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## NACTA Journal

# Contents

# Student Perceptions of an Introductory Animal Sciences Course for High-Ability Students[1]

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## Abstract

As institutions recruit high-ability students through honors programs, greater offering of courses that satisfy program requirements at the departmental level are needed to meet the interest of students while promoting the desired outcomes of program involvement. The purpose of this study was to 1) describe, in detail, the development and implementation of an honors introductory animal sciences course; and 2) discuss the findings of the student evaluations of the course and course components. During its first offering autumn quarter 2009, students enrolled in Honors Introductory Animal Sciences were asked to complete a post-course questionnaire to assess student perceptions of the course. The course offered multiple teaching and learning methods. Lecture format was perceived most valuable by students, rating $4.85 \pm 0.24$ on a 5 point scale ($P < 0.05$). The scientific evaluation of the book *Portrait of a Burger as a Young Calf*, which required students to demonstrate reading comprehension and effective writing skills, received the lowest rating ($3.85 \pm 0.24$) by students. Overall, students agreed that the course taught them a great deal about domesticated animal species ($4.46 \pm 0.24$) and animal science disciplines ($4.69 \pm 0.24$) and the enhanced learning experiences were recognized as valuable learning components.

## Introduction

Honors programs have been established at many universities and colleges to attract academically high-ability students. In turn, the post-graduate success of students originating from these programs reflects the quality and effectiveness of the undergraduate curriculum of the institution (Seifert et al., 2007). Students within honors programs are academically superior and honors programs aim to enhance the undergraduate education for these academically talented students (Kaczvinsky, 2007). Seifert et al., (2007) reported that honors programs provide extensive and challenging academic experiences through increased interaction with peers, greater academic involvement, increased higher-order learning, and greater instructor feedback.

According to guidelines developed and approved by the National Collegiate Honors Council, a fully developed honors program should constitute 20 to 25% of a student participants total course work and relate to effective completion of general education, as well as, degree area requirements (Spurrier, 2008). However, Sederberg (2005) reported that most honors programs predominantly offer courses that fulfill general education requirements of the core university curriculum with fewer offerings at the departmental level. To this end, an introductory animal sciences course at The Ohio State University was restructured to enhance the depth and breadth of the learning experience of honor program participants. The objectives herein are to 1) describe, in detail, the development and first offering of the departmental honors course; and 2) discuss the findings of the student evaluations of the course and course components.

## Methods

During autumn quarter of 2009 a survey and post-course questionnaire were administered to students enrolled in an introductory level animal sciences course designed for students in The Ohio State University honors program. The five credit hour course met 48 minutes, four times per week for lecture; 108 min, one time per week for laboratory; and 48 min, one time per week for recitation. Students met outside of regularly scheduled class time for individual laboratory training for a course designated team-based research project. The course, available to first and second year animal sciences majors and non-majors, concerned the use of animals and introduced basic principles and practices that allow humans to successfully coexist with animals in captive and controlled environments. The importance of animals was depicted throughout history and modern society as sources of food, clothing, knowledge, energy, power, transportation, companionship, entertainment, service, and capital. The course centered on the human-animal relationship and fundamental knowledge of the principles of behavior, nutrition, genetics, reproduction, lactation and production of food animal species, as well as horses and lamoids. The course is administered on-line through the universities course management system. A maximum of 25 spaces were available for enrollment during autumn quarter.

### Honors Concept and Course Components

The goals of The Ohio State University honors

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program are to enrich intellectual development of high-ability students by enhancing the rigor and breadth of a student's academic experience. Admittance into the program required a composite score of 30 or greater on the ACT or 1340 or greater on the SAT, ranking in the top 10% of their high school graduating class, completion of the Honors Affiliate Application through the University Honors Center, and maintenance of a 3.40 cumulative point hour ratio (CPHR).

The primary aim of introductory animal sciences for honors was to foster student's interest in basic science by offering a course focused on student-centered learning and the foundation of research, while meeting the goals of the honors program. To this end, four primary course components were used. The first consisted of lectures presented by the instructor of the course on fundamental topics of animal sciences (Table 1). The second required students to read *Portrait of a Burger as a Young Calf* (Lovenheim, 2002) and evaluate the science that supports or refutes selected excerpts from the book by reviewing peer-reviewed scientific literature concerning the topic (Table 2). The goals were for students to think critically regarding concepts and situations and gain an appreciation of how to interpret scientific data. Additionally, the second component fostered self-directed learning and promoted effective writing skills.

The third component was laboratory sessions that built on lecture concepts by allowing students to 1) visit the university animal centers that maintain animals of agricultural significance, 2) learn of the production practices employed and routine activities that are required to maintain these animals, and 3) provide hands-on experiences to explore

research methodology and technology that enhance the well-being of animals kept for human benefit and ensure quality of the products attained. Sessions provided opportunities in comparative physiology of reproductive and digestive anatomy, quality assurance evaluation of fresh harvested pork, clinical mastitis testing, and determination of feed preference in chickens as influenced by feed color. Tissues and samples used for activities were collected in

**Table 1. Topics Covered during the Quarter in the Lecture Component of an Honors Introductory Animal Sciences Course at The Ohio State University**

| | Topics |
|---|---|
| 1 | Importance of animals to humans: social, agricultural, and medical uses. |
| 2 | Domestication: when, how, and why? |
| 3 | Animal form and function: establishment of breeds and the role of animals in human society as directed by their physiology. |
| 4 | Animal behavior and its role in defining welfare. |
| 5 | Nutrition: nutrient requirements, digestive physiology, and the importance of different digestive strategies. |
| 6 | Organization of biological systems from molecular structures to physical features: DNA as the blueprint of life. |
| 7 | Genetics and application of genetics for animal breeding. |
| 8 | Biotechnology: progress, applications and limitations. |
| 9 | Principles of reproduction and assisted reproductive technologies. |
| 10 | Lactation strategies: nutritional and immunological support of the young and provision of food for humans. |
| 11 | Current status of the animal industries. |

**Table 2. Selected Excerpts from *Portrait of a Burger as a Young Calf* (Lovenheim, 2002) Used in the Scientific Evaluation Component of an Honors Introductory Animal Sciences Course at The Ohio State University**

| | Selected Excerpts |
|---|---|
| 1 | In one study of domesticated cows, contact between cow and calf for as little as five minutes after birth was shown to produce a strong maternal bond; cows did not break this bond with a calf even when another calf was born a year later (p. 16). |
| 2 | In about 85% percent of cases in which a female calf is born twin to a male, the male hormones circulate into the unborn female and render her sterile (p. 26). |
| 3 | Artificial insemination is used in 90 percent of US dairy herds, and, partly as a result, yearly milk production in the US has grown from 7,000 pounds per cow-about 814 gallons-in 1960, to about 22,000 pounds today-more than 2,500 gallons (p. 35). |
| 4 | Researchers at Colorado State University studying sixty-nine Angus bulls collected by electric stimulation found, by measuring vocalizations and release of hormones, that the higher the voltage and the less skilled the person handling the equipment, the more disinclined the bulls were to tolerate the electro-ejaculation procedure (p. 36). |
| 5 | Animal scientist who study social relationships among cattle have found that when moving from barn to milk parlor, dairy cows tend to travel in a consistent order: dominant cows in the lead, subordinate cows in the rear. Compared with the cows in the front, those in the back are usually very young or very old, smaller and more timid. Rearship is more consistent than leadership (p. 83). |
| 6 | Cows produce nine to eleven pounds more milk per day on bovine somatotropin (bST). Importantly, bST also lengthens a cow's lactation. Normally a cow begins to "dry off" – produce less milk- about ten months after calving. With BST, however, cows keep lactating (p. 87). |
| 7 | Many cases of bovine lameness involve inflammation or injury to the hoof or the skin between the hooves. Hind feet tend to be affected more often than front feet. Experts attribute some of the problem to genetic manipulation designed to increase milk yield by producing larger udders (p. 98). |
| 8 | If you decrease fiber by chopping the plant too small, fiber digesting bacteria will decline and other types of bacteria, such as starch-digesters, will increase. Too many of these, in turn, can cause lactic acid to enter the bloodstream and soften foot tissue, causing the cow not only to produce less milk, but also to become lame (p. 106). |
| 9 | A corn diet can cause metabolic disorders and disease such as acidosis, bloat, and most dangerous, liver abscess. You can feed a steer on a total mixed ration. It'll head you toward the finish line just like corn. It'll just take a little longer to get there (p. 143). |
| 10 | (When fed corn) They have a rumen functioning at a very low efficiency, maybe ten percent. There's still a population of bacteria that are wanting to digest fiber and forage, but they're not being fed that, so the calf becomes more like a simple-stomached animal (p. 153). |

conjunction with planned harvests or purchased. Briefly, reproductive tracts of cattle and laying hens were used to compare and contrast anatomical features of viviparous and oviparous species. Enzyme immunoassay (EIA) was performed on unknown plasma samples from female cattle according to the manufacturer's instructions (Assay Designs, Ann Harbor, MI) to quantify progesterone concentration to determine stage of the reproductive cycle. Digestive tracts of pigs and sheep were used to study and measure anatomical features of non-ruminant and ruminant digestive systems. Quality evaluation of fresh pork was performed on carcasses chilled to 4° C for 24 hours and ribbed between the 10th and 11th ribs (NPPC, 2000). Measurements of pH using a portable pH meter, subjective visual color score (NPPC, 2000), L*-value (Minolta Chroma Meter CR-310, 50 mm diameter orifice and D65 light source; Minolta Corp., Ramsey, NJ), and water holding capacity (Kauffman, et al., 1986) were used as quality indicators. To conduct clinical mastitis testing, somatic cell count was determined by the indirect measurement of the California Mastitis Test (CMT) on collected milk samples (Hogan, 1987). In the occurrence of a score of 1-3, indicative of reduced milk quality in the presence of elevated somatic cell counts, milk samples were cultured using selective agar media for the determination of gram-negative or gram-positive bacterial species. Organisms were further identified by the catalase slide test, CAMP test, or coagulase test (Hogan, 1987). To investigate the ingestive behaviors of young and mature poultry, broilers (n=4) and roosters (n=4) were observed for one hour after provided standard mash feed to determine the number and length of times that the bird visited the feed trough. Weight of the feed before and after the observation period was measured to determine feed disappearance. Students completed laboratory sessions in teams of three to four. Observations and data collected (used for descriptive statistics) were presented in abstract form.

The fourth course component engaged students in a descriptive research study designed to extend students' knowledge of selected course concepts and provide further experience in a laboratory environment. Students used histological techniques to study cell and tissue biology and the understanding of organ system structure as it relates to animal development and function. Working in teams of three to four students, each team selected an organ system (musculoskeletal, digestive, reproductive, etc.) for study of a specific organ or region of the system. Tissues were collected in conjunction with planned harvests and processed for histological preparation using standard procedures. At the time of collection tissue samples were immediately placed into a formalin-free fixative (*Prefer*, Anatech LTD., Battle Creek, MI), followed by dehydration and embedding in *Paraplast* X-TRA (Fisher Scientific Co.). Tissue sections were cut using a microtome (AO Spencer) and stained using Harris hematoxylin and eosin Y (*Protocol*, Fisher Scientific Co.). Histological preparations were examined and digital images of the microscopic sections recorded. Students were required to explore how the structure relates to the specific functions of the tissues. Comparisons among species and the study of common pathologies were encouraged. Individual written reports and oral presentations by team members were presented at the end of the quarter in an open-forum.

Course grades were determined from equally weighted examinations (n=3), writing compositions, laboratory abstracts, oral presentation of histology findings, and participation. Exams were mixed-format consisting of objective (multiple-choice, fill-in-the-blank) and subjective (short-essay) assessment. For subjective grading, the quality and completeness of the answer relative to all other answers provided by students in the class were considered. Exam questions were written with consideration of Bloom's taxonomy for the cognitive domain (Anderson et al., 2001).

### Survey and Post-Course Questionnaire

On the first day of class a survey was administered with the purpose of obtaining data on student demographic variables (gender, major classification, and career objectives), motives for course enrollment, and species of interest (n=13). The post-course questionnaire was developed to determine student perception of the value of the course and course components and was administered the last day of class (n=13). Specifically, students were asked to rank prior experience with animal science concepts and what was learned following course completion and rate course components using a 5-point response scale. Statistical analyses were performed by ANOVA using the mixed model (PROC MIXED) procedures of SAS appropriate for random nested effects (version 9.1; SAS, Cary, NC) to determine differences in mean responses to the post-course questionnaire. Data are presented as means ± SEM with $P \leq 0.05$ considered significant.

## Results and Discussion

All students enrolled on the initial start date of the course completed the course. Demographics of honors students enrolled in the course were similar to previous reports of animal sciences students (Edwards, 1986; Mollett and Leslie, 1986). Seventy-seven percent of the class was female and the majority of students (9 of the 13) reported primary interest in companion animals (dogs and cats) and horses. It is interesting to note that none of the honors students reported a career interest other than veterinary medicine. Although there were limited observations in the current study, unpublished survey data by the authors indicate that nearly 85% of honors students enrolled in animal sciences between 2006 and 2008 reported career interests in veterinary medicine. The percentage of honors students inter-

ested in the veterinary profession is greater than the percentages previously reported for animal sciences students (Edwards, 1986; Mollett and Leslie, 1986). The reason behind increased interests in this career by honors students is not known. Tidwell (1980) reported that nearly 50% of high-ability pre-college students stated objectives to pursue postgraduate studies. Furthermore, although not determined for this study, differences in career aspirations may reflect differences in rural, suburban, or urban demographics between the populations of students. It is well documented that an increasing percentage of animal sciences students are identifying as urban (Reiling et al., 2003). According to Howley (2006) urban students are more likely to pursue postgraduate studies relative to their rural counterparts.

Generally, students reported minimal experience with animal science concepts prior to enrolling in the course, but agreed that the course greatly increased their knowledge of domesticated animal species and animal sciences disciplines (Table 3). Student ratings of course components (Table 3) showed that lecture was perceived as most valuable ($P < 0.05$). The histology project received the second greatest rating and was perceived to be more valuable than the scientific evaluation, but did not differ from the perceived value of the laboratory component overall. Although the perceived value of individual laboratories was similar in most instances, the quality assurance laboratory received the greatest rating and was considered more valuable than the comparative reproductive physiology and avian behavior laboratories ($P < 0.05$). Murry and Downs (1998) demonstrated positive correlations between students perceived value of course content and students' academic achievement in an introductory companion animal course. Earned scores did not appear to be a primary factor underlying ratings for individual course components of the current study. While the exam average, reflecting graded assessment of lecture content, was 80.4% ± 8.7, average scores earned for the laboratory and scientific evaluation were 94.0% ± 4.5 and 91.5% ± 3.8, respectively.

**Table 3. Questions and the Responses by the Students Completing an Honors Introductory Animal Sciences Course at The Ohio State University**

| Question | Mean ± SE[z] |
|---|---|
| Rate your experience with animal science concepts before taking this course (minimal experience = 1) (considerable experience = 5) | 2.77 ± 0.24 |
| This course taught me a great deal about domesticated animal species (strongly disagree = 1) (strongly agree = 5) | 4.46 ± 0.24 |
| This course taught me a great deal about animal science disciplines (strongly disagree = 1) (strongly agree = 5) | 4.69 ± 0.24 |
| Rate the following components of the class toward your overall learning experience (of little value = 1) (very valuable = 5) | |
|     Lecture | 4.85 ± 0.24[a] |
|     Animal facilities tours | 3.96 ± 0.24[bc] |
|     Laboratories, overall | 4.18 ± 0.26[b] |
|         Comparative reproductive physiology | 4.23 ± 0.24[ab] |
|         Comparative digestive physiology | 4.00 ± 0.24[b] |
|         Quality assurance | 4.69 ± 0.26[a] |
|         Mastitis diagnostics | 4.09 ± 0.26[ab] |
|         Avian behavior | 4.00 ± 0.24[b] |
|     Scientific evaluation | 3.85 ± 0.24[c] |
|     Histology project | 4.35 ± 0.24[b] |
| How frequently did you participate in team activities prior to this course (not at all = 1) (frequently = 5) | 3.85 ± 0.24 |
| Did you enjoy participating in team-based activities during this course (not at all = 1) (really enjoyed = 5) | 4.34 ± 0.24 |
| How frequently did you use the supplemental on-line content (not at all = 1) (frequently = 5) | 3.38 ± 0.24 |

[z]Values are means ± SE, n = 13. Labeled means with superscripts without a common letter differ for course components or individual laboratories listed using analysis of variance, $P < 0.05$.
[y]The course was administered through the universities course management system, which provided students access to course notes and other course materials.

Studies suggest that classroom lecture is not an effective teaching format, promoting passive learning without the development of critical thinking abilities that are needed for students to become life-long learners (Amador and Görres, 2004). However, it should be recognized that lecture format is relevant to delivery of introductory material when students lack the background that is needed to facilitate higher-order learning (Deeter, 2003). According to Blooms Taxonomy (Anderson et al., 2001), learning is hierarchical. Rote memorization that demonstrates basic knowledge represents the first tier of the learning process that must precede the more sophisticated stages of critical thinking. Lecture format facilitates student achievement of the first tier of Blooms Taxonomy and lecturing remains a dominant teaching method in the university classroom (Lammers and Murphy, 2002). Students' attitudes toward lecturing are reflected by perceived quality of the lecture (Brown and Atkins, 1988). Ineffective lectures are commonly associated with large enrollment courses that demonstrate limited lecturer-student interaction and are void of classroom activities for engagement (Sullivan and McIntosh, 1996; Ebert-May et al., 1997). The lesser enrollment of honors introductory animal sciences promoted lecturer-student interaction and likely contributed to

the greater perceived value of lecture content relative to other course components.

Although lectures are effective for dissemination of information, they are less effective toward promoting students analysis, synthesis, integration, or application of information (Verner and Dickinson, 1967). These higher forms of learning can be incorporated through reading and writing exercises and to this end; the scientific evaluation was included in the course. Reading comprehension and effective writing are important outcomes of undergraduate education. Reading serves to deliver new knowledge, promotes assimilation of personal knowledge with that of others, and allows for synthesis of information (Carter-Wells, 1996); while writing improves communication, enhances reasoning, and increases organizational skills (Ryan and Campa, 2000). According to Haug (1996) students need to develop writing skills within their discipline, a sentiment shared by Aaron (1996). Writing across the curriculum demonstrates the relevance of science toward a specific discipline and is viewed more effective when placed in a meaningful disciplinary context (Ryan and Campa, 2000). In an introductory soil sciences course, 89% of student respondents reported that writing within their discipline promoted learning and viewed writing as an important aspect of their undergraduate education (Motavalli et al., 2003). Interestingly, studies suggest that students fail to perceive the value of reading contributing to a literacy among college students (Goodwin, 1996). Furthermore, reading is reported as one of the skills least addressed in colleges of agriculture (Lamberson and Smith, 2005). Limited reading exposure during development and disconnect between reading assignments and student's personal interests are implicated in students lack of reading initiative (Goodwin, 1996), and it is plausible that the lesser perceived value of the scientific evaluation by students may be attributed to the required reading of the selected text. Indeed, the selected text for the course emphasized food animal production, whereas the predominant interests of the class was companion animals or horses.

While students generally enjoyed participating in team-based activities during the course, fewer students reported that they had frequently engaged in this type of activity prior to the course (Table 3). Team-based learning is an active learning approach that allows students to explore concepts and evaluate relationships between concepts and is viewed as an effective technique in enhancing student learning (Millis and Cottell, 1998). Furthermore, forms of active learning that involve team-based approaches establish greater positive relationships amongst peers, promote increased depth of understanding, and result in greater academic success when compared to individualized forms of learning (Johnson et al., 1994). The overall outcome is providing graduates that have more developed social skills to function efficiently in teams, communicate effectively, and

think critically to solve problems, which are valuable skills that undergraduate programs aim to instill in their graduates (Deden, 1998; Andreasen and Trede, 2000). It is interesting to note, that although successful completion of team-based activities required additional student participation outside of regularly scheduled class time, all students reported that the time spent on the course was valuable (data not shown).

## Summary

We acknowledge the limited number of students involved in assessing the quality of the course; however, to our knowledge this is the first report of student perceptions of an honors course in the animal sciences. The course provided learning experiences for undergraduates that promoted increased knowledge of domesticated animal species and animal science disciplines, developed reading and writing skills, and encouraged team work as a valuable skill that will continue to serve students in their academic pursuits. This study indicates that the instructional strategies used in the delivery of an honors course in introductory animal sciences are positively perceived by students.

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# Team Members Perceptions of Benefits of Participation on a University Equestrian Team

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## Abstract

Intercollegiate Horse Show Association (IHSA) competitions were designed for undergraduate college students with various levels of horsemanship skills to compete as both individuals and as teams. The University of Nebraska-Lincoln's Equestrian team (UNL-ET) was a student organization and functioned as a club sport. In the 2009-2010 and 2010-2011 academic year, 142 individuals (74 and 68, respectively) tried out for the 38 to 45 member team which was split into both western and hunt divisions. The UNL-ET conducted weekly riding practices and monthly meetings, participated in barn chores, conducted fund-raising activities, and hosted IHSA competitions each semester. At the end of the 2009-2010 and 2010-2011 regional competition, UNL-ET members were asked to complete a survey. Nearly 80% of UNL-ET members indicated participation on the team had a positive influence on their life skill development. Furthermore, 78% of team members indicated that they learned to "be more adaptable to new situations" and "adjust to new situations quicker" after the UNL-ET experience. Participation on the team required a significant commitment; however, members indicated it was easy to devote time to team requirements. A very positive influence on student's overall undergraduate experience was indicated by 62% of UNL-ET members.

## Introduction

The Intercollegiate Horse Show Association (IHSA) is an organization that allows university students to compete in equestrian competitions individually and/or in a team format. In the 2009/2010 academic year, IHSA included teams from 350 member colleges and universities in 45 states and Canada (Intercollegiate Horse Show Association, 2010). In May of 2010, there were over 8,600 riders competing in hunt seat equitation, western horsemanship, and reining.

In IHSA competition, riders with various degrees of experience compete against those with similar riding experience, including novices. Students do not need to own a horse to compete, but utilize university owned or leased horses. In addition to competition, a goal of IHSA is to build team enthusiasm, good sportsmanship and student's life skills.

Undergraduate university equestrian teams are highly popular and are excellent aids for student recruitment (Gallager, 2000). Gallager (2000) showed that equestrian team participation increased from eight members in its inception in 1989 to a self-imposed limit of 65 members within four years. Furthermore, that study also reported a 394% increase in freshman students in animal science following the development of an equine science minor. Other studies have reported similar increases in enrollment and retention related to the addition of equine majors, options, and/or courses (Ames, 2000, Topliff, 2000, Wood, et al. 2010). However little has been reported on the benefits of students' participation on equestrian teams and in IHSA competitions. This study was conducted to determine how undergraduate university students' perceived their educational experience was affected by participation on a university equestrian team.

## Materials and Methods

### Team membership and requirements

The University of Nebraska - Lincoln equestrian team (UNL-ET) was initially developed in 1999 as a western team and a hunt division was added in 2009. The team functions as a recognized student organization and club sport. A coach and faculty adviser supervises the team, organizes team practices, and assists with club/team activities. A team of officers are elected by members each spring to assist with organization of activities for the upcoming season.

In order to practice and compete on the UNL-ET, students must be enrolled as a full-time student (minimum 12 credit hours per semester), be in good academic standing with the university (minimum GPA = 2.0), and successfully try-out for the equestrian team. Try-outs are open to all University of Nebraska-Lincoln students and consist of both a riding evaluation and brief interview. For the 2009-2010 and 2010-2011 seasons, a total of 142 students participated in UNL ET try-outs and teams of 38 (2009-2010) and 45 (2010-2011) members were selected. However, over the course of the two seasons, fourteen members (8 in 2009-2010, 6 in 2010-2011) left the team for various reasons (mid-year graduation, financial concerns, lack of time, academic eligibility and other personal reasons).

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The UNL-ET, students attend mandatory riding practices once a week with additional optional practices offered when possible. Students are also required to attend once-a-month meetings and complete approximately one hour of barn chores per week. These chores consist of cleaning stalls, grooming horses, and other routine barn maintenance. Required student membership dues were $130 per semester and each team member was required to complete $200 per semester of fund-raising. Fund-raising activities included selling program advertisements for home UNL-ET shows, assisting with local horse shows, selling t-shirts, and other miscellaneous activities. The team also conducts community service projects including "Boo @ the U" (a Halloween activity in the barn for local youth) and a Christmas toy drive. Funds cover travel costs, entry fees, and other team related expenses.

The UNL-ET competed in IHSA Zone 7 Region 1 in both hunt and western divisions. During the 2009/2010 and 2010/2011 academic years, the western team competed in eight shows and the hunt team competed in six shows per year. The UNL- ET hosted five western shows per year as well as the regional western finals competition in 2010. Team members assisted in planning, organizing, and conducting all home shows. Additionally, there was potential for members to qualify as individuals for regional, semi-national, and national competitions each year.

### Survey Procedures

An on-line survey (Polldaddy.com, 2010) was developed following the 2009/2010 season to assess student perception of benefits of participating on a university equestrian team. The survey was made available to members in April 2010 and 2011 following regional competition. Regional competition completed the year for all team members other than those qualifying for semi-national and national competition. The survey, initially asked for demographic information such as student's undergraduate major, age, academic classification, and number of years on the equestrian team. Participants were then asked to respond to a variety of questions on a 5- point Likert-type scale (1 = strongly agree, 2 = agree, 3 = neither agree nor disagree, 4 = disagree, 5 = strongly disagree). Survey questions were categorized to ascertain the influence of participation on the equestrian team on: 1) development of life skills, 2) requirements to be an equestrian team member, 3) general horse knowledge and equitation skills, and 4) overall undergraduate education. Team members were sent a link to the online survey with periodic reminders to complete the survey. The survey procedures were approved by the University of Nebraska – Lincoln's Institutional Review Board (IRB).

### Statistical Analysis

The responses to each question were analyzed to see if there were differences in response among academic classification (classification) and number of years on the equestrian team (noyears) using SAS® PROC GLIMMIX (SAS Inst., Inc., Cary, NC, USA). Initial analyses for all responses included year and a year by classification or year by noyears interaction term. There were no significant interactions, so secondary analyses were run including year. There were no significant differences in responses between the two years, so the final analyses included only classification or noyears.

## Results and Discussion

Of the 69 members on the 2009-2010 and 2010-2011 UNL-ET teams, 66% (n=46) completed the survey. It should be noted that 23 students or 33% of the team members either were no longer members of the team (n=14) at the time the survey was conducted or did not respond to the survey (n=9). Lack of responses from students who were no longer members of the team may have resulted in skewed data as students with issues related to participation on the team may have left the team or not responded. However, with a 67% response rate, a fairly large sample of team members was obtained.

Of those who completed the survey, 33.6% (n = 15) were seniors, 28.2% (n = 13) were freshman, and the remaining 39.1% (n = 18) were split between juniors and sophomores with the average age of all respondents 20.3 years of age. Furthermore, 95.6% (n=44) of the members were female and 4.3% (n = 2) were male. The majority of those responding (54.3%, n = 25) had been on the team only one year, 26.0% (n = 12) for two years, and 17.3% (n = 8) were team members for three to four years.

Animal Science majors made up 41.3% of those responding (n = 19) and the remaining were a wide variety of majors (biological systems engineering, language studies, marketing, agricultural business, merchandising, business administration, etc). These are similar to the demographics of all 142 students who initially tried out for the team as 58.4% (n=83) were majors in the College of Agricultural Sciences and Natural Resources (CASNR) and 68.6% (n=51) of the CASNR students were Animal Science majors. The remaining 41.5% (59 students) were from a variety of majors such as education and human services (n=13), arts and sciences (n=13), college of business administration (n=7), journalism and mass communications (n=4), architecture (n=1), engineering (n=2) and general studies or undeclared (n=9). Ten students did not provide major information. Furthermore, 75.4% (n=107) of those trying out for the UNL ET had not previously been on the team. Also, it should be noted; however, current UNL-ET team officers were not required to try-out. Therefore, an equestrian team appears to attract students from numerous majors and interests throughout the university.

## Team Members

### Life Skills

The greatest benefit of equestrian team participation appeared to be the impact on developing personality traits and life skills essential for future professional growth (Table 1). The most positive influence on life skills identified by members included 1) working with others, 2) communication, 3) behavior around horses, 4) responsibility, 5) team work 6) organizational skills, and 7) relating to different people. There were no differences (p > 0.05) in mean scores due to academic classification or number of years on the equestrian team.

Additionally, one highly valuable component of equestrian team competition was the ability to adjust and adapt to unfamiliar horses moments before competing on them. Horses are randomly drawn and contestants mount, adjust their equipment and compete in the designated class (IHSA Rule V, 2010). No "warm-up" time was permitted. Team members indicated they learned to be "more adaptable to new situations" (mean score = 1.91) and felt they could "adjust to new situations quicker" (mean score = 1.98) after the equestrian team experience (Table 1). Furthermore, unlike most other equestrian competitions, riders compete not only as individuals, but also as a team. During equestrian team competitions, the horses are generally ridden in several different classes and often by various team members. Therefore, riders in early classes analyze their mount and communicate to their team members as to how to get the best performance from each horse. Additionally, students gained organizational skills and experienced the importance of teamwork through planning and conducting numerous fund-raising activities and hosting equestrian team competitions.

Little has been documented on the advantages of being on a University equestrian team; however others have reported the positive benefits of working with horses on life skills (Bizub et al., 2003; Brickell, 2005; Smith et al., 2006). Additionally, Wood et al. (2010) reported students enrolled in university equine courses had reduced stress and increased self-confidence. Furthermore, other undergraduate competitive activities, such as intercollegiate judging, have also reported similar life skill enhancements (McCann, 1991, McCann and McCann, 1992, Nash and Sant, 2005). Students participating in intercollegiate judging competitions have increased communication and decision making skills, increased industry knowledge and improved team work (Field et al. 1998). Also, McCann and McCann (1992) stated that livestock judging provides youth who have an interest in the livestock industry the opportunity to develop necessary skills for their futures and their careers. Similar benefits were reported by Nash and Sant (2005) in which 97% of 4-H judging alumni indicated the judging experience had a positive influence on their personal success.

**Table 1. Impact of Participation on a University Equestrian Team on Undergraduate Experience and Life Skills**

| | Mean[x,y] | SD |
|---|---|---|
| I learned how to work well with others. | 1.65 | 1.18 |
| I learned the importance of effective communication skills. | 1.71 | 1.10 |
| I understand proper personal behavior around horses. | 1.74 | 1.32 |
| I am more responsible because of my involvement on the Equestrian Team. | 1.80 | 1.11 |
| I can work well within a team. | 1.80 | 1.38 |
| I learned the importance of organizational skills when working with people. | 1.82 | 1.07 |
| I can relate to people with different personalities. | 1.85 | 1.25 |
| I am more adaptable to new situations after being on the Equestrian Team. | 1.91 | 1.22 |
| I am a better leader because of my involvement with the Equestrian Team. | 1.91 | 1.24 |
| I can adjust to new situations quicker after being apart of the Equestrian Team. | 1.98 | 1.17 |

[x] On a scale of 1 (strongly agree) to 5 (strongly disagree), n=47
[y] Mean score was unaffected (P>0.05) by academic classification or number of years as a UNL-ET member

### Equestrian Team Requirements

Being a member of an equestrian team was considered an important commitment for undergraduate students (Table 2). There were no differences (p > 0.05) in mean scores due to academic classification or number of years on the equestrian team. Students were neutral on the team requiring a large amount of personal time (mean score= 2.76), but did indicate that it was easy to devote time to the requirements of the team (mean score = 1.93). However, there were a few students (n=14) who withdrew from the team during or at the end of the first semester due to time constraints (n=4), financial concerns (n=4), personal issues (n=3) academic eligibility (n=2) and mid-year graduation (n=1).

Participation on the team required a minimum of three to four hours per week and potentially up to three days per week when traveling to competitions. The typical week involved one night of practice (1-2 hr), completing barn chores (1 hr), and periodically participating in evening fund-raisers. Students indicated that living off campus verses on campus did not affect their ability to participate on the team (score mean = 3.71). The UNL campus is split geographically, with a "City Campus" and "East Campus." Students who resided on City Campus had to travel approximately five miles by bus or car to attend practices in the Animal Science Arena, located on East Campus.

Team members indicated they received clear instruction from the coach (mean score = 1.86) and could get individual help if needed (mean score = 1.89). For the 2009-2010 and 2010-2011 seasons, the UNL-ET utilized a part-time contracted coach and a separate faculty adviser. The coach focused on improving rider skills during practices, traveling to competitions, and assisting with fund-raising. The faculty adviser's role was to assist with student organizational needs such as financial management, travel arrangements, organizing competitions and general team business.

regards to the new coach included "Loved our coach, she strives to help us and offered additional practices which really helped" and "Even being a first year member on the team, I can tell the members of this team are working together and learning more efficiently than they had in years past. I really do believe this has to do with our new coach and advisor."

Team members were required to share in the general care, stall cleaning, and grooming of the horses. A limited number (n = 20) of horses were available for use by the over 38-member equestrian team and these horses were also utilized for several other undergraduate equitation courses. Therefore, team members were taught to skillfully handle the horses, notice any signs of lameness or soreness, and be cognizant of overall general horse health.

A positive relationship between total horsemanship and life skill development had been previously reported (Smith et al., 2006). They suggested that horse programs focused on life skill development should emphasize horsemanship skills, safety, health management and nutrition. Additionally, Schultz et al. (2007) reported building a relationship with horses promoted confidence, relationship skills and problem-solving skills in the persons involved with horses Additionally, interactions with horses have a positive influence on self-esteem of adolescents (Saunders-Ferguson, et al., 2008). That study indicated equine activities may provide beneficial results including increased self-esteem, physical exercise and positive youth development. By participating in horsemanship activities, adolescents can learn new skills and gain experiences useful for positive self-esteem development (Iannone, 2003). Iannone (2003) evaluated the influence of a vocational and therapeutic riding program on severely emotionally disturbed adolescents and found participation in horsemanship activities and interaction with horses to be very beneficial for increased self-esteem.

