-grant university system is the three-part mission of research, extension and education. Ideally, each part of the mission should benefit the other components of the mission. The “Explore Research at the University of Florida” video project has successfully blended all three parts of the mission. Students take an advanced digital media production course where they develop videos documenting research at the university and the videos then serve as extension of research. The videos are then displayed at the Florida Museum of Natural History and various online, broadcast and cable television outlets.

Teaching

To be accepted into the class where the sole focus is the production of the videos, students must submit video resumes showcasing what they have been able to apply in an introductory digital media course. The advanced production course begins with students practicing shooting and editing videos before they begin working with researchers. The production process goes as follows: 1) stories are assigned to students, 2) students conduct pre-interviews with researchers as preparation for both the students and the researchers, 3) the interviews are conducted, 4) students edit their videos, 5) the videos are critiqued by the instructors and fellow students at least twice, 6) the researchers review the videos, 7) re-editing occurs if the researchers do not approve of the videos initially, 8) final approvals are received from the researchers, 9) and videos are submitted to the museum. Surveys have been conducted of both the students and participating researchers. As found in surveys, the students have reported increased skills in video production, improved ability to coach interviewees and gains in communicating science. Other impacts on the students includes the museum hiring three students as video producers as a direct result of having participated in the class. In total, 130 videos have been produced for the project.

Research

The videos focus on explaining the practical impacts of scientific research being conducted at the University of Florida. The goal of the videos is to take what can sometimes seem like esoteric research and show how the research translates into real-world applications. Some examples include the use of algorithms to detect landmines, mapping cell phone use to track malaria and manipulating light colors to affect plant growth. The

researchers are able to tell the story of their research in their own words, in an understandable manner. They have realized increased exposure for themselves, their research and their departments/centers. Surveys have shown the researchers have been satisfied with the process. They also reported positive feedback from viewers, resulting from their stories being aired on the local PBS affiliate.

Extension

The extension component of the project stems from the dissemination of the videos. Initially, the videos were intended to be on display at the Florida Museum of Natural History, as well as being made available through the museum’s YouTube and TeacherTube pages. Since September 2012, there have been almost 200,000 views of the videos online. The videos have reached other outlets, including the National Science Foundation website, a local PBS affiliate, cable television outlets across the state, webinars generated from video content and use in the curriculum of the Florida Virtual School. The videos have also been used to tie into articles from the Explore Research magazine produced by the UF Office of Research.

Recommendations for Implementing Similar Programs

To implement a similar program at another university, it is recommended to identify and work with a real client, in this case, the Florida Museum of Natural History. At other universities, it may be working a university’s Office of Research or Experiment Station as a first step. It is also worth considering specialized centers at your university. Examples at UF include the Water Institute, Climate Institute and Center for Public Issues Education, though more exist. It is also important to note these programs are not meant to supplant college and/or university communications centers. The programs should exist to provide students with learning opportunities, while also benefiting the universities’ other functions.

Recommendations for Incorporating Students

For a course like this that incorporates the three-part mission of the land-grant system to succeed, it is important to make the course worthwhile for the students, providing them with something more than a grade. Students should feel that they are beneficially contributing to a client, with an end product that will be used, while at the same time, students should gain important knowledge and skills in the process of meeting the needs of the client. This particular course utilizes a

real client with a real project. This is contrasted with courses that develop projects for a real client, but the client does use the finished product, or with courses that create hypothetical clients and hypothetical projects that are never used. It is important for the projects to be client-driven, to provide students with the real-world experiences they face upon graduation. Setting a high bar of professional expectation is also necessary for success. Students need to know that they are expected to create as close to a professionally produced project as possible. It is the experience of instructors of this course that students have risen to the expectations that are explained to them at the beginning of the semester. It is also recommended that instructors be selective when admitting students to a course of this nature. In addition to showing excellence in the introductory digital media

production course, students had to submit a resume video and provide a brief explanation on why they wanted to take the course, before being allowed to enroll. Having a system like this in place means only those students who want to excel, learn new or advanced skills and benefit from the high-stakes assignments will be part of the course.

