# 2009 Innovative & Research Posters
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**Analyzing Quantitative Data: Doing the Right Thing and Doing it Right**

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**Analyzing Quantitative Data: Doing the Right Thing and Doing it Right**

Analyzing quantitative data are both challenging and a time consuming effort. Problems associated with use of statistical tools to analyze quantitative data are well documented in literature as well as in critiques of articles, paper presentations, theses/dissertation defenses, etc (Yoder, 2008). A review of discussant comments in NAERC papers presented and a review of comments from manuscript reviewers revealed several concerns regarding the use of statistical tools (Radhakrishna, 2009). Examples of concerns include: 1) using inferential statistics such as t-tests, ANOVA when the sample reported is not random, 2) computing t-tests on single items to detect statistical significance, 3) not using the same subjects when using dependent t-tests or repeated measures, that is unequal "n" in each wave of data collection, 4) not dummy coding nominal scale variables when using regression, 5) using correlation to report differences, 6) using Chi-square for reporting differences as opposed to associations, and 7) reporting means when variables are nominal

The focus of this poster is to present a general quantitative data analysis matrix that help address concerns stated above. In addition, present/discuss specific data analysis matrices for types of research—descriptive, correlational and experimental. Appropriate use of statistical tools is critical to accomplishing the objectives of the study, testing the hypotheses or to predict outcomes of a research study. Appropriate analysis of data begins with the purpose—general description, determine relationships or predict variables, determine differences between groups or cause and effect. In addition, researchers should pay attention to data analysis when designing and constructing the questionnaire or instrument (Radhakrishna, 2007). The following key questions should be considered before selecting appropriate statistical tools to analyze data. 1) what is the end sought from the study—describe, explain-predict, control outcomes; 2) what is the scale of measurement—nominal, ordinal, interval/ratio-- for key variables examined in the study, 3) the number of levels of key independent and dependent variables, and how many independent or dependent variables are used in the analysis—univariate, bivariate, multivariate, 4) how were subjects selected, that is, probability (random sample) vs. non-probability (purposive sample) or the entire population (census), and 5) statistical assumptions to be met—parametric vs. nonparametric tests. Answers to these questions are not only important but are to be emphasized at the research proposal level and should be reported in chapter 3 of thesis/dissertation. Figure 1 summarizes key elements of appropriate statistical tools for data analysis.

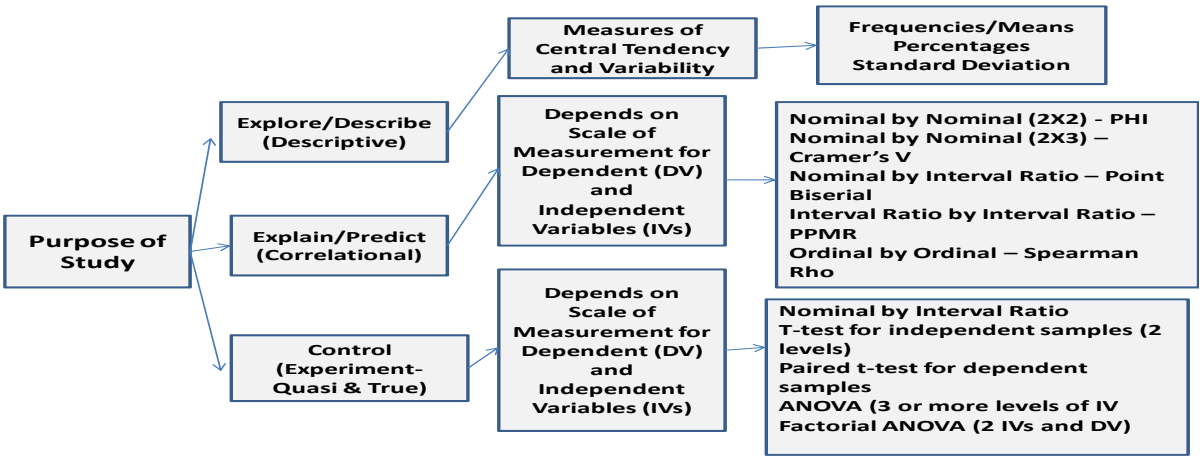


Figure 1: Quantitative Data Analysis Matrix

As shown in Figure 1, use of statistical tools to analyze data varies depending on the purpose of the study and type of data or scale of measurement. Faculty and graduate students can develop their own matrix for data analysis specific to their studies using the information in figure 1. Further, it is also useful to provide details of data analyses as depicted in Table 1. It is recommended that details of data analyses be reported in chapter three (methods and/or procedures) of a thesis or dissertation.

Table 1: Variables, Scales of Measurement, Data Sources, and Analysis by Research Questions

| **Research Questions/ Objectives/Hypothesis** | **Source of Information (Survey)** | **Scale of Measurement Ind. Variable and Levels** | **Scale of Measurement Dep. Variable and Levels** | **Statistical Analysis/ Tools** |
|---|---|---|---|---|
| What are the demographic characteristics of rice extension material users? | Section 6 | Nominal<br>Ordinal<br>Interval/ratio | - | Descriptive Statistics, Measures of variability |
| What factors influence the usefulness of knowledge products as a mass media approach in disseminating rice information? | Sections 1, 2, and 5 | Gratification and Non-gratification Variables (Nominal) | Usefulness of Knowledge Products (Interval/ratio) | PPMr, point bi-serial correlation, Mean, SD |

Appropriate use of statistical tools to analyze quantitative data is critical to answering the purpose and methodological rigor questions. Graduate students, faculty teaching research methods and data analysis courses will find the information presented in this poster useful. In addition, appropriate use of statistical tools will not only help reduce errors but also help able to stand up to the critical review and scrutiny of reviewers, committee members, and faculty. Further, using appropriate statistical tools to answer research questions/hypotheses/objectives will provide a confident basis for action and withstand criticism aimed at discrediting results (Rossi, Lipsey & Freeman, 2004 and Braverman & Arnold, 2008). Here are key CHECK points for data analysis:

- Consider the purpose of the study. The purpose of the study drives the use of appropriate statistical tools to analyze data.
- Always keep in mind the purpose and data analysis as you start developing your instrument. This is very critical to not only using certain type of statistical tools, but also in asking the type of questions (scaled vs. open-ended questions).
- Consider early on developing a data analysis matrix or table to link the purpose of the study to research questions to identification of independent/dependent variables to scales of measurement to statistical tools.
- Report appropriate “test of significance” levels to determine if the results are due to chance.
- Use appropriate symbols to match and support use of specific statistical tools.
- Make sure that the statistical assumptions for using specific statistical tools have been met.
- When reporting mean differences, calculate and report effect sizes.
- When all said and done, make sure that you checked all the points so that your results will withstand the test of scrutiny.

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**Development of a Seven Function Mentoring Framework for Use with Minority Summer Research Opportunity Program Participants**

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## Development of a Seven Function Mentoring Framework for Use with Minority Summer Research Opportunity Program Participants

### Introduction

Mentoring is a key component of most Summer Research Opportunity Programs (SROPs), especially programs aimed at increasing the presence of women and minority students in, science, technology, engineering, agriculture, and mathematics (STEAM) fields. SROPs provide undergraduate students interested in graduate school a glimpse into the life of a graduate student via the work that they perform with their mentor, and they are better equipped to make the decision in whether to pursue an advanced degree (Foertsch, Alexander, & Penberthy, 2000).

Even with literature emphasizing the importance of undergraduate research under the guidance of a mentor; there is very little information regarding the best practices of mentoring minority students who participate in SROPs, and the functions of a quality mentoring experience for students. Therefore, it is important that a mentoring framework be developed that SROP coordinators can use to enhance the mentoring components of their programs.

### Purpose

The purpose of this study was to develop a mentoring framework that SROP coordinators can use to enhance the mentoring components of their programs.

### Mentoring Framework

The mentoring framework developed in this study focuses on seven mentoring functions identified in the literature and includes three primary steps. The seven mentoring functions include: 1) clarity of project,2) challenging assignment, 3) training for the intern, 4) contact between mentor and intern, 5) assistance, 6) feedback, and 7) role modeling. The first step of the framework involves the mentors/program coordinators understanding of the seven mentoring functions and how the functions can be incorporated into their programs. The second step involves the mentor being introduced to the seven mentoring functions. The third step is the follow-up by mentors/coordinators to ensure that the functions are being practiced and the extent they are being practiced.

When a program coordinator/mentor decides to incorporates the seven mentoring functions proposed by this study in to practice in their program, there are three key steps that should be involved. The first step is that the mentor/program coordinator must be aware of the seven mentoring functions and the important role that they have in providing a quality mentoring experience. The second step is that the mentor/program coordinator must develop a definition of mentoring that will be used throughout the mentoring relationship. The coordinator of a SROP or a mentor may already have another definition of mentoring they prefer, but it is important that there is some operational definition of mentoring that is being used as a guide. Once a definition of mentoring has been developed it is then easier to understand how the seven mentoring functions can be incorporated into the mentoring program. These three steps are the foundation of the framework developed by the researcher; these steps should not be skipped, and are critical to the successful implementation of the seven mentoring functions in a program.

The second step in the framework is introducing the seven mentoring functions to the mentors that will be working with the interns. The first step in this phase of the implementation

is to conduct a mentoring workshop where this information can be disseminated. The second step is to provide the mentors with the operational definition of mentoring that has been identified by the program coordinators. The third and final step in this phase of the framework is to formally introduce the mentor to the seven mentoring functions that should be practiced with the intern. The mentor should be given the definition of each function along with an example of how the function should be practiced, and an example of how the function should not be practiced. Providing both good and bad examples will help the mentor visualize the importance of the functions, and be better able to recognize when a function may not be in practice.

The third step in the framework is the assessment. This step allows for the mentor/program coordinator to assess if the mentoring functions are being practiced, the extent to which they are being practiced, and allows the coordinators to adjust accordingly. The first step in the assessment is the coordinator conducting an informal interview with the intern. The second step is if the coordinator discovers that the mentor is not practicing the functions, then the coordinator should go and encourage the mentor to practice the mentoring functions, and provide some rationale as to why it should be done.

## Future Plans/Implications

A major implication of our framework is that when combined with our mentoring model, the framework could be used by not only minority SROPs, but also traditional undergraduate research programs in order to help mentors understand the importance of practicing the seven mentoring functions. The implementation of this framework will help mentors and program coordinators enhance the mentoring experience of the interns. Future plans include using our framework in faculty mentor training workshops of various UROPs and SROPs to introduce the seven mentoring functions model to mentors. We anticipate that successful implementation of this framework and our mentoring model will provide an enhanced mentoring experience and promote better mentoring practices for both interns and mentors.