**Table 2. Undergraduate Equestrian Team Member Perception of Team Requirements for Participation**

|  | Mean[x,y] | SD |
|---|---|---|
| The coach was very helpful and gave clear instruction. | 1.86 | 1.34 |
| I was able to receive individual instruction if needed. | 1.89 | 1.28 |
| It was easy to devote time to the requirements of the Equestrian Team. | 1.93 | 1.27 |
| Participating on the Equestrian Team required a large amount of personal time. | 2.76 | 1.17 |
| Living on/off campus affected my participation on the Equestrian Team. | 3.71 | 1.53 |

[x] On a scale of 1 (strongly agree) to 5 (strongly disagree), n=47
[y] Mean score was unaffected (P>0.05) by academic classification or number of years as a UNL-ET member

### Horse Skills

Equestrian team members gained appreciation for quality horse care, horsemanship, training and behavior when working around horses (Table 3). Nearly 83% indicated they had a better understanding of proper horsemanship and the amount of time it takes to care for horses. Furthermore, 80.4% strongly agreed or agreed they understood the importance of proper horse training. Over half of the survey responses were from first year UNL-ET members which could attribute to the greater improvement in team member's horsemanship skills being attained in the first years of equestrian team participation. Additionally, in the semester immediately prior to the 2009/2010 year the UNL-ET experienced a coaching change which may also have contributed to the increased understanding of horsemanship by the newer members. Comments from team members in

**Table 3. Undergraduate Team Members Showed Increased Horse Management, Training and Equitation Skills Following Equestrian Team Participation**

|  | Mean[x,y] | SD |
|---|---|---|
| I better understand proper horsemanship. | 1.63 | 1.25 |
| I understand the amount of time it takes to care for a horse. | 1.72 | 1.41 |
| I understand the importance of proper training of a horse. | 1.80 | 1.45 |
| I better understand the anatomy of a horse. | 2.47 | 1.31 |
| I have improved understanding of biology as it relates to horses. | 2.63 | 1.10 |

[x] On a scale of 1 (strongly agree) to 5 (strongly disagree), n=47
[y] Mean score was unaffected (P>0.05) by academic classification or number of years as a UNL-ET member

## Team Members

| | Mean[x,y] | SD |
|---|---|---|
| I would like more hands on experiences like this in college. | 1.87 | 1.39 |
| I am more likely to return to UNL next fall to participate on the Equestrian Team. | 1.87 | 1.46 |
| As a member of the Equestrian Team, I feel I am making an impact on the University. | 2.02 | 1.29 |
| I consider myself a highly involved student because of the Equestrian Team. | 2.07 | 1.25 |
| Being on the Equestrian Team motivated me to be a better student in class. | 2.09 | 1.38 |
| I was able to interact with UNL faculty because of the Equestrian Team. | 2.18 | 1.42 |
| I was able to apply what I learned in my other university classes to the Equestrian Team. | 2.30 | 1.17 |
| Being on the Equestrian Team helped to prepare me for a career. | 2.30 | 1.30 |

[x] On a scale of 1 (strongly agree) to 5 (strongly disagree), n=47
[y] Mean score was unaffected (P>0.05) by academic classification or number of years as a UNL-ET member

### Influence on Undergraduate Experience

Equestrian team members indicated that the UNL-ET experience was an asset to their overall undergraduate experience and instilled a certain amount of university "pride" (Table 4). Students who were in their first (mean score = 1.68) or second (mean score = 1.50) year on the team were more likely (P=0.01) to want more hands on experiences like participation on the team as part of their college experience compared to students in their third year on the team (mean score = 3.5). This difference may be due to differences in involvement on campus as students are further in their academic careers. Students indicated a very positive influence of the UNL-ET on their motivation to return to UNL the following fall semester (mean score = 1.87). Additionally, 73.3% of UNL-ET members felt very strongly they had a positive influence on the University (mean score = 2.02), were highly involved in the University (mean score = 2.07), and were more motivated to succeed in their classes (mean score = 2.09). Such motivation and involvement aids in student retention, plus helps to build loyal alumni.

The UNL-ET members were comprised of majors from all across the University with just over half in the animal science major. However, many non-animal science students enroll in animal science equine related courses and indicated a strong application of their course work to the UNL ET experience. The equestrian team appears to recruit non-animal science majors into animal science courses, thus increasing student credit hours generated in the animal science department.

Similar impacts of student retention and the enhanced educational value of an undergraduate program involving equine courses and activities have also been reported (Taylor and Calderone, 2001, Wood et al., 2010). Students in those studies strongly agreed equine courses helped them to develop skills as well as had a positive impact on their undergraduate education. Increased emphasis on advising, goal setting and equine skills resulted in an 85% retention rate in Equine Science majors (Taylor and Calderone, 2001). Furthermore, in a study of Colorado State University equine science alumni, only 56% of alumni indicated they were directly employed in the horse industry. However 84% reported being either very satisfied (38%) or satisfied (46%) with their equine science degree and education (Denniston and Russell, 2007). Although students enrolled in equine courses may not have lifelong careers in the equine industry, the educational program has a positive impact on recruitment and retention of students.

## Summary

In general, students indicated they perceived positive impacts from their university experiences and their personal life skills by participating on an IHSA equestrian team. While there were significant commitments of time and finances on the part of the students, it did not impact their desire to participate in the organization.

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# Teaching Load Among Faculty and Full-Time Instructors of Equine Science at Land-Grant Universities

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## Abstract

Recent increases in equine science programming at U.S. land-grant universities have heightened demand for instructional support, especially in lower-level, labor-intensive or specialty courses. Full-time instructors can supplement teaching of tenure track faculty; however, instructional contribution of these educators in equine science programs is undocumented. This study investigated teaching load parameters of 71 faculty and 57 full-time instructors teaching equine science courses at 42 land-grant institutions. On average, full-time instructors taught more total and lower-level courses and recorded more teaching time than faculty colleagues. Full-time instructors were responsible for nearly 60% of teaching time across all courses. No differences were found between faculty and full-time instructors for total credit hours taught per year, implying full-time instructors taught more time-consuming, laboratory-based courses. Only 20% of full-time instructors held a doctoral degree, compared with 100% of faculty. Among faculty, rank or gender had no effect on teaching load, but men were four times more likely to hold the rank of full professor, while women were predominantly associate or assistant professors. No effect of gender or terminal degree was found on teaching load among full-time instructors. Noteworthy differences exist in teaching load between faculty and full-time instructors teaching equine science courses at land-grant universities.

Keywords: animal science, rank, gender

## Introduction

Over the last decade, colleges and universities across the United States have witnessed tremendous growth and administrative investment in undergraduate equine science programs (Heird, 2009; Beard and Hassinger, 2009). Student demand for equine-related course content is higher than ever. This comes despite, and perhaps partly in response to, an economic downturn experienced by the nation's horse industry.

Concurrent with equine program growth is a change in undergraduate student profile. The typical undergraduate seeking instruction in the equine area is increasingly female (Food and Agricultural Education Information System, 2010), from a suburban background and without significant experience in animal agriculture (Greene and Byler, 2004; Buchanan, 2008). These students often have some hands-on experience with horses prior to enrollment, yet most are naïve with respect to the breadth and depth of the equine industry or issues related to enterprise management (Long and Morgan, 2010). Typical of many of today's undergraduates in the agricultural sciences, they also often lack transferrable skills (e.g., critical thinking, problem-solving, communication and leadership capabilities) required for the 21st century workplace (Fields et al., 2003; Mortensen and Vernon, 2009; National Research Council, 2009). In short, undergraduate students enter college less prepared for a career in the equine industry than their counterparts from only a decade ago (King, 2009).

A common approach to meeting the instructional demand in equine science courses, especially in tight economic times, is utilization of full-time, non-tenure track instructors to compliment teaching by tenure-track faculty. These personnel often bring significant practical experience to teaching roles, at reduced administrative cost, and can respond to the rising need for targeted instruction in basic and specialty coursework (Cross and Goldenberg, 2003; Giedt, 2010). Full-time instructor numbers have risen in higher education since the 1980s (Schuster, 2003; Jacobe, 2006). Although they have been historically employed in the social sciences or humanities, full-time instructors are increasingly seen in natural science, engineering and agricultural fields (Finley, 2008; Cross and Goldenberg, 2003). Additional benefits to employing full-time instructors include developing or strengthening industry and community contacts which can influence student recruitment, retention, and job placement (Dedman and Pearch, 2004). However, it has been reported (Schuster, 2003) that full-time instructors can be less academically rigorous or scholarly in teaching and assessment methods, less accessible to their students, and less integrated into the campus culture, all of which can detract from the student learning experience.

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Courses in equine science can be time-consuming and/or highly specialized; therefore, the potential for non-tenure track instruction is high. This is especially true at the land-grant university, where tenure-track faculty members are pressed to balance teaching time with that spent on scholarship and university service. However, teaching load parameters of faculty and full-time, non-tenure track instructors in equine science programs has not previously been documented. Therefore, the objectives of this study were to examine teaching load ascribed to faculty and full-time instructors of equine science at the nation's land-grant universities, and investigate fixed effects of gender, rank and terminal degree on teaching load variables.

## Materials and Methods

On-line course schedules for the 2010-2011 academic year for each of the United States' 46 land-grant universities were used to generate data on equine-specific courses. Institutions were omitted (n=4) from the study if all available course information was not publicly accessible as of October 31, 2010. Collected data included course name and level (1-4; freshman through senior), semester (or quarter) taught, number of credit hours, time scheduled, instructor name, and institution. Time scheduled included all lecture and/or laboratory sections as an indicator of an instructor's total time commitment in the classroom or laboratory setting for each course. Departmental websites were also consulted to collect demographic information on instructor gender, terminal degree earned, current rank or title, and to check for equine-specific courses taught outside an animal or equine science department. Due to inconsistent reporting across universities relative to variables measured, data from summer sessions, on-line or distance-delivered courses, independent study or study abroad courses were not used. Time allotted for each course was converted to total teaching hours per course, per week, and rounded to the nearest quarter hour. For courses listed with schedules 'to be announced,' total hours per week were conservatively assumed to be equal to total credit hours listed for the course.

Individuals listed on departmental webpages as full professor, associate professor or assistant professor were classified as 'faculty' and assumed to be tenure-track. 'Full-time instructors' were defined as full-time educators without faculty rank, and assumed not to be on a tenure track. Only those instructors listed as faculty or staff members were counted; part-time, adjunct or graduate student instructors were not included in this study. In cases where individuals had earned both a PhD and DVM, the PhD was considered the higher terminal degree.

Several variables were defined which can be used to indicate annual teaching load. These included total number of classes taught, total credit hours taught and total weekly instructional hours. Parameters for institutions which used a quarter system were converted to a semester basis prior to data analysis. Type of course (lecture vs. laboratory) was a parameter of interest; however, in many cases, it was impossible to determine if a course was primarily lecture- or laboratory-based solely from timetable data. Therefore, the ratio of total hours to credits taught was calculated. This variable remains at unity for single-section, lecture-based classes, but rises with laboratory and/or multiple class sections.

In gathering data from publicly-held sources, there is inherent risk that information may not be current, and therefore, may be inaccurate. For the purpose of analysis, errors of this nature are assumed to be free of systematic bias. Significance of fixed effects on teaching load parameters was tested via analysis of variance using PROC GLM of SAS. Relationships between categorical dependent and independent variables were assessed via PROC CATMOD of SAS. Significance is reported at the $p<0.05$ level. Institutional Review Board approval was not sought for this study as all data were held in public domain.

**Table 1. Summary Statistics for Faculty and Full-Time Instructors of Equine-Specific Courses at Land-Grant Universities[1]**

|  | Faculty | Full-time Instructors |
|---|---|---|
| Gender |  |  |
|   Men | 30 | 15 |
|   Women | 41 | 42 |
|  |  |  |
| Terminal degree*** |  |  |
|   PhD | 68 | 6 |
|   DVM | 3 | 6 |
|   Master's | 0 | 21 |
|   Bachelor's | 0 | 24 |
|  |  |  |
| Teaching load[2] |  |  |
|   Courses taught | 2.41 ± 0.19 | 3.45 ± 0.35** |
|   Credits taught | 6.43 ± 0.51 | 7.22 ± 0.61 |
|   Total hr taught/wk | 10.07 ± 0.97 | 16.30 ± 1.83** |
|   Total hr taught/wk : credits taught | 1.49 ± 0.06 | 2.18 ± 0.19*** |
|  |  |  |
| Average course level taught | 3.08 ± 0.08 | 2.52 ± 0.11*** |

[1] Gender and terminal degree data reported as counts; teaching load statistics reported as means ± s.e.
[2] 2010-2011 academic year.
**$p<0.01$
***$p<0.001$

## Results and Discussion

Summary statistics for faculty and full-time instructors are listed in Table 1. Full-time instructors were responsible for more courses and more total teaching hours per year. In addition, 54% of all courses and 57% of all instructional time dedicated to equine courses were taught by full-time instructors. More than half of all educators were faculty, contrasting with national statistics which indicate nearly 60% of all full-time teaching positions in higher education are non-tenure-track (Jaeger, 2008).

There were no differences between faculty and full-time instructors in total credit hours taught annually. Therefore, full-time instructors had more instructional hours relative to credit hours assigned. This indicates heavier responsibility for laboratory-based or multiple-section courses. It also suggests that while faculty taught fewer total classes, these courses carried more credit hours on a per course basis.

Only 20% of full-time instructors held a doctoral degree, compared to 100% of faculty. Benjamin (2003) noted that in a 1999 survey of natural science instructors at research institutions, 96.5% of tenured faculty held doctoral degrees, while only 62.6% of full-time, non-tenure track instructors held doctoral degrees. On average, full-time instructors also taught at a lower level than faculty. However, terminal degree and designation as faculty or full-time instructor both affected instructional load parameters and average level of courses taught. As both variables are confounded, goodness of fit tests were employed to determine which measure had a larger effect. Terminal degree explained more variability in course level taught than did designation of faculty vs. full-time instructor. On average, instructors who held a PhD or DVM taught at a junior level (3.07 and 3.06, respectively), while instructors with a master's or bachelor's degree delivered course content between a sophomore and junior level (2.32 and 2.46, respectively). No relationship between class level taught and tenure- vs. non-tenure-track status was found in this study. Cross and Goldenburg (2003) noted that within higher education, tenure-track faculty generally teach at a higher level than non-tenure-track instructors, and Schuster (2003) reported a growing willingness for senior tenure-track faculty to 'off-load' lower-division teaching to non-tenure track educators. In equine science programs, lower level courses often have multiple sections of hands-on laboratories or are basic riding classes. However, it is important to note that full-time instructors in this study also taught a number of upper-level, applied techniques courses (e.g., riding instructor training, advanced horsemanship, event management, farrier science), which presumably take advantage of the strong industry background and technical expertise inherent in these personnel.

There were no significant differences in gender distribution between faculty and non-faculty, although there was a tendency (p=0.06) for less representation by men amongst full-time instructors. This is consistent with previous reports (Finley, 2008; Schuster, 2003) which found that full-time instructors are more likely to be women than men. Overall, 64.8% of all educators were female, contrary to national figures in higher education, which reveal only 41.8% of overall faculty are women (U.S. Department of Education, 2008). The disparity grows among animal science faculty, in which reported representation by women drops to less than 20% (Food and Agricultural Education Information System, 2010).

Gender ratios were relatively equal among faculty, although significant differences in rank were found (Table 2). Men were four times more likely to hold the rank of full professor, while women outnumbered men nearly 4-fold in associate and nearly 2-fold in assistant professor positions. The changing demographics of junior faculty may reflect trends in undergraduate enrollment, which reveal that 90% of animal science students with equine concentrations are female (Food and Agricultural Education Information System, 2010). The demographics may also reflect difficulty experienced by female faculty members as they attempt to rise from the rank of associate to full professor (Finley, 2008; Banerji, 2006).

Discrepancies between faculty and full-time instructors may impact curricular development and the student learning experience. Full-time instruc-

| Table 2. Gender and instructional load among male and female faculty members teaching equine-specific courses at land-grant universities[1] | | |
|---|---|---|
| | Male | Female |
| **Rank*** | | |
| Full professor | 16 | 4 |
| Associate professor | 6 | 22 |
| Assistant professor | 8 | 15 |
| | | |
| Teaching load[2] | | |
| Classes taught | $2.12 \pm 0.85$ | $2.62 \pm 0.20$ |
| Credits taught | $5.72 \pm 0.76$ | $6.93 \pm 0.60$ |
| Total hrs taught/wk | $9.31 \pm 1.38$ | $10.62 \pm 1.30$ |
| Total hrs taught/wk : credits taught | $1.72 \pm 0.09$ | $1.84 \pm 0.11$ |
| | | |
| Average course level taught | $3.00 \pm 0.10$ | $3.19 \pm 0.11$ |

[1] Gender and terminal degree data reported as counts; teaching load statistics reported as means ± s.e.
[2] 2010-2011 academic year.
**p<0.01
***p<0.001

tors may have less initiative for faculty development, teach at a less scholarly level, be inadequately credentialed (lack a PhD) or have difficulty with formal assessment of student learning outcomes (Cross and Goldberg, 2003). Yet these instructors can significantly increase program credibility and curricular robustness by increasing capacity for timely, specialized courses, enhancing student competencies, and strengthening links to industry. Further, students can demonstrate greater engagement and motivation to learn when instructors have significant workplace experience and industry expertise with a topic (Wallin, 2004).

Teaching load is expected to be influenced by several factors that were unable to be addressed, given the nature of the data. Years of service may impact faculty rank (Li-Ping Tang and Chamberlain, 2003), and overall faculty workload may involve other activities, such as research, extension, university service, program administration or advising, which could decrease teaching load.

## Summary

This study is the first of its kind to investigate instructional contributions of tenure-track vs. full-time instructors in equine science programs at U.S. land-grant universities. Full-time instructors were responsible for more total teaching time during an academic year, and although they taught a greater number of courses, there were no differences in total credit hours taught. Educational background differed between the groups, with relatively few full-time instructors attaining a doctoral degree. Terminal degree held accounted for more variability in course level taught than did designation of instructor type.

Among faculty, there were no differences observed in number of courses taught, credit hours taught or total teaching time relative to rank or gender, but there were significant differences in rank attained between male and female faculty. Among full-time instructors, neither gender nor terminal degree had a significant effect on number or level of classes taught, credit hours carried or total instructional time.

Although this study examined several parameters related to teaching load between faculty and full-time instructors, further research is needed to determine if differences exist between the groups in learning outcomes among undergraduates in equine science programs.

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# What to Teach Future Commodity Merchandisers: A Survey of Skills and Needs

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## Abstract

Little information exists on grain merchandisers, their demographic and professional characteristics, or the skills they find necessary to be successful. Our research contributes toward filling this gap and helps teachers in agricultural economics and agribusiness prepare students for a career as a grain merchandiser. A summary of survey responses from 230 experienced grain merchandisers quantifies personal characteristics, skills perceived as important, and desire for further training. Higher income, education, and training levels are associated with a greater perceived importance of hedging and this view of hedging is related to a greater desire to improve understanding of basis and spreads, suggesting that these skills should be emphasized in the classroom. More educated merchandisers and those overseeing multiple locations place greater value on logistics. More experienced merchandisers have less desire to improve their understanding of futures markets, possibly because adequate skills were learned on the job over time or perhaps due to impending retirement.

## Introduction

*"What will our students do upon graduation? It is amazing to me that we have been so successful as an academic profession and yet have paid so little attention to this question"* (Padberg, 1987).

A number of college of agriculture graduates pursue commodity merchandising careers. As professionals, merchandisers are charged with the task of generating profit by organizing the purchase, sale, and transport (and/or other transformation) of a commodity across particular locations for specified dates and prices. The process entails coordinating logistics, accounting for transaction costs, managing price risk, and managing the margin across time or space. Commodity merchandising also requires the use of soft skills, such as communicating with clientele, solving day to day organizational problems, utilizing sales tactics, and working within a team. With many opportunities for students to pursue a commodity merchandising career, a better under-standing of the emerging and evolving skill sets needed for successful grain merchandising will assist teachers in preparing students for this field. The objective of this research is to report on respondent feedback from a mail survey of grain merchandisers, regarding skill-sets used on the job, access to information content found useful, educational experiences, and interest in professional development opportunities. With only one educational article addressing futures market risk management skills pertinent to grain merchandisers in over a decade (i.e., Parcell and Franken, 2009) and increasing commodity price volatility (Mckenzie, 2008), an assessment of skills desirable for this profession is warranted.

Similar surveys of students, alumni, employers, or other industry specialists have been used to rate education quality and inform curriculum development in colleges of agriculture (e.g., Larke et al., 1985; Harris, 1989; Trinklein and Wells, 1989; Barkley, 1991; Cole and Fanno, 2000; Cole and Thompson, 2002; Karsten and Risius, 2004; Parcell and Sykuta, 2005; Robinson et al., 2007; Denniston and Russel, 2007; Ewing, 2009; Robinson, 2009). While the importance of some skills (e.g., oral and written communication skills) spans nearly all degree programs (c.f., Cole and Thompson, 2002; Karsten and Risius, 2004; Schlee and Harich, 2010), this survey identifies skills of particular importance to grain merchandisers.

Consistent with the old adage, "Tell me and I'll forget. Show me and I'll learn. Involve me and I'll understand" (Gentry, 1990, p. 9), there exists ample evidence that students' comprehension and retention is enhanced with experiential-based learning. Battisti et al. (2008) chronicle the history of experiential learning and applications to agricultural education. Gosen and Washbush (2004) review outcomes from alternative experiential learning methods, noting that several of these methods enhance economic learning. Rogers (1969) who early on stressed the value of experiential learning notes that students learn best when students (1) are involved and have control over the need to learn, (2) directly confront real-world problems, and (3) are

allowed to self-evaluate. Schroeder et al. (1995) and Parcell and Franken (2009) offer examples of experiential learning through a course operating a student-invested futures contract trading pool, which addresses some of the skills identified as important by respondents to our survey. Earlier work has covered simulation techniques for teaching these skills, noting difficulties in conveying the information through traditional lectures and readings (e.g., O'Rourke, 1973; Hudson et al., 1989; Hamm et al., 1991; Drinka and York, 1992; Dahlgran, 1993). It is hoped that this paper sparks further discussion and generation of experiential-based coursework aimed at serving the educational needs of (current and future) grain merchandisers.

During the last several decades, agriculture market research has focused heavily on the producer. Academics have created extension programs to educate and certify producers and help update their practices. Surveys have been conducted to determine what strategies producers utilize for marketing their grain (Mishra et al., 1999; Pennings et al., 2004) and what tools they use in the commodity futures and options markets (Schroeder et al., 1998; Davis and Patrick, 2000).

Commodity merchandisers' role in orchestrating the movement of a commodity from producer to end user has been, as Schrimper (2001) explains, a key value adding component. It is the merchandiser's role to find logistical outlets that will accomplish this goal, and by doing so, reliable markets are created that allow businesses to make informed decisions (Schrimper, 2001).

The last study addressing the educational needs of commodity merchandisers was a survey of 20 grain elevator managers in east central Illinois conducted in the mid-1960s (i.e., Fiscus, 1965). In this context, the duties of elevator managers closely resembled the duties of today's grain merchandisers. In Fiscus (1965), elevator managers on average had 12.1 years of education, managed elevators for 9.9 years, and worked in some aspect of the grain handling business for 18.2 years with at least 8.3 years of experience before becoming a manager. Overall, managers placed great importance on business practices within their daily activities such as: 1) Understanding the types and processes of crop marketing; 2) Understanding economic factors affecting management of agribusinesses; 3) Understanding market information; and 4) Understanding economic factors to consider in expansion or enlargement of agribusinesses. Knowledge of international trade was somewhat less important, as was knowledge of laws affecting agriculture products and understanding business integration. Fiscus (1965) concluded that a higher level of education was needed for elevator managers and recommended post high school curriculum development for skills such as understanding crop marketing and crop market information.

Understanding economic factors affecting management of agribusinesses was suggested as a skill to be taught at an adult or continuing educational level.

With a better understanding of the current educational needs of commodity merchandisers, companies could develop more effective training programs. The industry may find it is beneficial to provide the upfront capital to implement a degree program in the event that the government would not be willing to support one at a public institute. Such programs have been developed by companies in the hospitality industry without the assistance of the government funds (Ingram, 1998).

This research takes a step toward filling the gap in knowledge of merchandisers' current educational needs by providing information on what curriculum would best prepare grain merchandisers and which type of grain merchandisers, if any, would be interested in continuing education opportunities. Thus, this study provides information useful to educators at the undergraduate level and post-graduate level. The sample for our survey was drawn from a database of four thousand licensed grain marketing businesses across the U.S. and Canada. The remainder of this paper is organized as follows. First, a description of the survey instrument and methodology is provided, followed by a summary of the data. Empirical procedures are described for ascertaining factors influencing grain merchandisers' interest in a certification program, annual meetings, and new publications, and results are presented, followed by a concluding discussion.

## Survey Instrument/Methodology

The database that was compiled from the Grain Inspection and Warehousing Divisions of each state also contained the listings of trucking companies, and sharecrop farmers. The survey was mailed to various grain merchandisers in the Missouri, Kansas, Minnesota, Iowa, Illinois, South Dakota, North Dakota, Nebraska, Texas, Ohio, and Canada in September 2008. State statutes require businesses who buy a predetermined amount of grain to be licensed. (For example, Missouri Statute 276.401.1 requires businesses/individuals to be licensed if they purchase more than $100,000 worth of grain.) Hence, other buyers were indistinguishable from their grain merchandising counterparts.

Because of the manner in which the database of potential merchandisers was generated, respondents were asked to read a definition and to verify that they fit the "grain merchandiser" criteria. The definition provided by the University of Arkansas Agriculture Department states:

*"The term grain merchandiser encompasses all agribusiness firms involved in the procurement, handling, storing, and re-distribution and processing of grain. As such grain merchandisers include country grain elevators cooperatives and non-*

*cooperatives, shippers and exporters, processors, and feeders."*

If the respondent considered herself or himself a grain merchandiser, then the respondent was asked to proceed with completing the survey. If they did not fit the criteria, then they were asked to check "Not a grain merchandiser" and return the survey. Questions were separated into three categories that were designed to gain a better understanding of the backgrounds of grain merchandisers, what information they find useful, and in what areas their knowledge is limited. See Kliethermes (2009) for the full

survey document, and see Alreck and Settle (1995) for a discussion of various types of survey response bias and the methods employed here to limit the potential for such bias. Before distributing the survey, it was pre-tested with a few grain merchandisers who were asked to review the questions. Their primary feedback included details pertaining to question clarification.

The first set of survey questions inquired about the education level and job experience of each respondent. Within their experience level, merchandisers were asked about what types of training they



**Figure 1. Distributions and summary of demographic data**
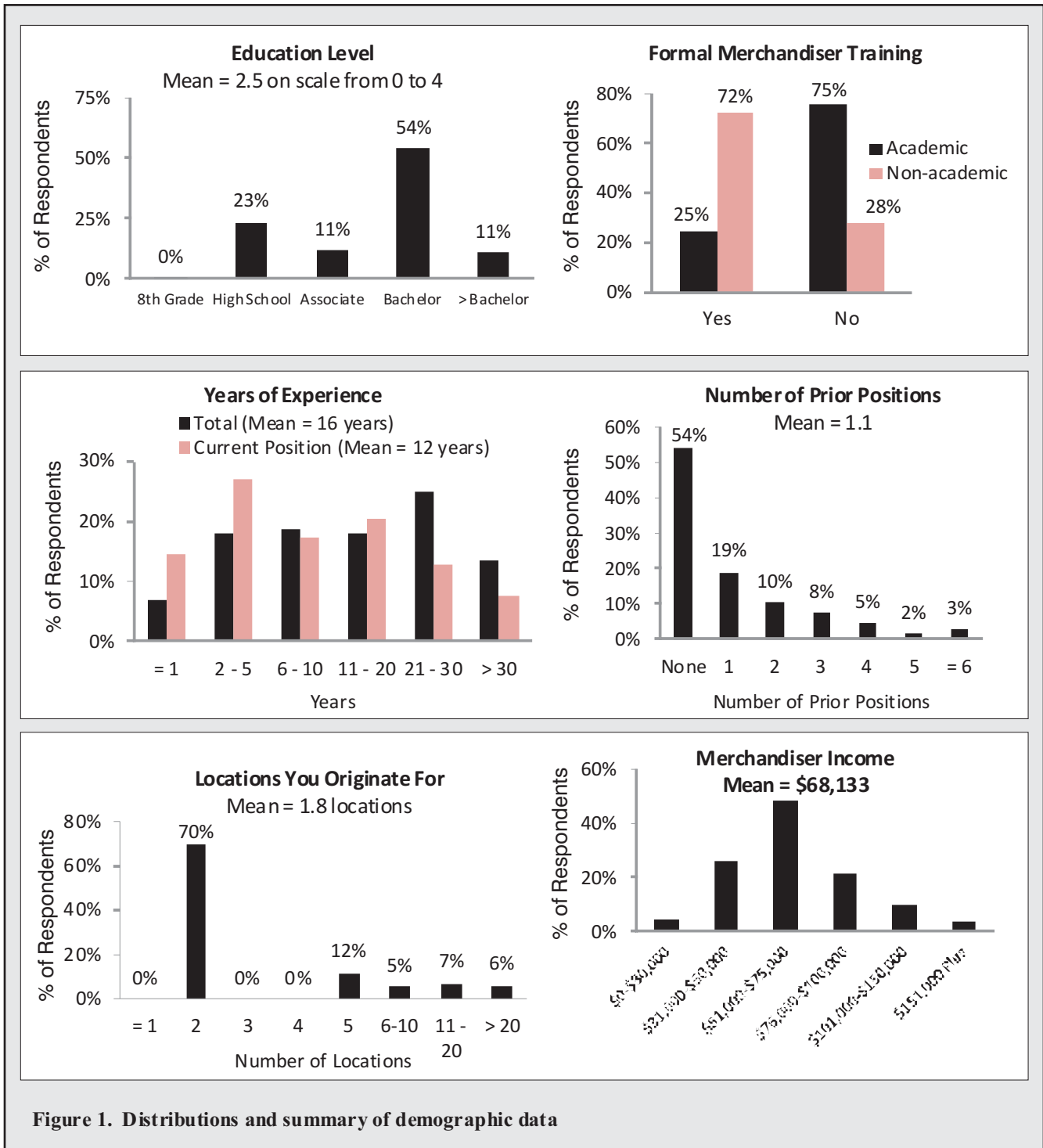
have been involved in and the duration of the training. Next, respondents were asked in what areas they wished they would have had more preparation. To determine what type of personality and skill sets merchandisers need, they were asked to rank the importance of several traits. Questions then moved into areas of products marketed, types of clients, and in what ways clients were contacted. Next, merchandisers were questioned about the design of their forward contracts such as, how far into the future they would contract. The last section of category one dealt with compensation of the merchandiser. These questions covered what type of monetary compensation they received on an annual basis (salary, commission, or combination thereof) and average annual income.

The second portion of the survey questions allowed written response to what types of information merchandisers subscribe to for accessing information. Some survey questions were targeted to gain an understanding of which areas merchandisers felt they needed more/better information. These questions were also to ascertain interest in a new market publication aimed at areas merchandisers were able to select.

The final survey questions related to issues concerning today's grain merchandiser. These include types of contracts used, business being conducted outside of the United States, and interest in an accredited merchandising association.

To obtain a diverse sample, at least one address was sampled from each zip code in the finished database. Due to issues, such as name replication, a total of 2,485 surveys were mailed to potential grain merchandisers. Of these, 276 were post marked "Return to Sender" while 279 were returned from respondents. Forty-nine returned surveys (2.22%) were checked "Not a grain merchandiser, and were discarded. The remaining 230 responses were deemed usable surveys which produces a 10.41% response rate. Due to the anonymous nature of the survey, follow up to determine whether differences exist between respondents and non-respondents was not possible. As a response rate of 20-30% is typical for a mail-out survey to a large sample of firms (Henderson, 1990), the response rate for this survey was low. Baruch (1999) acknowledges, however, that there is no set norm for what is considered an appropriate response rate, and lower response rates may be realized with a mail survey.

## Summary of Survey Respondents

The mean of respondents' grain merchandising experience was just over 16 years with the lower bound being less than one year of experience and the upper bound being 50 years of experience (Figure 1). A similar average of 18.2 years of experience in grain handling was reported in Fiscus' (1965) earlier study. On average, grain merchandisers change positions (i.e., switch companies) only once and early in their career (Figure 1), with the majority of their experience coming from their current position. Specifically, the average respondent has held their current position for almost 12 years with a total of about 16 years of experience merchandising.

Survey respondents indicated a variety of educational backgrounds. Less than 1% completed only the 8th grade, 23.2% up to high school, 11.4% up to an associate, 53.5% up to a bachelor, and 11.4% had a post-bachelor degree (Figure 1). The average level of education for grain merchandisers has increased from the mean of 12.1 years (basically high school) reported by Fiscus (1965) to between an associate and bachelor college degree (2.5 on a scale from 0 to 4). Most grain merchandisers did not receive formal academic training towards grain merchandising, however, as the mean statistic indicates that only 25% of respondents confirmed such training (Figure 1). Yet, 73% of respondents indicated that they had received non-academic training. When asked to specify how long, in their opinion, it took to train a new grain merchandiser the majority of respondents indicated at least six months and up to two years.

While over 40 commodities were handled by surveyed merchandisers, the most common were corn with 93.91% of respondents, soybeans with 84.78% of respondents, and wheat with 50% of respondents. Most merchandisers (70%) oversee two locations (Figure 1). Nearly half of merchandisers indicated they monitor basis daily (46%) and intra-daily (43%).

Annual income for grain merchandisers was predominantly salary-based as indicated by 68% of respondents, followed by solely commission-based at 14% with the remainder comprised of combinations thereof and other bonuses. The largest percentage of merchandisers (42%) had an average annual income between $51,000 and $75,000 (Figure 1).