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Book Reviews



The World in One Cubic Foot: Portraits of Diversity

By David Littschwager, foreword by E.O. Wilson. Univ. Chicago Press, Chicago, Illinois. Hard cover, 204 pages, \$45.00, 2012. ISBN 978-0-226-48123-4.

A stunning tribute to biodiversity, *One Cubic Foot* is a photographic delight that resulted from a unique conceptual idea. We all appreciate the importance of diversity, from rain forests to tropical coral reefs, but the detailed parade of life in each of these biomes is often missed by the casual observer as well as the discipline-bound scientist. Through a series of brilliant close-up photographs and an accompanying text written by experts in each location, photographer David Littschwager takes us on a delightful journey into the incredible living communities that often lie undetected right beneath our feet, in the arboreal canopy above, and in nearby waters. It is a trip well worth experiencing.

In the insightful foreword, eminent biologist E.O. Wilson describes the grand diversity of life forms on the planet, many of which are still to be discovered and classified. Even without this knowledge from science, we do know that an amazing complexity of competing organisms is what provides the basis for life and resilience on a planet that continues to evolve. More than a scientific novelty that captures the interest of specialists in biology, the intact biosphere is essential for our own health and survival. We ignore this truth at our own risk as humans to be able to continue to harvest food, mine fossil fuels and exploit other resources, and maintain an atmosphere favorable to our existence through photosynthesis and other ecological and physiological processes. *One Cubic Foot* provides a window on biological complexity that can be inspirational to the observer who loves nature and compelling to the skeptic who believes that only humans can control our destiny.

The journey begins under the Golden Gate Bridge, where more water flows out with the tide each day than moves out of the Mississippi River in the same time. This is accompanied by an estimated 2.6 billion organisms moving through each cubic foot of space. The bay interacts with one of the richest near-shore habitats on the globe. Photos of myriad species of plankton, diatoms, jellies, worm larvae, and dozens of other

species illustrate the incredible diversity of this water system. The sea lions and seals we easily observe from a trans-bay ferry are but the tip of a food pyramid found below the surface.

The story moves to a cloud forest in Monteverde Reserve in Costa Rica, 100 feet up in the canopy where the photographer observed two dozen plant species, plus more than 500 insects of 100 different species in one cubic foot over a full 24-hour day. Washed daily by mist and clouds, this forest canopy is home as well to untold numbers of mosses, beetles, bacteria, fungi, ants, and even earthworms in small pockets of accumulated soil. The diversity of micro-organisms has barely begun to be identified by scientists.

A tropical coral reef off of Moorea in French Polynesia represents a unique oceanic habitat that is found around the tropics, often low in nutrients, keeping the water incredibly clear and the abundant life accessible to a photographer. In the cubic meter, there were 600 animals and plants more than one mm in size, including 190 crabs from 32 species, plus thousands of smaller organisms drifting through each day. Reefs are threatened by increasing carbon dioxide levels, a climate change that may cause them and their rich biodiversity to disappear.

The interested student need not travel farther than Central Park in New York City to observe a rich, biodiverse deciduous forest. In the undisturbed four-acre Hallett Nature Sanctuary, a one-cubic foot section of the forest floor revealed over 100 species in the layers of leaves and upper crust of soil, even in the dry season when observations were made. Likewise, an easily accessible section of the freshwater Duck River in Tennessee showed this to be one of the most biodiverse waterways in the U.S. The photographer found over 150 species of insects and other animals in the cube over a 24-hour period, more diversity than is found in all the rivers in Europe combined. Notable are the turtles, fish, birds, and larger insects such as dragonflies, but the vast bulk of diversity is found in the shallow silt of the riverbed. For example, there are 55 species of mussels in the river, including seven in the cubic foot sample.