## Costs/ Resources Needed

- An institutional commitment to undergraduate research
- Program coordinators understanding the seven mentoring functions and the role they will have in their mentoring program
- Salary cost for program coordinators
- Faculty members wanting to serve as mentors and willing to attend a mentoring workshop
- Faculty mentor training workshop
- Cost of printing materials

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**Development of an Agricultural Mechanics Course for Preservice Teachers**

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## Development of an Agricultural Mechanics Course for Preservice Teachers

### Introduction

Changes within post-secondary agricultural mechanization programs have led to a discontinuation of hands-on skill oriented courses in agricultural mechanics for preservice teachers (Burris, Robinson, and Terry, 2005). This has forced some teacher education programs to assume the task of providing instruction regarding technical content, laboratory management, and instructional methods in agricultural mechanics (Hubert & Leising, 2000; Johnson, Schumacher, & Stewart, 1990). In light of this national trend, _____ University developed and offered a one credit hour workshop on methods for teaching agricultural mechanics in 2002.

The workshop was an interim step towards offering a permanent course to develop preservice teachers' agricultural mechanics competencies through hands-on instruction. The workshop was discontinued in 2003 and 2004. It was later revised and offered again in 2005 and 2006. The revised workshop only provided 16 hours of instruction. This did not reflect the importance of the needed skill sets. Due to a lack of equipment, no available laboratory site, and no available instructor within the department; the instruction for the workshop was done by an agriculture teacher at a local high school. Enrollment was voluntary. Students who chose to enroll in the workshop commuted six miles. This was done twice weekly during a four-week block prior to student teaching.

In 2006 the department entered into a collaborative agreement with the department of animal science, the _____ farm, and _____ University's research and demonstration farms. The agreement was made in order to build a new facility as a step towards developing a more permanent solution to address preservice agriculture teachers' instructional needs and to provide a central location to service the university's research and teaching farms. Land was donated by the _____ farm so that in 2007 a 5,760-square-foot building was constructed. Approximately 2,100-square-feet were dedicated as an agricultural mechanics teaching laboratory. This provided the foundation for an agricultural mechanics methods course to be included in the teacher education program. The development of the course is the focus of this poster.

### Purpose

The purpose of this poster is to share our experiences in developing and implementing a course on methods for teaching agricultural mechanics for preservice agriculture teachers.

### Procedures

- A graduate student with prior experience in teaching agricultural mechanics was recruited to pursue a doctorate in order to help coordinate instruction, develop curriculum, and to secure equipment and supplies for the course.
- Most of the equipment was donated by local secondary agricultural education programs and the departmental farm. Other pieces of equipment were purchased from retailers at an educational discount.

- An experimental course request placing emphasis on methods and management techniques for agricultural mechanics laboratories was submitted and approved by the department. Topics for the lecture component of the course included safety, management of students, instructional techniques, facility planning, and management of equipment and materials. The laboratory portion of the course focused on mechanical skills development in small engine technology, electricity, and welding as well as practice for teaching those skills.

- The course was approved to be included in the 2009-2011 University Catalog as a three credit hour course with one hour of lecture and six hours of lab per week The departmental curriculum committee included the course as a core agricultural science requirement for agriculture and life science education teacher certification majors.

- The course was taught for the first time in the fall of 2008. Classes met on Mondays from 1:10pm to 3:00pm and Wednesdays 1:10 to 4:00pm.

## Results

- Preservice teachers received hands-on instruction that focused on technical content integrated with curriculum design, instructional planning, and laboratory management.

- Thirteen students participated in the fall of 2008, eight participated in spring of 2009, and 13 are enrolled for fall of 2009.

- Students gave high course evaluation ratings. Students supported the course and encouraged the continuation of the course with a similar format.

- Students were provided resources including safety information, skill sheets, and presentation notes via WebCT.

- Students developed an agricultural mechanics teaching portfolio which included lesson plans and laboratory management plans.

## Future Plans

We plan to offer the course every semester. More skills will be included as equipment and funding are identified. An additional course will be developed and offered in the future

## Resources Needed

A student fee was charged for purchasing consumable materials and supplies. Departmental funds were used to acquire additional equipment not donated by other educational institutions.

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**Improving Facility Evaluation Skills**

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## Developing Facility Evaluation Skills (Innovative Idea)

### Introduction/need for innovation or idea

Novice secondary agriculture teachers have many responsibilities their first year and are often overwhelmed with tasks and obligations (Mundt, 1991; Mundt & Connors, 1999). Agricultural teacher education is charged with preparing highly qualified and motivated teachers. When a teacher is hired the summer prior to beginning the school year, the entire agriculture department facility must be inspected, cleaned, sorted, and organized for any hope of maintaining order. Highly motivated, passionate teachers are more likely to have well organized and efficient facilities, and therefore, a positive learning environment. Classroom management has been identified as the strongest factor associated with student performance (Wang, Haertel, & Walberg, 1993). It is difficult, if not impossible to successfully manage the learning environment without a high degree of order within your physical space. "An ounce of prevention is worth a pound of cure" was an attitude fostered through the course and assignments.

Without the ability to identify and address issues in the laboratory facilities, the novice teacher will struggle to provide safe and meaningful instruction to their students. These laboratory facilities can include: agriscience, food science, aquaculture, agricultural mechanics (welding, small engines, construction, etc.), horticulture, plant and soil science, animal sciences, and natural resources (Talbert, Vaughn, Croom, & Lee, 2007). Hence, to develop the skill of identifying and addressing facility issues, the following assignment was created.

### How it works/methodology/program phases/steps

Within the Facilities Organization and Management course at the University of Idaho, there were six local program visits. In addition to addressing Program Planning topics while on the visit, at the conclusion of the visit, teacher candidates complete an open ended evaluation form that assessed their perceptions of the facility. Teacher candidates were required to complete a detailed facility evaluation report including pictures illustrating areas of concern and an action plan to remediate those areas.

On the evaluation form, teacher candidates were asked to rate their first impressions of: grounds, building, classrooms, laboratories, and attitude of: host teacher, other teacher(s), students, and administrator(s) on a scale of 0 = *not impressed at all* to 10 = *extremely impressed*. The main concept of the evaluation form was to illustrate connections between the teacher candidate's impressions of facilities with the attitude of those who live and work within those facilities. After each assignment was turned in, a class discussion ensued to address all areas of concern.

The following list guided the evaluation process:

- Spatial & Educational – How well was space used for educational purposes?
- Visual – How well could the instructor keep an eye on all students within the facilities?
- Thermal – How were facilities cooled and heated?
- Sonic – What areas of noise concern you in this facility?
- Aesthetic – How did the facilities please your eyes?
- Audio-Visual – How was the A/V equipment and PA system utilized in facilities?
- Equipment – What condition was all of the equipment in?

- Maintenance & Safety – What evidence was there of a safety consciousness/program and a maintenance schedule?
- Do you see any glaring issues that concern you as an educator?

**Results to date/implications**

This evaluation form has been utilized for the past six years with teacher candidates. This form develops their ability to identify and address issues when they walk into any agricultural education facility by identifying concerns and creating an action plan to address problems. After the fourth program visit, teacher candidates' ability to identify and address areas of concern was greatly improved.

After completing all evaluations, candidates are more prepared to effectively address any issues they will face when they are fully responsible for their own facilities. When the teacher educator visited graduates who had experienced this evaluation process, a high level of facility management and organization was observed when compared with other novice teachers who had not experienced the evaluation process.

Based on classroom reflections and discussions, students noticed a definite connection between attitude of teacher(s), students, and administrators with the quality and organization of the agricultural education facilities. This finding reminds students that their attitude is very determinant of their performance as an agriculture teacher, including managing facilities.

**Future plans/advice to others**

This evaluation document has served a significant purpose in providing an opportunity for students to develop their facility evaluation skills. This experience prepares the students for inheriting any facility issues or problems and creating a plan to solve them. This assignment will continue to be an integral part of the Facilities Organization and Management course.

**Costs/resources needed**

During the student teaching block, the teacher educators and cohort visited 6 local programs on 5 trips, up to 30 miles from the university. Each trip was a maximum of 3 hours with travel. The approximate cost was $60 per trip for a total cost of $300.

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**Industrial Technology and Agricultural Education: A Realized Synergy**

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## Industrial Technology and Agricultural Education: A Realized Synergy

### Introduction

For approximately a decade, the separate units of industrial technology education and agricultural education, within the University of Nebraska-Lincoln, have been negotiating the creation of a combined endorsement. This dialogue was prompted by research completed in the spring of 2000 revealing 58 % of all Nebraska secondary school principals reported a definite interest for teachers possessing such an endorsement. Personnel management information collected revealed that only 52 and 54 percent of agricultural education and industrial technology instructors, respectively, were 100 % assigned to either subject area, suggesting that an instructor possessing both endorsements could contribute to more efficient personnel budgeting, especially in smaller rural schools.

Even though a combined endorsement has not yet been achieved, this discussion has led to, in the summer of 2008, the move of the industrial technology program from the College of Education and Human Sciences (CEHS) into the College of Agricultural Sciences and Natural Resources (CASNR), specifically assigned within the Department of Agricultural Leadership, Education and Communication (ALEC).

### Program phases/steps

The synergy between the two units actually began during the endorsement dialogue in 2002 when industrial technology undergraduates began enrolling in ALEC 308, Laboratory Management, and other selected mechanized systems management courses within CASNR. In spring 2008, the ALEC courses of teaching methods and practicum, program planning and professional seminar were added to the industrial technology preparation program.

Beyond the teacher endorsement path of industrial technology, a second option has been developed in industrial technology leadership. This option integrates in-place ALEC leadership course work with technical industrial technology course work in an effort to expedite the leadership development and capabilities of non-teaching graduates entering the manufacturing and construction industry.

### Results to date and implications

An obvious result has been a more effective use of faculty time and facilities. Rather than two faculty teaching classes of 8 and 6, and duplicating content, a singular content offering is offered by one faculty member to 14 students within a single facility, and the teaching unit's justification within the college and university is strengthened.

This co-enrollment program has created mutually beneficial outcomes. Through the demonstration oriented nature of the laboratory management course, agricultural education majors are exposed to a greater breadth of industrial technology laboratory machines, techniques and procedures, thus broadening their abilities to deliver agricultural mechanics instruction.

The blending of both majors in methods and program planning has provided a better vantage of diversity in program approach to the delivery of career education. Both programs contain cognitive, experiential (supervised agricultural experience and professional development

plan), and leadership learning (SkillsUSA and FFA); however, variations of emphasis within learning domains (i.e. cognitive, psychomotor, affective) and senses (i.e. visual, auditory, kinesthetic) between agricultural education and industrial technology provide interesting contrasts for lesson planning, development of program delivery models, and assessment strategies.

A closer vantage of another career education discipline has provided a platform for reflective program analysis. For example, the emphasis on active learning and demonstration within the industrial technology discipline has provoked serious reflective assessment on the degree to which agricultural education has become cognitively oriented. Equally as obvious was an industrial technology orientation toward instruction by example (teachable moment) with less emphasis on preliminary cognitive discussion and programmed repetition.

Another long term benefit is the establishment of professional relations with a greater diversity of career education instructors. An example being the exchange of practitioner directed inservice instruction. Recently, a computer assisted design workshop was conducted by a secondary industrial technology instructor for agricultural education instructors. This would not have occurred without the synergy of the ALEC agricultural education/industrial technology education program.