Several respondents indicated that wish they had training (45%), seminars (40%), college courses (34%), company courses (24%), and self-help materials/books (23%) prior to becoming a grain merchandiser. Furthermore, respondents ranked the importance of certain skill sets that merchandisers should have. These skills are listed in Table 1 in order of importance from highest to lowest based on the percentage of respondents indicating that the skill is either "Important" or "Very Important." Consistent with other surveys on skills that should be developed in agriculture degree programs, oral and written communication skills are considered important (Nippo, 1983; Harris, 1989; Neal et al., 1991; Barkley, 1991; Cole and Thompson, 2002; Karsten and Risius, 2004; Robinson et al., 2007; Robinson, 2009). About 74.2% of respondents considered oral communication skills "Important" or "Very Important" compared to 57.9% for written communication. Few respondents (50% or less) placed this level of importance on ability to access

public and private information, experience in general, and possession of a broker license. Other than oral communication, the most important skills related to aspects of merchandising that use information regarding futures markets, such as basis (i.e., cash price minus futures contract price) and hedging. This finding is consistent with the importance of understanding the types and processes of crop marketing for elevator managers reported by Fiscus (1965) and the importance of identifying and managing risk for undergraduates entering agrisales reported by Harris (1989). Logistical issues were also of notable importance with 72.4% of respondents ranking this item as "Important" and "Very Important." Hence, courses aimed to develop merchandisers should be heavily weighted in these areas, particularly at the undergraduate level.

Respondents also ranked the importance of merchandiser personality traits (Table 2). Nearly half of respondents valued quick thinking and risk tolerance as very important (45% and 48%, respectively), while over two thirds found relationship building very important (67%). Similarly, Robinson et al. (2009) found that employers and agricultural graduates in soft sciences (i.e., economics, education, and communication) consider risk taking and interpersonal relations important. Related to the last point, good people skills ranked number five on a top ten list of best college graduate employee skills summarized from a survey of employers by Cole and Thompson (2002).

Continuing education programs should then assist existing merchandisers in honing their skills in the areas of primary interest identified in Table 3, such as futures and options, basis, spreads, and customer communication. Of particular interest, understanding of future and options markets are one of the top skills merchandisers would like to develop further. Other top skills mentioned by respondents for further development include understanding basis and spreads and being able to adequately communicate with customers. These results are broadly consistent with Karsten and Risius' (2004) survey of agricultural degree alumni and employees, which identifies statistically significant differentials between job requirements and graduates' communication, marketing, and financial management skills that indicate room for improvement.

Nearly half (48%) of the merchandisers are members of the National Grain and Feed Association (NGFA), which hosts annual conferences and provides literature that may help members hone their merchandising skills. About 75% of respondents reported that they participate in professional development by reading information published on the Internet, while 64% read popular press publications and 54% read subscription based information. The top four popular press magazines that respondents read for information include Grain Journal, Feedstuffs, Wall Street Journal, and Feed and Grain. The top four professional marketing services respondents subscribed to are DTN, FC Stone, White

**Table 1. Importance Rankings of Various Merchandiser Skills**

| Skills Set | Mean | Unimportant [a] | Somewhat Important | Important | Very Important |
|---|---|---|---|---|---|
| Understanding Basis | 4.7 | 2.2% | 2.2% | 13.0% | 82.5% |
| Understanding Futures Markets | 4.7 | 1.3% | 4.0% | 20.1% | 74.6% |
| Oral Communication | 4.7 | 0.4% | 6.2% | 19.1% | 74.2% |
| Hedging | 4.3 | 5.0% | 11.7% | 30.6% | 52.7% |
| Placing Future Positions | 4.3 | 3.6% | 12.7% | 35.3% | 48.4% |
| Logistics [b] | 4.1 | 6.1% | 21.4% | 30.6% | 41.8% |
| Knowing One Industry Well | 3.8 | 8.1% | 31.2% | 33.9% | 26.7% |
| Written Communication | 3.7 | 9.5% | 32.6% | 32.1% | 25.8% |
| Analytic Skills | 3.7 | 7.3% | 35.9% | 35.5% | 21.4% |
| Access to Public Information | 3.5 | 14.1% | 40.5% | 27.7% | 17.7% |
| Access to Private Information | 3.5 | 14.5% | 36.2% | 31.7% | 17.7% |
| Years of Experience | 3.5 | 14.2% | 35.1% | 33.3% | 17.3% |
| Having a Broker License | 2.3 | 57.2% | 30.6% | 8.1% | 4.1% |

[a] To save space, "Not Important" and "Least Important" categories were combined due to the low number of responses for these two categories.
[b] A typographical error led to a lower response rate (98) on this item. Over 220 responses were obtained on all other items.

## What to Teach

Commercial, and Advance Trading Inc. Earlier research indicates similar importance of such publications and professional marketing services for producers marketing grain (Schroeder, et al., 1998; Pennings et al., 2004). Introducing students to these publications before graduation may have value to helping establish the student in the profession sooner.

Eighty-two percent of respondents indicated they would be interested in receiving publications to help improve their marketing skills with a focus on new strategies and developments delivered electronically. Merchandisers regularly sought to improve their marketing skills with 91.4% of respondents indicating they sought to improve their skills with only 8.5% not having an interest in improving their skills. Nearly 19% of respondents indicated they received daily articles aimed at improving their skills, 21% received articles weekly, and 42% received articles monthly. When asked if these articles helped, 81% indicated that they did. Together, these statistics suggest that an internet based delivery system of regular reports or seminars would be conducive to continuing education of merchandisers.

## Correlation Analysis

Abbreviated results of a correlation analysis are presented in Table 4 to highlight some of the more interesting associations among variables. Full results are available from the authors upon request. Asterisks ("*") denote statistically significant correlations among variable pairs.

Statistically significant correlations indicate that merchandiser annual income increases with education, the number of locations overseen, the amount of cross-contact with other merchandisers, and membership in the NGFA. Notably, correlations indicate a statistically positive relationship between income and the importance merchandisers place on hedging skills, and those placing greater importance on hedging also view logistics to be of greater importance and desire to improve their understanding of basis and spreads. The importance placed on logistics is also statistically associated with education level and the number of locations overseen. The significantly negative relationship between formal academic merchandiser training and perceived importance of logistics is difficult to interpret; it may reflect that those with academic training have

### Table 2. Importance Rankings of Various Merchandiser Personality Traits

| Personality Trait [a] | Unimportant [b] | Somewhat Important | Important | Very Important |
|---|---|---|---|---|
| Relationships Building | 0.9% | 5.3% | 26.7% | 67.1% |
| Quick Thinker | 0.9% | 12.4% | 41.3% | 45.3% |
| Multi-Tasking | 1.3% | 13.0% | 40.6% | 45.1% |
| Risk Tolerance | 3.1% | 11.6% | 37.3% | 48.0% |
| Patience | 1.8% | 13.3% | 45.3% | 39.6% |

[a] While response rate varied by survey item, over 220 responses were obtained for each item.
[b] To save space, "Not Important" and "Least Important" categories were combined due to the low number of responses for these two categories.

Seventy percent of survey respondents would be interested in attending annual educational conferences, which is notably higher than the 48% of respondents that are NGFA members and may attend the association's conferences. About 40% would find a certification process valuable, while 58% would not. Respondents were asked to rank a set of proposed curriculum if an annual conference became a reality. The activities ranked with the largest frequency include skills (e.g., futures markets), more networking (i.e., communication among industry professionals), seminars, and certification. These results suggest that if there was a grain merchandising association, skill development should be the major focus of the association, which could perhaps be substantiated via some sort of certification process.

### Table 3. Skills Merchandisers Desire to Develop Further

| Merchandising Skills [a] | Percentage of Respondents |
|---|---|
| Using Futures and Options | 38.1% |
| Understanding Basis | 18.6% |
| Using Spreads | 13.3% |
| Communication with Customers | 10.6% |
| Financial Management | 6.2% |
| Technical Analysis | 6.2% |
| Spread Management | 4.4% |
| Risk Management | 4.4% |

[a] While response rate varied by survey item, over 220 responses were obtained for each item.

determined other skills to be relatively more important or they may underestimate logistics' importance. Positive relationships between the perceived importance of hedging and measures of education, formal academic merchandiser training, and non-academic merchandiser training are more consistent, given the positive correlations between academic and non-academic merchandiser training . If such skills are related to merchandiser income, they should be emphasized in preparatory courses.

Interestingly, statistically inverse relationships exist between education and experience and experience and a desire to improve one's understanding of futures. The former result may partly reflect a trade-off between years spent learning and years working, but given the level of education observed in Fiscus' (1965) earlier study, more likely reflects that younger grain merchandisers tend to obtain higher degrees of education than their predecessors. The latter relationship may reflect that, with time, merchandisers can acquire sufficient knowledge of futures markets through hands-on experience, or that more experienced merchandisers are too close to retirement to justify investment in learning more about futures markets.

and hence should be at least introduced in undergraduate Agriculture Economics courses. Notably, correlation analysis reveals that merchandiser income is positively related to the importance placed on hedging, which is positively related to desire to improve understanding of basis and spreads. Ideally, higher level courses could be developed in these areas for interested individuals at the undergraduate level and for executive masters of grain merchandising programs or other forms of continuing education. The decision to create a degree program or focus more heavily on issues that affect grain merchandisers would have the greatest impact on entering students considering this particular career. This would also help the decision process of young minds when determining if this is the career they wish to pursue.

Another interesting finding is that many merchandisers desire a greater understanding of the future and options market and feel that basis and spreads are a major daily concern and that being able to adequately communicate with customers is important. Merchandisers wish to improve themselves in these areas and would be interested in publications aimed at issues such as new developments and strategies. Based on the average years of

**Table 4. Correlations for Selected Variables [a]**

| | Importance of: | | | | Improve Understanding of: | | | Demographic Variables | | | | | | | |
| | Basis | Futures | Hedging | Logistics | Futures | Basis | Spreads | Education | Academic | Non-academic | Experience | Locations | Cross Contact | Income | NGFA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Importance:* | | | | | | | | | | | | | | | |
| Basis | 1.00 | | | | | | | | | | | | | | |
| Futures | 0.65* | 1.00 | | | | | | | | | | | | | |
| Hedging | 0.49* | 0.48* | 1.00 | | | | | | | | | | | | |
| Logistics | 0.45* | 0.25* | 0.25* | 1.00 | | | | | | | | | | | |
| *Understanding:* | | | | | | | | | | | | | | | |
| Futures | 0.10 | 0.07 | 0.02 | 0.00 | 1.00 | | | | | | | | | | |
| Basis | 0.05 | 0.07 | 0.12* | -0.02 | $2.9\times10^{-4}$ | 1.00 | | | | | | | | | |
| Spreads | 0.07 | 0.11 | 0.13* | 0.13 | 0.10 | 0.10 | 1.00 | | | | | | | | |
| *Demographics:* | | | | | | | | | | | | | | | |
| Education | 0.02 | 0.00 | 0.12* | 0.22* | 0.03 | 0.07 | 0.01 | 1.00 | | | | | | | |
| Academic | 0.10 | 0.05 | 0.13* | -0.18* | 0.04 | -0.01 | -0.03 | 0.14* | 1.00 | | | | | | |
| Nonacademic | 0.09 | 0.09 | 0.28* | -0.03 | -0.05 | -0.05 | 0.08 | 0.21* | 0.17* | 1.00 | | | | | |
| Experience | -0.03 | 0.00 | 0.06 | -0.01 | -0.11* | 0.00 | -0.08 | -0.12* | 0.01 | -0.01 | 1.00 | | | | |
| Locations | -0.04 | -0.02 | 0.01 | 0.18* | -0.01 | -0.06 | 0.06 | 0.06 | -0.11 | 0.00 | 0.05 | 1.00 | | | |
| Cross Contact | 0.07 | -0.01 | 0.12* | 0.20* | 0.11* | -0.04 | 0.01 | 0.09 | 0.09 | 0.10 | -0.17* | 0.11* | 1.00 | | |
| Income | 0.01 | 0.03 | 0.14* | -0.06 | -0.03 | -0.08 | 0.02 | 0.15* | 0.11 | 0.09 | 0.26 | 0.31* | 0.18* | 1.00 | |
| NGFA | 0.02 | -0.01 | 0.08 | -0.05 | -0.07 | -0.04 | -0.01 | 0.06 | 0.13* | 0.08 | 0.01 | 0.07 | 0.22* | 0.30* | 1.00 |

[a] Asterisk ("*") denotes statistical significance at the 10% level. See previous tables for variable definitions.

## Conclusions

The information presented in this study indicated that grain merchandisers are a diverse group of individuals. Most merchandisers possess a Bachelor's degree, but did not receive formal academic training with an emphasis in grain merchandising. It is apparent that it would be advantageous for colleges to offer courses designed around grain merchandising. Survey responses suggest that a greater understanding of futures and options trading and basis comprehension is beneficial to grain merchandisers,

experience, such educational materials need to be designed around a merchandiser that has a moderate skill level. It is not apparent if demand is adequate to warrant a certification process, but based on the data, it is an option that should be given consideration and explored further. Overall, this survey has begun to fill the gap in the basic knowledge of a grain merchandiser and what information they would find helpful in their marketing activities.

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# A Model for Transforming the Undergraduate Learning Experience in Colleges of Agriculture

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## Abstract

Today's graduates of colleges of agriculture face many new and unique problems. The question arises, are they adequately prepared to solve these problems? Many critics would say no, and have called for changes in teaching in higher education. The push is on for a more student-centered approach to teaching with a greater emphasis on critical thinking, decision making, problem solving, and leadership. For almost a century secondary agricultural education has relied on a pedagogical model incorporating these ideas. Experiential learning is a foundation of secondary agricultural education and provides students the opportunity to be more engaged in their learning by giving students concrete experiences, which are essential to learning. Experiential learning also forces students to reflect on and generalize about their learning, thus making it more transferable. Students are able to build critical thinking and decision making skills through the hands-on problem based learning activities associated with experiential/constructivist epistemologies. The hands-on, experientially driven pedagogical methods inherent in secondary agricultural education provide a constructivist/experiential learning model for undergraduate education. Perhaps, colleges of agriculture should consider implementing the constructivist based, experiential pedagogical model presented to help transform the undergraduate learning experience.

## Introduction

The United States has changed dramatically in the last 150 years. Knowledge and innovation have increased at exponential rates, making today's technology seemingly obsolete tomorrow. It is in this climate of change that colleges of agriculture in America's universities now find themselves operating. Recognizing this climate, in 2009 the National Research Council (NRC) called for a transformation in colleges of agriculture to meet changes caused by: global integration, new science, consumer influence, environmental concerns, and demographic and political shifts. The NRC stated colleges of agriculture need to "reform their undergraduate curricula and students' experience to meet the needs of a changing world" (p. 13). This problem is not unique to colleges of agriculture; there is a consensus throughout higher education. A review of literature shows a recurring call for colleges and universities to change the way teaching and learning occurs (Barr and Tagg, 1995; Bok, 2006; Boyer Commission on Educating Undergraduates in the Research University, 1998; National Commission on the Future of Higher Education, 2006; National Research Council, 2009; Saroyan et al., 2004). According to the Association of American Colleges and Universities (2002), students are increasingly entering the workforce underprepared personally and professionally. Without changes, undergraduate education will continue to struggle to provide students with the tools for success. Colleges of agriculture are uniquely positioned to help fill the gap in undergraduate education and can provide a model for other disciplines to follow. According to the NRC (2009, p. 4), the "multi-dimensional and challenging nature of the agricultural disciplines" combines well with the basic and applied science disciplines such as technology, engineering, and mathematics.

To improve the undergraduate learning experience, the NRC (2009) called for an increase in transferable skills development that included abilities such as teamwork, working in diverse communities, working across disciplines, communication, critical thinking, ethical decision making, and leadership. The NRC also called for an increase in the use of case studies, problem-based learning, service learning, community engagement, cooperative learning, active learning, and developing learning communities. The NRC also recognized that non-formal learning activities like extracurricular organizations, undergraduate research, and study-abroad can be valuable pedagogical tools.

Education in the agricultural sciences is not limited to colleges and universities. For over 100 years, students have studied the agricultural sciences in high schools through programs originally referred to as vocational agricultural education (True, 1929). Recognizing the changing needs of students and society these programs have transformed into programs of agricultural science education and look much different than the original vo-ag programs (Phipps et al., 2008). As colleges of agriculture look to transform the undergraduate curricula, the practices adopted by secondary teachers of agriculture may provide a suitable model to examine.

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## Purpose

The purpose of this article is to present a pedagogical model that answers the National Research Council's (2009) call to transform undergraduate agricultural education. This synthesis of research attempts to achieve this purpose by addressing the following objectives:

1. Define the epistemological and theoretical basis of secondary agricultural education;
2. Define the pedagogical model for secondary agricultural education and;
3. Create a transferable pedagogical model.

## Findings

### Epistemological and Theoretical Basis of Secondary Agricultural Education

The first objective was to define the epistemological and theoretical basis of secondary agricultural education. In order to understand why the secondary agricultural education model is worth examining, one must first consider the origins of agricultural education. Since the national inception of vocational agriculture through the Smith-Hughes Act of 1917, teaching and learning in agriculture has traditionally been hands-on and experientially based (Knobloch, 2003). Rufus Stimson, a pioneer in secondary agricultural education, is noted for bringing the idea of experiential learning to the forefront of agricultural education through the use of individual home-based projects (Moore, 1988). Learning through the use of individualized projects is still prevalent in secondary agricultural education (Roberts and Harlin, 2007). Another widely used pedagogical approach has been the problem-solving method where students must actively seek out answers to problems, thus generating critical thinking skills and creativity (Parr and Edwards, 2004). Additionally, secondary agricultural education has made extensive use of extracurricular activities through the National FFA Organization as a pedagogical tool. Knight (2008) stated, "The work of people like Rufus Stimson and many others were driven largely by a philosophy that was focused on creating environments that engaged students with their learning intellectually, physically, and emotionally" (p. 9).

One of the epistemological bases for secondary agricultural education is constructivism. Constructivism is an epistemological belief that knowledge is constructed in the mind of the learner through experiences (Doolittle and Camp, 1999).

Doolittle and Camp posited learners use prior knowledge and experiences to understand new material being learned. Byrnes (1996) helped clarify this with an analogy; he compared students' knowledge to a brick wall being built inside their minds. Byrnes stated constructivists believe teachers provide the bricks, but the student places the bricks in the appropriate place through cognitive processes. Byrnes argued sometimes students place the bricks in the wrong place (eg. lack of understanding), or they have not built up the wall enough for a certain type of brick (eg. abstract ideas). Piaget's (1952) idea of assimilation and accommodation explain how students correct misplacing bricks or inability to place bricks. When a student uses assimilation they search and find the proper place for their brick to be laid. Accommodation is used when a student changes the shape of their brick wall to make the new brick fit.

Varying views of constructivism exist; however three commonalities surface across all types of constructivism (Doolittle and Camp, 1999). First, learners must use active cognitive processes. Next, all types of constructivism require some degree of interpretation of reality. Third, they are all situation dependent, in that they all require an experience. This last point indicates the direct connection between constructivism and experiential learning.

Beard and Wilson (2006, p. 2) defined experiential learning as "the sense making process of active engagement between the inner world of the person and the outer world of the environment." Knobloch (2003) operationally defined experiential learning in agricultural education as "learning in real-life contexts that involves learners in doing tasks, solving problems, or conducting projects" (p. 26). Many
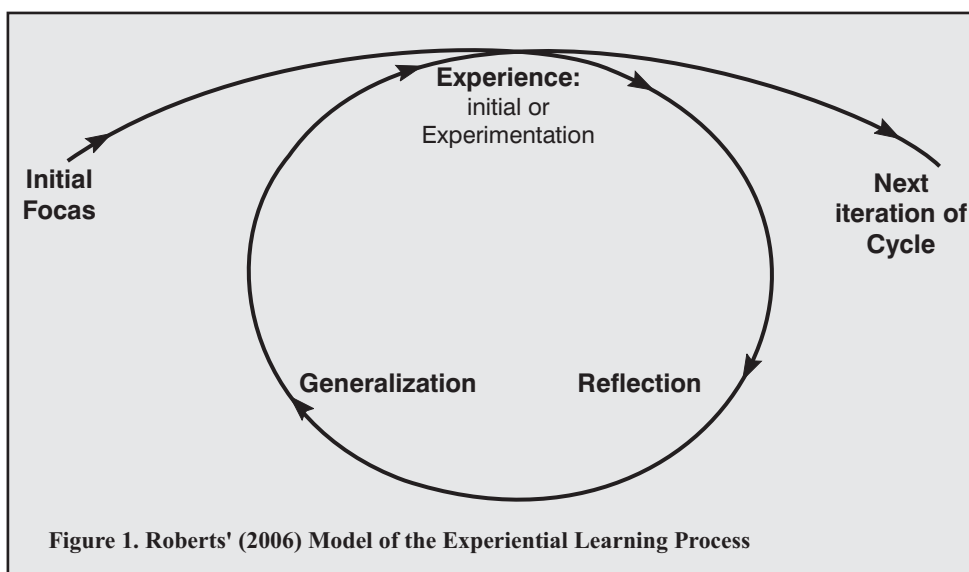


Figure 1. Roberts' (2006) Model of the Experiential Learning Process

theorists including Dewey (1938), Joplin (1981), and Kolb (1984) have created models to explain experiential learning. Through an analysis of the literature, Roberts (2006) examined these three models and divided experiential learning into two categories; the

*process* of experiential learning and the *context* in which it takes place. For the purpose of this study the researchers looked at the *process* of experiential learning.

Roberts (2006) synthesized a new model, the *model of the experiential learning process* by combining the like characteristics of the three aforementioned models. The model is cyclical and begins with an initial focus, followed by an experience (initial or experimentation), reflection, generalization, and experimentation (Figure 1). Due to its simplicity the Roberts Model is recommended.

Constructivist views and the experiential learning process align very well. Constructivist ideas of experience, active cognitive processing, and interpretation of reality agree with the experiential learning processes of experience, reflection, and generalization. This led the researchers to synthesize a model showing the relationship between these features (Figure 2). Although depicted in a linear fashion, learning is not a linear process; the intent of this model is to strictly show the relationship between the tenets of constructivism and experiential learning leading to knowledge acquisition.



Figure 2. The Relationship between Constructivism and Experiential Learning
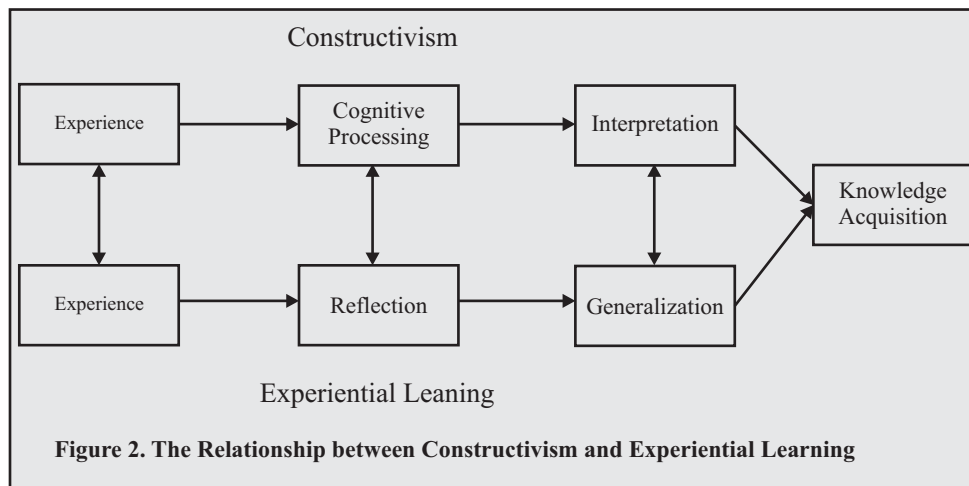
### Pedagogical Model for Secondary Agricultural Education

The second objective was to define the pedagogical model for secondary agricultural education. In the secondary agricultural education model, students receive instruction in classrooms and laboratories, enhance their knowledge through supervised agricultural experience projects (SAE), and then apply that knowledge through participation in a student organization (FFA). This creates a tripartite pedagogical model which provides students learning experiences through varying instructive approaches.

The first component of the secondary agricultural education model is classroom/laboratory instruction. Hughes and Barrick (1993) stated, "[secondary] agriculture teachers have used classroom and laboratory instruction to promote leadership skills, personal development, and technical competencies in order to prepare young people for agricultural employment" (p. 64). Traditionally, this has been accomplished using a variety of hands-on teaching methods. Effective secondary agricultural instructors use active learning strategies, cooperative learning, and field trips among others. One of the more common teaching methods in secondary agricultural education is problem solving (Parr and Edwards, 2004). These types of pedagogical approaches allow students to construct their knowledge through classroom experiences.

Application of classroom learning through individualized projects in a real world setting is commonplace in secondary agricultural education (Barrick, 1989) The main purpose of SAE is for students to enhance their learning and develop a deeper understanding of the material learned in class (Roberts and Harlin, 2007). Secondary agricultural education students are required to conduct a SAE project. There are several categories of SAE ranging from entrepreneurship, which can include projects such as raising animals or crops, to work-based learning opportunities where students work in an agriculturally related job under the supervision of their instructor. A comprehensive SAE project for a secondary agricultural education student should be a planned program consisting of supervision and evaluation by the instructor and the student should receive recognition for their work (Barrick et al., 1992). In addition, ideally, the student's SAE project should align with the classroom curriculum.

FFA is an integral part of the secondary agricultural education model. FFA provides outlets for students to apply learning in various ways. Career development events (CDE) allow students to apply classroom learning in various industry related competitions. For example, if a student were preparing for a career in the horticulture industry he could take part in several competitions such as agronomy, floriculture, and/or nursery and landscape. This same student could be awarded for his SAE work through various proficiency awards such as diversified horticulture, landscape management, or nursery operations. These awards are based on the size, scope, and productivity of the student's SAEs. Additionally, the National FFA Organization hosts an agriscience fair where this same horticulture student could conduct agriculture related research and compete at various levels of competition. Lastly, FFA also provides sundry opportunities for students to develop leadership through workshops and conferences.

## A Transferable Pedagogical Model

The pedagogies implemented in secondary agricultural education have many of the features that the NRC (2009) suggested be incorporated into undergraduate education, such as problem-based learning, service learning, community engagement, cooperative learning, active learning, and extracurricular organizations. All these strategies are framed around a common constructivist, experiential theoretical basis. A model for colleges of agriculture would include these same strategies. The researchers illustrated this with a Venn diagram (Figure 3), which best represents the model for colleges of agriculture because all areas of the model should be designed to work synergistically with one another.

Classroom/laboratory instruction in colleges of agriculture should employ more hands-on, active learning strategies. The various disciplines in agriculture lend themselves well to utilizing these types of strategies (NRC, 2009). Many agricultural disciplines have classes which already include laboratory sections providing students with engaging learning activities; however implementation of active learning in the classroom could help students' knowledge acquisition. For example, in an animal science classroom this might take the form of students creating models representing metabolic pathways. This allows students to actively engage with learning the information

Experiential learning should be implemented in college courses in agriculture. Students could gain a deeper understanding by applying the material in real-world contexts. Out-of-class experiential learning could include projects, internships, study abroad, and undergraduate research opportunities. For example, in a horticulture course a student might take an internship with a wholesale plant distributor for the summer. Coupled with specific learning objectives and supervision the internship could provide a beneficial learning experience for the student.

There are many ways extra-curricular activities could enhance the learning in colleges of agriculture. Colleges of agriculture have many student organizations already in place such as Block and Bridle, Young Farmers, Collegiate 4-H, and Alpha Zeta among others. Partnerships between instructors and these student organizations could lead to learning opportunities outside of class where students can utilize information learned in the classroom. One learning opportunity which could be utilized is service learning. Service learning helps students understand the importance of community engagement and can give students a way to apply concepts such as critical thinking and problem solving in different contexts.

The traditional secondary agricultural education model was designed to prepare students for careers in agriculture. Hughes and Barrick (1993) posited in addition to classroom/laboratory instruction and application components, agricultural education also contains components of employment and/or additional education followed by a career, which is the "intended outcome[s] of an agriculture program" (p. 61). However, many students in secondary agricultural education programs will pursue postsecondary education as opposed to going into production agriculture. Since many students now pursue a bachelor's degree, perhaps some of the same practices proven beneficial at the secondary level can be used to advance undergraduate education.



**Figure 3. A Pedagogical Model of Undergraduate Education for Colleges of Agriculture.**
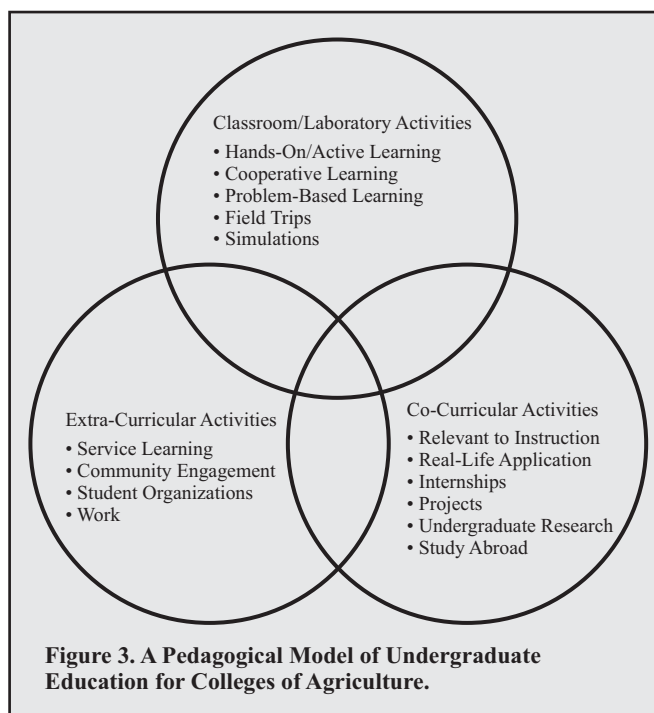
## Conclusions

The case for change in undergraduate education has been given, and the call has been made to colleges of agriculture to step to the forefront. A multifaceted approach to undergraduate education utilizing a variety of in and out-of-class learning experiences can help colleges of agriculture move towards meeting the NRC's (2009) goal of transforming agricultural education. Instructors in colleges of agriculture can apply constructivist principles in facilitating experiential learning through classroom and laboratory instruction, individualized projects, research, and extracurricular activities. This pedagogical model can help prepare graduates of colleges of agriculture prepare to work in an ever-changing world.

Saroyan et al. (2004) said there needs to be a "learning-centered" approach to teaching (p. 17). McLaughlin et al. (2005) echoed this notion and added learning takes place when students are cognitively engaged with appropriate subject matter knowledge. The hands-on, experientially driven pedagogical methods inherent in secondary agricultural education have been shown to be effective in helping students learn. Colleges of agriculture should consider implementing the constructivist based,

experiential pedagogical model presented to help transform the undergraduate learning experience.

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# Who Enrolls in Agriculture and Natural Resources Majors: A Case from Michigan State University

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## Abstract

Colleges of agriculture in the United States are facing a challenge of unstable student enrollment. The College of Agriculture and Natural Resources (CANR) at Michigan State University recognized the need for a comprehensive profile of its students. To obtain this profile, data were collected from undergraduate students in the CANR via annual online surveys from 2004 to 2008. The study aimed to determine the demographic profile of students and find out how students learned about CANR programs, how they entered (directly from high school or as transfer students from within MSU or other colleges and universities) CANR programs, and identify factors influencing students' decisions to pursue CANR majors. Findings indicated that a majority of the CANR students are Caucasian and female, raised in suburban and urban communities, and former members of their high school National Honor Societies. Findings showed that students utilized family and friends, websites, and printed materials as their major sources of information to learn about CANR programs. About one-third of the students came directly from high school. The majority (nearly two-thirds) of students entered CANR programs as transfer students. Academic programs or curricula, the reputation of the CANR, the availability of internship opportunities, academic advising, and recommendations of family members, friends and alumni were the important factors in students' decision to attend the CANR.

## Introduction

Agricultural colleges have been facing a challenge of unstable student enrollment during the past 20 years (Robinson et al., 2007; Dyer et al., 1996). As a result of the farm crisis in the United States in the late 1970s and early 1980s, the enrollment in colleges of agriculture dipped significantly in the late 1980s (Peiter et al., 2004; Dyer et al., 2002; Dyer et al., 1999). Enrollment in agricultural colleges in land-grant universities declined by 24% from 1978 to 1988; enrollment in non-land-grant programs decreased by 13% over the same period (Manderscheid, 1988). To respond to the national crisis of declining agricultural enrollment, curricula were modernized as suggested by the National Research Council in 1988; as a result, the enrollment at agricultural colleges and high schools rebounded in the early 1990s. According to the U.S. Department of Education, 1992 enrollments in colleges of agriculture were 18.9% above 1981 enrollments nationwide (U.S. Department of Education, 1996).

The number of agronomy or crop science degree recipients fell from 764 in 1984-85 to 523 in 2002-03 (McCallister et al., 2005). According to a recent national survey of all the 1862 land-grant universities, the undergraduate enrollment in all crop and soil science-related majors averaged 90 students per university (Hansen et al., 2007). Similarly, the average undergraduate enrollment in agricultural economics decreased by 17% from academic year 1984-85 to 1995-96 (Blank, 1998).

At Michigan State University, the College of Agriculture and Natural Resources faced a challenge of declining undergraduate enrollment from 1994 to 2004. The trend in fall enrollment for the undergraduate program in the CANR at MSU was negative, with an average percentage change of -0.5% for the decade of fall 1994 to fall 2004. The undergraduate enrollment in the CANR at MSU increased significantly in fall 2005 and has been increasing since then. The increase in enrollment in the CANR at MSU was largely the result of administrative changes. For example, the dietetics major, which used to fall under the College of Human Ecology, was annexed to the CANR. In fall 2005, enrollment in the dietetics major increased by 688.9% over the fall 2004 enrollment (Michigan State University, 2009). Fall enrollment data for several other agricultural majors within the CANR at MSU indicate, however, that the undergraduate enrollment trend is not stable.

Nationwide, the demographic composition of today's college of agriculture students has changed in several respects from that of the 1980s (Peiter et al., 2004; Scofield, 1995). Dyer et al. (1996) reported that 66.4% of freshmen in the College of Agriculture at the

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University of Illinois at Urbana-Champaign were from urban backgrounds. Dyer et al. (1999) reported that the majority of students at the Iowa State University College of Agriculture were no longer from rural or farm backgrounds but had been replaced by freshmen from urban backgrounds with no knowledge of or prior experience in agriculture. National statistics on undergraduate enrollment show that the demography has shifted in ethnicity and gender as well, as enrollments of both ethnic minority and female students are increasing (U.S. Department of Education, 2007).