Finally the author travels to South Africa to Table Mountain National Park, to a *Mountain Fynbos* in the Cape Floristic Region that is characterized by nutrient-poor, rocky soils. Yet this seemingly inhospitable area is home to 9,000 species, many of which are found nowhere else and evolved here over millennia. In one cubic foot, the observer with camera found 90 species including 25 types of plants, 200 seeds of some five species, plus 70 invertebrates in this Mediterranean-type climate. He explained that moving the cube a few meters to a new location would likely reveal at least a 50% change in the resident biota.

To be sure, this is a delightful table-top book to skim for its beautiful photography. But it is much more – a fascinating sampling of six distinct biomes with their luxurious biodiversity presented in an accessible and interesting layout. Each is accompanied by cleverly-written text that breathes life into the illustrations. In *One Cubic Foot*, photographer Littschwager provides us a window on the unbelievable diversity of life on the planet, and an incentive for the biologist as well as the interested observer to get outdoors and observe the life around us on which we all depend. The lesson is also clear to those in agriculture who continue to pursue monoculture cropping systems as the ideal, without considering the long-term increased resilience and sustainability that could result from multiple cropping, permaculture, or prairie polyculture systems.

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Food Politics: What Everyone Needs to Know

By Robert Paarlberg. 2010. Oxford University Press, New York, NY. 240 pages, \$16.95. ISBN 978-0-19-538960-9.

The fragility and flaws in the world's food and agricultural policies have become increasingly apparent during the first decade of the twenty-first century. Designing appropriate food and agricultural policies is essential in countries where food is barely enough for subsistence and rural poverty is widespread. In high-income countries, where agricultural subsidies and related trade policy have played an important role in the political arena for decades, new challenges have brought food and agricultural policies back to the front burner of policymaking [from Pinststrup-Andersen and Watson, *Food Policy for Developing Countries*, 2011, p. 26]. The challenge for most of us is to understand the complexity of food policies and how they differ around the globe.

Robert Paarlberg's *Food Politics: What Everyone Needs to Know* is an articulate discussion in a digestible language that can help the informed lay person begin to understand this critical area of international concern, as well as how appropriate change can be designed for the future.

Food Politics explains the multidimensional and complicated issues of political involvement in the food system in an easily understood format using language the lay reader can absorb. Author Robert Paarlberg examines many important dimensions associated with food such as famine, chronic hunger, obesity, farm subsidies, food aid, environmental impacts, Green Revolution, food safety, organic foods, transgenic breeding methods and products and fast food. As a true academic, the author discusses these issues based on facts, and often challenges some of the popular wisdom and beliefs about food. This is a fact-based, question-answer book on global and local impacts of food politics. The book is divided into 14 chapters around these key issues, and each chapter addresses the current situation, historical events, and their many interactions with food around the world. It is a good primer for students and others interested in delving into global realities and how they are impacted by policy.

The politics of food have gone through drastic changes over the past several decades. Both policy and consumer demand in the early part of the last century were focused on producing and delivering sufficient energy to satisfy basic human needs, while in the last 60 years the emphasis has shifted to safe, cheap and convenient food. Today's post-agricultural consumer demands fresh, safe, high nutritional content, and low carbon footprint foods along with increasing attention placed on animal welfare. In Africa, the situation is the opposite. Many people remain malnourished due to poverty and lack of food. Such drastic differences among countries and their availability of food can be attributed in part to implementation of science-based advances that have been spectacular in the North and often absent in the South. In the U.S., for example, average maize yields have increased from 46 bu/acre in the 1940s to 156 bu/acre in 2007. Many African countries on the other hand have lacked access to critical and appropriate agricultural technologies and in some areas have seen a decline in yields over several decades.