## Future plans

(1) Development of a course to specifically address SkillsUSA and Professional Development Plan (PDP) for industrial technology majors, (2) Program planning/methods practicum experience for industrial technology majors, (3) Laboratory skills practicum for agricultural and industrial technology education majors, (4) Continued synergy between agricultural and industrial technology education practitioners for inservice education purposes, (5) Development of an introductory ALEC course specifically for industrial technology and agricultural education majors, and (6) Development of a “dual endorsement” plan available for industrial technology and agricultural education majors.

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**Jamaica: Dawn of a New Beginning**

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## Jamaica: Dawn of a New Beginning

### Introduction

Agricultural Education undergraduates must be prepared to live and work in a multicultural, global society. Talbert and Edwin (2008) recommended that these students experience gender, ethnic, socio-economic status, and rural/urban diversity in their field placements. They found that one-third of the responding agricultural education programs placed students at schools with little to no ethnic diversity. Also, according to U.S. Census Bureau (2004) data, less than five percent of U.S. college students study abroad in any particular year.

In 2004, the Agricultural Education program at Purdue University proposed a short-term study abroad for its teacher education students. The country of Jamaica was chosen as it had a secondary agricultural education system, a college of agriculture, and was substantially different in ethnicity and socioeconomic status from Indiana. In addition, the study abroad would count as two of the three "international understanding" courses required in the College of Agriculture's undergraduate core curriculum.

### How it Works

An internal university grant supported the two instructors to travel summer 2004 to Jamaica to make in-country arrangements for the initial study abroad experience in summer 2005. From this exploratory trip it was decided that the Jamaican College of Agriculture, Science, and Education (CASE) would be the "home base" for the study abroad. It was also decided that the experience would be three weeks in length. This length was chosen for both pedagogical and financial reasons. It also seemed to be the length of most other summer study abroad programs at Purdue University.

At Purdue for study abroad experiences, students pay program fees instead of tuition. This allows study abroad programs to be self-funding and self-sustaining. A budget is developed based on a targeted number of participants and expected expenses.

It was decided that the experience would begin immediately after the conclusion of spring semester exams. This allowed students to complete the three week experience and still have June and July to work at internships or take on-campus summer classes. This schedule also allowed the instructors to be on-campus during the state's FFA Convention, the university's summer incoming student registration, and the state's agriculture teachers association summer conference.

Students took two teacher education courses, *Introduction to Teaching* and *Multiculturalism in Education*, worth 6 semester credit hours during the Jamaican study abroad. The schedule was: Monday/Wednesday/Friday classroom days, Tuesday/Thursday tropical agriculture tours or high school observations, and Saturday/Sunday recreational and cultural activities. Classroom days cover essentially the same content as that covered during the academic year, on-campus offerings of the courses. Course assignments are the same as the on-campus offerings with minor adjustments for technology and course length.

## Results to Date/Implications

Summer 2009 was the fifth group of students to participate in the Jamaica study abroad. Group sizes have been 12, 11, 12, 13, and 11 for a total of 59 participants. This has been approximately 50% of the freshman class (the target audience) in agricultural education at Purdue University. Several Jamaica participants have taken other study abroad courses including India (another Education block) and Spain (full semester). The program has been successful in being self-funding and sustainable.

In the course evaluation, students have responded that the program provides them experiences they could not obtain in the United States. They reported they now know what it feels like to be an ethnic minority. They also reported they have a greater appreciate for the wealth in the United States and have ideas on how to use inclusive teaching for students of all backgrounds.

## Future Plans/Advice to Others

The first year the experience was 22 days inclusive of the two travel days to/from Jamaica. This was too long both financially and pedagogically. Therefore, the next four trips were 17 or 18 days in length. With a more efficient itinerary, this has proven to be an appropriate number of days.

Jamaica is a country in which transportation outside of chartered services may not be safe and parts of the country, Kingston in particular, are not safe for student to explore on their own. Because of this, all trips and activities including recreational/cultural were as a group. This had the unexpected consequences of bonding the students as a group and encouraging less-adventuresome students to try new experiences.

The instructors initially believed that cost would be a prohibitive factor. We have found that as long as the experience is comparably priced to other study abroad courses at the university that students see the cost as reasonable. However, we did hear anecdotally that several students who were considering participating in summer 2009 did not because of the difficult economic times.

## Costs/Resources Needed

Each university will have a slightly different structure for study abroad. At Purdue University, the Jamaica study abroad costs each student participating approximately $4,000 using a budget with 12 participants. This covered: airfare; university fees; travel insurance; in-country travel; in-country food; in-country lodging; entrance fees to cultural/recreational activities; instructor travel expenses, salaries and benefits; and CASE room and equipment rental. Because these expenses were a part of the program fee, the financial aid office treated the fee the same as tuition. Therefore, students could use grants, loans, and scholarships to pay the program fee. Additional expenses that students had to pay for out-of-pocket included: passport, travel to the U.S. airport, souvenirs, and miscellaneous expenses.

From an instructor perspective much of the planning and program arrangements took place during the preceding academic year. This required time resources and organizational skills.

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**Professional Development through Winter Technical Institutes: Agricultural Electrification**

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## Professional Development through Winter Technical Institutes: Agricultural Electrification

### Introduction

According to Phipps and Osborne (1988), a total secondary agricultural education program consists of three essential and interdependent components. Specifically, these components are: classroom and laboratory instruction; independent experiential learning, commonly known as Supervised Agricultural Experience (SAE); and participation in the student leadership organization, typically the National FFA Organization.

In the field of agricultural mechanics, laboratories are essential educational tools for student development. Johnson and [Author] (1989) stated that much of the instruction of the agricultural mechanics curriculum takes place in a laboratory setting. As such, a great deal of instructional time is spent in the agricultural mechanics laboratory. Phipps and Osborne (1988) estimated that in many courses, the time allocated for instruction in agricultural mechanics comprises 25% to 40% of the total instructional time. Shinn (1987) reported that the amount of time devoted to laboratory instruction may comprise one-third to two-thirds of the total instructional time in many agricultural programs. Furthermore, no one will dispute the fact that the use of a laboratory setting, where students can learn by doing, is a basic tenant of agricultural education programs (Sutphin, 1984).

In the curriculum area of agricultural mechanics, the basic objective for teachers is to foster the development of students' abilities to perform the mechanical tasks needed in agriculture (Phipps & Osborne, 1988). Johnson, [Author], and Stewart (1990) stated that students learn important psychomotor skills in agricultural mechanics education and that much of the instruction takes place in the school's agricultural mechanics laboratory. In order for teachers to effectively instruct agricultural mechanics curriculum to students, it is essential for them to be able to safely demonstrate these agricultural mechanics skills. Birkenholz and Harbstreit (1987) found that electricity skills were the third highest rated professional development need of [State] agricultural educators. Furthermore, in a 2008 study of [State] agricultural educators, electricity was one of the agricultural mechanics curriculum areas that teachers reported as having professional development education needs in ([Authors], 2009). With the continuing emergence of this agricultural mechanics area as a topic for professional development education by [State] teachers, agricultural education institutions and the professional development staff of the [State] [Department of education] should provide agricultural mechanics educators with professional development education opportunities to learn agricultural electrification skills and curriculum development techniques ([Authors], 2008; [Authors], 2009).

### Methodology

As a result of a statewide agricultural education professional development study ([Authors], 2009), the Agricultural Electrification Winter Technical Institute was designed and implemented by the professional development staff of the [State Department of Education] to provide [State] agricultural teachers professional development education in the area of agricultural electrification. During this winter technical institute approximately 20 teachers received professional development education. Among the objectives of the winter technical institute were construction and wiring of a comprehensive electrical wiring board. Additionally, participants

were required to learn electrical theory, electrical safety, and electrical circuit planning and installation. This activity and others provided the participants with the opportunity to learn, demonstrate, and ultimately develop agricultural electrification curriculum to further educate secondary, agricultural education students. At the conclusion of this winter technical institute, teachers received a comprehensive electrical wiring board and a wire size display board.

## Results to Date

At the conclusion of the agricultural electrification winter technical institute, participants were asked about the benefits they received from the course. Specific comments from the participants included:

- "It was about the right amount of lecture and discussion…"
- "This was very helpful. It will benefit me in our Agricultural Structures class."
- "Good instructions and good hands-on activities…"
- "The most beneficial part of the session were all the hands-on activities."

## Future Plans

The Winter Technical Institutes will continue to be an integral part of the professional development plan for [State] agricultural education. The timing of these winter technical institutes will be designed to meet the specific needs of [State] agricultural educators: after the conclusion of the National FFA Convention, before the end of the fall semester, and before the beginning of the preparation of career development event teams. The content for future winter technical institutes will be prioritized based on empirical professional development research concerning [State] agricultural educators and the availability of facilities and content experts.

## Costs/ Resources Needed

The costs for these winter technical institutes vary depending upon the content provided. For the agricultural electrification winter technical institute, the administration costs and supplies were $84 per person. To adequately instruct this institute, the instructors required a laboratory with work tables, a variety of electrical hand tools, safety glasses, and a computer with projector. Handouts and consumable supplies such as electrical wire, wire nuts, etc. were needed as well.

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**Student Teaching Capstone Expedition**

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## Student Teaching Capstone Expedition (Innovative Idea)

### Introduction/need for innovation or idea

At the conclusion of their field-experience, student-teachers returned to campus for finals week at the University of Idaho. During the week, the faculty and the student-teachers met to debrief and reflect on their classroom experience and to prepare for graduation. While the finals week meetings were productive, they tended to be monotonous and mundane.

In order to improve the student-teachers' attitudes and enthusiasm for their final week of their undergraduate work, the teacher educators undertook a total redesign of the finals week sessions. The teacher educators replaced the classroom reflection sessions with a three-day "Capstone Expedition" to allow for more authentic reflection and discussion of their experience, visit different secondary agriculture programs and production agriculture businesses, and discuss their future careers as high school agriculture teachers.

### How it works/methodology/program phases/steps

*The goals of the student teaching capstone journey were to:*

- Utilize driving time to discuss, debrief, and reflect on their recently completed student teaching experience.
- Visit quality secondary agriculture programs in different settings (rural, urban, and suburban), with different curricular focus areas (horticulture, natural resources, fruit production, etc.) and varying student demographics (urban, non-agriculture, ethnic).
- Address program challenges for recently hired teacher candidates.

This idea grew out of the cohort approach utilized by the teacher education program. "… contemporary research suggests that learning about teaching develops through participation in a community of learners where content is encountered in contexts in which it can be applied" (Darling-Hammond & Bransford, p.405). Eight programs in a neighboring state were identified by "seasoned" teachers within the state. Each program was contacted several weeks in advance and all allowed our group to tour, probe, and observe instruction. All eight programs were new to the student teachers and teacher educators. The programs greatly varied in community and school size, agricultural emphasis, and program focus.

A list of questions guided legs of the trip and were summarized and shared between the vehicles as we unloaded at the next destination.