In today's context of an ailing U.S. economy, shrinking federal and state support to higher education, rising costs of college education, and changing student demography, colleges of agriculture are challenged to seek innovative ways to appeal to prospective students. It is more critical than ever before that the colleges of agriculture employ effective recruitment methods to attract the best and brightest students. In this endeavor, reliable information was lacking about students' characteristics, the sources of information they use, and other important factors that influence their decision to enroll in colleges of agriculture. This paper reports the findings of a study aimed at understanding the demographic profile of the undergraduate students in the CANR at MSU, identifying the routes by which they entered the college programs, the sources of information they used to learn about college programs, and the factors that influenced their decision to choose college majors within the CANR at MSU.

Literature on students' college enrollment decisions and selection of college majors indicates that students are influenced by a myriad of diverse factors. This study adapted the Chapman's model of student college choice as the theoretical basis. Chapman suggested that college choice decision is influenced by a combination of two broad factors: students' characteristics and external factors which include the influence of significant persons, college characteristics, and college efforts to communicate with prospective students (Chapman, 1981). Chapman concluded that the choice of which college to attend is first influenced by the background characteristics of the student and the student's family. Second, a series of other external influences, such as the cost of attending the college, the availability of financial aid, the availability of the student's choice of academic major, the geographical location of an institution, and the communication efforts of an institution play a vital role in the student's college choice process. Chapman suggests that these multiple influencing factors be considered by college administrators while charting student recruitment strategies.

A review of literature was conducted to understand the latest trends in sources of information and important factors influencing prospective students' choice of a college of agriculture. The literature shows three major factors influencing student decisions:

*i) Influential sources of information (individuals and media)*

Studies have shown that prospective students utilize a wide range of sources of information when making the decision to choose a college of agriculture. The most influential individuals as information sources for students were parents and family members, other relatives, friends, alumni, high school agriculture teachers, and college faculty members (Williams et al., 2008; Robinson et al., 2007; Rocca and Washburn, 2007; Bobbitt, 2006; Rocca and Washburn, 2005; Peiter et al., 2004; Segler-Conrad et al., 2004; Washburn et al., 2002; Lynch, 2001; Sivapirunthep, 2000).

Mixed results have been found related to high school agriculture teachers as a source of information and their influence on prospective students making the decision to study agriculture. Segler-Conrad et al. (2004) and Washburn et al. (2002) found that high school agricultural education teachers were the most influential people for freshmen selecting the agricultural education major. Williams et al. (2008) and Peiter et al. (2004) reported that high school agricultural teachers were the fourth most influential individuals for students deciding to attend a college of agriculture. Similarly, Robinson et al. (2007) found that first-time enrollees ranked high school agriculture teachers as the fifth most influential individuals in the college choice process. Rocca and Washburn (2005) reported that high school agriculture teachers had the least influence on high school matriculants' and transfer matriculants' selection of an agricultural college. However, Rocca and Washburn (2007) found that high school agriculture teachers were the most influential people for college students who were former members of Future Farmers of America (FFA).

With increasing access to the Internet, websites are one of the most important sources of information about educational institutions. Rocca and Washburn (2005) found that websites were the most used and the most useful source of information for both high school matriculants and transfer matriculants of the University of Florida. However, Robinson et al. (2007) and Peiter et al. (2004) found university websites to be the fourth most helpful source of information for university freshmen. Washburn et al. (2002) studied factors influencing the college choice of first-time enrollees in the College of Agriculture, Food and Natural Resources at the University of Missouri and found that, although the university and college websites were used by less than 50% of the respondents, the respondents perceived them as useful sources of information.

Printed materials, such as university and college brochures, were also useful sources of information for prospective students (Robinson et al., 2007; Rocca and Washburn, 2005; Peiter et al., 2004; Washburn et al., 2002; Cole and Thompson, 1999). Cole and Thompson (1999) found that nearly 70% of the respondents at Oregon State University used

pamphlets or literature to learn about the college of agriculture. Robinson et al. (2007) found that first-time enrollees ranked printed university publications as the second most used source of information when choosing a college of agriculture. Washburn et al. (2002) reported that university publications were used by seven and eight out of 10 matriculants and non-matriculants, respectively, in the College of Agriculture, Food and Natural Resources at the University of Missouri. Peiter et al. (2004) found that brochures were the third most used source of information by freshmen majoring in agriculture at the University of Kentucky. Rocca and Washburn (2005) found that more than 50% of high school matriculants and transfer matriculants used printed university publications in the College of Agriculture and Life Sciences at the University of Florida.

Campus visits were the most important source of information for first-time enrollees in colleges of agriculture (Robinson et al., 2007; Peiter et al., 2004). Robinson et al. (2007) and Washburn et al. (2002) reported that nearly 75% of the first-time enrollees in the College of Agriculture, Food and Natural Resources at the University of Missouri used campus visits as the most important source of information when deciding to attend the agriculture college. Peiter et al. (2004) found that university freshmen ranked campus visits as the most helpful source of information influencing their decision to attend colleges of agriculture in one land-grant and three non-land-grant universities in Kentucky. Rocca and Washburn (2005) and Cole and Thompson (1999) reported that more than 50% of the respondents used campus visits as a source of information and found them useful in making the decision to attend colleges of agriculture.

*ii) Institutional characteristics*

The major institutional characteristics influencing prospective students' decisions to choose a college of agriculture were the reputation of the university or college, preparation for employment, opportunities after graduation, faculty quality and reputation, and quality of the facilities (Robinson et al., 2007; Rocca and Washburn, 2005; Washburn et al., 2002). Rocca and Washburn (2007) reported that opportunities after graduation and preparation for employment were the two most influential institutional characteristics for respondents who were former FFA members. Availability of scholarships ranked below the middle in a long list of 17 institutional characteristics (Rocca and Washburn, 2007). Class size was the least influential institutional characteristic in all three studies mentioned above.

*iii) Academic program characteristics*

Studies have revealed that career opportunities available for graduates were the most influential academic program characteristic for students choosing an agricultural college (Robinson et al.,

2007; Rocca and Washburn, 2007; Peiter et al., 2004; Washburn et al., 2002). Quality and reputation of courses was ranked the second most influential academic program characteristic in studies by Robinson et al. (2007) and Rocca and Washburn (2005). In their studies, Rocca and Washburn (2007) and Peiter et al. (2004) found that respondents ranked the reputation of faculty members as the second most influential factor. The least influential academic program characteristic was the number of students in a major.

## Purpose and Objectives

The specific objectives of this paper are to:

1. Document a demographic profile of undergraduate students currently enrolled in the CANR at MSU;
2. Identify how students decided to enter the CANR;
3. Identify sources of information used by the CANR students to learn about college majors; and
4. Identify and rank the factors influencing students' decisions to enroll in the CANR majors.

## Methods

The population for this five-year study was the undergraduate students enrolled in the CANR at MSU from spring 2004 through spring 2008. The study utilized an online survey for simplicity and cost effectiveness. The survey instrument was developed on the basis of an extensive review of literature relevant to students' assessments of undergraduate programs. The draft instrument was shared with the CANR assessment committee members, undergraduate advisors, and coordinators to ensure the face and content validity. The final survey instrument incorporated the comments and suggestions received from the CANR assessment committee members, undergraduate advisors, and coordinators.

The instrument was designed as an online survey to solicit students' academic information: academic status, primary majors, dual majors, second degrees, entrance to the CANR, sources of information used to learn about college majors in the CANR, and important factors in making the decision to enter their current CANR majors. The electronic mail addresses of the current undergraduate students were obtained from the Office of the Dean in the CANR. The online surveys were sent to all current undergraduate students through university e-mail in a personalized cover letter, along with a hyperlink to the survey. Students were asked to click on the hyperlink in the e-mail text to access the web-based survey. Once the student completed the survey and clicked the "submit" button, data were automatically collected in the web-based database. The survey was administered in the spring semester from mid-March to April of each year from 2004 to 2008. It should be noted that all students except the graduating seniors were invited to participate in the online survey and some students could have completed the survey in consecutive years.

To increase the survey response, a free two-scoop ice cream coupon was provided as a token incentive to each participant who completed the survey. Additionally, survey reminders were sent after one week and again a week before the ice cream event to enhance the survey response rate. The response rates were 30.8%, 9.5%, 25.4%, 22.2%, and 34.4% in 2004, 2005, 2006, 2007, and 2008, respectively. The overall survey response rate for the five-year survey was 24.5%. It is noted that survey response rate was lowest (9.5%) in 2005. Authors believe that the most likely reason for a lower response rate could be the lack of incentive to survey participants and fewer follow ups in 2005. Unlike other survey years, the survey participants were not provided ice-cream coupons as an incentive in 2005, and the number of follow-ups was less than other survey years, which could be the most probable cause for the lowest response rate.

Non-response error, inherent in any survey research, is a potential threat to the external validity of the study. In order to overcome the problem of non-response error in survey research, social scientists have recommended three statistically sound and professionally acceptable methods, namely: compare early to late respondents, compare respondents to population on characteristics known *a priori*, and compare respondents to non-respondents (Miller and Smith, 1983; Lindner et al., 2001; Dooley and Lindner, 2003). This study adopted two methods: comparison of respondents with population and comparison of early respondents with late respondents in handling the non-response error. Comparison of respondents with population for certain demographic characteristics such as gender, ethnicity, residential background (rural or urban), residency status (in-state, out-of-state, and international), and participation in 4-H/FFA revealed no differences between the two groups. Similarly, early respondents were compared with late respondents for two variables: sources of information used and factors influencing their decisions to enroll in the CANR major. The results indicated no differences between the early and late respondents. Therefore, the test results for nonresponse error in this study suggest that the findings can be generalized to other similar population.

The data were analyzed by using the computer software Statistical Package for Social Science (SPSS 15) for Windows. The data were summarized by using descriptive statistics: frequency, mean, and standard error of mean. The factors in deciding to enter the CANR program were identified by calculating the mean and standard error of mean for each factor and then ranked in descending order on the basis of mean. The reliability of each factor was determined by Cronbach's alpha procedure. The overall reliability for factors in deciding to enter the CANR program was 0.867.

## Results and Discussion

This section presents the results and discussion of the five-year study. Results are summarized in descriptive statistics for demographic characteristics of survey respondents, their responses to enter the CANR, use of sources of information to learn about the CANR majors, and important factors in making their decisions to enter their current majors. A total of 2,798 undergraduate students within the CANR at MSU participated in the five-year study.

### Demographic characteristics of respondents

Of 2,798 respondents who completed the online survey from 2004-2008, 384 (13.7%) were freshmen; 689 (24.6%) were sophomores; 1,117 (39.9%) were juniors; and 608 (21.7%) were seniors. Of the total respondents, 184 (6.6%) indicated that they had second majors. Over three out of five (63.8%) were female. The age of respondents ranged from 18 to 58 years with a median age of 20 years.

In all survey years, more than four out of five survey participants were Caucasian (87.1%). Participation of Hispanic (3.9%) and Asian-American students (2.5%) was slightly higher than the participation of African-American students (2.1%). Less than 1% (0.6%) of students was Native American.

In all survey years, less than one-fifth (19.3%) of respondents were from rural areas and had farm experience. A little more than a quarter (26.1%) of the respondents were from rural areas but had no farm experience. The majority of respondents (43.8%) were from suburban communities, and 10.8% of the respondents were from urban communities. A residency status question was added to the survey in 2005 and findings showed that nine out of ten (91.7%) respondents were in-state students. Participation of out-of-state students and international students was 5.7% and 2.6%, respectively. Nearly one quarter (24.4%) of respondents had participated in youth development programs such as 4-H and FFA. More than half (55.3%) of the respondents indicated membership in the National Honor Society while they were in high school.

### Sources of students in the CANR

The CANR at MSU receives students from various sources. Table 1 presents the sources of students in the CANR program at MSU. Of the 2,782 respondents, 1,008 (36.2%) indicated that they entered the CANR directly from high school. In each of the five years of the study, more than 30% of the respondents indicated that they entered the CANR program directly from high school. Thirteen percent (13.3%) of the respondents were transfer students from community colleges. Less than 10% (8.2%) of the respondents were transfer students from other colleges or universities. About 1% (1.3%) of respondents was transfer students from MSU's Agricultural Technology program. Forty-one percent of the

respondents were transfer students from other MSU programs.

According to the National Center for Higher Education Management System (NCHEMS, 2009), the three year (2004, 2006, and 2008) average college-going rate of high school graduates (directly from high school) is 61.3% in Michigan. This finding suggests that it may be possible for the CANR at MSU to increase its enrollment of students directly from high schools by improving its recruiting strategies.

Community colleges have provided 13% of the total students in the CANR, which is less than half of the current transfer rate of 28.9% from community colleges to four-year programs nationally (Eddy et al., 2006). According to a national study conducted for the National Center for Educational Statistics, 68% of beginning community college students enrolled in an academic program, and 71% indicated that they anticipated earning a bachelor's degree or higher (Bradburn et al., 2001). A study of Michigan community college students indicated that 61% intended to transfer to other institutions, and 79% of those indicated that they intended to transfer to public four-year schools in Michigan (Monroe and Richtig, 2002). These statistics indicate that community colleges are the potential source of students for four year public colleges including CANR at MSU.

Transfer students from other MSU programs made up the largest proportion of the CANR students. However, the percentage of transfer students decreased by 1% per year during the last three years of the study (2006-2008). Overall, nearly two-thirds of the survey respondents were transfer students either from other colleges/universities or from other MSU programs.

### Sources of information used by the respondents

Prospective students use various sources of information when selecting a college. Table 2 presents the frequency count and percentage for sources of information used by respondents to learn about CANR majors at MSU. Respondents were asked to indicate various sources of information they had used.

The results indicated that family and friends (31.8%), university and college website (27.1%), and printed materials (12.2%) were the top three primary sources of information used by the respondents to learn about CANR majors. Five percent of the respondents received information about the CANR from high school counselors, teachers, and CANR faculty members. The least utilized source of information was high school career days and

recruitment meetings. Other sources of information included professional meetings organized by 4-H, FFA, and the Career Center and events such as Ag Expo and ANR Week, organized by the CANR.

Prospective students used many sources of information, including parents, guardians, and friends, in the process of making the decision to choose a particular college or major. This study shows that family and friends were the principal source of information to learn about CANR majors; this is consistent with the findings of Cole and Thompson (1999) and Peiter et al. (2004).

University and college websites are important sources of information for today's technologically savvy students. Respondents in this study indicated that the MSU and CANR websites were their second most important source of information. These findings are consistent with Hoyt and Brown (2003); Butler et al. (2004); and Rocca and Washburn (2005), who found that high school and transfer matriculants used websites to learn about degree programs.

Printed materials, such as college brochures and university publications, are useful sources of information for prospective college students. The findings of this study revealed that printed materials were the third most useful source of information in selecting CANR programs at MSU. This result is in agreement with the findings of other studies (Rocca and Washburn, 2005; Peiter et al., 2004; Hoyt and Brown, 2003), in which printed materials were ranked as the third most important source of information used by students while selecting a college of agriculture. However, Cole and Thompson (1999) and Segler-Conrad et al. (2004) found that university pamphlets and brochures rated as highest in importance, and Robinson et al. (2007) found that they were the second most important source of information used by the respondents when selecting a college of agriculture.

High school counselors, teachers, and college professors were collectively ranked as the fifth most important source of information. In other research studies, however, personal contact or conversations with professors have been found to be a more important and more frequently used source of information (Peiter et al., 2004; Segler-Conard et al., 2004; Washburn et al., 2002). More than a quarter of students consulted high school teachers when

**Table 1. Sources of students in the CANR**

| Entrance | 2004 Freq. (%) | 2005 Freq. (%) | 2006 Freq. (%) | 2007 Freq. (%) | 2008 Freq. (%) | Total Freq. (%) |
|---|---|---|---|---|---|---|
| From high school | 250 (33.2) | 72 (32.0) | 189 (37.9) | 186 (35.8) | 311 (39.6) | 1,008 (36.2) |
| Transferred from community college | 101 (13.4) | 23 (10.2) | 73 (14.6) | 74 (14.2) | 98 (12.5) | 369 (13.3) |
| Transferred from other college/university | 62 (8.2) | 20 (8.9) | 27 (5.4) | 47 (9.1) | 72 (9.2) | 228 (8.2) |
| Transferred from MSU's AgTech | 9 (1.2) | 6 (2.7) | 7 (1.4) | 9 (1.7) | 6 (0.7) | 37 (1.3) |
| Transferred from another MSU program | 331 (44.0) | 104 (46.2) | 203 (40.7) | 204 (39.2) | 298 (38.0) | 1,140 (41.0) |
| Total | 753 (100) | 225 (100) | 499 (100) | 520 (100) | 785 (100) | 2,782 (100) |

choosing the College of Agricultural Sciences at Oregon State University (Cole and Thompson, 1999). A recent study by Williams et al. (2008) revealed that high school agriscience teachers and high school counselors were ranked as the fourth and 12th most influential persons by first-time agriculture students at Texas Tech University.

University representatives have been found to be a very important source of information for prospective students choosing college majors. Nine percent (8.9%) of the respondents utilized the personnel from University Undergraduate Division (UUD) at MSU as their source of information to learn about CANR majors. However, this response item was added in the survey from 2006. Similar results were found by Robinson et al. (2007) in their study of influential factors used by first-year, first-time enrollees at the University of Kentucky, who found conversations with college admissions representatives as one of the most important sources of information.

The importance of campus visits as a source of information for prospective students was asked only in the 2008 survey. Campus visits were equally utilized as the printed materials by respondents in 2008. Research indicates that campus visits have been found to be a widely used and very useful source of information for college students choosing a college of agriculture (Robinson et al., 2007; Rocca and Washburn, 2005; Peiter et al., 2004; Hoyt and Brown, 2003; Washburn et al., 2002; Cole and Fanno, 1999).

In summary, family and friends, university and college websites, and printed materials are the most used sources of information by prospective students to learn about CANR majors at MSU.

### Factors in selecting CANR majors

The final objective of this study was to identify the important factors in deciding to enter CANR and to rank them for the various groups of respondents in order of importance, from high to low. To accomplish this objective, the survey asked respondents the question "How important was each of the following factors to your decision to enter your current CANR major?" The question contained 16 response items to be rated on a scale of 1, indicating "not important," to 4, "extremely important."

Table 3 presents the important factors on the basis of the mean for each of the factors, and their rankings in descending order for overall respondents and for each group of

respondents. The description, comparisons, and discussions follow for each factor by type of respondents.

Academic program or curriculum in the CANR was found to be a very important factor, and it ranked first across the various groups of respondents. It was highest for transfer students from within MSU, with the highest mean score (mean=3.36) among the four groups. Respondents who entered the CANR directly from high school and transfers from other colleges/university perceived the CANR's academic program or curriculum to be equally important.

The reputation of the CANR at MSU was ranked the second most important factor by respondents in three groups: students entering directly from high school, transfer students from community colleges, and transfer students from other colleges/universities. Overall, the reputation of the CANR ranked as the second most important factor for respondents entering the CANR.

These results show that the academic program characteristics and the institutional reputation of the CANR at MSU are the two most important factors in prospective students' decision to choose a CANR major. These findings are consistent with the findings of other studies (Robinson et al., 2007; Rocca and Washburn, 2005; Hoyt and Brown, 2003; Hodges and Barbuto, Jr., 2002; Pratt and Evans, 2002; Washburn et al., 2002; Chapman, 1981) that investigated the factors influencing college choice decisions.

Opportunity for internships was ranked the third most important factor by the respondents who came directly from high school and transfer students from other colleges/universities. It is important to note that transfer students from other programs within MSU ranked internship opportunities in the CANR as the second most important factor. The reason for this ranking could be that the transfer students within MSU had already been on campus for some

**Table 2. Sources of information used by respondents to learn about CANR majors**

| Sources | 2004 (N=761) | | 2006 (N=500) | | 2007 (N=525) | | 2008 (N=786) | | Total (N=2,572) | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Freq. | (%) | Freq. | (%) | Freq. | (%) | Freq. | (%) | Freq. | (%) |
| Family/Friends | 404 | (37.0) | 230 | (29.9) | 221 | (29.0) | 387 | (30.3) | 1,242 | (31.8) |
| University/College website | 231 | (21.1) | 237 | (30.9) | 234 | (30.7) | 356 | (27.9) | 1,058 | (27.1) |
| Printed materials (college brochures) | 190 | (17.4) | 99 | (12.9) | 83 | (10.9) | 103 | (8.1) | 475 | (12.2) |
| High school counselor/teacher | 68 | (6.2) | 42 | (5.5) | 37 | (4.9) | 57 | (4.5) | 204 | (5.2) |
| Professor (Advisor) | 90 | (8.2) | 26 | (3.4) | 32 | (4.2) | 55 | (4.3) | 203 | (5.2) |
| High school career day/ recruitment meetings | 33 | (3.0) | 10 | (1.3) | 11 | (1.4) | 17 | (1.3) | 71 | (1.8) |
| Others (FFA, 4-H, Career Center, Ag Expo, etc.). | 77 | (7.0) | 45 | (5.9) | 34 | (4.5) | 38 | (3.0) | 194 | (5.0) |
| University Undergraduate Division | * | | 79 | (10.3) | 110 | (14.4) | 159 | (12.4) | 348 | (8.9) |
| Campus visit | ** | | | | | | 106 | (8.3) | 106 | (2.7) |
| Total | 1,093 | (100) | 768 | (100) | 762 | (100) | 1,278 | (100) | 3,901 | (100) |

Note:
i. This was a multiple-response question, so the total frequency counts exceed the total N in each survey year.
ii. This question was not asked in the 2005 survey.
* This item was added in the 2006 survey.
** This item was added in the 2008 survey.

time and may have gotten a chance to compare the internship opportunities available in their former major department with those available in the CANR. Thus, availability of more internship opportunities for students in the CANR might have influenced the students from other MSU programs. Studies show that career opportunities after graduation are one of the most important criteria for selection of college major for students (Robinson et al., 2007; Rocca and Washburn, 2005; Hoyt and Brown, 2003; Pope and Fermin, 2003; Hodges and Barbuto, Jr., 2002; Washburn et al., 2002). Internships are associated with job placements after graduation. It is believed that internship opportunities may lead to full-time job offers. A recent study of Michigan State University indicates that graduates who stack up as many internships as possible have a high chance of getting jobs (Gardner, 2008).

Academic advising was ranked the sixth most important factor by respondents from community colleges and transfer students from other colleges/universities. It was ranked seventh by the respondents who entered the CANR directly from high school but fourth by respondents who transferred from other MSU programs. Overall, academic advising was ranked the fourth most important factor for respondents' decision to enter the CANR programs. Findings of a study on undergraduate students' satisfaction with academic advising at Michigan State University indicated that respondents were very satisfied with academic advising

services in the CANR (Shrestha, 2009). In the same study, the participants who were transfer students were more satisfied with academic services in the CANR than with those in their former academic departments.

Recommendations of friends, alumni, and family members appeared as the fifth most important factor. Respondents who transferred from other colleges/universities and other MSU programs rated recommendations of friends, alumni, and family members equally as the fifth most important factor influencing their decision to enter the CANR. Respondents who entered the CANR program directly from high school, however, ranked them as the fourth most important factor, which suggests that first-time applicants were much more influenced by their parents, peers, and alumni than were respondents who were not first-time enrollees. The results for the respondents who entered directly from high school are similar to the findings of Robinson et al. (2007). In their study, parent or guardian and friend in college were ranked the third and fourth most influential people in the college choice decision for first-time enrollees. Similar results were obtained by Esters and Bowen (2005) and Reis and Kahler (1997) about factors influencing agricultural education students in making their career decisions.

Opportunity for study abroad was perceived very differently by the various groups of respondents. Respondents directly from high school ranked it as the fifth most important factor; respondents from

**Table 3. Factors in selecting CANR majors**

| Factors | High school (N=1,005) | | Community college (N=368) | | Other college/university (N=227) | | MSU's other programs (N=1,170) | | Overall Rank | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Rank | Mean*(± s.e.) | Rank | Mean*(± s.e.) | Rank | Mean*(± s.e.) | Rank | Mean*(± s.e.) | Rank | Mean* (± s.e.) |
| Academic program/curriculum suited to your interests | 1 | 3.31 (±0.02) | 1 | 3.19 (±0.04) | 1 | 3.31 (±0.05) | 1 | 3.36 (±0.02) | 1 | 3.31 (±0.01) |
| Reputation of CANR at MSU | 2 | 2.85 (±0.03) | 2 | 2.78 (±0.05) | 2 | 2.87 (±0.06) | 3 | 2.56 (±0.03) | 2 | 2.72 (±0.02) |
| Opportunity for internships | 3 | 2.62 (±0.03) | 4 | 2.50 (±0.06) | 3 | 2.67 (±0.07) | 2 | 2.61 (±0.03) | 3 | 2.60 (±0.02) |
| Academic advising | 7 | 2.35 (±0.03) | 6 | 2.28 (±0.05) | 6 | 2.38 (±0.07) | 4 | 2.47 (±0.03) | 4 | 2.39 (±0.02) |
| Recommendation of friend/alumni/family member | 4 | 2.49 (±0.03) | 6 | 2.28 (±0.05) | 5 | 2.41 (±0.06) | 5 | 2.30 (±0.03) | 5 | 2.38 (±0.02) |
| Opportunity for study abroad | 5 | 2.43 (±0.03) | 11 | 2.04 (±0.06) | 10 | 2.23 (±0.07) | 7 | 2.17 (±0.03) | 6 | 2.25 (±0.02) |
| Scholarship/financial aid | 6 | 2.42 (±0.04) | 5 | 2.36 (±0.07) | 7 | 2.36 (±0.09) | 14 | 2.04 (±0.04) | 6 | 2.25 (±0.03) |
| Clubs and extracurricular options | 8 | 2.31 (±0.03) | 11 | 2.04 (±0.05) | 13 | 2.14 (±0.06) | 8 | 2.16 (±0.03) | 7 | 2.20 (±0.02) |
| Personal/family reasons | 9 | 2.27 (±0.03) | 8 | 2.18 (±0.05) | 9 | 2.26 (±0.07) | 10 | 2.11 (±0.03) | 8 | 2.19 (±0.02) |
| Opportunity for research | 10 | 2.26 (±0.03) | 7 | 2.19 (±0.06) | 8 | 2.27 (±0.07) | 9 | 2.12 (±0.03) | 8 | 2.19 (±0.02) |
| Credit evaluation and transfer | 14 | 1.89 (±0.03) | 3 | 2.61 (±0.06) | 4 | 2.60 (±0.07) | 6 | 2.19 (±0.03) | 9 | 2.17 (±0.02) |
| Class size | 11 | 2.13 (±0.03) | 10 | 2.09 (±0.06) | 11 | 2.21 (±0.07) | 12 | 2.09 (±0.04) | 10 | 2.12 (±0.02) |
| Opportunity for service learning | 11 | 2.13 (±0.03) | 9 | 2.12 (±0.05) | 12 | 2.19 (±0.06) | 11 | 2.10 (±0.03) | 10 | 2.12 (±0.02) |
| Faculty member contact | 12 | 2.06 (±0.03) | 12 | 1.96 (±0.06) | 14 | 2.00 (±0.07) | 13 | 2.07 (±0.03) | 11 | 2.04 (±0.02) |
| 4-H/FFA background | 13 | 1.97 (±0.04) | 13 | 1.57 (±0.05) | 15 | 1.64 (±0.06) | 16 | 1.42 (±0.02) | 12 | 1.66 (±0.02) |
| Ineligible for preferred major at MSU | 15 | 1.40 (±0.02) | 14 | 1.40 (±0.04) | 16 | 1.44 (±0.05) | 15 | 1.60 (±0.03) | 13 | 1.49 (±0.02) |

* Mean is computed based on 1= not important, 2=somewhat important, 3=very important, and 4=extremely important

other colleges/universities and community colleges ranked it as the 10th and 11th most important factor, respectively, in their decision to enter a CANR program. Respondents from other MSU programs ranked it as the seventh most important factor. According to the Open Door report (2008/09), MSU ranked No. 1 for study abroad participation among public universities for the sixth year in a row (MSU News, November 15, 2010). Despite MSU's reputation as a top public university in study abroad program, respondents from other colleges and universities perceive this factor as "somewhat important," this could be due to the "credit crunch" experienced by them on a shorter timeline. Overall, opportunity for study abroad was ranked as the sixth most important factor in respondents' decision to enter a CANR program.

Scholarship/financial aid was also ranked the sixth most important factor overall. Respondents directly from high schools and community colleges perceived scholarship/financial aid to be a more important factor than did respondents from other colleges/universities and transfer students from within MSU. For transfer students from other programs at MSU, scholarship/financial aid was one of the least important factors in their decision to join a CANR program. A similar result was found by Rocca and Washburn (2005): in their decision to enter the agricultural college at the University of Florida, high school matriculants were more influenced by scholarships awarded than were transfer matriculants. A study of factors affecting transfer decisions of community college students in Michigan revealed that, of the students who were planning to transfer, 38% were expecting financial aid from four-year colleges (Monroe and Richtig, 2002). However, Hodges and Barbuto, Jr., (2002) found that financial aid was one of the most influential factors for recruiting rural and urban high school students.

Clubs and extracurricular options were ranked the eighth most important factor by the respondents who entered directly from high schools and transfer students from within MSU. This was perceived to be a more important factor by respondents who transferred from community colleges than by the respondents who transferred from other colleges/ universities. Overall, clubs and extracurricular activities ranked seventh of the 16 factors. The focus group study of graduating seniors in the CANR at MSU (Shrestha, 2009) found that extracurricular activities conducted by the student clubs -- such as Forestry Club, Park and Recreation Club, Fisheries and Wildlife Club, and Horticulture Club -- were very important to CANR students at MSU for hands-on learning and developing skills for employment.

Personal/family reasons and the opportunity to get involved in research activities were equally ranked as the eighth most important factor overall. Undergraduate research is a powerful pedagogical approach for fostering competencies in creativity and innovation, problem solving, systems thinking, and civic, social and personal responsibility. Undergraduate research opportunities allow students to become more actively engaged in their education through intellectual and practical learning. Students develop research, analytical, writing, and speaking skills, which ultimately help them better prepare for their future careers in either graduate study or meaningful employment. Given the increasing call for undergraduate research experiences and the availability of research grants from National Science Foundation, United States Department of Agriculture, and National Health Institute, opportunities for getting involved in research activities have become one of the important factors for making the decision to enter the CANR.

Credit evaluation and transfer were ranked the third most important factor by the respondents who entered from community colleges and the fourth most important factor by respondents who transferred from other colleges/universities. Transfer students from within MSU ranked credit evaluation and transfer as the sixth most important factor. However, it was one of the least important factors for respondents who entered the CANR programs directly from high school; this is likely the case because not many high school students enter college with transfer credits. Although it was ranked as the ninth most important factor overall, it was among the top four most important factors for transfer students. This indicates that easy credit evaluation and transfer is one of the most important factors for transfer students deciding to enter a CANR major. One of the themes raised by the respondents in Monroe and Richtig's (2002) study of factors affecting the transfer decisions of community college students in Michigan was that four-year colleges should accept credits earned in community colleges and make the credit transfer process easy.

Class size and opportunity for service learning ranked as the 10th most important factor for respondents in their decision to enter a CANR program. Both factors were almost equally ranked by respondents within and across the groups. Other studies also found that class size was one of the least important factors for prospective students choosing an agricultural college major (Robinson et al., 2007; Rocca and Washburn, 2005; Washburn et al., 2002). Rocca and Washburn (2005) found, however, that class size was a more important factor for students entering the University of Florida directly from high school than it was for transfer matriculants.

Faculty member contact, 4-H/FFA background, and ineligibility for their preferred major at MSU were the least important factors in deciding on a CANR major. Results indicate that the 4-H and FFA background of respondents was the least important factor for making the decision to choose an agricultural major. It is important to note, however, that only 24.4% of the respondents had 4-H and/or FFA

backgrounds. Therefore, the mean ranking was skewed. An analysis of the respondents with 4-H and/or FFA backgrounds revealed that having a 4-H and/or FFA background was a very important factor in selecting a CANR major. A study by Williams et al. (2008) found that related clubs or organizations were the fifth highest rated influencing factors for agriculture students choosing an academic major at Texas Tech University.

Overall, three factors -- academic program or curriculum, institutional reputation of the CANR, and opportunity for internships -- were the top three factors for respondents in deciding to enter into a CANR program.

## Summary

This study is aimed at understanding the demographic profile of the undergraduate students in the CANR at MSU and identifying the routes by which they entered CANR programs, the sources of information they used to learn about the programs, and factors influencing their decisions to choose majors in the CANR at MSU.

Analysis of the demographic data showed that a high majority of the respondents in this study were Caucasian females from suburban or urban communities, and residents of Michigan. Less than a quarter of the respondents had participated in 4-H and/or FFA activities, so a large majority of respondents did not have backgrounds involving working in agriculture-related clubs and organizations or prior experience in agriculture. Given the demographic characteristics of respondents, the CANR may develop strategies to promote agriscience studies in high schools and recruit more students who have prior experience in agriculture, have taken agriculture courses in high schools, and were members of 4-H and/or FFA.

There are four major sources of students for the CANR: transfer students from within MSU (41%), students entering the CANR directly from high schools (36.2%), students from community colleges (13.3%), and transfer students from other colleges and universities (8.2%). Among these entrants, it is easier to identify and target students from high schools and community colleges than transfer students from other colleges/universities and from within MSU. Therefore, recruitment officers in the CANR should target high school students and community college students by working with high school teachers/counselors and community college transfer counselors.

Family members and friends were the most influential individuals as sources of information for prospective students in the CANR at MSU; other sources were websites and printed materials. Campus visits ranked as the fourth most frequently used source of information. Therefore, it is recommended that recruiters for the CANR at MSU:
• Work with parents and guardians of prospective students to provide accurate information about college majors.
• Work with the college alumni network to disseminate college information.
• Update college websites regularly and make them more interactive and informative.
• Distribute college brochures to high school and community college students.
• Promote campus visits for prospective students and their parents and guardians.

Academic program/curriculum, the reputation of the CANR at MSU, and opportunities for internships were the top three important factors influencing students' decisions to enter CANR majors at MSU. Other factors influencing respondents' decision to enter CANR majors were academic advising, recommendations of friends, alumni, and family members, opportunity for study abroad, scholarships and financial aid, and clubs and extracurricular activities. Recommendations of friends, alumni, and family members were more influential to respondents who entered the CANR directly from high school than they were for other entrants. Credit evaluation and transfer, and scholarships and financial aid, were more important factors for respondents who transferred from community colleges than they were for other entrants.