Informed readers are well familiar with the food crisis in 2007-2008, where international food prices increased substantially compared to a decades-long pattern of real price decline. Most people assume that such an event originated in the food and farm sector, just as in the previous price spike in the 1970s. In fact, the author claims that the cause lies with governments and their key role in attempting to stabilize local markets

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through management of food imports. Such decisions allow governments to benefit producers by taxing imports when local prices are low and buying more imports at lower price when domestic prices are high to benefit consumers. Inevitably it drives instability from the international into the local market place. When several governments do this at the same time, a sense of panic develops. Many countries respond by accelerating the timing of purchases, thus creating the perception of low product availability. The world does face a real food crisis, but the best way to measure this crisis is not in food price but in actual hunger. Most of the world's hungry do not get their food from international markets.

Unlike chronic hunger, famine results when large numbers of people die from lack of food. These events may be triggered by drought, disease, flooding, war, change of government, or combination of factors. Food aid timing is critical when other governments or international agencies respond to famine. When governments act too early, local farmers will relocate to feeding stations and abandon their farms. Such events can leave farmers unable to plant when the situation improves. Only when all non-essential items have been sold off and people are forced to sell even essential equipment should food aid be administered, a drastic but proven solution. When the situation improves, a one-time distribution of equipment, animals and operating funds should be given to help people return to a productive lifestyle.

In total numbers, obesity is currently a greater human health concern worldwide, with estimates of twice as many overfed as underfed people on the planet. So much political attention has focused on those who have too little food that governments are unable to generate policies to adequately monitor and control the obesity situation and help educate the public about this growing crisis. Obesity comes with a barrage of health problems and medical costs of treating obesity-related diseases have doubled over the past decade to \$147 billion annually in the U.S. alone. Causes of this problem include increased caloric intake and lack of physical labor due to many technological advances that make our lives easier. Among the largest culprits are introductions of fast food, junk food and sweetened beverages. Individual meals at fast food outlets may exceed 1000 calories per serving. In addition, food industries design their products to be more difficult for unwary consumers to resist by manipulating the sugar, fat and salt contents as described in the 2001 best seller *Fast Food Nation* by Eric Schlosser.

As consumers begin serious evaluation of their food, there is confusion about the value of unique sources such as organic, local, or GMO-free foods. Some believe that

organic food is more nutritious and safer to eat, while an article in the American Journal of Clinical Nutrition in 2009 found no evidence of nutritional benefits compared to conventional products. In one study in 2003, the Food and Drug Administration tested several thousand samples of domestic and imported foods and found only 0.4 to 0.5% with any detectable levels of pesticide that exceeded tolerance levels. Food activists are now pushing consumption of local foods and surveys indicate consumers are willing to pay a premium for this produce. Local market numbers have increased from 1,755 in 1994 to 4,385 in 2006. Some healthier products in a farmers market can help consumers avoid temptations of oversalted, oversweetened and microwavable foods of the supermarket.

However, the local food scenario may contribute to problems of climate change. Driving to farmers markets to bring home small amounts of food can result in a large carbon footprint. Carnegie Mellon University researchers found that transportation only accounted for 11% of the greenhouse gas emissions for food, and the best way to reduce the carbon footprint is to eat less red meat. Transgenic foods have received considerable scrutiny since their introduction in the late 1990s. As of 2009, according to the author there has been no documented evidence of human health or environmental risk from GMO foods, although recent data contradict this statement. Opposition to GMO foods appears to be the result of a technology in which success has not been transferred to the consumer, but rather the profits have been captured by companies that hold the patents and the producers who save money by using less pesticide. These issues continue to foster contentious debate.

In summary, *Food Politics* is a valuable compendium of information around the issues of food today, bringing up opposing points of view that will stimulate valuable debate. It is a book well worth reading to gain an analytical foundation for discussion of key food issues of the day. Although many readers will not agree with the information or interpretations presented, the book raises key questions about agriculture, consumer health, and the politics behind government and industry decisions about food. The author brings impressive credentials to this report as professor at Wellesley College, an Associate in the Weatherhead Center for International Affairs at Harvard University, and an acclaimed authority on food policy. *Food Politics* could be a valuable resource for courses in agriculture, nutrition, economics and public policy, as well as for the general consumer public.

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