- Instructional planning; in terms of flexibility, how was your performance affected, and did you meet the goals and objectives of your lessons/units?
- Discipline; did the students find your buttons? How did your clarity, consistency, and involvement of parents affect your discipline issues?
- What strategies worked for you to reduce disruptions and increase the FLOW of your time with your students?
- What strategies worked best for you in increasing motivation and engagement?
- What strategies worked best for you in developing rapport with students and building strong relationships with them?

- What strategies worked best for you in developing rapport with colleagues and community to build support and strong relationships?
- What were the highlights of your student teaching experience?
- Now that you've seen outstanding programs and have your student teaching experience behind you, what are the keys to building a total program?
- How do we develop a high quality program?
- How do we balance responsibilities of life and running the total program?

Assisting those student teachers who had already signed contracts identify facility and program issues that need to be addressed were priority areas for the expedition. After each visit the program's facilities and total program were discussed and the newly hired teachers' programs were considered for applying these new ideas.

## Results to date/implications

After completing our inaugural capstone expedition, the teacher educators agree that it was a success, meeting their goals. The teacher candidates were appreciative of the opportunity to see another state's diverse agriculture production and for seeing such a diverse group of high quality programs. The teacher educators were encouraged to continue to stretch the future cohort's ideas of what agricultural education is and can be. The expedition provided an excellent opportunity to encounter new ideas and for the cohort to apply their learning to their new programs.

## Future plans/advice to others

The teacher educators plan to rotate between neighboring states. Several of the teacher candidates were still in the job interview process during the expedition. Next year we will address the job interviewing and offering process before we load up and begin the journey.

A few teacher candidates expressed concern that they were never going to teach in the "other" state and didn't see the bigger picture of how running a highly successful program can be done other ways than what they were accustomed to. A recommendation would be to encourage the student teachers to plan the trip. This would increase participant ownership, keep engagement at a higher level, and hopefully reduce workload on teacher educators.

## Costs/resources needed

The department covered the cost for vehicle rental, gas, and hotel rooms totaling roughly $700. In addition, two faculty members time were allotted for the three-day trip across neighboring Washington.

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**Developing a Diversified Program: The Madison County 4-H Youth Outreach Project**

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## Developing a Diversified Program: The Madison County 4-H Youth Outreach Project

### Need for Idea

Madison County, Texas has a rich mixture of people from different economic and ethnic backgrounds. According to the latest census, people of color represent over 40% of the county's population (U.S. Census Bureau, 2007). Economically, the median household income is $29,613 per year while 20 % of the county's population lives under the poverty level (U.S. Census Bureau, 2007). While the county's 4-H program is vibrant and growing, children of color and non-traditional youth have typically been underrepresented in many of the county's 4-H initiatives. Although there are many contributing factors that may potentially play a role in the lack of participation by these groups, the Madison County 4-H Youth Outreach Program was implemented to eliminate many of these tangible barriers. With the assistance of community leaders, extension agents, and local businesses, the program is on track to enhance the educational and personal growth opportunities 4-H offers.

### How it Works

Prior to the start of the program, potential students are recommended by teachers, community leaders. After recommendations are received, needs assessments were conducted by county extension agents to determine if students qualified for the program. Once identified, information letters describing the purpose of the program were sent to parents for consent. Following the initial agreement from parents and students, a second assessment is conducted to determine what type of livestock would best fit each student's ability. Once students select the species of livestock they wish to show, the county agent serves as a liaison to ensure that proper care and maintenance of the animals is being completed by the students. The goal is for students to raise and show the animal at the Madison County Fair. Funds generated from the sale of animals are placed in a trust fund under the student's name. The funds are governed by a three signature system. Students receive the profit at the completion of high school and the entrance to a trade school, junior college, or university.

#### *Educational Benefits*

Students are required to attend monthly 4-H club meetings. Animal care, health, and nutritional needs of livestock are topics discussed. Students are also required to attend livestock showing practices that provides them with the opportunity to learn techniques of exhibiting livestock while gaining knowledge regarding shearing and fitting animals. Students are also required to be present at workshops offered at the county and district levels. The objective is to acquire more knowledge about 4-H and encourage other youth to develop an interest in agricultural education.

### Results

During the first year, ten youth participated in the program. Because the program is in the beginning phases, the results of knowledge gained and change in attitude are difficult to determine. However, as the program progresses, students become more familiar with their projects. Students are attending meetings, livestock project clinics, and showmanship practices. Every student has been enthusiastic and eager to learn. The reward is witnessing students working with their families on a livestock project that would not have been possible without this

program. At the conclusion of the program, the students will be required to complete a program questionnaire that will assist in evaluating their experience and improving the program.

## Future Plans

The program is in the first of two years of operation. As the students progress with their livestock projects, there will be an effort to expand the youth's experiences to other aspects of the 4-H program. More specifically, the students will be recruited for leadership roles at the club level. The program will be evaluated at the conclusion of the second year for success and merit in Madison County. A needs assessment will be administered to determine if the 4-H program is effectively recruiting and maintaining underrepresented youth in the Madison County 4-H Program.

## Costs/Resources Needed

The program operates on a $2000 fiscal budget provided through the Texas AgriLife Extension Service. Because many items were donated by outside resources, total operation cost is difficult to determine. A list of items needed and the source of donations is provided.

- Animals: Donations secured by the county extension agent. The donation of the animals is recorded with the local educational foundation. The foundation provides the donor with documentation for federal income tax reduction purposes.
- Feed Cost/Show Supplies: The county extension agent secured monetary donations to cover the cost of feed and show supplies from a local bank.
- Livestock Feed and Showing Supplies: The county extension agent facilitated collaboration with local feed stores to provide feed and supplies to the program, at cost to the store.
- Housing: The county extension agent coordinated with county's school district to utilize the high school agriculture farm to house animals in the program.

A local bank has agreed to fund the program in 2009-2010, however additional funds are always needed as veterinarian bills and unforeseen costs arise.

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**Visualizing Critical Thinking: Development of Interpersonal Leadership through Experiential Learning**

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## Visualizing Critical Thinking: Development of Interpersonal Leadership through Experiential Learning

### 1. Introduction/need for innovation or idea

Students enrolled in an interpersonal leadership course at the University of Nebraska-Lincoln are required to complete a 20-hour service-learning project. The service-learning project, conducted at various off-campus community service agencies, provides students with an opportunity to practice and observe interpersonal behaviors in real-life situations while also positively contributing to the community.

Stedman (2009) argued that leadership classrooms should seek to develop the cognitive capabilities of students by enhancing critical thinking skills; therefore, allowing for a more purposeful and effective reflection process in leadership development. The use of critical thinking skills provides an in-depth and forward thinking reflection process (Rudd, Baker & Hoover, 2000). Facione (1990) referred to critical thinking as "purposeful, self-regulatory judgment, which results in interpretation, analysis, evaluation, and inference, as well as explanation of the evidential, conceptual, methodological, criteriological, or contextual considerations" (p. 2). Huitt (1998) argued that students develop more thorough skills when critical thinking is linked to a specific domain of knowledge and an outcome is pursued. To improve critical thinking and leadership skills while allowing for integration of the service-learning project with classroom concepts, students design and display a poster which integrates the work done at a service project with interpersonal leadership concepts. This specific reflection links an experiential learning project with classroom concepts.

### 2. How it works/methodology/program phases/steps

This project is completed as a capstone at the conclusion of the service-learning project. The project requires the development of a poster no smaller than 2 feet by 2 feet. Students work in teams of two and select one to two concepts, out of approximately 15 interpersonal leadership concepts taught throughout the course of the semester. The selected topic should be described on the poster in an interesting manner—moving beyond simple definitions. Students are then required to depict the course concept from situations encountered at the service-learning project using imagery, collage or other creative methods and limiting the use of text. Finally, students must demonstrate the impact (positive, negative or neutral) that the application of the concept had at the service learning project site.

### 3. Results to date/implications

This poster project links an experiential learning activity with classroom concepts that may otherwise seem somewhat abstract to students. The project allows students to concretely describe and depict leadership concepts from experiences or observations in interpersonal interactions. In addition, students are given the opportunity to reflect upon how effectively (or ineffectively) interpersonal leadership concepts are utilized in their experiential learning projects. Producing this creative product provides students with critical thinking capabilities with which to enhance future interpersonal interactions. Examples of student posters will be included to show how critical thinking capacity can be expressed graphically.

**4. Future plans/advice to others**

This innovative capstone poster project will continue to be utilized to bring together an off campus service learning project with concepts taught in an on-campus classroom. This capstone project may be utilized with similar experiential learning techniques.

**5. Costs/resources needed**

Students or instructors may incur small expenses of less than $5 per poster to purchase poster board and art supplies. More professionally designed posters can cost upwards of $25.

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**An Exploratory Study of Students' Oral Presentation Self-Efficacy**

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## An Exploratory Study of Students' Oral Presentation Self-Efficacy

### Introduction

A major goal of undergraduate educators should be to produce graduates with communication skills sufficient for success in the workplace (Zinn, Faustman, & Riesen, 1993). For example, enhancing communication skills will contribute to a student's ability to work together, to speak to diverse audiences, and to communicate their knowledge and expertise more widely to a variety of audiences (NRC, 2009). In a recent presentation to the American Agricultural Economics Association, Boteler (2006) noted that communication skills were two of the top three rated skill sets that agribusiness employers sought in new college graduates. This finding is important considering that the inability to communicate effectively is a significant disadvantage for agricultural graduates (National Council for Agricultural Education, 2009).

In recent years, calls have been made for graduates to be proficient in oral communication skills so that they can function effectively the workplace (Crosling & Ward, 2002). Oral communication covers a wide area, ranging from formal presentations to participating in teams and meetings. Because the development of oral presentation skills has received little research attention (De Grez, Valcke, & Roozen, 2009; Brown & Morrisey, 2004; Alshare & Hindi, 2004; Campbell, Mothersbaugh, Brammer, & Taylor, 2001), we sought to explore undergraduate students' level of oral presentation self-efficacy using a measure based on the principles of Bandura's social cognitive theory.

### Theoretical Framework

The theoretical foundation for this study is Bandura's (1986) Social Cognitive Theory (SCT). Social cognitive theory has been noted to be very well suited to explain the development of complex behavior such as oral presentation skills (Grez, Valcke, & Roozen, 2009). In particular, we were interested in self-efficacy, one of the core constructs of Bandura's theory. Self-efficacy is defined as, "people's judgments of their capabilities to organize and execute courses of action required to attain designated types of performances" (Bandura, 1986, p. 391). Self-efficacy beliefs are constructed from four principal sources of information: mastery experiences, vicarious learning, verbal persuasion, and emotional arousal (Bandura, 1997). Numerous studies have found that as self-efficacy, or a person's confidence in his/her ability to perform a task increase, performance measured after training also increases (Bandura, 1986; Brown & Morrisey, 2004). In fact, several researchers have noted the importance of confidence in giving successful oral presentations (e.g., Tucker & McCarthy, 2001; Crosling & Ward, 2004; De Grez, Valcke, & Roozen, 2006; Adams, 2004; Brown & Morrisey, 2004; Huiberts & Leeds, 2009).