On the basis of these findings, the CANR should continue offering the current academic programs, maintain its institutional reputation, and work closely with potential employers to find opportunities for student internships. Linkages should be established with transfer counselors and advising officials at community college transfer centers to inform community college students about the transfer process, requirements, programs, and prospects of higher education in agriculture. Transfer students need help in transferring credits and applying for scholarships and financial aid. The CANR recruitment office should work closely with key persons, such as agriscience teachers, the state supervisor for the agriscience program, local FFA chapters, and 4-H educators and club leaders to facilitate the college application process, especially for 4-H and FFA members.

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# Fostering Political Activism in Animal Agriculture Courses

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## Abstract

Younger voters consistently fail to engage in American politics and rarely view political issues as pertinent enough to warrant participation. An agricultural issue on the November, 2009, Ohio ballot presented a unique opportunity to encourage student participation in politics. The proposed constitutional amendment (Issue 2) would create an Ohio Livestock Care Standards Board responsible for establishing animal care guidelines. This proposal was in response to legislation passed in other states. Fifty-nine students enrolled in three undergraduate animal science courses were administered pre- and post-tests. These students designed and implemented projects to educate voters on Issue 2, which they evaluated upon completion. Student projects included passive education, social networking, website development, radio, email and active campaigning. On a 1-10 Likert scale, pre-assignment familiarity scores were $2.47 \pm 2.01$, $5.29 \pm 2.83$, and $2.95 \pm 2.61$ for Issues 1, 2, and 3 respectively. Post-assignment familiarity scores increased on Issue 2 to $8.83 \pm 1.79$ (p < 0.001) and Issue 3 to $6.52 \pm 2.44$ (p < 0.05). Similarly, students' overall knowledge of Issue 2 increased (p < 0.01) between pre-test (42.1%) and post-test (70.7%) scores. This activity increased students' perception and knowledge of contemporary ballot issues while actively engaging them in the political system.

## Introduction

Voter participation is the key tenet of an effective democratic government. Yet, numerous studies have shown younger voters to be apathetic when it comes to civic engagement (Converse, 1971; Wattenberg, 2007; U.S. Census Bureau, 2010). Published studies have addressed student activism both domestically and abroad, (Bolten, 2009; Liu, 2004), yet most have focused on cultural issues such as sexuality and racism. Reportedly, student volunteerism and membership in volunteer organizations has increased, however, college students do not seem to be as concerned with politics, but rather appear to be more preoccupied with fame and wealth (Spanier, 2008). Research by Lipka, (2007) has shown that student involvement in politics is very low with roughly a third keeping up with political issues and events. Furthermore, few if any studies have addressed student political activism in the realm of U.S. agriculture. In the 2009 Ohio General election, we foresaw a unique opportunity which allowed us to stimulate student involvement in the political process. This paper describes our efforts to affect student political participation in an area germane to their academic career choice.

Prior to 1998 animal rights' groups had focused their activities in large part to protesting animal hunting and trapping, utilization of animals for research, and highlighting animal exploitation. More recently, Animal Rights' activist groups such as People for the Ethical Treatment of Animals (PETA) and the Humane Society of the United States (HSUS) have sponsored and promoted the passage of controversial legislation in numerous states regarding acceptable practices for food animal production. These groups have become increasingly vocal with regard to how livestock are reared, housed, transported, and slaughtered. Not content with the pace of change exhibited by the American livestock producer, animal rights groups have pushed for legislative measures mandating changes in agricultural production. In 1998 voters in the state of California voted to prohibit the slaughter of horses and sale of horse meat for human consumption. In 2002, HSUS was successful in backing a constitutional amendment in the state of Florida which banned the use of swine gestation crates (Florida Department of State). Using this success as a call to arms, the group then successfully proposed more restrictive legislation in Arizona (Arizona Secretary of State's Office, 2006) and California (California Health & Safety Code § 25990., 2008). Voters in both states passed the legislation by a fairly wide margin.

In late 2008, following the passage of California Proposition 2, which placed severe restrictions on animal housing in the veal, swine, and poultry industries, Animal Rights' group representatives met with Ohio Agricultural industry representatives to work on outlining acceptable food animal production practices in that state. No formal agreements or arrangements arose from these meetings. In response, Ohio Agricultural industry leaders developed a proposal which would create an independent 13 member board to establish and enforce standards governing the care of livestock and poultry. Board members were to include producers, consumers, veterinarians, and animal rights representatives. This constitutional amendment (known as Issue 2) was placed on the 2009 Ohio ballot. Pro-active in nature, this initiative was the first of its kind in the U.S., and was supported by the Governor, and both major political parties. Recognizing this opportunity

might represent a historical juncture in American agriculture whereby the future oversight of livestock production practices might be established, we sought to involve our undergraduate animal science students in the political process working on an issue directly related to their education and their future careers.

Given the traditionally low rate of student involvement in politics in general and agricultural politics specifically, and the unique opportunity presented by Issue 2, we endeavored to study students' awareness, ability, and willingness to become involved in agricultural politics. The objectives of this study were to: 1) measure undergraduate animal science students' familiarity with political issues; 2) educate them regarding a particular issue directly impacting their chosen field of study; 3) enable them to educate others about contemporary political issues and; 4) actively engage them in the political process.

## Methods

Fifty- nine students enrolled in three courses at the Ohio State University Agricultural Technical Institute (Ohio State ATI) participated in the study. Two of the courses were undergraduate level animal science courses and one was an undergraduate level equine course. In early October 2009, students completed a multiple choice pre-test to assess their knowledge, perceptions, and comprehension of statewide ballot initiatives. As part of this assessment, students were asked to indicate their level of familiarity with three statewide issues utilizing a Likert scale (1-10), with one being unfamiliar and ten being very familiar. Additionally, the pre-test specifically assessed student knowledge of factual information regarding Issue 2. Test questions were knowledge questions as defined by Anderson et al., (2001) and further categorized as either tier one, basic recall of elementary details, or tier two which tested more in depth knowledge of the issue.

Following the pre-test students were presented with factual information regarding Issue 2 including pro and con arguments. In order to maintain consistency across all three courses one faculty member presented the material. Students then conducted surveys of random members of the public to determine awareness of and support for Issue 2.

Political action projects were assigned where students were instructed to adopt a stance on Issue 2 either pro or con, formulate an approach to educate voting members of the public, and then implement and document the execution of their political action project. Students were permitted to work individually or in

small groups (< 4). Creativity in developing educational approaches was strongly encouraged and no other limitations were placed upon student projects. In developing their educational approaches, students were encouraged to consider both the number of voters they were likely to interact with as well as the degree or quality of the interaction. Upon completion of the project students prepared a self-evaluation assessing the perceived effectiveness of their educational strategy, their evaluation of the learning process, and a summation on how they believe the result of the vote will impact the future of animal agriculture here in Ohio. Following completion of the political action project, students were administered a post-test, identical to the pre-test, to measure the effectiveness of student-centered experiential learning in a political environment.

Simple means were calculated for self-reported voter registration data. Differences in pre and post-test data were analyzed using Paired T-test, SPSS 2008. Means and standard deviations were reported. This study was deemed exempt by the Ohio State University Institutional Review Board.

## Results and Discussion

Historically, 49.3% of 18-20 year olds nationwide report that they are registered to vote in Presidential election years whereas 37% reported registering in Congressional election years (U.S. Census Bureau, 2010). Information obtained from our pre-test indicated that 71% of Ohio State ATI students enrolled in the participating animal science courses were registered voters (Figure 1). This is much higher than the national average for 18-20 year olds, particularly since this was neither a Presidential or Congressional election year. In part, this may be due to the State of Ohio's efforts to improve voter registration rates by increasing registration opportuni-



**Figure 1. Voter registration and participation among undergraduate college students.**
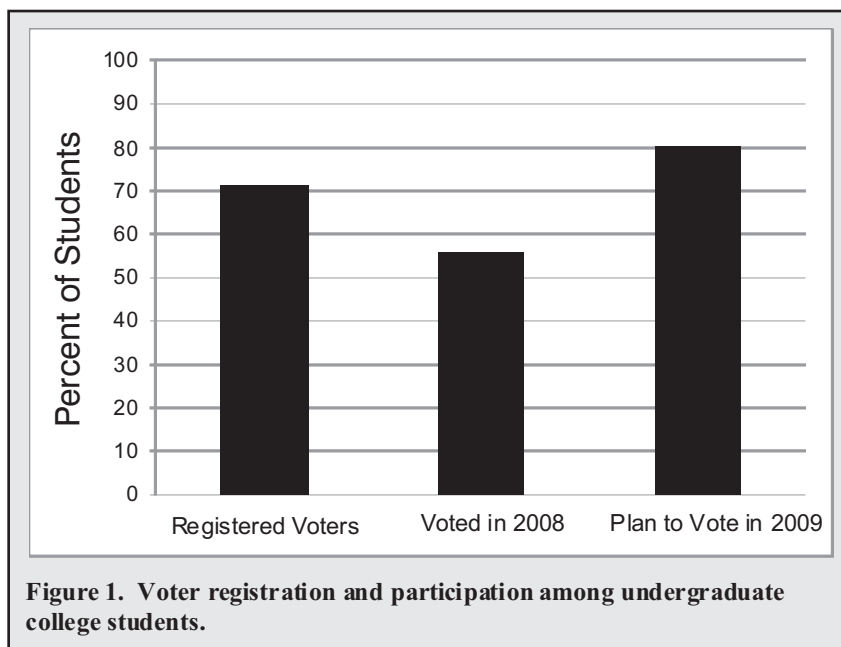
ties. Additionally, citizens with some college are more likely to be registered and more likely to vote according to U.S. Census data (U.S. Census Bureau, 2010). However, only 56% of eligible student voters in our study reported voting in the prior election. Again, this was much higher than the national average reported for 18-20 year old voters in Presidential and Congressional elections years at 41 and 17 %, respectively. A full 80% of Ohio State ATI students indicated on the pre-test that they would vote in the upcoming 2009 election (Figure 1). Students may have perceived this to be the desired response on the pre-test and answered accordingly or prior knowledge of ballot issues, particularly Issue 2, may have influenced their decision to vote.

Students (n = 55) approached 781 random community members during the survey portion of this exercise. Of the 781 interviewed, 70.4% were registered to vote. Student surveys, indicated the percentage of registered voters was very close to that predicted (71.9 %) for Ohio voters based on national statistics, (U.S. Census Bureau, 2008). Of the registered voters surveyed (n=550), 40.2% indicated they were familiar with Issue 2. Thus, the majority of voters were unfamiliar with the issue approximately one month prior to the election.

Student political action projects ranged widely in scope and approach. Some of the more common approaches included: direct and indirect voter contact (e-mail, text messages); social media, including Facebook; and flyer distribution. Alternative approaches included community presentations, participation in organized rallies, website development, radio announcements, marquee displays, and T-shirt sales. Although students were free to select their own stance on the issue, all political action projects were pro Issue 2. This was not surprising given the makeup of the student body. In hindsight, it would have been interesting to engage students in other majors to determine if their attitudes and perceptions were the same. Some students were initially reluctant to become politically active and expressed some apprehension about the assignment.

When asked to rate the effectiveness of their educational approaches, most students estimated their projects educated a minimum of 50 prospective voters. Assessing the quality of their interaction was more difficult. Those utilizing direct contact had a good feel for the level of voter comprehension, whereas those utilizing indirect contact had little or no basis for evaluating voter understanding of the issue. However, all students indicated that they perceived they were effective in successfully educating the voting public on Issue 2. We felt most students were cognizant of the compromise made between broad-based approaches, such as social media, designed to reach large numbers of voters and the quality of one-on-one or small group interactions. One student commented that *"working with small groups of people allows the voter to understand the*

*issue more thoroughly because it opens up more of an opportunity to ask questions that pertain to the issue."*

In their final evaluation of the political action project, most students reported having a positive learning experience despite some initial reluctance. Typical student comments included:

*"The assignment was good and not only educated us but gave us the chance to give back information to others."*

*"This was a different way of teaching us about how we need to be aware of everything that is going on in our world and how it affects us directly and indirectly."*

*"… was a good way for me to learn about contemporary political issues…made me want to research groups such as PETA and HSUS."*

A few students expressed a sincere desire to continue their political activities. Conversely, other students recognized the extensive time commitment the legislative process requires and the importance of differentiating voter education from propaganda.

Comparison of students' self-reported familiarity with statewide political issues before and after the project yielded some interesting results. Students initially expressed more familiarity with Issue 2, the proposed development of an animal care and use standards board than Issue 1, the sale of state bonds and Issue 3, approval to construct several casinos. On a 1-10 Likert scale, pre-assignment familiarity scores were $2.47 \pm 2.01$, $5.29 \pm 2.83$, and $2.95 \pm 2.61$ for Issues 1, 2, and 3 respectively (Figure 2). Not surprisingly, students were more familiar with Issue 2, likely due to their involvement within the agricultural industry. Students may feel the other issues are not pertinent to their daily lives and therefore dismiss any information they may have been presented with regarding these topics. Alternatively, differences in the level of media exposure could be a factor however; none of the issues seemed to garner much media attention. Student self-reported familiarity with Issues 2 ($p < 0.001$) and 3 ($p < 0.05$) increased significantly following the assignment (Figure 2). Numerically, student self-reported familiarity with Issue 1 more than doubled, yet due to a large standard deviation the difference was not statistically significant. These results indicate students perceived their understanding of the Issues was much greater than prior to the assignment.

Similarly, students' overall knowledge of Issue 2 significantly increased ($p < 0.01$) between pre- and post-test scores (Table 1). Knowledge of more in depth questions (tier 2) also increased ($p < 0.05$), while tier 1 scores increased, but not significantly. Students enrolled in animal science courses scored numerically higher on both pre- and post-tests compared to students enrolled in equine courses. All students scored better on tier one questions both pre- and post-test than tier two questions (Table 1). Thus, this experiential learning activity improved both students' perception and factual knowledge on a

current political issue. It was exciting to see students become actively engaged in citizenship despite their apperception and the stigma often associated with American politics.

We feel this assignment afforded us an excellent opportunity to invoke the many different levels of learning as described in Webb's depth of knowledge model (Webb, 1999). The instructors designed multiple choice tests to measure student's ability to recall information regarding political issues. Political action projects allowed students to practice research skills and apply conceptual knowledge, while organization and evaluation of the projects required both strategic and extended thinking. Students felt invested in the project and could directly see how the outcome might directly affect their chosen career path. Additionally, other less measurable benefits of the assignment included; the development of communication skills both written and oral, fostered teamwork, provided leadership opportunities, and invoked a sense of community.

Ohio voters passed Issue 2 on November 3, 2009 with 64 % approving the establishment of an Ohio Livestock Care Standards Board (Ohio Constitution). From their interactions with the voting public on this issue, few if any students were surprised by these results.

In the summer of 2010, the Governor of Ohio along with the leaders of the Ohio Farm Bureau and other Ohio Livestock Commodity groups surprisingly announced that they had reached a compromise with HSUS regarding livestock housing (Coehrs, 2010). This agreement effectively eliminated construction of caged housing for layers and gestation stalls for swine along with many other restrictions for both livestock and non-livestock



Figure 2. Student self-reported familiarity with 2009 Ohio statewide ballot issues increased following completion of a political action project. Error bars indicate standard deviations. Asterisks indicate statistically significant differences for paired bars (*) for (p < 0.05) and (***) for (p < 0.001) using paired t-test.

species. We therefore thought it might be interesting to solicit a response to this agreement from those students in this study which had worked diligently to gain passage of this legislation as this agreement effectively negated much of their efforts. Overwhelmingly, the students that responded felt the Ohio livestock producers had been "sold out" by this agreement and thought: "Issue 2 was a big hassle … because in the end HSUS got what they wanted."

Table 1. Summary of student pre- and post-test scores following completion of an experiential learning political action project.

| | Pre-test Equine | Post-test Equine | Pre-test Animal Science | Post-test Animal Science | Pre-test Combined | Post-test Combined |
|---|---|---|---|---|---|---|
| Overall score | 30.7 % | 58.3 % | 42.1 % | 70.7 % | 37.7 % | 66.7 %** |
| Tier 1 question score | 52.3 % | 78.4 % | 61.5 % | 87.8 % | 58.1 % | 93.1 % |
| Tier 2 question score | 19.9 % | 42.1 % | 32.4 % | 59.6 % | 27.5 % | 53.5 %* |

[1] Asterisks in combined columns indicate statistically significant differences (**) for (p < 0.01), and (*) for (p < 0.05) between pre- and post-test scores using paired t-test.

## Summary

Initial student knowledge of political issues was very limited despite many of them being registered voters. This experiential learning activity engaged

students in the political process, increased their perception and knowledge of contemporary political issues, and stimulated citizenship. Additionally, students reported developing an interest in the political process, improved research and communication skills, and enhanced creativity. Students often thrive when given the opportunity to apply academic lessons in practical situations. As educators we should seek every opportunity to allow students to convert ideas into tangible action.

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# Implications of Neuroscience Developments for Teaching Agricultural Economics/Agribusiness[1]

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## Abstract

Developments in our understanding of human decision making have important implications for agricultural economics and teaching in general. Psychology, neuroeconomics, and economics deal with decision making in different ways, with economics assuming rational behavior while making decisions, and psychology and neuroeconomics studying how decision making occurs in various situations and in different parts of the brain. Results from a great deal of research suggest there are two competing processes for making decisions. Neuroeconomics makes a crucial distinction between automatic ("hot") and controlled ("cold") decision-making processes. Automatic processes are quick, efficient, reactive, and can often be carried out in parallel. These processes frequently originate from emotions and are often based on instant reactions to stimuli. In direct contrast, controlled processes are deliberate, sequential, voluntary, and analytical. Economists base their theoretical models of human decision-making on controlled processes which represent the rational side of human decision-making. Agricultural economists can be more relevant and more realistic in their teaching programs if they accurately reflect how decisions are made. In particular, teaching how both processes work, offers the opportunity to help students better understand economics and help them become more effective decision-makers in all aspects of their lives.

## Introduction

Findings from the relatively new field of neuroeconomics, the study of the biological bases for economic decision-making, are valuable not only in helping us understand ourselves and human behavior but also in pedagogy. The rate of new discoveries about brain structure and function and how they influence human decision-making is astounding. Developing knowledge in this area is frequently reported in the popular media because of its relevance to all of us in our decision making efforts. Keeping up with new knowledge related to decision making will be a challenge, but bringing this knowledge into the agricultural economics classroom can enhance student understanding of decision-making and economic models.

This article will first discuss "brain-based learning" and its relation to economics and applied agricultural economics. Then we will discuss general principles of dual process models of decision-making. These principles will be supported by recent research from the fields of cognitive neuroscience and neuroeconomics. We conclude with future directions for applying neuroeconomics to traditional agricultural economics teaching.

### Brain-based Learning

Literature on brain-based learning has been oriented toward teaching in ways that complement and augment how the brain works. Bellah et al. (2008) published a review and historical timeline of brain-based learning studies. They conclude that using knowledge from both cognitive neuroscience and educational psychology can provide greater insight and expanded views of brain function and learner abilities. Chipongina (2007) posited that "teaching and a need for understanding how the 'organ of learning' works is now linked as never before." We concur, and want to emphasize that cognitive neuroscience is a relatively new field that is growing rapidly, providing information about brain function that is extremely important to the teaching profession.

Although economists are certainly interested in taking advantage of brain processes that facilitate learning, we also are interested in helping students make better decisions, which is one of the most important aspects of learning economics. Students must understand their own decision-making processes to improve them. Decision-making is important, regardless of whether students are deciding whether to attend class, selecting answers on a test, or making personal economic decisions. Moreover, better understanding of decision-making is particularly vital in agribusiness because learning how to make better decisions may be crucial to success in a competitive economic environment.

Economists generally have not questioned or explored how people make decisions. Instead, economists assume people are rational and self-interested, and build models based on these assumptions. Results from these models are intended to provide insights into both consumer and producer behavior. Consistent with their research models, economists also generally teach as though students are consistently rational, logical, and analytical decision-makers. But decades of behavioral research demonstrates that people frequently make decisions based on emotional reactions, interpersonal pressures, and cultural standards, then often apply ad hoc logic and analytical reasoning in an attempt to explain the decisions they have already made (Kardes, 1994). These differences in what economists assume about behavior and how psychologists experimentally describe behavior contribute to making teaching agricultural economics at the undergraduate level a challenging task. Some student difficulties in learning economics stem from the fact that human beings are not always the rational, logical, analytical, self-interested beings that economists assume. Further, students may not recognize themselves when economists describe the rational and self-interested behaviors underlying these models.

Bridging the gap between economics and psychology, neuroeconomics may provide economics instructors with models of decision-making that aid in teaching economics. This growing field applies concepts and theories from psychology and experimental methods from neuroscience to better understand actual human economic behavior. Neuroeconomics, also referred to as decision neuroscience, makes a crucial distinction between automatic ("hot") and controlled ("cold") decision-making processes (Sanfey, 2007). Automatic processes are quick, efficient, reactive, and can often be carried out in parallel. In addition, automatic processes frequently originate from emotions and are often based on instant reactions to stimuli. In direct contrast, controlled processes are deliberate, sequential, voluntary, and analytical. Economists base their theoretical models of human decision-making on controlled processes. Controlled processes represent the rational side of human decision-making. Economists assume that everyone uses controlled, rational modes of thinking during the decision-making process. Neuroscience research supports the distinction between automatic and controlled processing (Camerer, 2008; Sanfey, 2007). In fact, research shows that automatic decisions occur in the emotional centers of the brain (limbic and paralimbic system) whereas controlled processes occur in the planning and organization centers of the brain (orbitofrontal cortex, anterior and dorsolateral regions of the prefrontal cortex) (Camerer et al., 2005; Camerer, 2008; Sanfey, 2007).

### Economics, Applied Economics, and Challenges to the Profession

Traditionally, economists resist the idea that individuals might be irrational, emotional, or biased when making decisions. According to McFadden (1999), the rational consumer model is so deeply entwined in economic analysis that many economists have difficulty imagining that failures of rationality could infect major economic decisions or survive market forces. However, McFadden enumerates accumulating behavioral evidence against the rational model. McFadden calls a consumer "Chicago man" if s/he conforms to the standard economic model of perception, preference, and process rationality. He makes four observations about the Chicago man model: it is convenient, successful, unnecessarily strong, and false. The Chicago man model is false because of overwhelming behavioral evidence against literal interpretations of Chicago man as a universal model of choice behavior. McFadden lists 25 major cognitive anomalies. In summarizing the evidence, he concludes that perception rationality and process rationality fail, but he maintains some hope that preference rationality may hold given that evidence against it is primarily circumstantial. He states that confronted with the accumulated experimental evidence, economists must recognize that the Chicago-man model does not apply universally or even regularly to choices made in non-market contexts.

The idea that Chicago man-type behavior cannot be assumed presents problems for the economics profession in general. McFadden suggests that economists should evolve Chicago man, correcting the most glaring deficiencies as a behavioral model and modifying economic analysis so that it applies to more realistic human behavior. This is a difficult task because the major benefit of rationality assumptions is the relative simplicity of the analysis that follows.

Mittelhammer (2009) states that the call for both relevance and accountability in the work of economists is steadily increasing. This spills over to agricultural economists, who frequently view themselves as applied economists (even though Mittelhammer points out no universally accepted definition is associated with the term applied eco-

nomics). Mittelhammer believes an evolution in the profession has arguably led to a narrowing in the scope of professionally acceptable frameworks for conducting applied economics analyses. He argues that this narrowing may be impeding rather than fostering advances in the field. The pendulum may have swung far enough that a correction in the view of what constitutes acceptable applied economics may be beneficial, overdue, and perhaps even already underway. Further, a more varied and comprehensive collection of approaches used to analyze the complex economic issues in the real world will result in stronger analysis through recognition of new decision-making paradigms that more accurately reflect how decision-makers operate.

Undergraduate teachers do not face problems nearly as substantial as those that researchers face in introducing these new models of decision-making. Students can benefit greatly from lively discussions about how people make decisions and comparisons with the theoretical "Chicago man" decision-making model. McFadden (1999) believes that the discipline of economics needs to catch up to the field of marketing to understand the extent to which the mix and presentation of products reflects anomalies in consumer behavior. Students who are aware of their own departures from rationality also will be able to prevent others from taking advantage of these tendencies; that is, they can improve their decision-making by improving their self-awareness.

Ariely (2009) believes that recognizing where humans depart from the ideal rational being is an important part of the quest truly to understand ourselves, and one that promises many practical benefits. Understanding irrationality is important for our everyday decisions and for understanding how we design our environment and the choices it presents to us. He believes that we are not only irrational, but *predictably* irrational—that our irrationality happens the same way repeatedly. If experiments demonstrate this, teaching students about these irrational tendencies is sensible because students benefit from better understanding both their rational *and* irrational tendencies. The beauty of this approach is that it allows for changes in decision-making. If we as economists assume irrationality away, little room exists to recognize and improve how we decide; however, recognizing our irrational biases can lead to more effective decision-making that benefits both the individual and the greater economy.

### Dual Process Models of Decision-Making and Supporting Evidence

Traditional economic theory ignores decades of psychological research showing the impact of emotions, interpersonal influences, and cultural norms on decision-making. About 30 years ago, Thaler and Schifrin (1981) modeled the individual as an organization. They believed that at any point in time, each individual is both a farsighted planner and a myopic doer. More recently, experts have expanded on this notion and have proposed a dual process framework of decision-making. Fudenburg and Levine (2006) offer a simple dual-self model that provides a unified explanation for several empirical difficulties in explaining behavior. They assert that many types of decision problems should be viewed as a game between a sequence of short-run "impulsive selves" and a long-run "patient self." Ashraf et al. (2006) reported that behavior was determined by the struggle between the "passions" and the "impartial spectator." They reported that behavior was under the direct control of the passions, but believed people could override passion-driven behavior by viewing their own behavior from the perspective of an outsider—the impartial spectator. Loewenstein (2000) expands on this notion, asserting that a wide range of emotions, drive states, and feeling states grab people's attention and affect their behavior. He argues that people are powerfully influenced by their emotional states, and he discusses how to model individuals when they are in a "hot" or "cold" state. Loewenstein et al. (2003) have used state-dependent utility to model decision-making— the mental state of the individual influences the utility received from consumption. They explain projection bias, or the tendency of people to exaggerate the degree to which their future tastes will resemble their current tastes; a variety of domains support the existence of poor decision-making due to this bias. Shiv and Fedorikhin (1999) examine how automatic processes and more controlled processes influence consumer decision-making. They believe that when our rational, analytical cognitive processes are freely available, they have a dominating impact on and influence over our behaviors. In contrast, when our analytical processes are in use or overloaded, our emotions have greater impact on our decisions. Benhabib and Bisin (2004) developed a model of consumption in which individuals have the ability to invoke either automatic processes or alternative control processes. According to their study, automatic processes are susceptible to temptation and control processes are immune to such temptations.

Neuroscience research supports the distinction between automatic and controlled processing (Camerer, 2008; Sanfey, 2007). Early research resulted from disease models of individuals with neurological damage. These individuals showed predictable changes in decision-making. Bechara (2004) discusses several studies of decision-making in neurological patients who can no longer process emotional information normally. Damage to the ventromedial prefrontal cortex renders patients unable to make advantageous, rational decisions. These individuals have no regard for consequences because they do not experience negative emotions associated with outcomes of poor judgments.

Research also has gone beyond disease models to examine "normal" decision-making. Results from decision-making studies in primates demonstrate that the economic value of items is represented in the orbitofrontal cortex (Padoa-Schioppa and Assad, 2006; Padoa-Schioppa, 2009). Functional neuroimaging in humans has provided another way to examine the neural basis of decision-making in real time. Functional magnetic resonance imaging (fMRI) provides a safe, noninvasive method to study normal human decision-making. A recent study examined the relationship between self-control and decisions (Hare et al., 2009) and showed that goal-directed decision-making produced increased neural activity in the ventromedial prefrontal cortex (the same brain area identified in the aforementioned neurological patients). Exercising self-control required inhibition of this goal-directed activity by increasing activation in the dorsolateral prefrontal cortex. Researchers interested in the influence of uncertainty on decision-making demonstrated that risk and ambiguity are represented in two separate regions of the brain (Hsu et al., 2005).

Cognitive neuroscientists also have examined brain regions involved when people must decide between immediate or delayed rewards. These delayed discounting, or intertemporal choice, paradigms are directly relevant to economic behavior and decision-making. McClure et al. (2004) proposed a model that emphasizes the limbic system's (emotional center's) role in immediate rewards whereas the prefrontal cortex (planning, organization) is involved in choosing larger, delayed rewards. This theory is supported by adolescent behavior and neuroimaging studies. Adolescents are notorious for making impulsive, irrational decisions leading to deviant behavior, unsafe sex behaviors, and drug and alcohol experimentation. Neuroscience research again supports this notion as the reward centers of the teenage brain (areas that make emotional decisions) are hypersensitive to potential rewards and the cognitive control regions (areas that make rational decisions) are underdeveloped (Casey et al., 2008; vanLeijenhorst et al., 2010). Interestingly, when the control regions of the brain (prefrontal cortex) are more developed, the prevalence of risk-taking behaviors decreases (Spear, 2000). Individual differences exist among adults as well in that some people value long-term rewards over short-term benefits. What individuals value is also situation-dependent, as indicated by the results of one recent study that aimed to alter decision-making in adults so that the participants would more greatly value larger delayed rewards (Peters and Buchel, 2010). Researchers were successful in helping participants make more controlled, rational decisions.

Mukherjee (2010) unites neuroscience findings, psychological paradigms, and economic theory into a dual model for decision-making that utilizes both automatic and controlled processes. He indicates that existing models in economics use only a single system, although he notes that economics is increasingly influenced by a multiple systems approach to decision-making. Mukherjee proposes that we generate values through the use of two psychological processes: valuation by calculation and valuation by feeling. He develops a parameter that represents the relative extent of emotional involvement in decision-making. This parameter provides insight into different decision-making processes used for oneself and for an organization. He argues that his model can be applied to a wide variety of empirical phenomena and can account for many anomalies in present representations of decision-making processes.

Russell James (Texas Tech University) has developed a set of PowerPoint slides that present the dual process model of decision-making and a large number of irrational tendencies and biases that humans have demonstrated. He has made these slides available for download through SlideShare. The slides are nicely illustrated, they invite student interaction, and they keep students' attention.

## Conclusion

Reconceptualizing human decision-making as a result of both automatic and controlled processes has many implications for agricultural economics and agribusiness teaching programs. If we teach students to recognize different decision-making processes, they can better understand consumer and producer behavior as well as how they as individuals make all types of decisions. In turn, this will help them to better learn economics and understand that economic models are based on "rational," controlled processes of decision-making. Both automatic and rational cognitive processes are necessary for advantageous decision-making, but students will learn to emphasize the logical, rational, and analytical processes that are valuable to success in economic and financial decisions. This pedagogical approach also has the potential to help students become more effective decision-makers in all aspects of their lives.

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# Perceptions of Influence on College Choice by Students Enrolled in a College of Agricultural Sciences and Natural Resources

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## Abstract

A study was conducted to determine specific student characteristics and external influences affecting the undergraduate choice of students enrolled in the College of Agricultural Sciences and Natural Resources (CASNR) at Oklahoma State University (OSU). A 39-question survey instrument was used to assess the relative importance of sources of information available during recruiting, institutional characteristics (e.g., placement rate and degree program requirements), and personal influences on the timing of a student's decision to attend CASNR at OSU. Nearly 93% of participants agreed the recruiting materials were satisfactory in providing enough information to make a college choice. Survey respondents indicated campus visits were the most useful source of information. Career opportunities after graduation and academic reputation were the two most influential institutional characteristics influencing college choice, while parents or guardians were the people providing the strongest influence during the decision process. More than 60% of students made their decision to attend CASNR at OSU during their senior year of high school or during their enrollment at another post-baccalaureate institution. Collectively, these results suggest the current recruitment practices are effective.

## Introduction

Agriculture by nature is a vast and complex industry. It encompasses professions ranging from production to law. With technological developments, consumer interest, governmental policies, and the threat to U.S. food systems increasing, this industry will see more employment opportunities for U.S. graduates, specifically those graduating from the fields of food, agriculture, and natural resources (Goeker et al., 2004). A national study conducted by the Cooperative State Research, Education, and Extension service of the U.S. Department of Agriculture and the Purdue University College of Agriculture (Goeker et al., 2004) found there will be approximately 52,000 employment opportunities for students graduating between 2005 and 2010 and about 49,300 expected qualified graduates to enter the workforce during the same time frame. As academic institutions struggle to educate students with the tools that ensure their success in industry, so must these institutions ensure their own successes by continuing to recruit students. To enhance recruitment efforts, academic institutions must understand what influences students' decisions to attend college (DesJardins et al., 1999; Martin, 1996; Chapman, 1981).

Chapman (1981) found specific student characteristics and a series of external influences that guide college choice of traditional age (18-21) students. This model was the theoretical basis for this study. The influencing factors of students to attend college are continually changing (DesJardins et al, 1999; Martin, 1996; Boatwright and Ching, 1992); therefore, it is imperative for institutions, colleges, and departments to continue to understand these factors and how their own identities affect enrollment.

Chapman's (1981) model of influence on college choice suggests there are student characteristics and external influences that affect the college choice decision. Chapman identified student characteristics as socioeconomic status, aptitude, level of educational aspiration, and high school performance. External factors were separated into three distinct categories: significant persons, fixed college characteristics such as location, and college effort to communicate with prospective students.

### Influence of significant persons

A study by Rocca, Washburn, and Sperling (2003) found a significant person in a student's college decision-making process may include friends, parents, guardians, other relatives, alumni, teachers, and counselors. A significant person may influence a student's college choice by helping shape a student's expectations of a particular college, providing direct

advice about a college, or by already attending or having attended a particular institution (Chapman, 1981).

Most agree that parents or guardians are influential in a student's college choice (Rocca et al., 2004; Reis and Kahler, 1997, Scofield, 1995; Donnermeyer and Kreps, 1995). Schuster, Constantino, and Klein (1988) and Trent and Medsker (1968) found parents or guardians as influential to college choice. Boatwright and Ching (1992) suggested that peers are more influential than parents or guardians today compared to ten years ago. Rocca et al. (2004) and Reis and Kahler (1997) found students' friends ranked high in influence when choosing a college. Other persons of influence found in the literature were relatives who attended the university (Washburn, 2002), agricultural teachers (Reis and Kahler, 1997), and students attending a potential university (Greer, 1991).

### Influence of institutional characteristics

Institutional characteristics include academic reputation, quality of facilities, class size, student reputation, cost, financial aid/scholarship availability, variety of majors, and location (Rocca et al., 2003).

Donnermeyer and Kreps (1994) and Washburn (2002) found financial incentives such as scholarships, good job opportunities, and potential income to be the second most influential factor in influencing freshman enrollment. St. John (2000) found "student aid offers have an immediate and direct effect on whether students enroll. They also have an influence on whether students can afford to continue their enrollment (pg. 72)." Cole and Fanno (1999) found that 20% of students from Oregon State University who transferred out of the College of Agricultural Sciences said they entered the college because of financial support.

Academic reputation may be one of the most influential institutional characteristics in determining student college choice (Rocca et al., 2004; Washburn, 2002; Schuster et al., 1988; Gorman, 1974). Gorman (1974) and Washburn (2002) both found academic reputation to be the most influential institutional characteristic. In addition to financial incentives and academic reputation, cost and location (Schuster et al., 1988) and preparation for employment (Washburn, 2002) are influential institutional characteristics.

### Influence of college efforts to communicate with students

Chapman (1981) found that one of the first ways a college responds about enrollment concerns is to evaluate how it finds and recruits prospective students. This is one of the initial ways a college responds because efforts to communicate with students can be changed more quickly than fixed characteristics (Chapman, 1981).

Kealy and Rockel (1987) discovered campus visits have the greatest effect on student perception of college quality. Washburn (2002) found campus visits to be the most useful source of information prospective students used to choose a college. More than half of matriculants used information from campus visits to make their college choice (Washburn, 2002). Gorman (1974) found campus visits and personal contacts with the institution or with current students to be influential. Rocca et al. (2004) found printed materials to be the most influential source of information in the early stages of the college-choice process, and campus visits and personal contacts to be the most important sources of information in the later stage.

Washburn (2002) found non-matriculants used personal contact the least to influence their college choice, in fact 11.5% of non-matriculants used college-specific information to assist their college choice (Washburn, 2002).

## Purpose

The purpose of this study was to identify the recruitment efforts and external influences affecting the undergraduate college-choice process when enrolling in the College of Agricultural Sciences and Natural Resources at Oklahoma State University.

### Research Questions

The specific research questions guiding this study were:

1. How useful were sources of recruitment information in helping students make the decision to enroll in the College of Agricultural Sciences and Natural Resources at Oklahoma State University?

2. How influential were characteristics of the institution, selected individuals, degree program characteristics, and social interaction opportunities in helping students make the decision to enroll in the College of Agricultural Sciences and Natural Resources at Oklahoma State University?

3. When did students begin the decision-making process in selecting a college or university, selecting a major, and finalizing the decision to attend Oklahoma State University?

## Materials and Methods

This study used an internet survey developed based on previous research related to influencing factors of college choice decisions (Washburn, 2002; Rocca et al., 2003) to identify the recruitment efforts affecting undergraduate college-choice for students enrolling in the College of Agricultural Sciences and Natural Resources at Oklahoma State University. The 39-question instrument was created using FreeOnlineSurveys.com. This service provided the researcher the ability to use an unlimited number of questions per survey, download individual responses, and offered password protection (http://www.Free OnlineSurveys.com). The instrument was tested for

validity and reliability. A panel of experts consisting of personnel representing the College of Agricultural Sciences and Natural Resources academic programs office, Oklahoma State University's high school and college relations office, and the Department of Agricultural Education, Communications, and 4-H Youth Development reviewed the instrument establishing face and content validity. Reliability was tested using a Chronbach's Alpha reliability analysis. The overall reliability coefficient was .962 for the final data.

The study used a random sample of full-time (registered for at least 12 credit hours) undergraduate students enrolled in the College of Agricultural Sciences and Natural Resources at Oklahoma State University during the spring 2005 semester. The size of the total population was 1,744 students, and a random sample of 1,035 students was sent a prenotice e-mail on February 11, 2005. After removing 51 students due to invalid e-mail addresses, the sample was reduced to 984 students. The researcher used an adapted form of Dillman's Tailored Design method (2000) to encourage participation. Three initial rounds of e-mail were sent out in one-week intervals. After the three weeks, 229 had responded. The process was repeated a second time and reached a 95% confidence level (Krejcie and Morgan, 1970). An additional 500 students were randomly selected and 110 responded, totaling 339 responses (22.8% response rate). Non-response error was controlled by comparing the age, gender, and academic classification of early participants and late participants.

Frequencies, percentages, means, and standard deviations were used to describe the influence of recruitment information sources, institutional characteristics, influential people, degree program characteristics, and social interaction opportunities. Descriptive statistics were tested using the Statistical Package for Social Sciences 12.0 for Windows (2004) to interpret the data.

## Results

This study surveyed students from all majors within the College of Agricultural Sciences and Natural Resources.

### Selected Demographic Characteristics of Respondents

Participants in the study were 38.1% ($n= 129$) male and 61.1% ($n= 207$) female with 82.3% ($n= 279$) being of white or non-Hispanic ethnicity. Three students did not indicate their gender. Age of participants ranged from 18 to 55 with more than 94.8% ($n=309$) falling within the age range of 18 to 24. The mean age was 21.3 with a standard deviation of 3.94. Academic classification of the participants were 36.0% ($n=122$) seniors, 27.1% ($n=92$) juniors, 15.6% ($n=53$) sophomores, 20.1% ($n=68$) freshmen, and 1.2% ($n=4$) did not respond.

More than one-fourth (85) of the participants were animal science majors. According to the Oklahoma State University Division of Enrollment Management and Marketing and Institutional Research and Information Management (2004), animal science is the largest major in the university (Table 1).

Because of the population, students may have entered the university as freshmen or transferred from another university. Nearly one-third (32.7%) of participants ($n=111$) entered Oklahoma State University from another university or junior college. The majority (63.7%, $n=216$) entered the university as freshmen. Twelve did not respond.

Agricultural association was measured in several ways, including group or club involvement, immediate family's agricultural involvement, and immediate family's income from production agriculture. Participants denoted that 53.1% ($n=180$) were involved in 4-H; 59.3% ($n=201$) were involved in FFA; 51.9% ($n=176$,) were not involved in production agriculture, and 47.2% ($n=160$) was involved in production agriculture.

### Information Sources

The first research question was to determine the usefulness of recruitment materials in aiding students' decision to enroll in the College of Agricultural Sciences and Natural Resources at Oklahoma State University.

Participants were given 28 information sources and asked to indicate the usefulness of these resources in aiding their decision to enroll, using a scale of 1 to 5, with 1 indicating "not useful" and 5

| Table 1 . Distribution of Participants by Major[1] | | |
|---|---|---|
| Major | Frequency | Percent (%) |
| Animal science | 85 | 25.1 |
| Pre-veterinary science | 50 | 14.7 |
| Agricultural communications | 32 | 9.4 |
| Agricultural education | 31 | 9.1 |
| Agribusiness | 30 | 8.8 |
| Biochemistry and molecular biology | 28 | 8.3 |
| Agricultural economics | 16 | 4.7 |
| Horticulture | 15 | 4.4 |
| Plant and soil science | 15 | 4.4 |
| Landscape architecture | 12 | 3.5 |
| Environmental science | 10 | 2.9 |
| Forestry | 5 | 1.5 |
| Entomology | 3 | 0.9 |
| No response | 3 | 0.9 |
| Biosystems and agricultural engineering | 2 | 0.6 |
| Landscape contracting | 2 | 0.6 |

[1]The study used a random sample of full-time (registered for at least 12 credit hours) undergraduate students enrolled in the College of Agricultural Sciences and Natural Resources at Oklahoma State University during the spring 2005 semester.

indicating "very useful." If an information source was not used, participants were asked not to select a level of usefulness. The most useful and most used source of information was visiting campus with a mean usefulness of 3.95 and a standard deviation of 1.24. A majority (87.6%) of participants indicated that they had visited the campus. Information sources with a mean usefulness level of 3.00 or better were considered important in the recruitment process. Other sources of information with mean usefulness levels of more than 3.00 were personal conversation with a professor, 71.7%; degree program information on a web site, 77.3%; printed university publications, 72.3%; College of Agricultural Sciences and Natural Resources publications, 71.0%; and the university web site information, 71.7%. The least used and least useful information source was the Noble Foundation's Ag Venture program, 43.4%. The Noble Foundation's Ag Venture program had the lowest mean level of usefulness, 1.45 and a standard deviation of 0.96. A list of all information sources is in Table 2. In addition to determining what information sources were used and their usefulness, information was sought about student satisfaction with the information sources. Participants were asked if the information needed to make an informed decision was present during the decision-making process.

The participants who responded "not satisfied" were asked to identify what additional information would have been helpful. Two ideas that were mentioned frequently was to provide more information on transfer credit from junior college or other universities to Oklahoma State University and more information directly from the College of Agricultural Sciences and Natural Resources.

### Influences

Participants ranked the level of influence of institutional characteristics, selected individuals, degree program characteristics, and influence of social interaction using a scale from 1 to 5, 1 indicating "not influential" and 5 indicating "very influential."

Opportunities after graduation were the most influential institutional characteristic with a mean

level of influence of 4.03. Academic reputation, quality of facilities, campus environment, and scholarships awarded were influential characteristics participants sought in choosing a college.

Fourteen total institutional characteristics had a mean level of influence greater than 3.00. Influential individuals were measured by giving the participants a list of 15 potentially influential individuals, and they were asked to rank the level of influence for each of the individuals in terms of college-choice decisions. To determine the individuals used for input, the participants were asked not to select a level of influence if they did not consult that particular individual on college-choice decisions.

The most used and most influential individual in university selection was a parent or guardian. This individual received a mean level of influence of 3.31 and was used by 93.8% of participants (Table 3). More than 70% of participants used all individuals except community college counselors in the university selection process.

Seven degree program characteristics were used to measure participants' influence of the degree program. Participants were asked to rank the influence of degree program characteristics in making college-choice decisions using a scale of 1 to 5,

### Table 2. Information Sources Used and Usefulness[1]

| Source of Information | Used Percent | Usefulness $\overline{x}$ (rank) | SD |
|---|---|---|---|
| Visit to campus | 87.6 | 3.95 (1) | 1.24 |
| Personal conversation with a professor | 71.7 | 3.43 (2) | 1.50 |
| Degree program information on a Web site | 77.3 | 3.36 (3) | 1.41 |
| Printed OSU publications | 72.3 | 3.23 (4) | 1.39 |
| Printed CASNR publications | 71.0 | 3.15 (5) | 1.50 |
| OSU Web site information | 71.7 | 3.07 (6) | 1.41 |
| CASNR Web site information | 63.1 | 2.81 (7) | 1.49 |
| Personal conversation with a CASNR representative | 65.2 | 2.80 (8) | 1.49 |
| Personal conversation with an OSU admissions or high school and college relations representative | 67.6 | 2.72 (9) | 1.45 |
| Letter and/or information mailed from a CASNR representative | 63.4 | 2.58 (10) | 1.46 |
| Information obtained at a CASNR recruitment booth at FFA events | 62.5 | 2.53 (11) | 1.50 |
| Participation in FFA events on OSU campus | 57.8 | 2.53 (11) | 1.59 |
| Letter and/ or information mailed from an admissions representative | 64.0 | 2.46 (13) | 1.39 |
| Participation in an OSU on-campus recruitment program | 58.4 | 2.38 (14) | 1.49 |
| Letter and/ or information mailed from a professor | 50.4 | 2.18 (15) | 1.49 |
| Participation in Animal Science "Big Three" Judging Field Days | 51.6 | 2.15 (16) | 1.55 |
| Visits by OSU representative to your school | 56.6 | 2.13 (17) | 1.43 |
| Participation in athletic events on OSU campus | 51.9 | 2.09 (18) | 1.43 |
| Participation in other student events on OSU campus | 52.5 | 2.03 (19) | 1.41 |
| Phone call from an a CASNR representative | 53.4 | 2.02 (20) | 1.35 |
| Phone call from an OSU admissions or high school and college relations representative | 51.3 | 1.94 (21) | 1.33 |
| TV, radio, newspaper, or magazine advertisements | 51.6 | 1.77 (22) | 1.12 |
| Participation in an CASNR on-campus recruitment program (Future Ag Leaders Conference) | 47.8 | 1.75 (23) | 1.34 |
| Participation in 4-H events on campus | 47.5 | 1.73 (24) | 1.29 |
| Participation in an OSU promotion event sponsored by OSU alumni in your area | 49.0 | 1.72 (25) | 1.17 |
| Visit by CASNR representative to your school | 46.6 | 1.63 (26) | 1.10 |
| Information obtained at an on-campus multicultural event through participation in REAP program | 44.2 | 1.51 (27) | 1.04 |
| Participation in the Noble Foundation's Ag Venture program | 43.4 | 1.45 (28) | .96 |

[1]The study used a random sample of full-time (registered for at least 12 credit hours) undergraduate students enrolled in the College of Agricultural Sciences and Natural Resources at Oklahoma State University during the spring 2005 semester.

1 indicating "not influential" and 5 indicating "very influential." The most influential degree characteristic was career opportunities after graduation with a mean level of influence of 4.18 and a standard deviation of .99. Quality of facilities (3.84) as well as quality and reputation of courses (3.76) and faculty (3.71) influenced student decisions.

### Decision making

Participants were asked when they began the process of selecting a college and were asked to choose one of five categories based on grade classification. More than one-fourth (26.8%) of the participants began their decision-making process before the ninth grade. By the time participants had finished the eleventh grade, 78.3% (266) had begun the decision-making process.

Participants were asked to determine when they finalized their decision to attend Oklahoma State University. Eight response options were given for participants. About one-fourth (26.6%) of participants had made the decision to attend this university before their senior year of high school. The majority (60.4%) made their decision to attend this university during the twelfth grade or while attending community college (18%) (Table 4).

## Discussion
### Information sources

Campus visits were the most useful source of information. This is consistent with the literature in that others found campus visits to be useful (Boyer, 1987; Gorman, 1974; Kealy and Rockel, 1987; Washburn, 2002; and Rocca et al., 2004). Printed publications and letters from an admissions representative were used by more than half of the participants. Washburn (2002) found more than half used printed publications as an information source. Sources of information considered useful were campus visits, personal conversation with a professor, degree information from a Web site, and printed publications from the university, college or department. Nearly 93% of participants agreed the information they used was satisfactory.

### Influences

Participants in this study noted the two most influential institutional characteristics were opportunities after graduation and the academic reputation of the university. Rocca et al. (2004) identified these characteristics to be the most influential. Gorman (1974), Shuster et

al. (1988), and Washburn (2002) found academic reputation to be influential in student college choice. Donnermeyer and Kreps (1994) found scholarships and incentives to be one of the most important factors. Cole and Fanno (1999) found financial incentives to be key in college choice, while financial incentive ranked fifth in this study. The least influential institutional characteristic in this study was prominence of university athletic teams, which is consistent with previous research (Rocca et al., 2004; Washburn, 2002).

In reference to significant individuals, participants noted a parent or guardian was the most influential. This was consistent with the majority of the literature (Broekemier and Seshadri, 1999; Donnermeyer and Kreps, 1994; Rocca et al., 2004; Washburn, 2002). According to Greer (1991) agricultural teachers were the fourth most influential individual in this study despite their mean level of influence being below 3.00 on a 1 to 5 scale, I indicating "not influential" and with 5 indicating "very influential."

Career opportunities was the most influential degree program characteristic in this study and being the most influential in the Washburn (2002) and Rocca et al. (2004) studies. Of the seven degree program characteristics listed, the number of students in the major fell below a mean influence of 3.00 based on a 5-point scale, with 1 indicating "not influential" and 5 indicating "very influential."

### Decision Making

This study found 78% of students who participated had begun the process of choosing a college by the time they started the 12th grade (senior year) of high school. This was representative of the findings in the Rocca et al. (2004) and the Washburn (2002) studies. More than 60% of participants had finalized their decision to attend this university during the 12th grade (senior year) of high school or while attending community college.

| People | Used Percent | Level of Influence (rank) | SD |
|---|---|---|---|
| Parent or guardian | 87.6 | 3.41 (1) | 1.24 |
| OSU graduate | 71.7 | 2.94 (2) | 1.50 |
| Relative who attended OSU | 77.3 | 2.70 (3) | 1.41 |
| High school agriculture teacher | 72.3 | 2.63 (4) | 1.39 |
| Friend in college | 71.0 | 2.61 (5) | 1.50 |
| CASNR faculty and/or staff | 71.7 | 2.40 (6) | 1.41 |
| Agriculture or 4-H extension Educator | 63.1 | 2.38 (7) | 1.49 |
| Current CASNR student | 65.2 | 2.38 (8) | 1.49 |
| Other high school teacher | 67.6 | 2.16 (9) | 1.45 |
| OSU high school and college relations representative | 63.4 | 2.13(10) | 1.46 |
| Friend in high school | 62.5 | 2.12 (11) | 1.50 |
| High school guidance counselor | 57.8 | 1.98 (11) | 1.59 |
| Community college instructor | 64.0 | 1.84 (13) | 1.39 |
| High school science teacher | 58.4 | 1.49 (14) | 1.49 |

Table 3. Influence of People in Selection of University[1]

[1]The study used a random sample of full-time (registered for at least 12 credit hours) undergraduate students enrolled in the College of Agricultural Sciences and Natural Resources at Oklahoma State University during the spring 2005 semester.

**Table 4. Final Decision to Attend University[1]**

| Grade | Frequency (rank) | Percent (%) |
|---|---|---|
| During 12th grade, 1st semester | 74 (1) | 21.8 |
| During 12th grade, 2nd semester | 70 (2) | 20.6 |
| Community college | 61 (3) | 18.0 |
| No response | 44 (4) | 13.0 |
| During 11th grade | 43 (5) | 12.7 |
| Before 9th grade | 29 (6) | 8.6 |
| During 10th grade | 12 (7) | 3.5 |
| During 9th grade | 6 (8) | 1.8 |

[1]The study used a random sample of full-time (registered for at least 12 credit hours) undergraduate students enrolled in the College of Agricultural Sciences and Natural Resources at Oklahoma State University during the spring 2005 semester.

Since the college student is ever changing, it is important to continue to research the factors that influence college choice. As the research indicates, significant persons, institutional characteristics, and communication efforts influence the college-choice process. Considering that parents or guardians tend to be the most influential person in a student's college choice, more research needs to be conducted to identify background information of these individuals and what factors they use to influence the college-choice process. More recruitment efforts need to be made to include significant persons in the recruitment process. Materials may need to be developed to educate this group as well as the prospective students about institutional characteristics. With institutional characteristics such as academic reputation being identified as influential in a students' decision to attend a particular college, it is imperative that each institution identify and understand its unique positive and negative traits. With academic reputation being so influential, it is important to maintain a strong and positive academic image. Efforts to increase this reputation must be made. Research should be conducted to determine the attributes of academic reputations a prospective student finds to be the best marks of a prestigious institution. This may help an institution improve its own image and prevent negative perceptions.

As indicated, campus visits are one of the most influential sources of information used by prospective college students. Institutions need to continue to increase opportunities to attract prospective students onto their campuses and strive to provide a positive experience. Whether an informal or a formal visit, a professor should be available to assist in the presentation. Printed materials are important sources of information. Although printed materials are influential, it is important to note that more and more prospective students are using web sites as sources of information. In this study, both the university web site and the college web site ranked directly under printed materials as the most useful source of information. Research should be done with prospective students to assist in the development of information presented on university web sites. Research should focus on the ease of use of university web sites.

Considering when students are beginning the college-choice process, recruitment efforts should focus on prospective students earlier than high school. It is important to note that a large majority of prospective students finalize their decision in the 12th grade or final year of high school. Rocca et al. (2004) said that campus visits are most influential during the final stages of choosing a college. Therefore, it is important to study if campus visits are occurring more often during a students' senior year.

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# Perceptions of Agricultural Industry Recruiters on Writing in the Workplace

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## Abstract

This descriptive study focused on recruiters' perceptions of the importance of writing in the workplace and the writing abilities of the graduates of Oklahoma State University College of Agricultural Sciences and Natural Resources. These recruiters primarily represent for-profit organizations and recruit for business- and management-type positions in the United States. The majority of the Agricultural, Food, Environmental, and Natural Sciences Career Fair recruiters who responded reported that they took writing skills into consideration frequently or almost always. They assessed the writing abilities of graduates most frequently through written letter of application. In addition, recruiters indicated almost all of their employees have some responsibility for writing, and the most frequent type of writing is e-mail correspondence. Overall, recruiters reported that they were satisfied with the writing abilities of the graduates of the Oklahoma State University College of Agricultural Sciences and Natural Resources. Furthermore, the results of this study were comparable to the national study conducted by the National Commission on Writing for America's Families, Schools, and Colleges in 2004. Based on the results of this study, the authors recommend faculty, staff, and administrators stay abreast of changing communication needs in the agricultural industry, incorporate writing skills into agricultural curriculum, and prepare students for workforce communication with real-world scenario writing assignments.

## Introduction

In the 21st Century, communication skills have become a must in the workforce (National Association of Colleges and Employers, 2006). To increase awareness of the need for more writing in the workplace, the National Commission on Writing for America's Families, Schools, and Colleges (NCoW) produced a series of reports reflecting the need for writing in the workplace (NCoW, 2003; NCoW, 2004; NCoW, 2005; NCoW, 2006). According to NCoW (2003), "Writing is not a frill for the few, but an essential skill for the many" (p. 11). The commission's 2004 report indicated the need for writing in the workforce, and its 2005 report explored the importance of writing in the government sector, which found that writing was more important in the American government sector than in the non-government area (NCoW, 2005). Andelt et al. (1997), Field (2001), and the National Commission on Writing (2004) indicated that if students are to be successful in the workplace and life, they must be able to write. However, in many cases, employers report graduates fall short in their communication skills (NACE, 2006).

Because today's students will become tomorrow's employees, Stevens (2005) assessed employers' satisfactions with graduates' writing abilities and found employers were not fully satisfied with graduates' business communications skills or workplace writing skills. Although employers indicated written skills were important skills for entry-level employees to possess (Andelt et al., 1997; Brand et al., 2006; Field, 2001), only few West Virginia University College of Agriculture, Forestry, and Consumer Sciences graduates had the communication skills employers desire (Brand et al., 2006).

Land-grant institutions were founded on the principle to educate rural students and provide them with not only technical skills but also basic skills, such as writing (Benjamin, 1962; Burnett and Tucker, 2001; McDowell, 2002; McDowell, 2003). "A professional education requires knowledge of the liberal arts to be complete" (Orr, 1996, p. 2831). Employers expect colleges and universities to equip students with both basic and technical skills and create writing friendly environments for students to develop and acquire written communication skills (Cassidy, 2006; NCoW, 2006). Furthermore, students want to obtain skills such as writing, so they can be

more prepared for the workplace (Scanlon and Baxter, 1993).

As the communication needs of the industry continue to change, universities and colleges must adapt the curricula to meet those needs (Gerson and Gerson, 1994; Singh et al., 2004) and evaluate employers' perceptions of students' writing abilities (Stevens, 2005). "In an era when agricultural education is concerned with informing people about agriculture, faculty must ensure students are literate in the subject matter, have the skills to effectively communicate, and are successful in finding employment after graduation" (Garton and Robinson, 2006, p. 553).

Graduates' ability to write in the workplace may be the key to obtaining their dream jobs (NACE, 2006; Stewart, 1987). According to NACE Job Outlook 2006, employers seek strong communication skills more than any other skills in recent college graduates. Although some educators argue communication skills should not be taught outside the walls of an English classroom (Stewart, 1987), "… developing the kinds of thoughtful writers needed in business, and elsewhere in the nation's life, will require educators to understand writing as an activity calling for extended preparation across subject matters—from kindergarten through college" (NCoW, 2004, p. 20). Written communication should be a part of learning in all disciplines, not just English (Cassidy, 2006; Flowers and Reaves, 1991; NCoW, 2003; Smith et al., 1993; Stewart, 1987). Educators in agriculture have the responsibility to prepare students for the communication demands of the industry and provide students with the opportunities to improve their writing abilities (Flowers and Reaves, 1991; Stevens, 2005; Stewart, 1987).

The purpose of this study was to determine the 2000-2005 Agricultural, Food, Environmental, and Natural Sciences Career Fair recruiters' perceptions of the writing abilities of the graduates of Oklahoma State University College of Agricultural Sciences and Natural Resources. To accomplish this purpose, the researchers used the following objectives:

1. Describe selected characteristics of the Agricultural, Food, Environmental, and Natural Sciences Career Fair recruiters and recruiting organizations;

2. Determine the recruiters' perceptions of the importance of writing when recruiting new employees;

3. Determine the recruiters' perceptions of the frequency and types of writing required of recent college graduates in the recruiters' workplace; and

4. Determine recruiters' perceptions of the writing abilities of the graduates of Oklahoma State University College of Agricultural Sciences and Natural Resources.

## Methods

A descriptive instrument was used to survey recruiters who participated in the Agricultural, Food, Environmental, and Natural Sciences Career Fair from 2000 to 2005 because of their familiarity with new college graduates. A database of the recruiters was obtained from Oklahoma State University Career Services. The researchers obtained 112 valid e-mail addresses of 142 individuals who recruited during this time frame. The response rate for the study was 30.36% ($N = 34$). When compared to similar studies, low response rates were consistent among employers (Irlbeck and Akers, 2009; Van Horn, 1995; Woratschek and Lenox, 2002). In a study that surveyed employers and coworkers of agricultural communications' graduates, Irlbeck and Akers (2009) had a 34.1% response rate. On a national writing study, the National Commission on Writing (2004) had a 16.6% response rate six weeks after the survey was distributed and 53.3% after a telephone follow-up.

Approval was obtained from the National Commission on Writing to use The Business Roundtable and National Writing Commission Human Resource Survey March 2004 as the basis for the development of the instrument for this study. The National Commission on Writing sought to determine what the respondents "thought was important about writing to explore what respondents actually do when hiring and promoting employees" (NCoW, 2004, p. 25). However, it did not make mention of the validity and reliability of the instrument (NCoW, 2004).

Most recruiters were determined to have e-mail addresses and Internet access; therefore, surveymonkey.com was used. Each recruiter received four e-mails—pre-notification e-mail, survey e-mail, follow-up e-mail, and second follow-up e-mail (Dillman, 2007), which contained the link to the questionnaire. The Web-based instrument contained three parts—organizational demographics, importance of writing skills in the recruitment process and the workplace, and recruiter demographics. Part One of the instrument identified the types of organizations that participated in the Agricultural, Food, Environmental, and Natural Sciences Career Fair; the types of positions for which they recruit; and the number of employees associated with the organization. Part Two of the instrument was related to the importance of writing in the agricultural industry and contained questions about the frequency and types of writing required of recent college graduates. Part Three of the instrument identified the demographics of the recruiter. Additionally, if the respondents graduated from Oklahoma State University College of Agricultural Sciences and Natural Resources, they were asked about their own writing education.

To determine validity, a panel of experts, consisting of eight university faculty and staff, reviewed the instrument (Dillman, 2007; Muijs, 2004). A pilot study was conducted using employers ($N = 50$) who

did not recruit at the Agricultural, Food, Environmental, and Natural Sciences Career Fair from 2000 to 2005. The Cronbach's alpha was 0.87 for two summated scales, which is considered reliable (Muijs, 2004). The researchers visually compared the other items in the instrument to ensure reliability; as no differences were detected, no changes were made in the instrument.

## Results

Objective one sought characteristics of the Agricultural, Food, Environmental, and Natural Sciences Career Fair recruiters and recruiting organizations from January 1, 2000, to December 31, 2005 (Table 1). Recruiters primarily represented "profit" (55.90%) organizations and hired for "management and business" (45.50%) positions. In addition, recruiters reported, as of January 1, 2006, they employed from 4 to 8,000 ($n = 26$) individuals in the United States, and on average hired between 0 and 360 ($n = 25$) employees annually from January 1, 2000, to December 31, 2005 (Table 2).

application letter or other written material when hiring, and how often samples of written materials or presentations are required of a job applicant (Table 3). Recruiters reported they "frequently" consider writing when hiring new college graduates as professional staff ($M = 3.11$; $SD = 1.10$) and hourly staff ($M = 2.54$; $SD = 1.07$). Additionally, a poorly composed application letter or other written material "frequently" has an impact when hiring professional staff ($M = 3.48$; $SD = 0.70$) and hourly staff ($M = 2.88$; $SD = 0.85$). Recruiters indicated that a majority of the time they use the individual's letter/written application (82.10%) and personal communication with references (64.30%) to assess a job applicant's writing ability (Table 4). Furthermore, recruiters reported quality writing skills are worth between "$2,501 and $5,000" ($M = 3.22$; $SD = 1.83$); however, the large standard deviation indicates variation among the respondents.

Objective three sought to determine the frequency and types of writing required of a recent college graduate (Table 5). Recruiters reported "almost all" professional staff employees have some responsibility for writing ($M = 3.5$; $SD = 0.88$) and "about 2/3rds" have effective communication characteristics ($M = 3.37$; $SD = 0.63$). Whereas, "about 2/3rds" of hourly employees have responsibility for writing ($M = 2.6$; $SD = 1.23$) and "about 1/3rd" have effective communication characteristics ($M = 2.24$; $SD = 0.88$). Furthermore, recruiters reported employees "almost always" use e-mail correspondence ($M = 3.78$; $SD = 0.42$) and "frequently" use oral presentations with slides and visuals ($M = 3.19$; $SD = 0.68$) (Table 6). Additionally, recruiters considered accuracy ($M = 3.89$; $SD = 0.32$); clarity ($M = 3.81$; $SD = 0.40$); conciseness ($M = 3.74$; $SD = 0.45$); and spelling, punctuation, and grammar ($M = 3.67$; $SD = 0.64$) as "extremely important" communications characteristics (Table 7).

Objective four determined employers' perceptions of the writing abilities of the graduates of Oklahoma State University College of Agricultural Sciences and Natural Resources. Seven (46.50%)

### Table 1. Demographic Characteristics of Recruiters and Recruiting Organizations (N = 34)

| | N | % |
|---|---|---|
| Nature of recruiting organizations | | |
| Profit | 19 | 55.9 |
| Government | 6 | 17.6 |
| Education | 5 | 14.7 |
| Non-profit | 4 | 11.8 |
| Types of positions for which organizations hire | | |
| Management and business | 15 | 45.5 |
| Agricultural forestry and production | 7 | 21.2 |
| Education, communication, and government | 7 | 21.2 |
| Scientific and engineering | 4 | 12.1 |
| Graduate of Oklahoma State University College of Agricultural Sciences and Natural Resources | | |
| Yes | 5 | 18.5 |
| No | 22 | 81.5 |

### Table 2. Means, Modes, and Medians of the Graduates of Oklahoma State University College of Agricultural Sciences and Natural Resources Who Are Employed at the Recruiting Organizations Between January 1, 2000, and December 31, 2005

| Employees | Min | Max | M | MO | MD |
|---|---|---|---|---|---|
| Employed on January 1, 2006 | | | | | |
| Inside the United States | 4 | 8,000 | 1,237.04 | 3,000.00 | 525.00 |
| Outside the United States | 0 | 500 | 48.36 | 0.00 | 0.00 |

| Employees | Min | Max | M | MO | MD |
|---|---|---|---|---|---|
| Hired each year | | | | | |
| Inside the United States | 4 | 350 | 81.72 | 35.00 | 35.00 |
| Outside the United States | 0 | 5 | 0.70 | 0.00 | 0.00 |
| Hired each year who are Oklahoma State University College of Agricultural and Natural Resources graduates | | | | | |
| Inside the United States | 0 | 10 | 2.07 | 0.00 | 1 |
| Outside the United States | 0 | 0 | 0 | 0 | 0 |

Objective two sought respondents' perceptions of the importance of writing when recruiting new employees including consideration of writing when hiring new employees, impact of a poorly composed

**Table 3. Means and Standard Deviations of the Employers' Perceptions of the Importance of Writing in the Workplace (N =34)**

| | n | M | SD |
|---|---|---|---|
| Professional staff | | | |
|   Impact of a poorly composed application letter or other written material when hiring | 27 | 3.48 | 0.70 |
|   Consideration of writing skills when hiring new employees | 28 | 3.11 | 1.10 |
|   Importance of effective writing skills when making promotion Decisions | 25 | 2.96 | 0.79 |
|   Opportunities to improve writing skills when an employee possesses poor writing skills | 26 | 2.35 | 1.06 |
|   Samples of written materials/presentations required of job applicant | 29 | 2.07 | 1.10 |
| Hourly staff | | | |
|   Impact of a poorly composed job applicant's letter or other written material when hiring | 24 | 2.88 | 0.85 |
|   Importance of effective writing skills when making promotion Decisions | 23 | 2.61 | 0.94 |
|   Consideration of writing skills when hiring new employees | 26 | 2.54 | 1.07 |
|   Opportunities to improve writing skills when an employee possesses poor writing skills | 24 | 2.00 | 0.93 |
|   Samples of written materials/presentations required of job applicant | 26 | 1.54 | 0.86 |

*Note.* Scale equals: one–few, two–about 1/3rd, three–about 2/3rds, four–almost all.