### Methods

*Participants*

Sixty-nine percent of students were male and 31% were female. Students' age ranged from 19 to 24 ($M$= 21.0, $SD$ = .47). Forty-five percent of students were seniors, 49% were juniors, 4% were sophomores, and 2% were freshmen.

The research design of the study was a one-group pretest-posttest design. The dependent variable was oral presentation self-efficacy score. The intervention involved instructor/researcher's use of the four principal sources of self-efficacy information. Participants

for this study were undergraduate students enrolled in an oral communications course in the College of Agricultural and Life Sciences at a Midwestern university ($n$ = 75). The measure used to collect data was the Presentation Self-Efficacy Scale (PSES; Authors, 2007). The PSES is comprised of 15 items which measure the level of confidence students have in their ability to complete oral presentation-related tasks. The PSES items are rated on a 6-point Likert-type scale from 1 (*no confidence at all*) to 6 (*complete confidence*) with higher scores indicating greater levels of confidence. Internal consistency for the measures was assessed during a pilot test resulting in an alpha reliability of .92. Descriptive statistics used included frequencies, percentages, means, and standard deviations. Paired t-tests were used to describe differences between pretest and posttest scores on the PSES.

## Findings

Fifty-two percent of students had no previous course or courses that required a large number of presentations while 60% had no previous work-related experiences that required giving a large number of presentations (e.g. workshops, seminars, or meetings). Results of the paired t-tests showed significant differences in mean pretest and posttest oral presentation self-efficacy scores (Pretest mean = 4.30, $SD$=.80, Posttest mean =5.10, $SD$ =.57, $t$=-8.436, $p$<.001).

## Conclusions and Implications

Despite the limitations related to the research design of the study, findings indicate that the use of an intervention involving the use of the four principal sources of self-efficacy information enhanced the oral presentation self-efficacy of undergraduate students. It should be noted that the current version of the PSES did not specifically measure the four sources of self-efficacy, hence a logical next step will be to develop a revised version of the PSES that include items measuring mastery experiences, vicarious learning, verbal persuasion, and emotional arousal. One of the major implications resulting from this study is the potential benefit to instructors seeking to enhance the oral communication skills of their students.

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**Characteristics of Distinguished Faculty in Agricultural Education**

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## Characteristics of Distinguished Faculty in Agricultural Education

### Introduction/Need for Research

Agricultural education has been influenced by distinguished individuals throughout the history of the profession (Camp & Crunklilton, 1985). Birkenholz and Simonsen (2009) noted that faculty were the most commonly-cited feature of distinguished agricultural education programs. Previous studies in agricultural education have produced lists of prolific authors in the profession (Birkenholz & Ewing, 2005; Edgar, Edgar, Briers, & Rutherford, 2008; Harder, Goff, & Roberts, 2008; Moore, 1982; Radhakrishna & Jackson, 1995). However, the researchers were unable to identify characteristics of distinguished faculty beyond the authorship metric. This study was conducted to identify characteristics of agricultural education faculty who were highly regarded by professional colleagues.

### Conceptual Framework or Theoretical Foundation

Social expectations theory describes the process of developing and understanding group behavior. Burris posited that characteristics and routines of groups are identified and understood which leads to the shaping of group norms (as cited in DeFleur & Dennis, 1991). Norms become guidelines that groups strive to achieve and perpetuate (Hossler, 1998). Social expectations theory suggests that underlying norms in this study have been reinforced over time through professional interactions among agricultural education faculty. Reputational perceptions are also reflected through the accumulation theory of minimal effects. Exposure over time and through repeated interaction influences the perceptions upon which professional colleagues base their opinions (DeFleur & Dennis, 1991). Respondents in this study were assumed to base their perceptions on disciplinary norms developed over time as a member of the academic community. Respondent perceptions were also expected to be in alignment with normative expectations of the discipline of agricultural education.

### Methods

The survey instrument was designed by the researchers. The population frame consisted of a primary contact person in each agricultural education program listed in the *2007 Directory of Teacher Educators in Agricultural Education* (American Association for Agricultural Education, 2007). Data collection instruments were mailed to 82 agricultural education programs in the United States. Respondents were asked to identify ten agricultural education faculty (currently active in the profession) that were held in "highest professional regard." Respondents were also asked to identify distinguishing characteristics for each faculty member they identified. However, respondents were instructed to not include themselves in their response. Cumulative frequency counts were used to identify 15 distinguished agricultural education faculty members. Characteristics reported for each of the distinguished faculty were summarized by the researchers. The three most frequently-cited characteristics were reported for each distinguished agricultural education faculty.

### Results/Findings

A total of 56 instruments were returned, although eight did not provide useable data. Therefore, the results of this study were based on data collected from 48 respondents for an overall response rate of 59%. Non-respondent follow-up procedures were not employed. Thus,

the results of this study cannot be generalized beyond the respondents providing usable data. Agricultural education faculty that were held in the "highest professional regard" by the respondents are listed in alphabetical order in Table 1. The three most frequently-mentioned distinguishing characteristics for each of the faculty are also provided.

Table 1
*Distinguished Agricultural Education Faculty and Their Distinguishing Characteristics*

| Distinguished Faculty | Distinguishing Characteristics |
|---|---|
| Matt T. Baker | Leadership, helpful/friendly, and scholarship |
| Robert J. Birkenholz | Leadership, research, and respected |
| Gary E. Briers | Research, leadership, and teaching |
| William G. Camp | Leadership, research, and teacher education |
| Jack F. Elliot | Curriculum development, leadership, and research |
| Bryan L. Garton | Teacher education, research, and leadership |
| Robert A. Martin | Leadership, research, and visionary |
| Gary E. Moore | Historical research, dedication, and leadership |
| Edward W. Osborne | Leadership, research, and problem based learning |
| Rick D. Rudd | Leadership, critical thinking, and research |
| Glenn C. Shinn | Leadership, agricultural mechanics, and knowledge |
| Rob Terry, Jr. | Teaching, research, and leadership |
| Greg W. Thompson | Leadership, research, and professionalism |
| Robert M. Torres | Research, personable, and mentorship |
| M. Susie Whittington | Cognition research, teacher education, and service |

## Conclusions

Leadership and research were the two most frequently-cited characteristics of faculty who were held in the highest professional regard in agricultural education. Several distinguished faculty were also characterized with a specific research or curricular area. Teacher education and teaching were cited as a distinguishing characteristic multiple times. Interpersonal dispositions such as helpful, friendly, visionary, professional, personable, and service were also listed as distinguishing characteristics for several faculty. Readers should avoid inferring that faculty omitted from the list are not distinguished or held in high regard by professional colleagues. Also, readers should be cautioned against concluding that characteristics missing from the list implies any professional shortcoming or deficit. Rather, this study was conducted to identify characteristics that agricultural educators consider to be distinguishing features of highly esteemed professional colleagues.

## Implications/Recommendations/Impact on Profession

Since faculty are the most frequently-cited distinguishing feature of highly regarded agricultural education programs (Birkenholz & Simonsen, 2009), targeted efforts should be directed toward recruiting, developing, and retaining talented faculty. This study reveals perceived characteristics of distinguished faculty who were held in high regard by colleagues in agricultural education. Program administrators should promote professional development efforts to enhance the distinguishing characteristics reported. Concerted efforts should be undertaken to encourage and support all faculty to continue their professional development with a special emphasis on the characteristics of distinguished agricultural education faculty.

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**Development of an Instrument to Measure the Agriscience Education Self-Efficacy of Middle School Students**

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## Development of an Instrument to Measure the Agriscience Education Self-Efficacy of Middle School Students

### Introduction

Experts in the field of career development have devoted much attention to investigating the factors that predict career choices in science, technical, engineering, and math-related disciplines (Quimby, Seyala, & Wolfson, 2007). One reason for the increased attention has been the desire to investigate the factors responsible for the underrepresentation of women and minorities in the STEM career fields (Hackett, Betz, Caas, & Rocha-Smith, 1992; Lent et al., 2005 as cited in Quimby, Seyala, & Wolfson, 2005). Similarly, factors influencing the educational and career choices in the agricultural sciences, especially urban minorities, has also been a topic of interest in career and technical education research (see Esters & Bowen, 2004; Esters & Bowen, 2005; Jones & Larke, 2003; Talbert, 1996, 1997; White, Stewart, Linhardt, 1994). One of the weaknesses of these studies however, has been the lack of attention to students at the middle school level.

### Theoretical Framework

This study was guided by Social Cognitive Career Theory (SCCT; Lent, Brown, & Hackett, 1994). Social cognitive career theory is anchored in Bandura's (1986) social cognitive theory and focuses on three cognitive-person variables: self-efficacy beliefs, outcome expectations, and personal goals. SCCT has successfully been applied to areas such as science, mathematics, and engineering (e.g., Lent et al., 2001; Lent, Brown, Brenner, Lyons, & Treistman, 2003; Lent, Lopez, Lopez, & Sheu, 2008); however, it is particularly critical to examine other domain areas if the SCCT model is to be applied generally across occupational areas (Smith & Fouad, 1999). Recently, Esters (2006, 2007) applied SCCT to the domain of agriculture through the development of the Agriscience Education Self-Efficacy Scale (AGESES; Esters & Luster, 2004). For this study, agriscience education self-efficacy was operationalized as a students' belief in his/her ability to perform occupational tasks related to an agricultural career. The AGESES was originally developed for use with high school students; recently however, a version was developed for use with middle school students (see Esters, 2008). Although evidence of reliability was presented in this study, details regarding the development and psychometric properties of the middle school version have not been examined. As such, the purpose of this study was to describe the development of a reliable and valid instrument measuring the agriscience education self-efficacy of middle school students.

### Methods

Participants for this study were students enrolled in middle school agriscience education programs ($n$ = 150). Fifty-six percent of participants were male and 44% were female. Participants' age ranged from 12 to 15 ($M$= 13.5.0, $SD$ = .73). The instrument used to collect data for the study was the AGESES (Esters & Luster, 2004) which was modified for use with middle school students. The instrument is comprised of four sections measuring variables of the SCCT framework: (1) Agriculture Self-Efficacy (AgSE), (2) Agriculture Outcome Expectations (AgOE), (3) Agriculture Goals/Intentions (AgGI), and (4) Agriculture Interests (AgInt). Development of the AGESES was based upon the guidelines set forth by Bandura (1995), Lent (2006), and Betz (2006) for measures based on social cognitive theory. An EFA using principal-axis factoring with an oblimin rotation was utilized. The number of factors to extract was

determined by examining the scree plot, Eigen values greater than 1.0, and conceptual interpretability of the factors using a factor loading cutoff of .40.