**Table 4. Frequency and Forms of Assessing a Job Applicant's Writing Ability (N =34)**

| | N | % |
|---|---|---|
| Impression based on letter/written application | 23 | 82.1 |
| Personal communication with references | 18 | 64.3 |
| Writing sample provided by job applicant | 13 | 46.4 |
| Review of coursework on résumé | 11 | 39.3 |
| Writing test taken during the job interview | 3 | 10.7 |
| Open Web forum (e.g., Facebook, MySpace, blogs, etc.) | 2 | 7.1 |

**Table 5. Means and Standard Deviations of Employers' Perceptions of Written Communication Practices in the Workplace For Professional and Hourly Staff (N =34)**

| | N | M | SD |
|---|---|---|---|
| Professional staff | | | |
|   Employees who have some responsibility for writing | 28 | 3.50 | 0.88 |
|   Employees who have effective communication characteristics | 27 | 3.37 | 0.63 |
| Hourly staff | | | |
|   Employees who have some responsibility for writing | 25 | 2.60 | 1.23 |
|   Employees who have effective communication characteristics | 25 | 2.24 | 0.88 |

*Note.* Scale equals: one–a few, two–about 1/3rd, three–about 2/3rds, four–almost all.

recruiters reported "almost all" agricultural graduates of Oklahoma State University had sufficient writing abilities, although the mean ($M = 2.87$; $SD = 1.30$) indicated "about 2/3rds" of these graduates were considered to have satisfactory writing abilities. Furthermore, recruiters reported they were "satisfied" with hired graduates' writing abilities ($M = 3.20$; $SD = 0.68$) and interviewed graduates' writing abilities ($M = 2.94$; $SD = 0.74$).

Last, recruiters ($N = 2$) could provide additional comments regarding graduates of the Oklahoma State University College of Agricultural Sciences and Natural Resources. One recruiter commented, "I have been very pleased with the overall performance of the OSU graduates that I have hired." However, another commented, "I have not been pleased with the writing skills of our Oklahoma State University College of Agricultural Sciences and Natural Resources' graduates because I continually find myself spending time editing their work."

## Discussion, Conclusions and Recommendations

Due to the small response rate (30.36%), this study's findings may have rather limited generalizations beyond the participating sample, especially for items with relatively large standard deviations. However, as this study's results are comparable to the results reported by the National Commission on Writing (2004), they provide a beginning point for consideration when agricultural faculty review curricula as well as provide insight into the continuing need to improve writing education.

Career fair recruiters represent primarily profit organizations and recruit predominantly for business- and management-type positions. Additionally, their organizations employ as many as 8,000 people and as few as four, and annually they hire an average of 81 employees, including, on average, two graduates from the Oklahoma State University College of Agricultural Sciences and Natural Resources. The vast majority of these employees work in the United States.

Recruiters consider writing abilities an important part of the recruiting process and the workplace as they frequently take writing skills into consideration when hiring both professional and hourly staff. In fact, the respondents reported taking writing skills into consideration slightly more than do the companies of the Business Roundtable (NCoW, 2004), which has 160 member companies represented by their chief executive officers (Business Roundtable: About us, n.d.). The most frequently assessed item is the applicant's job application and accompanying business letter.

The vast majority of new agricultural college graduates are responsible for writing and using e-

mail correspondence in their jobs, which mirrors results of the national survey in 2004 (NCoW, 2004). Accuracy, clarity, conciseness, and correct grammar are the most important characteristics of effective communication, which parallels the National Commission on Writing 2004 study. However, recruiters indicated fewer employees have effective communications skills than the proportion responsible for writing in their positions.

Moreover, recruiters are satisfied with the writing abilities of Oklahoma State University College of Agricultural Sciences and Natural Resources' graduates. In comparison, the National Commission on Writing (2004) determined 65% of new college graduates have sufficient writing abilities, which is similar to the "about 2/3rds" reported for the Oklahoma State University College of Agricultural Sciences and Natural Resources' graduates.

The researchers recommend faculty, staff, and administrators continue to stay abreast of the changing communication needs in the agricultural industry by assessing current writing curricula in the college, incorporating writing skills into agricultural curriculum, using writing as a way of learning, and preparing students for workforce communication with real-world scenario writing assignments. In addition, faculty should attend career fairs and participate in other networking opportunities to gain insights into the writing skills employers want graduates to possess. More research is needed to determine instructors' perceptions of graduates' writing abilities and evaluate graduates' satisfactions with their writing education.

According to Stevens (2005), this type of study should be replicated every five years. Assessing the communication needs of the agricultural industry can help close the gap between the skills of new college graduates and the needs of the industry (Andelt et al., 1997; Cassidy, 2006; Stevens, 2005). Therefore, Oklahoma State University's College of Agricultural Sciences and Natural Resources, as well as other agricultural colleges, should periodically conduct this type of study to ensure graduates meet the communication needs of the agricultural industry. Furthermore, agricultural colleges should assess current writing curricula, continue to incorporate basic writing skills into agricultural curricula, use

**Table 6. Means and Standard Deviations of the Types of Writing and Frequency Performed on the Job (N = 34)**

|  | n | M | SD |
|---|---|---|---|
| E-mail correspondence | 27 | 3.78 | 0.42 |
| Oral presentations with slides/visuals (e.g., PowerPoint) | 27 | 3.19 | 0.68 |
| Oral presentations without visuals | 27 | 2.93 | 0.73 |
| Other memoranda and correspondence | 27 | 2.89 | 0.85 |
| Formal reports | 27 | 2.81 | 0.96 |
| Technical reports | 27 | 2.74 | 0.86 |
| Web text | 26 | 2.42 | 0.99 |

*Note.* Scale equals: one–almost never, two–occasionally, three–frequently, four–almost always.

**Table 7. Means and Standard Deviations of the Importance of Effective Communication Characteristics (N=34)**

|  | n | M | SD |
|---|---|---|---|
| Accuracy | 27 | 3.89 | 0.32 |
| Clarity | 27 | 3.81 | 0.40 |
| Conciseness | 27 | 3.74 | 0.45 |
| Spelling, punctuation, and grammar | 27 | 3.67 | 0.64 |
| Visual appeal | 26 | 3.38 | 0.64 |
| Scientific precision | 25 | 3.28 | 0.74 |

*Note.* Scale equals: one–not at all important, two–not very important, three–important, four–extremely important.

writing as a way of learning, and prepare students for workforce communication by giving them more real-world scenario writing assignments.

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# Student Perceptions of Reflection Tools Used in a Service Learning Community Nutrition Course

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## Abstract

Service learning is promoted as an effective teaching and learning approach that integrates meaningful community service into the college classroom. Reflection is included as a key component in this instructional method. Journaling is the common method of reflection, although other methods are available. There is little published evaluation on comparisons of the relative value of different methods of reflection. To better understand students' response to service learning and to reflection tools, a pre and post questionnaire was administered to 66 undergraduate nutrition majors in three community nutrition classes taking place between spring 2008 and spring 2009. These students reported benefits from all three reflection tools used in the course. However, none of the three tools (journal, panel discussion about the site experience, written questionnaire about experience) were reported as statistically significantly more useful than another. In fact some students preferred one tool to reflect on self and another tool to reflect on the community. Instructors are encouraged to implement and evaluate a variety of reflection tools which are creative and utilize universal design for learning concepts thereby optimizing the students' reflection in service learning.

## Introduction

Service learning is an effective teaching and learning approach that integrates meaningful community service into the curriculum (National Service Learning Clearinghouse, 2009). Faculty who use service learning report that it brings new life into the classroom, enhances academic performance, increases student interest in the subject and teaches problem solving skills (Bringle and Hatcher, 1996). Markus et al.(1993), using a randomized control-group design found that students in service learning sections had more positive beliefs and attitudes toward community service and scored higher on examinations. Other research supports the positive effects of service learning in higher education (Bringle and Kremer,1993; Giles and Eyler,1994). A key component of this instructional method is the opportunity for self- reflection (McCarthy and Tucker, 2002; McCarthy and Corbin, 2002; Wells and Graber, 2004). Many college students participate in service activities. However, in order to maximize

academic learning, promote personal growth and instill a commitment to lifelong civic engagement, these activities must be thoughtfully linked to the course content and include structured student reflection (Ash, 2003).

In the field of nutrition and dietetics, service learning has been shown to enhance depth of learning and enhance student's self-reported levels of self-confidence (Nicholson, 2003). Ash in 2003 reported on an innovative reflection tool for an upper level nutrition course, which consisted of biweekly structured reflection facilitated by student leaders held in small groups outside of class time. These reflection sessions included students writing what they learned and how they learned it on three dimensions: personal, civic and academic. Ash reported that these additional structured reflection sessions deepened student understanding of themselves, and their local and global community (Ash, 2003). These students also kept journals. Journal keeping is the traditional approach to student reflection commonly used in service learning classes (Gilson and Ottenritter, 1999; Mills, 2001)

There is no one way to keep journals. The authors could not find published research indicating the effectiveness of journal keeping over other methods. Some faculty have reported on the "shallow" nature of student writing (Hume, 2009) and others note the confusion about reflection (Grant et al., 2006). McGuire et al., (2009) reported on a case study where faculty identified low to high quality journals and tracked whether the journal writing improved during the course. They reported that half of those students characterized as having low quality journal writing remained at that low quality even at the end of the course. They reiterated the challenges involved in stimulating critical thinking using journaling.

The objective of this project was to ask students to report on reflection techniques used throughout an upper level community nutrition course to gain better understanding on what type of reflection technique optimizes students' perception of learning. It is hoped that this information will inform university instructors on how best to implement service learning into their courses.

## Methods

The use of reflection tools in service learning was examined by a questionnaire presented to 66 stu-

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dents in three community nutrition classes taught at California State Polytechnic University, Pomona from spring 2008 through spring 2009. This research was approved by the California State Polytechnic University, Pomona's Institutional Review Board. All sixty-six undergraduate students gave informed consent and completed the pre and post course questionnaire. Frequencies and Chi Square procedures were performed in SPSS (version 16.0, SPSS Inc, Chicago, IL, 2008). The questionnaire sought student input on class satisfaction, concerns and learning as well as specific questions regarding usefulness of reflection techniques. This paper reports on the responses to only the reflection techniques questions. All students were asked to keep journals and turn them in at the end of the course as part of their grade. They were instructed to write in any style they wished. The only mandate in journaling was to consider the experience from three levels: personal, program site where they performed their service learning and from a larger societal view which is typical of journal writing (Gilson and Ottenritter, 1999; Cooper, 1997). Two other reflection techniques in addition to journaling were used throughout the course (written surveys and panel discussions). Written surveys which contained questions such as, "What concerned or worried you the most about doing service learning?" and "What did you like the most about doing service learning?" were given to the students both pre and post experience. Panel discussions were also used. The panel consisted of the small group that went to one particular service learning site. They discussed their experience and responded to questions from the rest of the class on their particular site experience. The written survey also asked students to report on any additional reflection techniques that they developed. Students were asked to report how a particular reflection tool helped them to reflect at each of the three levels (self, site and greater societal issues) as described by Cooper, 1997.

## Results

Students were 95% female and 5% male which reflects the gender composition of dietitians in the US (Bryk and Kornblum, 1999). Since this course is for upperclassman, 32% of the students were juniors, 55% were seniors, and 9% reported they were graduate students with three not responding.

The students were asked to rank the following reflection techniques (journaling, survey questions,

and panel discussions) from useless (1) to very helpful (5) on how that particular tool helped them think about themselves, the site and the greater community/issues. Table 1 reports on the collapsed responses (1 and 2 as useless, 3 as unsure on usefulness and 4 and 5 as helpful).

Differences in student responses to usefulness of reflection tool were analyzed using Chi Square procedure in SPSS version 16.0, (SPSS Inc., Chicago, IL, 2008). There was no statistically significant difference in the student responses on usefulness of one reflection tool as compared to another. Since the least useful tool was still reported as helpful by 65% of students, it appears that each of these reflection tools is helpful to students and that some tools help students reflect on themselves and other tools help students reflect on the program site and/or the greater community and issue. The highest reporting of reflection tools as "useless" was for self-reflection. This could indicate that students used other self-initiated reflection methods to reflect on self or did not find any tool that allowed them good self-reflection. The levels of reflection and which tool helped students reflect on that level should be further addressed in future studies. When asked if the student used yet another reflection tool that was not expressly assigned, 15 (23%) students replied. Nine students reported that other class assignments such as the mid-term exam and homework served for useful reflection, three students reported that talking with others not in the class was useful, two reported talking with a guest speaker and one reported that speaking with the course instructor helped them reflect on the service learning experience. Although given the option to provide any additional comments on reflection tools, no students did.

## Results and Discussion

According to these students, a variety of reflection tools is helpful and no one tool is better than another. Instructors are advised to utilize creativity when devising reflection tools. It would be helpful to use reflection tools that adhere to the universal design for learning (Wakefield, 2007) by allowing and encouraging multiple means of expression and engagement in reflection; not just journaling in one set format since students report usefulness of a variety of techniques including self-developed reflection tools. Since journaling is a core component of reflection, students should be encouraged to journal in a way that makes sense to them. For example, they could draw pictures or write a song about their experience; they do not have to write in a typical journal style, but should be encouraged to individualize their journals. Some students in

| Table 1. Students' report on Usefulness of Reflection Tool (n = 66) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Journaling | | | Questionnaires | | | Panel Discussion | | |
| | Useless | Not sure | Helpful | Useless | Not sure | Helpful | Useless | Not sure | Helpful |
| Self-reflection | 14 | 9 | 43 | 11 | 11 | 44 | 12 | 3 | 51 |
| Program-reflection | 3 | 2 | 61 | 6 | 9 | 51 | 2 | 2 | 62 |
| Community reflection | 8 | 9 | 49 | 9 | 14 | 43 | 3 | 4 | 59 |

service learning classes I have taught have used a scrapbooking approach to journaling. It is not important how they journal, but that they invest themselves into the journaling assignment and think and express their reaction to their service learning experience.

Panel discussions should be lively and informative. In order to initiate a good discussion, the instructor may want to ask such questions as, "If this site offered you a paid position, would you take it? Why or why not?," "How would you describe the morale of the site staff?" and "What was most surprising about your site experience." After the discussion using instructor initiated questions, the rest of the class should continue asking questions to the panel which usually takes about 30 minutes per panel. A variety of reflection tools should be implemented and evaluated within the service learning classroom context. Future studies should seek more in-depth student responses to journaling and other methods of reflection using a larger sample of students and study possible gender, learning style and ethic differences in reflection tool usefulness.

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# A Model for Using Threaded Discussions in On-line Agricultural Education Courses[1]

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## Abstract

Distance education is becoming popular in higher education institutions in the United States and throughout the world. Instructors offering on-line courses are looking for new technologies or using the existing ones in new ways to enhance student learning. Discussions designed as threaded discussions are integral to most on-line courses, and have been found to facilitate active learning among students. But, research indicates that threaded discussions sometimes digress into chat that is not in line with the intended purpose, thus causing the discussions to lose their focus. To address this problem, threaded discussions for a graduate level on-line agricultural education course were designed in a particular way to help facilitate more focused discussions. The findings indicated that by following this model, there was more student participation, more focused discussion, and less deviation from the intended purpose. Threaded discussion posts also suggested that students engaged in reflection before posting their messages. A two-stage threaded discussion model was developed based on the experiences of designing and implementing threaded discussions for this on-line course, and is presented in this paper. This model has implications for designing discussion boards in on-line courses in agricultural education as well as in other fields.

## Introduction

Many universities in the United States are adopting distance education for their courses (Roberts and Dyer, 2005). Although distance education has been in use for a long time, introduction of the internet has considerably changed university level teaching and learning with many universities transitioning toward on-line courses (Davidson-Shivers et al., 2001). For learning to happen, it is imperative for instructors to design their on-line courses in ways that facilitate interaction among students and with the instructor. This interaction is usually provided in the form of discussions. Gunawardena et al., (1997) affirmed that "…true distance education is impossible without provision for interaction" (p.401). On-line discussions are a central component of many on-line courses (Gao and Wong, 2008). These discussions play a vital role in acquiring knowledge during learning (Feng et al., 2006a). Among the various forms of on-line discussions, computer-mediated conferencing discussions like threaded discussions are popular, and applicable to the field of education (Feng et al., 2006b).

A threaded discussion is an asynchronous, web-based discussion that takes place in an on-line environment under a number of different topics that are called threads (Kirk and Orr, 2003). More simply, a threaded discussion involves posting of messages pertaining to a specific topic (Middlesex Community College, n.d.). It includes an initial message and subsequent posted responses that are sequentially linked to the initial message (Feng et al., 2006a). It is a form of conversation in which people express ideas, elaborate arguments, and answer questions of other group members (Feng et al., 2006b).

Threaded discussions offer many advantages like improving higher-order thinking (Kirk and Orr, 2003; Meyer, 2003), meeting constructivist curricular objectives (Weasonforth and Meloni, 2002), helping students become participatory citizens (Larson and Keiper, 2002), building on-line learning communities (Edelstein and Edwards, 2002), improving students' writing skills (Jordan, 2001), improving computer and on-line skills (Davidson-Shivers et al., 2001), facilitating student collaboration (Miller and Benz, 2008), and promoting active and group learning (Kirk and Orr, 2003). In addition, students themselves perceive threaded discussions favorably (Miller and Benz, 2008). They enjoy them because of the convenience factor (Davidson-Shivers et al., 2004).

Despite the many advantages associated with threaded discussions and students' preference for them, it is often a challenge to design threaded discussions in a way that is interactive, yet manageable and focused on the topic and objectives of the discussion at hand. Knowlton (2001) noted that on-line discussions could digress into chat that is not related to the intended purpose, thus hampering student learning. Consequently, not being able to maintain the focus of on-line discussions is a concern for many instructors (Gao and Wong, 2008). It has been the authors' personal experiences that some students lose focus and deviate from the discussion requirements, and can lead the discussion completely

off track. Meyer (2003) categorized such responses under the "social" category.

In order to minimize responses falling under the "social" category (Meyer, 2003), we must evaluate our practices and show ways to incorporate discussion boards into on-line classes (Bailey and Wright, 2000). A review of literature suggested that there is no model or framework in the field of agricultural education that demonstrates an effective way of using threaded discussions. In order to fill this gap, we structured a threaded discussion assignment for a graduate level on-line agricultural education course offered in spring 2010 at Iowa State University in a particular way that helped students focus on the topic of discussion and minimize deviations. Subsequently, this was developed into a model that could serve as a guide for instructors designing on-line threaded discussions.

## Purpose

The purpose of this paper is to present and describe the *Two-Stage Model for Threaded Discussions in On-line Agricultural Education Courses* (Figure 1) that was developed based on the teaching experience and outcomes of a graduate level on-line agricultural education class. Relevant literature support was also used in developing this model.

## Methods

The Institutional Review Board at the Iowa State University approved this study. The first author taught the course: "Introduction to Learning Theory in Agricultural Education" during the spring semester of 2010 at the Iowa State University. Fifteen chosen case studies, each based on a learning theory taught in the class, were designed using threaded discussions and students were required to participate in the discussions. Each case was broken into two stages (Figure 1). Clear directions were given for each case study to help maintain the focus of the discussions and minimize deviations from the topics. The directions as provided for each case study in the course are given below:

Please read the Teachers' Casebook X and follow the steps given below.

Step 1: Read "Teachers Casebook" and formulate and post your response to the case. This has to be your intuitive and original response as to how you handle or respond to that situation. (One or two paragraph long)

Step 2: Go to page XX in your text book and read how some practicing teachers responded to this situation.

Step 3: Review your peers' first posts and formulate your second responses to this case and post it. Did your response change in anyway? Why or Why not?

Students are encouraged to carry on discussion beyond the two required posts if the topic interests them.

Larson and Keiper (2002) suggested requiring students to post only a specific number of postings. Duly following their suggestions, students were required to post a minimum of two posts for each case study. This minimum requirement ensured the manageability of the discussion for both the students and the instructor. Students had an option to continue discussions beyond the required two posts if a specific concept/idea sparked further discussion.
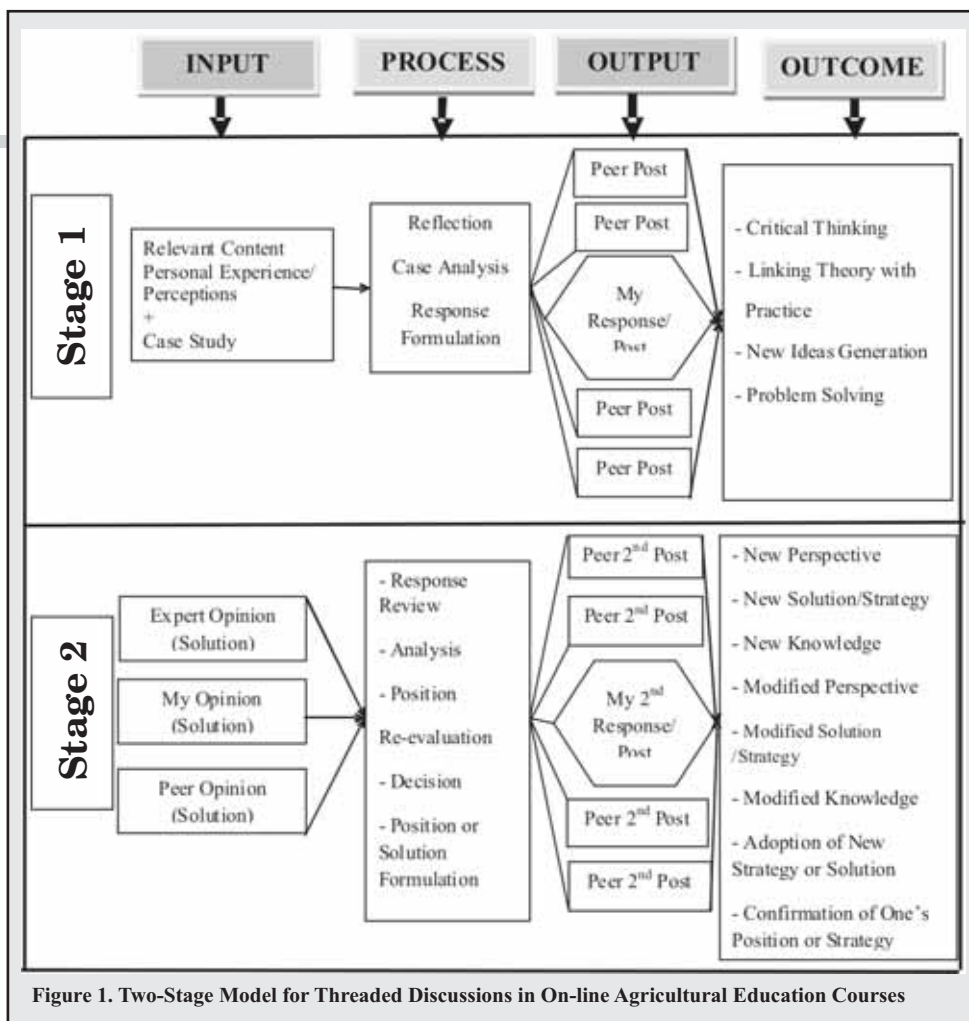


Figure 1. Two-Stage Model for Threaded Discussions in On-line Agricultural Education Courses

## A Model

Opportunities were provided for students to go through reflective process, and contribute quality and reflective original posts rather than feeding off of other students' posts/ideas right at the start of discussion. A Two-Stage Model was developed primarily based on the outcomes from this on-line class experience. Additionally, a literature review and the authors' experiences of offering and taking various other on-line classes with threaded discussions also helped develop this model. The description of this model is given below.

### Two-Stage Model for Threaded Discussions in On-line Agricultural Education Courses

The Two-Stage Model for Threaded Discussions in On-line Agricultural Education Courses (Figure 1) consists of two stages: Stage 1 and Stage 2. Both stages have four clearly demarcated components: Input, Process, Output, and Outcome that explain the stages through which the students pass as they participate and respond to messages in threaded discussions. Before starting the Stage 1 discussion, students review the case thoroughly and read the literature provided by the instructor (input), reflect on and analyze the case (process), and post their first responses based on their personal experiences, the literature read, and their overall perceptions about the case (output). The anticipated learning outcomes from this stage are critical thinking, linking of theory to practice, generation of new ideas, and problem solving.

In stage 2, students review a provided expert opinion on the case, review their peers' first posts (input), reconsider their own first posts before articulating their second posts (process), and post their second responses (output). The anticipated learning outcomes from this stage are developing new perspectives and solutions, gaining new knowledge and adopting new strategies to solve similar problems, and developing new perspectives or simply confirming that their first strategies were sound (outcome). The four components (input, process, output, and outcome) under Stages 1 and 2 provide a road map for threaded discussion design.

Additionally, students were encouraged to carry on discussions beyond Stages 1 and 2. At this point, students may focus on any particular concept, idea or issue that was raised within the two posts and pursue further discussions. This stage was not identified separately in the model because this was not a requirement for a grade; however, it is encouraged based on interest. This stage was left open for the instructors to decide based on factors like number of students in the class and the number of discussion cases instructors plan to include in their courses. We identify this to be an essential component of the model, as setting a minimum requirement to two postings makes the whole assignment manageable both for the instructor and the students, and helps maintain quality of those discussions.

## Results and Discussion

There were 17 students enrolled in the class, out of which 10 were female (~59%) and seven were male (~41%). All students participated in all the 15 case study discussions and successfully completed the two required postings. It was found that there were no personal discussions that were completely out of the scope of the topics that were discussed. The second postings, posted after students went through the expert and peer views, suggested that the students reviewed and reflected on their peers' first posts, considered expert opinions, and then articulated their own views, which were the requirements for the assignments. Examples of student work supporting this finding are presented below. The names of the students that appear in these examples are pseudonyms that have been made up to ensure the anonymity of the students. These student discussions posting examples are sampled from different cases that were used for the class.

*Example 1*

First, I stated that I would break the class into smaller groups trying to incorporate multiple language-backgrounds into a group. However, I think Mack's suggestion of "a group containing three English speaking students would also contain the two Somali speaking students" is much better. I agree that creating groups as I initially approached the scenario would be frustrating to many students and this is an [a] better alternative.

*Example 2*

I think my classmates could easily have provided the expert responses for the text. It's been most interesting for me to read what those of you who are actively teaching are already doing for your students on teaching study habits, organizational skills, etc. I'm impressed…. I wouldn't change that from my first thoughts. What I would add are some items. Jane commented about how we can teach them the skills, …. What I'd strengthen in my comments is the importance of making sure our lessons provide relevant learning opportunities.

*Example 3*

A few classmates also suggested that they would integrate student family members into the process of learning English. While this seems like a logical idea I contend that if the students are having trouble with the language the parents will have more. As it is said, you can't teach an old dog new tricks --- or at least quickly.

*Example 4*

…I recognize I did not utilize the student intern I had available to me. Many people suggested they become a tutor for … students. However, I disagree since if I, the 'seasoned' teacher have difficulties in this classroom setting I could not have my intern handle this.

*Example 5*

No need to restate the class consensus - family involvement, group work, utilize resources…. Emily and others discussed at some length family involvement and regular meetings. I like that concept, would investigate that more…. The component I'd seriously investigate more is Kathy's when she hinted at after-school groups to supplement instruction.

*Example 6*

I would not change much from my initial response after reading the teacher's ideas, as well as my classmates' ideas. The one thing I might add to my first response is to include having the students use journals to write in daily about symbols they see.

*Example 7*

I would change my first response. I would work different ways of learning for the students. I would take others advice and have them create a skit, debate, make a film, or a mock trial. Also, I would consider have them make a film on a certain event.

*Example 8*

I [am] going to stay strong with my first response because I agree with all of them. I do like the response of my classmate Amanda and the attention she places on the students IEPs this is something that you must do as a teacher at the beginning of every school year.

*Example 9*

Several options arise from classmates that I was not thinking of and would gladly consider as I realize they are good ideas while accommodating the needs of the mainstream students.

*Example 10*

That theme was also identified by several class members. So yes, I'd stick with my instincts regarding seating charts, more teacher control over group partners, etc. One item I've been struggling with is the whole concept of culture based lessons. One item I'd add to my initial response is the approach recommended by Greg, Mike and others…

The ten examples provided above include the posts where students changed their first responses as a result of going through the peer posts and expert opinion and also where the students stuck to their first post views/positions. These students clearly indicated why they took a particular stance. Discussions were carried on above and beyond the required two posts on all the 15 cases. These additional discussion posts beyond the required two posts ranged from 3-13. Further analysis of one case study indicated that seven students carried on further discussions and posted a total of 13 additional posts above and beyond the required two posts, and this threaded discussions spanned for four days. There

were similar other case discussion examples with varying number of postings showing that discussions occurred above and beyond the required two postings. In addition, these discussion posts strictly adhered to the case being discussed and no digression from the focus of the assignment was observed.

It was further found that for all 15 case studies, a majority of the students either added more information to their first responses or completely changed them. In two case studies, 88% of the students opted to either modify or completely change their first post responses. In two other case studies, 59% of the students chose to either modify or completely change their responses, whereas in the remaining 11 case studies, the percentage of students who made changes ranged between 59 and 88%. Further, students also indicated why they chose to/not to change their original responses, which indicated that they reflected on the peers' responses, their own first postings, and expert opinions, as can be seen from the examples of student work provided. They also provided substantive responses for all the required postings.

The findings appear to be consistent with the findings of Davidson-Shivers et al., (2001), Kirk and Orr (2003), and Meyer (2003), as it was found that students provided clear and thoughtful responses for all the case studies, and showed evidence of higher-order thinking, especially in their second posts. This is evidence that they followed the assignment requirements. Further, Davidson-Shivers et al. found that threaded discussions facilitated reflective responses. The Model of the Experiential Learning Process developed by Roberts (2006) identifies reflection as one of the components of the experiential learning process, indicating that threaded discussions can also promote experiential learning.

Additionally, it was observed that all students participated in all the 15 case studies and posted reflective and meaningful messages. The instructor and the Teaching Assistant (TA) were also able to read all the messages and provide timely and meaningful feedback, when needed. This indicates the utility and additional value of the depicted Two-Stage Model in facilitating learning through timely feedback on the discussions.

## Recommendations and Implications

This study was considered as a pilot-test. The instructor is currently testing this model in an undergraduate class in the fall 2010 semester; he intends to share these findings in the future. Nonetheless, based on the findings from this pilot-test, the authors believe that this two-stage model will benefit educators in designing threaded discussions for on-line agricultural education courses. Therefore, we recommend that instructors offering on-line agricultural education courses should utilize this model for designing discussion boards in their courses.

Threaded discussions have been found to be useful for larger classrooms as well (Miller and Benz, 2008). We recommend that larger classes be broken down into smaller discussion groups and that all discussions be carried out on the same case or topic simultaneously. The first author is now testing this strategy in an undergraduate on-line class of 50 students. This model has been used in on-line agricultural education courses up to the current semester, but we believe that it can be used in on-line courses in any discipline that requires active participation and interaction among students.

Additionally, this model is resource-effective as the costs/resources involved in designing and implementing it are minimal. This model may be used in any on-line learning management systems to enhance discussions and interaction among students, and student learning as a result.

## Summary

Designing threaded discussions for on-line courses in a way that is interactive, yet manageable and focused is a challenge facing many instructors. This paper presents and describes the *Two-Stage Model for Threaded Discussions in On-line Agricultural Education Courses* that was developed based on experiences and outcomes of a pilot-test conducted in a graduate level on-line agricultural education course at Iowa State University. The authors recommend that on-line instructors use this model for threaded discussion assignments in agricultural education and in other fields.

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# Foundations of Experiential Education as Applied to Agroecology[1]

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## Abstract

An overview of historical roots of experiential education provides insight from pioneer educators including John Dewey, Kurt Hahn, Paolo Freire, and David Kolb and how their innovations inform the design of contemporary learning landscapes. Clear definitions of experience, of learning, of reflection, and of systems approaches are needed to facilitate communication among people in different disciplines. The integration of production, economics, environmental, and social dimensions in an analysis of complex systems further complicates an already uncertain situation that is open to the influence of political and power structures at the local level and above. The applications of innovative experiential learning strategies in agroecology are explored, based on historical and multi-faceted perspectives. The goal is to create and immerse students in a learning environment that will develop their capabilities to work closely with instructors and clients in order to graduate as broad, articulate, and committed people who are dedicated to responsible action. Although the applications described are from agroecology, we maintain that this approach to education is relevant for other disciplines that are important to development of human activity systems where the challenges are biological, economic, and social.

Keywords: integrative education, systems learning, practical education, learning landscapes

## Introduction

Experiential education is an effective method of holistic teaching, structured within a framework that promotes student autonomy, individual learning, and learning through doing. This strategy is consistent with the teachings of John Dewey (1897) more than a century ago. Experiential learning also provides a useful opportunity to examine power issues in education and in society, and to work toward a greater social justice (Freire, 1973). In summary, experiential education allows students to discover meaning in their own lives and in the world around them, helping them meet one of the key goals instructors often pursue in designing a learning landscape. This paper explores the historical foundations of experiential education as they apply to developing contemporary education programs in agroecology.

To many instructors who use constructivist or active learning methods, the roots of experiential education remain a mystery. Teachers often intuitively use these methods without really exploring the literature or recognizing this as a formal field of study in education. Many equate "experiential" with an outdoor experience, a farm field trip, or an instructional visit to a food processing facility, and may consider that these experiences need less pedagogical preparation and planning. More than an activity to get students into the fresh air or avoid detailed preparations for class, the experiential learning activity should have clear learning goals, structure to maximize the value of the event, and explicit reflection and evaluation. Learning more about the history of such education may help inform both the planning and success of this type of learning experience.

In some ways, experiential education is still its own field with a special set of theorists and practitioners, working sometimes alongside but more often outside the scope of conventional education. In agroecology, although we do use internships, shadowing professionals, and work-study as activities that contribute practical experience to what is learned in the classroom, and the combination of agriculture and ecology in our field means a number of active lessons are easily available to us in the form of field trips and labs. However, both the breadth and depth of this type of learning could be greatly expanded even within agroecology (Lieblein et al., 2005; Østergaard et al., 2010; Francis et al., 2010). As we prepare for experiential educational opportunities in agroecology, we base our planning on much of the literature reviewed here.

In order to more fully understand experiential education, in the study of agroecology and in general, it is useful to examine its basic foundations. What are the historical and theoretical influences and documented applications? How have university culture and public policy affected educators' general interest in using these methods? What, exactly, is experiential education … and experiential learning? Finally, how can this learning strategy be used more effectively in agroecology, the study of the ecology of food systems that embraces the production, economic, environmental, and social complexity of this vital sector of human activity (Francis et al., 2003)?

A useful understanding of experiential education can be found by examining the educational research in this arena, considering the types of learning that have been explored, and determining what questions have been asked in the past and in the present context. Most useful to the agroecology instructor is a consideration of current issues where experiential learning can provide insight into design of contemporary learning landscapes. How could we use this historical information and present practice to do a better job of designing future learning environments?