## Results

The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy of the AGESES were above .85 and Bartlett's test of sphericity was significant ($p < .001$ ) for each of the four sections indicating the suitability of the data for factor analysis (Tabachinik & Fidell, 2001). Examination for the pattern matrices revealed two-factor solutions for AgSE, AgOE, and AgInt; and a one-factor solution for AgGI. The two factor structure of AgSE, AgOE, and AgInt accounted for 65.72, 74.19, and 64.27 of the variance respectively. The one-factor structure for AgGI accounted for 75.72 of the variance. The AgOE factors were labeled Future Ag Outcomes and Personal Expectations. The AgGI factor was labeled Educational and Career Intentions. Because both the AgSE and AgInt factor solutions focused on animals and plants, the two factor solutions were labeled animal and plant efficacy; and animal and plant interests. All of the values of internal consistency reliability for the AgSE, AgOE, AgINt, and AgGI full scales and subscales were $\geq$ .77.

## Discussion

The purpose of this study was to describe the development of a valid and reliable instrument measuring the agriscience education self-efficacy of middle school students. Overall, findings indicate that the newly developed SCCT-based scales are a valid and reliable measure. Specifically, factor analysis revealed two-factor solutions of AgSE, AgOE, and AgInt; and a one-factor solution for AgGI. In sum, this study provides initial support for the Lent et al. (1994) SCCT model in occupational areas other than science, math, and engineering.

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**Economic Viability of Selling Locally Grown Foods to Local Food Businesses**

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## Economic Viability of Selling Locally Grown Foods to Local Food Businesses

### Introduction/Theoretical Framework

Local foods in restaurants were identified as the 'hottest trend' in 2009 (National Restaurant Association [NRA], 2009). However, there is limited research on whether it would be economically viable for growers to sell directly to local food businesses, including restaurants, and under what conditions. Economic viability for growers is critical to ensure local foods sales directly to local food businesses are a sustainable strategy. This study was part of a broader effort that took a systems view to evaluate the economic viability of local foods for foodservice organizations, local growers, and consumers. In this particular study the focus was on assessing economic costs and benefits for growers. This study is associated with the wider literature in theories of economic sustainability, eco-localism, and farm-to-fork system's approach. Further, local food systems programming is a major effort under the Agricultural Sustainability program area of Cooperative Extension in many states in the United States.

### Background

"Local food" is gaining popularity as an alternative economic strategy for developing local communities (Hinrichs, 2003). However, for it to develop and be adopted progressively, clear costs and benefits for producers and consumers need to be evaluated. Theories of economic sustainability such as eco-localism stress the importance of creating local or regional community economies that are self-reliant (Curtis, 2003). Emphasis has been placed on examining the economic possibilities that short distance commerce and self-reliant local economies can offer. In context of shorter distances, research shows that even though there may be significant environmental consequences of longer transportation of foods, actual transport costs are small and by itself, may not provide an economically competitive justification to choose local foods over the conventional system (Pirog et al., 2001). A more thorough comparative analysis of costs of production, processing, packaging, and distribution is needed to justify use of local food systems. Growers are motivated to sell locally due to the asymmetry in farm-retail price spreads where costs to farmers may change by only 16%, yet the price to consumers (through wholesale market channels) can go up by as much as 52% (Dunham, 1994). Even then, adopting such selling strategies may imply new types of processes, costs, and investments simply because growers are approaching a different market to sell their produce (Telfer & Wall, 1996). While local farm-to-retail markets provide opportunities to reduce these price spreads and maximize benefits for growers, economic viability of using these foods in local food businesses is a crucial variable because these businesses provide an important market for locally grown foods.

### Purpose and Objectives

The purpose of this study was to assess the economic costs and benefits for growers by selling their products directly to local food businesses such as restaurants. The objective of this study was to identify economic implications for local growers/producers who wish to establish sustainable partnerships with local restaurants. The two research questions were as follows: 1) What are the costs and benefits for growers to sell products directly to restaurants? 2) How can growers maximize the economic benefits and minimize costs when selling to local restaurants?

## Methodology

This study was conducted in a mid-Western university. The local growers directory was used to identify growers. The authors established first contact via phone, and requested participation. A value chain framework was adopted to assess incremental costs and financial investments required by growers and producers who sell local foods to restaurants. The value chain components included the following: production, storage, packaging, marketing, transportation, delivery, and others. Face-to-face interviews were conducted with 10 local growers/producers who were selling fruits, vegetables, dairy, chicken, pork or beef to at least one local restaurant. For this study, local food was defined as that sold by growers within 50-mile radius. Interviews were pre-scheduled and where possible the growers were provided the instrument before the interview. The discussions were semi-structured and conducted by at least two researchers. One of these researchers recorded the responses, and the other verified them. Responses were analyzed using non-parametric statistics, and financial and descriptive documentation of current practices.

## Highlights of Findings

Grower responses were categorized into three distinct areas: grower information, issues concerning sales to local restaurants, and value chain component information of costs and benefits. The following section provides highlights of these results.

*Value chain activities*

Each value chain activity was investigated for its reported costs and benefits. In case of *production* no differences in costs were reported. Similarly *storage* activity also did not result higher costs for growers. On the other hand two growers reported that packaging of tomatoes, asparagus, and corn were higher due to portioning. Lamb producer and vegetable grower reported higher marketing costs, particularly related to establishing initial contact and later relationship building. Most importantly, all growers agreed *transportation* and *delivery* costs would be higher. In context of pricing benefits, nine of the ten growers agreed that restaurants would be willing to pay a price premium for their products. Other comments/observations included the following:

1. Restaurants were usually unable to commit for orders. This impacted growers to plan effectively.
2. Growers also felt that some restaurants (along with their chefs) were considerably better than others in their ability to have flexible purchasing policies. This allowed growers to increase sales to such restaurants.
3. Still others observed restaurant chefs need to be better informed and trained to work with different types of products.
4. The need was also felt for growers to engage in interactions with restaurants, to sell their products.

## Conclusions and Implications

There were clearly higher costs for growers in at least two components of the value chain process in order to sell directly to restaurants. However, most growers also identified benefits, such as price premiums. On the other hand there was a need felt that growers and restaurants much increase interactions. It was felt that such interactions would help growers showcase their products to local food businesses. Respondents agreed that some type of a roundtable discussion amongst restaurants and growers would help establish contacts and develop professional relationships.

Findings and conclusions of this study are of immense value for Extension professionals who are promoting local food systems programming. Community and Economic Development educators can work with local growers to make informed decisions about the costs and benefits for selling their produce locally. Need exists for offering training programs/workshops to help growers and local food businesses to understand the economic implications for their sustainable partnerships.

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**FFA Professional Development Needs of [State] Agricultural Educators**

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## FFA Professional Development Needs of [State] Agricultural Educators

### Introduction

According to Phipps and Osborne (1988), a total secondary agricultural education program consists of three essential and interdependent components: classroom and laboratory instruction; independent experiential learning, commonly known as Supervised Agricultural Experience (SAE); and participation in the student leadership organization, known as the National FFA Organization. With the continuing growth of agricultural education in [State] and the increased student participation in FFA Career Development Events (CDE) ([State] Department of Education, 2008), research was conducted to determine the professional development needs of [State] agricultural educators pertaining to FFA CDE teams. Researchers utilized a paper questionnaire, administered to [State] teachers at area agricultural education meetings, to conduct this descriptive census.

### Theoretical Framework

Over the years, agricultural education programs have evolved from production oriented training to consumption based education focused on semester long curriculum and courses (Washburn & Dyer, 2006). The constant evolution of agricultural education programs and the addition of core subject content skills have required many teachers to seek professional development opportunities to meet the demands of the changing emphasis of their programs (Washburn & Dyer). To accomplish this goal, providers of professional development in-service education should monitor the needs of agriculture teachers over time and provide educational programs based upon their current needs (Birkenholz & Harbstreit, 1987). Garton and Chung (1995) concluded that "the in-service needs of agriculture teachers should be assessed and prioritized on a continual basis" (p. 78). Nine years have elapsed since the last comprehensive study of professional development in-service needs of [State] agricultural educators. In previous studies, researchers found in-service needs in the following areas: developing agribusiness management skills, electricity skills, training FFA contest teams, assisting students with SOEP records, completing reports for local and state administrators, etc. (Birkenholz & Harbstreit, 1987; Garton & Chung, 1996; King & Garton, 2000). Due to the length of time since those studies were conducted and the continual need for research regarding the professional development in-service needs of agricultural educators (Osborne, 2007), an assessment of current professional development needs of agriculture teachers was warranted.

### Purpose and Research Objectives

The purpose of this study was to identify the professional development education needs of [State] agricultural educators. The following research questions were investigated to accomplish this purpose:

1. What are the personal and professional characteristics (years of teaching experience, agricultural education district, agricultural education area, sex, FFA membership, 4-H membership, type of teacher certification, major in bachelor's degree, minor in bachelor's degree) of school-based agricultural educators in [State]?

2. What are the professional development education needs of school-based agricultural educators in [State] related to educating [State] FFA Career Development Event (CDE) teams?

## Methodology

The population for this study was all school-based agricultural education teachers in [State] (*N* = 467). Subjects were identified from the 2008-2009 [State] Agricultural Education Directory (2008) and confirmed by the agricultural education professional development staff of the [State Department of Education] [Name], personal communication, September 1, 2008). This study was extracted from a larger research project designed to assess the professional development needs of [State] agricultural educators. The data collection instrument, developed by Garton and Chung (1995), was modified for use with this study. Appropriate methods were used to determine the validity and reliability of the instrument including the use of a panel of experts (*n* = 9) and a pilot study (*n* = 20). Usable responses were received from 383 [State] secondary agricultural educators for an 85.68% response rate.

## Results

[State] agriculture teachers had slightly more than 10 years of teaching experience. Nearly three-quarters (71.01%) of these teachers were men. The majority of the respondents taught at schools located within the Central agricultural education district and the Area 8 agricultural education area. Most of the respondents were FFA members (88.50%) and 4-H members (58.00%) as a youth. Overwhelmingly, almost 9 out of 10 (88.80%) of the respondents had a traditional agricultural teacher certification. Additionally, 76.50% of the teachers held a bachelor's degree in agricultural education. The respondents indicated that they had some need (Dairy Cattle Evaluation; *M* = 2.07 to Agricultural Sales; *M* = 2.49) for professional development education for all of the [State] career development events except for Parliamentary Procedures. For this CDE, [State] agricultural educators indicated that they had much need (*M* = 2.52) for professional development education.

## Conclusions, Implications and Recommendations

The typical school-based agricultural educator in [State] is male with 10 years of teaching experience. He teaches at a school located in the Central agricultural education district and the Area 8 agricultural education area. As a youth, he was a member of the National FFA Organization and 4-H. In addition, he holds a traditional teacher certification in agriculture and a bachelor's degree in agricultural education. The characteristics of the respondents along with factors such as: location, length of time, time of year, cost, graduate school credit, and use of distance education technology (synchronous and asynchronous) should be considered when developing professional development programs for agriculture teachers.

[State] agricultural educators have professional development education needs relevant to the [State] FFA Career Development Events. The continual need for professional development education (Osborne, 2007), the increasing [State] FFA membership ([State] department of education, 2008), and the changing demands of agricultural education programs (Washburn & Dyer, 2006), creates a need for relevant and timely professional development education programs for [State] agricultural educators. These professional development opportunities should be planned and implemented by [State] agricultural teacher educators and state professional

development staff and be delivered through summer and winter technical institutes. Future research should be conducted to determine the effectiveness of various types of workshops for diverse agricultural education topics and the effectiveness of pre-service teacher education in [State] for preparing teachers to educate FFA career development event teams.

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**High School Teachers' Beliefs of Sustainable Agriculture and the Extent Teachers Teach Sustainable Agriculture in the North Central Region**

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# High School Teachers' Beliefs of Sustainable Agriculture and the Extent Teachers Teach Sustainable Agriculture in the North Central Region


## Abstract

Conner and Kolodinsky (1997) suggested that extension educator beliefs about sustainable agriculture (SA) may influence the teaching of SA to farmers and the design of professional training on SA. The purpose of this study was to determine agriculture teacher beliefs about SA practice and examine the extent to which teachers teach SA topics in high school agriculture curriculum in the North Central Region. A self-administered questionnaire sent to 844 teachers found teachers had beliefs supporting SA and taught SA topics moderately. Because teachers agree to SA concepts, teachers require access to curriculum materials and teaching innovations about SA to increase conceptual understanding and awareness of SA (Agbaje, Martin & Williams, 2001; Udoto & Flowers, 2001).


## Literature Review

SA can provide a foundation for integrated instruction and application of science in agricultural education and address challenges in the agricultural sector (Williams & Dolliso, 1998). Beliefs about an object can influence cognition, affect and behaviors of individuals towards the object (Fishbein & Ajzen, 2003). However, information regarding teacher beliefs and extent to which teachers teach selected topics in SA is not available.

## Methods and Procedures

The questionnaire instrument had 4 subscales and demographics: (1) SA beliefs, (2) selected practices in SA, (3) extent of teaching selected SA topics, and (4) extent of use of different teaching methods. The beliefs subscale was based on Alternative-Conventional Agricultural Paradigm (ACAP) scale (Beus & Dunlap, 1991). Cronbach's coefficients alpha from a pilot study on teachers ranged between .82 and .95. 844 teachers were selected from a population of 2,904 teachers in 12 North Central Region States by stratified random sampling. Dillman's (2000) Tailored Design method was used for data collection. Questionnaire return rate was 28%. No statistical significant difference was found between early and late respondents on the main research variables. Results are generalized to the population of study (Tables. 1, 2).

## Results

1. Teachers, overall, agreed with statements supporting concepts about SA, emphasizing its ecological and social dimensions.
2. Teachers relatively positively perceive selected SA practices
3. Overall, teachers only teach about SA moderately, rating topics they teach similarly
4. Teachers mainly used traditional teaching methods; used experiential teaching methods only to a low to moderate extent
5. There is a substantial positive linear relationship between SA concepts and selected practices only, but a negligible to low relationships with other variables

Table 1. Top rated concepts about SA and rankings

| SA Belief Statement | Mean | Rank | SD |
|---|---|---|---|
| Healthy soil is important for SA | 4.24 | 1 | 0.90 |
| SA conserves natural resources for the future | 4.14 | 1/2 | 0.88 |
| Crop rotation is important to SA | 4.14 | 1/2 | 0.98 |
| SA promotes recycling of renewable resources | 3.93 | 2/3 | 0.82 |
| SA values nature for its own sake | 3.93 | 2/3 | 0.92 |
| Extension knowledge is important for success of SA | 3.93 | 2/3 | 0.80 |
| Exchange of local knowledge promotes SA | 3.88 | 2/3 | 0.77 |
| Integrating crops with livestock promotes SA | 3.86 | 3/4 | 0.74 |
| Local farming practice impacts success of SA | 3.85 | 3/4 | 0.89 |

Note: SA = Sustainable Agriculture; SD = Standard Deviation

**Table 2.** Top rated means, and standard deviations for individual items regarding the extent to which teachers taught selected SA topics

| SA Belief Statement | Mean | Rank | SD |
|---|---|---|---|
| Soil test | 4.10 | 1 | 0.93 |
| Wildlife conservation | 3.77 | 2 | 1.00 |
| Crop rotation | 3.70 | 2/3 | 1.02 |
| Food safety | 3.64 | 2/3 | 1.05 |
| Water quality | 3.57 | 2/3 | 1.01 |
| Use of animal manure | 3.51 | 2/3 | 1.06 |
| Reduced tillage | 3.46 | 3 | 1.13 |
| Integrated pest management | 3.45 | 3 | 1.08 |
| Renewable sources of energy | 3.43 | 3 | 1.03 |

Note: SA = Sustainable Agriculture; SD = Standard Deviation

**Conclusions and Recommendations**

1. Teachers' beliefs about SA do not influence the extent to which teachers teach SA topics
2. Perceptions about selected SA practices can influence the extent to which teachers teach selected topics in SA
3. The extent to which agriculture teacher is likely to teach SA may be better determined from perceptions of selected practices than from beliefs about SA
4. Because teachers agree to SA concepts, teachers require access to curriculum materials and teaching innovations about SA to increase conceptual understanding and awareness of SA

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**Mentoring Perceptions and Experiences of Minority Summer Research Opportunity Program Participants**

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## Mentoring Perceptions and Experiences of Minority Summer Research Opportunity Program Participants

### Introduction

For years mentoring in higher education has been purely a relationship between graduate student and major professor, but now more focus is being paid to the mentoring that takes place for undergraduates as a way to increase retention and as a tool of enrichment of the overall undergraduate experience (Jacobi, 1991). One critical aspect of many Undergraduate Research Opportunity Programs (UROPs) and Summer Research Opportunity Programs (SROPs) is the role of mentors (Gaffney, 1995; Kinkead, 2003). Under the guidance of a mentor, undergraduate research is seen as a scholarly activity that helps to promote scientific inquiry, experiential learning, scholarship, career development among other functions (Kinkead, 2003).

Mentoring is a key component of most UROP/SROPs, especially programs that are aimed at increasing the presence of women and minority students in, science, technology, engineering, agriculture, and mathematics (STEAM) fields. The majority of students that participate in SROPs happen to be minority students and it is through SROPs that these students are exposed to more educational and career opportunities (Crawford, et al., 1996). Several studies have documented an increase in retention and persistance among minority students to pursue advanced degrees, and remain in the academy when mentoring is made available to them (Crawford et al.,1996; Tenenbaum, Crosby, & Gliner, 2001; Thomas, Willis, & Davis, 2007).

Because various thoughts of quality mentoring in undergraduate research programs exist, it is important that a mentoring model be developed identifying key functions necessary for undergraduate interns to have a meaningful mentoring experience. To date, there have been few empirically-based studies examining the perceptions of mentoring and mentoring experiences of minority students in SROPs.

### Purpose

The purpose of this study was to explore and compare the mentoring perceptions and experiences of minority summer research program participants.

### Functions of the Mentoring Model

Mentoring involves behaviors that can be defined, learned and practiced (Wunsch, 1994). With this in mind, based on a comprehensive review of the literature seven mentoring functions were identified which have been shown as being highly important in undergraduate research programs. The functions used in our model include: 1) clarity of project, 2) challenging assignment, 3) training for the intern, 4) contact between mentor and intern, 5) assistance 6) feedback, and 7) role modeling.

### Methods

Former interns were sent a link to an online questionnaire that contained 37 items measuring the interns' perceptions of mentoring and 37 items measuring the interns' mentoring experience. The statements were measured using a four point Likert-type scale (1=Strongly Disagree to 4= Strongly Agree). Statements corresponded with one of the seven selected mentoring functions. The population of this study consisted of (*N=78*) former interns from 2006-

2008 who participated in the Alliance for Graduate Education and the Professoriate and the George Washington Carver Internship Program. Forty-two questionnaires were returned resulting in a 54% response rate.

## Findings

After participating in one of the SROPs, 84% of participants decided to pursue an advanced degree, while 38% of the interns indicated that their mentoring experience was better than expected. Forty-one percent of the interns noted that after this experience they were very likely to participate in another undergraduate research program. Three open ended questions were asked to students to better understand their mentoring experience. When asked to provide suggestions to enhance the mentoring experience three major themes arose. The three themes were 1) training, 2) contact and 3) clarity of project; each of these themes was named for the functions that they represent.

As related to the mentoring perceptions scale the challenging assignments function had the highest mean value ($M=3.57$); while the training function had the lowest mean value ($M=3.12$). The scale measuring the interns' mentoring experience indicated significantly lower mean values with the challenging assignments function having the highest mean value ($M=3.37$) and the training function having the lowest mean value ($M=2.77$). A paired sample t-test was conducted comparing the interns mentoring perceptions to their actual experience. Results indicated a significant ($p<.05$) difference between the interns perceptions of mentoring and their actual mentoring experience.

## Conclusions, Implications, and Recommendations

From these findings we can conclude that the interns' perceptions of what will occur throughout their mentoring process are not being met. Program coordinators must emphasize the importance of practicing the seven mentoring functions to mentors. We can also conclude that SROPs are helping encourage minority students to pursue advanced degrees and helping them define their educational/career path. From the open-ended questions we observed that the functions training, contact and clarity of project are important to the students that participate in these programs. Program coordinators must begin to emphasize the importance of these three functions to mentors for students to continue to have meaningful mentoring experiences. To improve the mentoring aspect of SROPs, we recommend that SROP coordinators implement the seven mentoring functions into their programs. We also recommend that coordinators host mentoring workshops to introduce mentors to the seven mentoring functions and the importance of these functions when mentoring minority students. Further research is needed to determine the impact of the seven mentoring functions on the mentoring experience of SROP participants. Further research is also needed to determine the mentors' perception of the seven mentoring functions and the extent to which they are practiced by the mentor.

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**Perceptions of Wisconsin Agricultural Education Teachers Towards Integration Of Science Into The Agricultural Education Curriculum**

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## Perceptions of Wisconsin Agricultural Education Teachers Towards Integration Of Science Into The Agricultural Education Curriculum

### Introduction/need for research

Secondary agricultural education programs in the state of Wisconsin are being pushed toward integrating higher levels of science content and process into the curriculum (J. Hicken, personal communication, May 13, 2009). No formal research has been conducted to determine how the teachers in the state perceive this change. The purpose of this study was to look at agricultural education teachers' perceptions towards the integration of science into the agricultural education curriculum. The study looked at agricultural education teacher demographics, barriers to science integration, perceived support from outside organizations, collaboration possibilities with science teachers, and earning science credit for graduation.

### Conceptual framework

Balschweid and Thompson, G. W. (2002) and Warnick and Thompson (2007) established the importance of agricultural education teacher perceptions to the integration of science. This information is critical to state level efforts to develop inservice programs, review teacher preparation programs, and create materials to support teachers integration of science concepts and processes into the secondary agricultural education curriculum.

### Methodology

The instrument used in this study was based on that used by Warnick and Thompson in 2007 where it was found to be valid and reliable. No changes were made in the formatting of the questions. Question text was edited to use terms appropriate to Wisconsin teachers. A link to a web based informed consent statement and the instrument was sent by email to all 275 agricultural education teachers for which a valid email address was available. Usable responses were received from 149 teachers for an overall response of 54%.

### Results/findings

The demographic information data showed that the average participant in the study had been teaching 16.8 years (SD 10.09) and was 34.3 years old (SD=11.02). Out of the teachers that completed the survey, 62.7% were male while 37.3% were female. The teachers reported that 31% of the schools offered at least one agricultural education courses that carried science credit and 19.3% of the teachers held a science license.

Teachers responded to statements regarding science integration using a five-point Likert-type scale where 1=strongly disagree, 2=disagree, 3=neutral, 4=agree, and 5=strongly agree. As shown in Table 1, there was a high level agreement on the importance of science in agriculture and the benefits to students when science is integrated into agricultural education courses. Teachers agreed that barriers limited their ability to successfully integrate science. The lack of appropriate equipment (Mean 3.86, SD 0.898) and the lack of adequate federal, state, or local funding (Mean 3.50, SD 0.970) were the highest rated barriers.

**Table 1**
*Wisconsin Agricultural Education Teachers' Perceptions Toward Science Integration* (N=149)

| Science Integration Item | Mean | Standard Deviation |
|---|---|---|
| Agriculture is an applied science. | 4.78 | 0.531 |
| People pursing a career in agriculture must have a greater understanding of science than ten years ago. | 4.48 | 0.724 |
| Students are better prepared in science after they completed a course in agricultural education that integrates science. | 4.41 | 0.692 |
| Science concepts are easier to understand for students when science is integrated into the agricultural education curriculum. | 4.35 | 0.700 |
| Students are more aware of the connection between scientific principles and agriculture when science concepts are an integral part of their instruction in agricultural education. | 4.28 | 0.718 |
| Students are more motivated to learn scientific concepts when they are integrated into the agricultural education curriculum. | 4.26 | 0.760 |

Answers to the open ended question regarding the state process of science equivalency were given by 94 teachers. Comments ranged from very positive "I think it is great" to negative "difficult process. Several suggestions were offered for how to improve the process.

## Conclusions

Results indicated that Wisconsin agricultural education teachers have an overall positive attitude towards integrating science into their curriculum. Several barriers were identified that teachers perceive as limiting further integration of science. The current system for gaining science equivalency received mixed reviews from this group of teachers. Results of this study were very similar to those in other states (Balschweid & Thompson, 2002; Warnick and Thompson, 2007).

## Implications/recommendations/impact

Agricultural education leaders in the state of Wisconsin should use this information to support current teachers and prepare new teachers. Teachers identified several challenges with the current system of gaining science equivalency for agricultural education courses. State leaders should develop ways to limit the barriers to teachers working to gain science equivalency for their courses.

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**Selected Demographic and Personal Characteristics of Secondary Agricultural Education Teachers in Texas**

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## Selected Demographic and Personal Characteristics of Secondary Agricultural Education Teachers in Texas

### Introduction

Changing demographics in public schools across the country has had a profound effect on the agricultural education profession, as national organizations like FFA, and The National Council for Agricultural Education realize that tomorrow's teachers of agricultural education will be from a wide range of individuals from different ethnic, racial, cultural, and societal backgrounds. Because of this impact, the field of agricultural education has been charged with meeting the needs of our society and, in turn, ensuring that the profession is more applicable to a wide range of people. Teachers of agricultural education must be prepared in terms of philosophy, pedagogy and curriculum to deal with the challenges of an increasingly diverse population and actively work on preparing this population to navigate the waters of agricultural education successfully. This study sought to describe selected demographic and personal characteristics of Texas secondary agricultural education teachers employed in public schools.

### Conceptual Framework

The conceptual framework that guided this research was based upon the concept of diversity inclusion. Diversity inclusion is an educational philosophy that welcomes all learners by actively engaging them in educational programs regardless of their race, ethnicity, or exceptionality. A diversity inclusive program is where the critical infusion of multicultural education, inclusion, and culturally responsive teaching takes place. Teachers and programs that exist within this area have positive perceptions about (a) the benefits of diversity inclusion; (b) understanding that, because of past perceptions, pre-existing barriers may be reason why students of color and students with disabilities are underrepresented in agricultural education, and (c) having an awareness of possible solutions to increase underrepresented group participation in agricultural education.

### Methodology

This purpose of this study was to explore and analyze secondary agricultural education teachers' attitudes toward diversity inclusion in secondary agricultural education programs. The target population consisted of all Texas secondary agricultural education teachers as listed by the Texas Education Agency (TEA) during the 2006-2007 school year (N = 1,732). A nonproportional stratified random sampling technique was employed to determine the levels of subgroups within the sample to be selected. The researchers decided that all 10 administrative areas as defined by the Texas FFA Association would be proportionally represented in the study. Within each administrative area, 32 teachers were selected randomly ($n$ = 320). Sample size was determined using a sampling formula from Bartlett, Kotrlik and Higgins (2001).

The questionnaire used in this study was based on previous work by Warren and Alston (2007) concerning diversity and inclusion perceptions of North Carolina agricultural education teachers. Survey implementation and data collection methods followed Dillman's (2007) *Tailored Designed Method*. A panel of experts with expertise in diversity and inclusion established content and face validity. To address nonresponse error, the researchers compared respondents to nonrespondents by comparing participants who completed the questionnaire before the deadline ($n$ = 195) to those that completed the questionnaire after the closing date ($n$ =

37) (Lindner, Murphy, and Briers, 2001). The final response rate after controlling for response error was 72.5% (*n* = 232).

## Findings

Approximately 79% of the respondents were male while females constituted 21% of the participants in the study. The average age of participants was 39 years old (*SD*=10.72). Nearly 61% of secondary agricultural education teachers had 15 or less years of teaching experience. Approximately 32% of secondary agricultural education teachers indicated that they received some form of diversity/multicultural training during their undergraduate matriculation. Conversely, 47% of participants indicated that they received some form of diversity/multicultural training outside of a college/university requirement. A large percentage (63%) of participants indicated that their school was located in a rural setting. The second largest percentage in the school setting was suburban (22%). Approximately 91% (*n* = 191) of the respondents indicated that they were White/European American while the second largest percentage (6%) of respondents identified themselves as Hispanic/Latino Americans (*n* = 13). Four (2%) participants identified themselves as Native Americans while less than 1% of the sample identified themselves as either African American (*n* = 2) or Asian American (*n* = 1).

## Conclusions/Implications

Generally, a diverse demographic and personal characteristic difference exists between secondary agricultural education teachers within Texas. The gender representation of participants reflected a similar representation of gender as reported by the Texas Education Association (TEA, 2008a). Based on the findings in the study, the researchers suggest that preservice teacher education programs need to incorporate a greater focus on the aspects of the courses that will provide preservice teachers with diversity/multicultural training at the undergraduate level to ensure that agricultural educators are prepared to deal with the challenges of a diverse student population. Data of demographic trends in public schools imply that this type of training is warranted (TEA, 2008b). If agricultural educators are to stay abreast of the demographic shift occurring in public schools, diversity and multicultural education courses must be a vital part of the undergraduate curriculum.

Respondents in this survey were more than likely to have received diversity/multicultural training outside of a college or university requirement. One implication from this finding is that secondary schools are making conscious efforts to provide diversity/multicultural education to agricultural education teachers. Based on the implication, deliberate efforts should be made to examine the depth at which local schools implement diversity/multicultural training to secondary agricultural education teachers.

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# POSTER PRESENTATIONS

Twenty-four abstracts were received for the 2009 poster presentations. The abstracts were reviewed using blind-review procedures. Each abstract was blind-reviewed by three agricultural and extension educators from institutions in other states. The poster session chair received the recommendations to accept or reject from the reviewers. Nineteen poster abstracts were accepted to be presented.

**Poster Abstract Reviewers for 2009**

| | |
|---|---|
| Shannon Arnold | Montana State University |
| Kirby Barrick | University of Florida |
| Jacquelyn Deeds | Mississippi State University |
| Don Edgar | University of Arkansas |
| Ed Franklin | University of Arizona |
| Stacy Gartin | West Virginia University |
| Donald Johnson | University of Arkansas |
| Kathleen Kelsey | Oklahoma State University |
| Tracy Kitchel | University of Kentucky |
| Dale Layfield | Clemson University |
| James Lindner | Texas A&M University |
| Donna Moore | Virginia Tech |
| Edward Osborne | University of Florida |
| Grady Roberts | University of Florida |
| Greg Thompson | Oregon State University |

Poster Presentation Chair:
Harry N. Boone, Jr.
West Virginia University

North Central Region
American Association for Agricultural Education
September 27-29, 2009
Lincoln, Nebraska

## Call for Innovative & Research Posters

**Deadline for submissions: Friday, July 17, 2009 – 5:00 pm (EDT)**

Two poster session categories have been implemented for 2009: Innovative Idea and Research. Innovative Idea posters must be a new idea or the creative modification of an existing idea. Research posters must be related to a problem, demonstrate a need for research, and implement the research process. **With both categories, the innovative idea or research must be implemented prior to submission.**

Poster narratives in each category must be of potential regional or national significance focusing in the areas of teaching, communications, extension and/or leadership. A peer review evaluation process will be used based on the established evaluation forms.

Once accepted to the North Central Region AAAE, posters will be presented in Lincoln, Nebraska. Evaluation will be based upon the poster abstract, design and display, presentation, communication of presenter, significance to the profession, and innovation of idea or related to research poster session.

**Headings by Categories:** The poster narrative proposal should have these heading/sections when appropriate:

**INNOVATIVE IDEA**

1. Introduction/need for innovation or idea
2. How it works/methodology/program phases/steps
3. Results to date/implications
4. Future plans/advice to others
5. Costs/resources needed
6. References

**RESEARCH**

1. Introduction/need for research
2. Conceptual or theoretical framework
3. Methodology
4. Results/findings
5. Conclusions
6. Implications/recommendations/ impact on profession
7. References

**Format:** The proposal narrative is limited to two (2) pages, single spaced with double-spacing between paragraphs. The two-page limit includes all tables and figures. Margins are 1" top, bottom, and right, and 1.25" left side. The font should be Times Roman, 12 point, or equivalent. Tables should be prepared using the table function to facilitate conversion to HTML. Please include a cover page and reference page. The total proposal, including cover page and references may not exceed four (4) pages.

**Style:** Use the *Publication Manual of the American Psychological Association,* (5th ed.) except as modified above. Italicize the names of journals, statistical symbols, titles of tables, etc. per *APA* requirements. Do not use the underline feature in the areas listed above. Turn off all hyperlinks in URL references.

**Submission Procedures:** Documents will be submitted using the online submission process. To submit narratives go to http://www.agedweb.org/AAAE and select the "2009 North Central AAAE Poster Session."

**Deadline:** Poster narrative proposals are due **July 17, 2009 – 5:00 p.m. (EDT)**

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