Here we explore the historical perspective through examining contributions of John Dewey, Kurt Hahn, Paulo Freire, and David Kolb, as well as the experiences of several influential groups who currently use experiential learning methods. In defining experiential education, we explore the meanings of experience and reflection, as well as the roles of educators and students in meeting the explicit goals in an agroecology education program. Understanding how theory and research in the field have been translated into practice and experience is one of the most useful exercises for today's instructor, and deciding how we can evaluate the outcomes of experiential learning is crucial if we are to fit this into our current institutional framework. Although the paper is focused on higher education and specifically on agroecology, we believe the practical applications are equally important in secondary and primary educational settings, and in other practical fields of study. We conclude with reference to current issues in farming and food systems, and to how agroecology can effectively address the complexity and uncertainty of the future through experiential education by building on the foundations established in other fields.

### Historical Influences in Experiential Education

#### Influence of John Dewey

We recognize that experiential learning has a long and rich tradition in most cultures, often associated with traditional gender roles, as boys learned herding and hunting from fathers and girls learned crops and cooking from mothers. One of the most influential thinkers in the modern academic incarnation of experiential education was John Dewey (Carver, 1996, 1997; Hopkins, 1994; Itin, 1999; Katula and Threnhauser, 1999; Trigg and Balliet, 1997). Dewey began his career in philosophy near the end of the 19th century, a time during which philosophy and psychology were closely related and were often intertwined in courses for training young minds. From his earliest writings, Dewey established himself firmly in the realm of the practical, as reflected in his pragmatic theory that "argued that thinking and acting should be considered as one coherent entity and not as separate endeavors" (Null, 2000). For example, in alignment with the U.S.

progressive education movement, Dewey not only believed that "education was … the central part of preparation for participation in a community" (Itin, 1999), but on a larger scale, "was also concerned that students become active participants in American [sic, U.S.] democracy" (Katula and Threnhauser, 1999). Further, he believed that practical experience was the best preparation for young citizens.

Although Dewey had a high level of respect for individuality and experience, this was mixed with the pragmatism of need for organization and structure. In *Experience and Education* (Dewey, 1977), he addressed the educator's responsibility to make choices of the best experiences for the student as well as a structure that could best support the process. Dewey observed traditional school subject matter as rooted in choices made based on success of past students, while ignoring the needs of the students presently being educated. As a colleague at University of Nebraska said recently, "We need to teach the students who are in our classes, not those we wish were in our classes." Rather than looking to the school system for a selection of subject matter, in which "the material to be learned was settled upon outside the present life experience of the learner" (Dewey, 1977), Dewey was convinced that subject matter should begin in each student's present situation. Thus each new learning experience is built on the student's current reality, and any new experience becomes part of the student's lived knowledge. For this reason, in agroecology we start each new group with a shared experience on the farm, helping to create common ground on which to build subsequent learning activities (Østergaard et al., 2010).

Dewey suggested that education should not be unrelated to the past, and stressed that the most important connection was that of the student and not the teacher. Integrating students' past experiences, even when those experiences are not directly connected to agroecology course syllabi, builds a stronger foundation for those students as they begin acquiring new field-specific knowledge and skills. "Policies framed simply upon the ground of knowledge of the present cut off from the past are the counterpart of heedless carelessness in individual conduct. The way out of scholastic systems that made the past an end in itself is to make acquaintance with the past as a means of understanding the present" (Dewey, 1977). Dewey suggested a dialectical process of learning, by "integrating experience and concepts, observations and action, learning and being taught" (Katula and Threnhauser, 1999). In his laboratory school at University of Chicago, both students and teachers learned through experience. We see this today as essential to experiential education in agroecology, when we use 'open-ended cases' – learning situations in which answers are not known by farmers, instructors, or students – where all are searching together to derive relevant questions and design potential scenarios for the future (Francis et al., 2009).

In this search for relevance, Dewey interpreted experience through his "principle of interaction" that depicts experience as a "result of the interaction between the student and the environment" (Carter, 1997), and his "principle of continuity" where experience "both takes up something from those which have gone before and modifies in some way the quality of those which come after" (Dewey, 1977). Thus each experience does not stand alone, but must be viewed within a framework constructed of all experiences that the student has had, and will have in the future. It is all part of an integrated whole, and nothing is isolated … including academic, personal, or social learning. Today we call this learning in context, an essential part of phenomenon-based learning (Østergaard et al., 2010).

To expand on the importance of the holistic nature of learning, and in the spirit of Dewey's theories of learning, Carver (1997) suggested that the educational value of an experience "takes into consideration not only the explicit curriculum but also the lessons people acquire by participating in activities … lessons acquired collaterally as well as formal curriculum are the substance of students' learning." How students interact with the environment in which they are immersed, within an educational experience, and how the experience relates to past and future experiences determines the learning value of the experience. In the same vein, Dewey considered the role of habit in learning and distinguished "between habit, 'the great flywheel of society' that enables society to function predictably when faced with recurring challenges, and the habit that tyrannically traps us into behaving in a particular way without thinking of alternatives" (Beard and Wilson, 2002). Recently Barker (2001) described this as "paradigm paralysis," in which certainty prevents the mind from opening to new possibilities. Dewey recognized the unconscious influence of habit on thinking and learning, and how prior assumptions and other cultural influences were important but not often discussed explicitly in most traditional educational situations. Taking on such influences opens new possibilities to support students' exploration of not only alternate habits but also futures, and the concrete planning (recently conceptualized as a 'learning ladder') necessary to make those futures real (Lieblein et al., 2007). In order to be able to work with students in this way, we must understand and incorporate into our planning those students' habits of learning, often highly influenced by their less open-ended educational experiences.

### Outdoor Education and Kurt Hahn

Related to agroecology and farming systems is experiential learning in the natural environment. A near –mythical figure in the history of experiential education, especially outdoor or wilderness education, is Kurt Hahn, the designer of Outward Bound. For his first school in Germany, Hahn created a set of principles in 1930 which were later expressed in Outward Bound as the Seven Laws of Salem (Salem School, n.d.):

1. Give children opportunities for self-discovery
2. Make the children meet with triumph and defeat
3. Give the children the opportunity of self-effacement in the common cause
4. Provide periods of silence
5. Train the imagination
6. Make games important but not predominant
7. Free the sons [sic] of the wealthy and powerful from the enervating sense of privilege

Although directed toward youth and children, the application to higher education and agroecology is apparent, as the principles relate to how we work in farms and communities and the ways we urge students to involve all their senses in embracing the real world environment.

Outward Bound's roots were influenced by Hahn's belief in preparing youth to "speak their convictions" (Smith, 2001) and by his previous educational experiences in Germany and England. "Concerned that society was crumbling, he designed Outward Bound to 'protect youth against a diseased civilization' in which there existed a lack of 'care and skill,' 'enterprise and adventure,' and 'compassion'" (Carver, 1997). This combination of beliefs about the goals of education and opportunity resulted in what many experiential educators think of as the foundation of wilderness education – the most widely recognized form of experiential education. Encouraging growth in students' "care and skill, enterprise and adventure, and compassion" have direct applications in agroecology education. A solid program of agroecology study will explicitly incorporate ethics and values into the individual's learning journey in farming and food systems. (Lieblein et al., 2007).

Hahn's stated goals for education and his methods of reaching those goals reflect his belief that the "foremost task of education [is] to ensure the survival of these qualities: an enterprising curiosity, an undefeatable spirit, tenacity in pursuit, readiness for sensible self-denial, and above all, compassion" (HIOBS, 1990). James (1995) outlines Hahn's "four central elements … to education":

1. Using a 'training plan' in which students would contract around specific personal goals and a code of responsibility
2. Structuring the use of time to gently impel students into action
3. Placing difficult challenges before students that involved a perceived level of risk and adventure
4. Using the group to mirror a mini-community and using shared experiences to help them begin to work together

These aspects of Hahn's philosophy are clearly reflected in the writings and guiding tools of today's experiential educators. Our application in open-

ended case projects on farms and in communities places students in socially and intellectually challenging situations that parallel the physical challenges of Outward Bound (Francis et al., 2009).

### Social Change and Paolo Freire

A voice often connected with critical philosophy in experiential education is that of Paolo Freire, "a Brazilian educator whose theory of adult education [was] set within a larger framework of radical social change" (Merriam, 1987). Freire's (1973) "conscientization" was designed to raise social issues imbedded in conventional educational systems, in order to provide alternatives that could improve the conditions of all, especially the less favored in society. As summarized by Burbules and Berk (1999), "Freedom, for Freire, begins with the recognition of a system of oppressive relations, and one's own place in that system. The task of critical pedagogy is to bring members of an oppressed group to a critical consciousness of their situation as a beginning point of their liberatory praxis. Changes in consciousness and concrete action are linked."

*Praxis*, as defined by Freire, is "the authentic union of action and reflection" (Burbules and Berk, 1999), with definite connections to the key elements of experiential education. An alignment between experiential educators and critical theory is constructed through Freire's writings. Recognizing the key value of experience, he believed that "to attend to the experience of people is to empower them, to give them a voice, to challenge and disrupt established arrangements, to engage in dialogue and thus to evoke what Paulo Freire (1972) called 'generative themes' that point to change and reconstruction, whether in a classroom or in a society" (Hopkins, 1994). In experiential education, Freire's work illustrates the power of experience, both in learning and in recognition of agency – the ability of people to act independently and make their own choices. Freire insisted that people learn the value of working with others, rather than doing things for (or to) others (Claus and Ogden, 1999). An awareness of social and cultural issues surrounding education and the importance of validating the strengths each individual brings to an educational experience has become more widely discussed and accepted in experiential education over the past few decades.

A key tenet of agroecology education is the involvement of students in the farming and larger community. Far from simply getting students out of the classroom, this involvement connects students with real-life issues and struggles of farmers and other community members, and prepares them for the work they will take on after their schooling is complete. It is imperative, in such situations, that students recognize Freire's emphasis on the agency and perspective of the community members with which they work. Truly listening to clients and partners is a skill and collaboration tool, and cannot

be neglected in the development of agroecology professionals. Further, Freire's theory of praxis is exemplified in the experiential agroecology lesson, in which academic theory and the students' and partners' experience combine to create new understandings for all.

### David Kolb's Learning Cycle

Through the twentieth century, many educators have explored the role of experience in learning. Cognitive scientist Davis Kolb expanded on Dewey's work, focusing on the realm of higher education, with a goal "to change the educational environment in this country [U.S.] to meet the needs of the new populations entering higher education: non-traditional students, minorities, and the poor, whose concrete experiences and socialization have not prepared them for traditional textbook approaches to learning" (Katula and Threnhauser, 1999). Kolb's assertion is that experiential learning "allows for the development of a community-based body of knowledge to be construed from the multiplicity of experiences brought into the contemporary classroom" (Katula and Threnhauser, 1999), aligning with Dewey's ideas about individualized approaches to subject matter and curriculum.

Kolb explicitly addressed the links between school and work, and between contemporary learning and competency testing. Kolb is most well-known for his experiential learning model, developed in 1975 (Kolb, 1984). The four main sections of the model are often depicted in a circle, though the learning cycle was first described as a spiral (Smith, 2001). Typically the cycle begins with a *concrete experience*, then moves through *observation and reflection, forming abstract concepts*, and *testing in new situations*, or experimentation (Kolb, 1984). "Knowledge results from the combination of grasping experience (concrete and experimental) and transforming it (conceptualization and reflection) … for Kolb, learning actually begins with experience" (Katula and Threnhauser, 1999). An application of the approach is our use of shared student farm experiences, starting in the first week of class in agroecology (Lieblein et al., 2007). Kolb's description of the use of his experiential learning cycle highlights his emphasis on work-school relationships:

*The experiential learning model pursues a framework for examining and strengthening the critical linkages among education, work, and personal development. It offers a system of competencies for describing job demands and corresponding educational objectives and emphasizes the critical linkages that can be developed between the classroom and the 'real world' with experiential learning method. It pictures the workplace as a learning environment that can enhance and supplement formal education and can foster personal development through meaningful work and career development opportunities (Kolb, 1984).*

**Figure 1. Kolb's Learning Cycle [adapted from Kolb, 1984]**
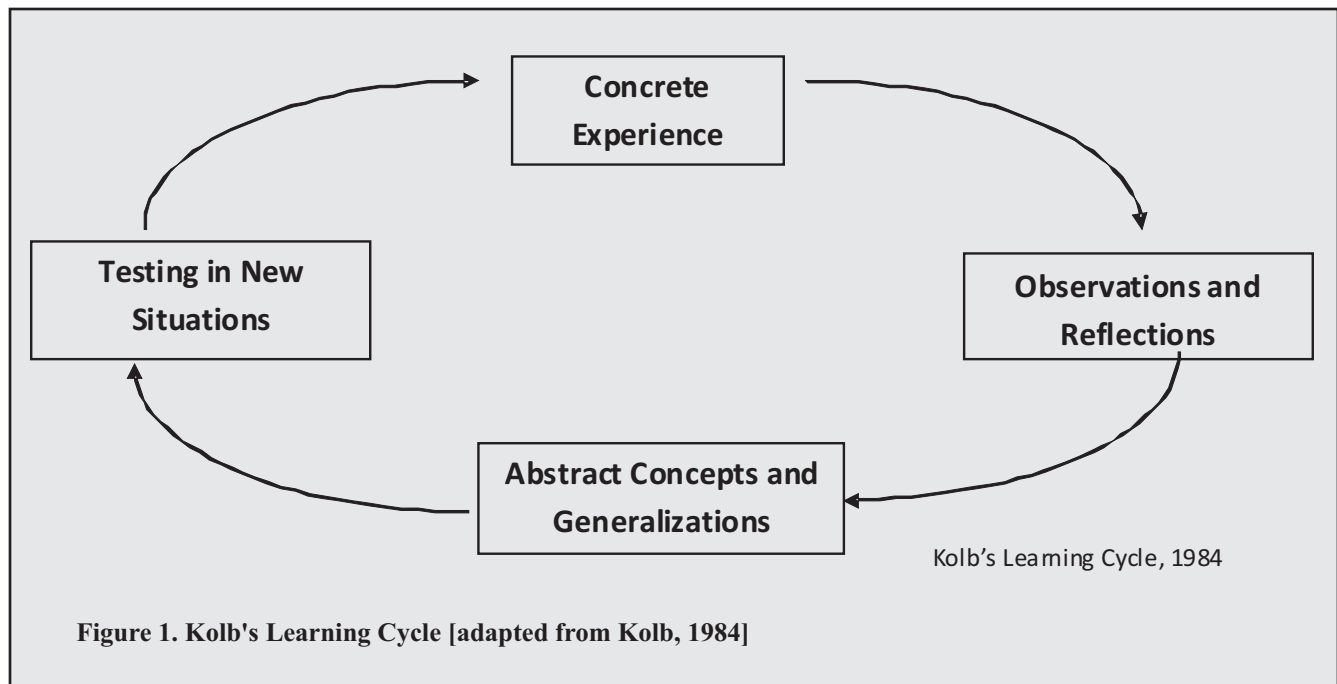
The links to Dewey's ideas about linking learning with experience are obvious. Kolb's work diverged from Dewey in an exclusion of habit from both his experiential learning model and the underlying thinking behind the model. Kolb also did not include Dewey's more explicit connection of experiential learning to social interactions (Holman et al., 1997).

Kolb's experiential learning cycle, while highly popular with education practitioners and theorists, has been critiqued and discussed since its introduction (Anderson, 1988; Askew and Carnell, 1998; Holman et al., 1997; Hopkins, 1994; Miettinen, 2000). Common critiques include the contention that the model does not take into consideration the multiplicities of experiences that Kolb himself has purported to value – that the model is a product of and is workable only for western thinking (Anderson, 1988), that it does not truly reflect the nature of knowledge (Smith, 2001), and that it views the inner life of thinking, learning and knowledge as individual and mechanistic rather than as a social (Miettinen, 2000) or quasi-social phenomenon (Beard and Wilson, 2002). Nevertheless, Kolb's experiential learning cycle has become a starting point for many educational theorists' explorations of experiential education, as well as practitioners' plans in executing experiential learning. Kolb's cycle figures prominently in our design and implementation of active learning on the farm and in the community in courses in agroecology in the Nordic Region (Lieblein et al., 2010).

*Other Historical Influences*

A number of other historical influences and well-known initiatives have encouraged the growth of experiential education inside and outside of formal U.S. educational institutions. Government programs during the presidency of John F. Kennedy widened the scope of U.S. humanitarian interaction worldwide, training "citizens of the world who could work in the world through venues such as the Peace Corps and VISTA" (Katula and Threnhauser, 1999). Study-abroad programs also began to proliferate after the close of the Cold War, further encouraging U.S. students to expand their life experiences.

Calls by many constituencies for accountability and stronger practical education emphasis in higher education have spurred these institutions to provide experiential programs in the form of study abroad, internships and cooperative learning experiences, field experiences, and service learning projects. The American Association of Higher Education (AAHE) has expressed a commitment to experiential learning; in 1995 the chair of the board of directors, Helen Astin, recognized the need of higher education institutions to "connect our research, teaching, and service to the needs of the communities and society at large" (Katula and Threnhauser, 1999). By 2002 this dedication had been realized in the AAHE (now AAHEA) Service Learning Project, consisting of a 21-volume monograph series, in which each volume "discusses how service-learning can be implemented within a specific discipline" (AAHEA, n.d.), and coalition-building meetings that were sponsored by the organization.

The National Society for Experiential Education (NSEE) also explored ways to promote and support experiential education across all disciplines and ages, and within and outside formal educational venues. In 1998, NSEE established its principles of good practice in order to "facilitate experiential education's goal of integrating the classroom and the out-of-classroom experience" (NSEE, in Katula and Threnhauser, 1999). Additionally, NSEE provides educators with resources, collaboration, and consulting services to support learning through experience for intellectual

development, cross-cultural and global awareness, civic and social responsibility, ethical development, career exploration, and personal growth (NSEE, 1998).

The Association for Experiential Education (AEE) provides similar activities and resources, as well as awards, education-related jobs, and an accreditation specific to adventure programs. The accreditation provides guidelines for demonstrating excellence by making sure that a program "has an educational mission, clearly defined and appropriate objectives, maintains conditions under which those objectives may be achieved, and appears to be achieving them" (AEE, 2001). Successful completion of the accreditation process provides recognition by potential participants and employees, outside granting and monitoring sources, and public lands regulatory agencies.

These historical precedents and practical applications combined through the last century to create a new field dedicated to individuality, strengthening community, and experience. Throughout decades of waxing and waning financial support, experiential learning programs have continued in higher education. In 2002, Disney Corporation alone reported working with 8,000 interns and cooperative students, from 450 colleges and universities throughout the U.S. and Puerto Rico (Gold, 2002). In 1996, the Directory of College Cooperative Education Programs listed programs in 460 colleges through the U.S. (NCCE, 1996), and 99 U.S. undergraduate engineering and engineering technology college programs, for example offered a cooperative experience to their students in 2004 (Mathews, 2004). In 2008, the Corporation for National and Community Serviced reported: "at least a quarter of all higher education institutions and more than half of all community colleges [in the U.S.] have adopted service learning programs, (CNCS, 2010). Philosophers and practitioners are cited today by experiential researchers and educators in addressing the challenges of contemporary issues, including the never-ending questions surrounding definition of experiential education, experience, and sustainability. Grounded in the ideas of Dewey, Hahn, Freire, Kolb, and others plus the practical applications in the Peace Corps and now in educational programs in agroecology and active learning, a clearer picture of the potentials of experiential education is emerging.

### Definitions in Experiential Learning

To put experiential learning into the present context it is useful to explore definitions of experiential education, of experience, of reflection, and of learning, as well as how we are redefining the roles of educators and placing more responsibilities on students.

### What is experiential education?

Many confuse this term with experimental education, while others think only of wilderness or Outward Bound experiences, which provide useful concepts and applications but are not inclusive of all the present uses of these methods. Others confuse experiential education with experiential learning, and may use the terms interchangeably as we have in this review. Because of the diversity and richness of definitions, it is important to define what is meant by the concept, and to make this explicit in any article or program.

The Association for Experiential Education (Luckmann, 1996) constructed what has become a well-known and accepted definition: *Experiential education is a process through which a learner constructs knowledge, skill, and value from direct experiences.*

Even with this publication, the editor of the Journal of Experiential Education expressed reservation about the concept, stating that "Hopefully, newcomers to the journal will pick up an issue and by reading what is published, begin to define and describe for themselves what is implied by the phrase "experiential education" (Luckmann, 1996). How appropriate that even the definition is subject to exploration and discovery! As derived from this process, a number of key principles emerge:

• Experiential learning occurs when carefully chosen experiences are supported by reflection, critical analysis, and synthesis.

• Experiences are structured to require the learner to take initiative, make decisions, and be accountable for the results.

• Throughout the experiential learning process, the learner is actively engaged in posing questions, investigating, experimenting, being curious, and solving problems, assuming responsibility, being creative and constructing meaning.

• Learners are engaged intellectually, emotionally, socially, soulfully, and/or physically. This involvement produces a perception that the learning task is authentic.

• The results of the learning are personal and form the basis for future experiences and learning.

• Relationships are developed and nurtured: learner to self, learner to others, and learner to the world at large.

• Because the outcomes of experience cannot be totally predicted, the educator and learner may experience success, failure, adventure, risk taking, and uncertainty.

• Opportunities are nurtured for learners and educators to explore and examine their own values.

• The educator's primary roles include setting suitable experiences, posting problems, setting boundaries, supporting learners, insuring physical and emotional safety, and facilitating the learning process.

• The educator recognizes and encourages spontaneous opportunities for learning.

• Educators strive to be aware of their biases,

judgments, and preconceptions and how they influence the learner

• Design of the learning experience includes the possibility to learn from natural consequences, mistakes, and successes.

• Priority or order in which each professional places these principles may vary (Luckmann, 1996).

This definition and list of principles is all-encompassing, yet the very length makes it less than simple to use. A breakdown of the attributes and synthesis into a more easily digested format appears desirable to most authors. Keeping in mind the basic definition from AEE (1994), "Experiential education is a process through which a learner constructs knowledge, skill, and value from direct experiences," what can be said about "experience?"

### What is Experience?

According to historical and philosophical foundations of experiential education, an experience is something that the student is actively involved in doing. The application of Dewey's philosophy of education required students to work, to move, to be active in their learning – in the literal sense – and required educators to provide learning opportunities based on the students' interests and previous experience (Dewey, 1897). Yet Dewey himself ironically expressed his imprecise grasp of the term: "Experience is a weasel word. Its slipperiness is evident in an inconsistency characteristic of many thinkers" (in Beard and Wilson, 2002).

Current writers in experiential education usually fall along the same lines – both in basic philosophy and in consternation with the concept – and some make the specific point of reiterating the statements of the foundational philosophers. Richard Hopkins (1994) invokes philosopher Charles Sanders Peirce: "Experience is our only teacher. And … this action of experience … takes place by a series of surprises." Further, Hopkins asserts that "True interest, as a quality of attention, expresses itself actively through the body … experiential learning requires that the learner be free to go out and go after knowledge, integrating the entire sensory apparatus into a unified, experiencing whole." Direct experience, then, involves the whole learner, and cannot happen through abstract means such as lectures or while sitting quietly at computer desks, but only in authentically engaging and even surprising activities.

Part of the slipperiness of experience lies in its density, as described by Carver (1996): "Experience involves any combination of senses (e.g. touch, smell, hearing, sight, taste), emotions (e.g. pleasure, excitement, anxiety, fear, hurt empathy, attachment), physical conditions (e.g. temperature, strength, energy level), and cognition (e.g. constructing knowledge, establishing beliefs, solving problems)." An experience that takes most all of these aspects into consideration is not planned lightly. Another concept of slipperiness in experience is its very personal nature. As it is impossible to climb inside another to understand exactly how she or he experienced a situation or interaction, how can really know the nature of others' experiences? A multiplicity of experiences becomes part of the definition. This discussion underlines the difficulty in knowing how students are progressing in what could be called their internal learning ladder (Lieblein et al., 2007).

### What is Reflection?

Since reflection is such an integral component of experiential learning, and is too often ignored in conventional design of learning environments, we invest substantial time here reviewing the concept and practices. Key is Dewey's idea of the intertwined nature, in experience, of thought and action. An experience is neither thought nor action alone, but a link between the two. "… Dewey was able to connect opposites or dualities, e.g. person and nature, subject and object, [and] in this way these polarities become connected and the concept of experience creates an organic whole of continuity, process and situation" (Beard and Wilson, 2002). Malinen (2000) further breaks down the action/thinking of authentic experience into two categories: "Immediate action happens in order to test new constructions, but delayed action indicates that a learner has engaged with what he [sic, she or he] knows." In both immediate and delayed action, the learning is interested in what she or he is doing, is actively involved in the experience, and is combining action and thought about what is happening and what has happened.

This thinking combined with action in experience is what, in experiential education, may be termed reflection. It could be said that reflection, and its relationship with action, is the most highly recognized idea within experiential education. Certainly, experiential educators are quick to caution that success in experiential situations cannot happen with experience alone; reflection must be an explicit part of the process (Brooks-Harris and Stock-Ward, 1999; Itin, 1999; Kolb, 1984; Raffan and Barrett, 1989; Stremba, 1989).

Building on the spiral nature of Kolb's experiential learning cycle, it becomes evident that reflection may happen at any point during a learning experience. Some authors extol the use of reflection at the beginning of an exercise, in order to prepare students for learning, recall past experience and affirm present knowledge (Brooks-Harris and Stock-Ward, 1999). More often, reflection is suggested for the period immediately after an experience, in order to help students assimilate the experience into their working knowledge, thereby moving students into Kolb's cycle's third step of forming abstract conceptions.

For many experiential educators, especially those working with students over an extended period of time, reflection is a recurring or ongoing process, rather than an isolated event. Students are encour-

aged to continually reflect, individually or socially, throughout their time together. Stremba (1989) and Raffan and Barrett (1989) both discuss the importance of ongoing reflection in outdoor adventure experiences. Stremba (1989) suggests the following uses for reflection: "… reflection and discussion about self, relationships with other group members, and about the adventure, enriches the entire experience and makes it more holistic," and "… reflection provides the participants with tools to take the experience back home with them." Both goals can be met with meetings, in pairs or in larger groups, to verbally discuss what has happened and what students are thinking about their experiences.

In addition, tools to support individual reflection are valuable: "Journals are a most effective tool for individuals to keep track of their feelings, experiences, insights and changes" (Stremba, 1989). Raffan and Barrett (1989) explored journal reflection more thoroughly by building a research project into a seven-week expedition in Canada's Northwest Territories. Participants' journals were analyzed for journal entry styles and the content of their reflections. Participants were asked to reflect in their journals on a daily basis throughout the expedition. Journal entry styles ranged from quick sketches; daily notations of location, weather, and emotions; and billboard pronouncements ("DEATH TO ALL BLACK FLIES", one participant exclaimed); to extensive prose, poetry, songs, and carefully executed drawings. Maps, free-writes, lists and letters also made appearances in journals as participants found that they fulfilled a particular need. During a U.S. Midwest travel course to farms and historical areas, one student was found in tears as she sat on a rock, writing in her journal, and reflecting on the pre-history of that spot where Native Americans once lived free and in balance with their environment … and the tragedy of the dramatic transformation of that spot into today's industrial agriculture. Her integration and involvement of values and emotions into her learning will long be remembered by the instructors.

One surprise to Raffan and Barrett (1989) was the lack of theory-testing, or making generalizations to the larger world, that occurred in the journals. A possible explanation for this omission, according to the authors, was the many opportunities that participants had, during the expedition, for verbal theory testing. Additionally, we have also observed in most classes that university students have difficulty generalizing from specific information to the broader or more general application, and there is much to be done by us as instructors to better facilitate this process.

As for content: "…the journal appears to be a powerful tool for self-expression and for documenting personal growth on the trail. The journals allowed individuality to flourish" (Raffan and Barrett, 1989). After analyzing the journals' content, the authors

concluded both that they were safe places for thinking and musing on experience, and that they actually encouraged greater learning throughout the expedition. Trends found in the journal content that suggested this learning benefit included "The shift to visual entries, the trend toward drawing maps, and the gradual development of a sense of belonging on the land…" (Raffan and Barrett, 1989). Part of what made this possible was the integration of a journaling type of reflection throughout the experience, rather than only at the beginning, middle or end.

Dewey's classic definition of reflection has a definite rational slant: "active, persistent and careful consideration of any belief or supposed form of knowledge in the light of the grounds that support it and further conclusions to which it leads…it includes a conscious and voluntary effort to establish belief upon a firm basis of evidence and rationality" (in Beard and Wilson, 2002, italics added). Other definitions have included more of the emotional side of thinking. Boud et al. (1985) rework Dewey's ideas in such a manner in their description of reflection:

• Returning to experience - that is to say recalling or detailing salient events;
• Attending to (or connecting with) feelings – this has two aspects: using helpful feelings and removing or containing obstructive ones; and
• Evaluating experience – this involves re-examining experience in the light of one's intent and existing knowledge, etc. It also involves integrating this new knowledge into one's conceptual framework (in Smith, 1999).

Most current examples of reflection reflect this type of definition. They can obviously take many typical forms, depending on the situation and the goals of the individual student in keeping a journal of reflections. These can include:
• Analyzing a problem
• Communicating to others outside the group
• Celebrating a success
• Awareness-raising
• Reconstructing an event
• Rehearsals
• Testing of theories
• Working through issues (individual, social, or other)
• Reviewing or assessing the experience (from Greenaway, 2002).

Some faculty are also active in journaling during educational activities, including the time for reflection between specific actions in the field or classroom and in the evening. Often, an instructor keeps detailed notes on activities, for future reference, or observations and reflections on what has been successful and what could be improved. There are as many options for reflection and journaling as there are people who use these techniques.

### What is Learning?

Some educators make a distinction between experiential education and experiential learning. While the distinction is small, it can be important in clarifying our understanding of both concepts. Experiential learning can be thought of as individual: "the insight gained through the conscious or unconscious internalization of our own or observed interactions, which build upon our past experiences and knowledge" (Beard and Wilson, 2002). In this sense, learning "rests within the student and does not necessarily require a teacher" (Itin, 1999). Experiential education, while relying entirely on experiential learning as its foundation, "must include or make clear the transactive component between teacher and learner which is absent from the definition of experiential learning," and "must consider the larger system level issues of education such as the socio-political-economic elements in the learning environment" (Itin, 1999). In this way, experiential education encompasses but is much larger in scope than experiential learning. Experiential education must be a social, and socially aware, undertaking. To implement these ideas requires a readjustment in roles of teacher/educator/instructor and those of the students.

### How Do Learning Goals Change the Roles of Educators?

One unique aspect of experiential education is a set of explicit goals. The meaning that students take away from experiences is recognized as both individual and multiple in nature, and in agroecology our students are expected to come away from an experience with better appreciation of how to deal with complexity, diversity and uncertainty, and to learn how to ask relevant questions in the future (Lieblein et al., 2005, 2007; Østergaard et al. 2010). However, "Although the goals of experiential education typically focus on the development of the individual, implicit in this focus is the broader vision of individuals learning to contribute to the larger community and society" (Lindsay and Ewert, 1999), or what Lieblein and Francis (2007) call the capacity for responsible action. Experiential education is also typically planned around "specific physical skills and decision-making abilities" (Lindsay and Ewert, 1999), rather than skills and concepts traditionally viewed as academic.

Related to the dense nature of experience discussed above, the goals of experiential education tend to be holistic, with programs designed to embrace students "as thinking, feeling, physical, emotional, spiritual and social beings" (Carver, 1996); each student is also a teacher, in a sense, with much to contribute to the overall community learning experience. This holistic approach is affected by values that are implicit in experiential education programs: "caring, compassion, communication, critical thinking, respect for self and others, individu-

ality and responsibility" (Carver, 1996). These goals and values, having originally sprung in part from the wilderness and adventure beginnings of experiential education, now influence the many types of programs offered within this broad, varied type of learning experience, including:

• "Job training internships and apprenticeships
• Survival training and rescue training
• Service learning and program focused on advocacy
• Art education and production
• Media production
• Academic-oriented programs
• Community-based support programs
• Early education programs
• T-groups (training-groups; interpersonal dynamics workshops)" (Carver, 1996)

Thus, the values and goals that help define experiential education require a different type of educator or learning leader than those in traditional education programs. "The educator's primary roles include setting suitable experiences, posing problems, setting boundaries, supporting learners, insuring physical and emotional safety, and facilitating the learning process" (AEE, 2010). Lacking here are the traditional roles of the teacher, as purveyor of information or knowledge, or as enforcer, although some of these can still be necessary to encourage students in their journey through the learning landscape. Students are expected to be responsible for their own learning, and are encouraged and supported in their search for meaning. "... The philosophy of experiential education makes clear the context within which [teachers'] knowledge is disseminated ... the learner actively engages in co-creating with the teacher the educational process" (Itin, 1999). The open-ended cases used in agroecology are one example of this process (Francis et al., 2009).

Convincing students that they are in fact responsible for how they approach a topic, what outcomes will be most important to them, and even to participate in how their learning will be evaluated are not small tasks. People are accustomed to being told what to learn and what will be on the exams. Experiential learning as we apply the concept in agroecology represents a major shift in thinking that requires close attention by instructors to create the space for independent learning. At the same time, the challenge to convince instructors that their role as *sage on the stage* should be transformed into one of a *guide on the side* or a *learning leader* is an equally daunting task. As instructors, we have often been strongly influenced by great lecturers encountered in our past, and one could say that we self-selected ourselves to continue in that tradition. Experiential learning requires major changes in attitude and behavior of both students and instructors.

## Putting Research into Practice and Evaluating Learning

With the basic definition of experiential education as a foundation, we can further examine the research on experiential education theories and programs. Educational programs, research and the application of results requires integration of foundational knowledge with understanding theoretical frameworks within which present day educational researchers operate. The critical process of evaluation as an integral and continuing component of education is explored. The applications we use in agroecology may serve as examples of the principles of experiential education as described above.

### Theory Linked with Practice

Although experiential education is typically viewed as practice-based, and there has always existed a tension between theory and practice in the field (DeLay, 1996; Gass, 1992; Lindsay and Ewert, 1999), pockets of interesting research on experiential education programs and how they link theory with practice have surfaced over the past two decades. The tension around balance has been examined by researchers in the field, in a debate that has yet to be decided.

Michael Gass (1992), in his role of guest editor for AAE's flagship publication The Journal of Experiential Education, recognized the "maturation" of the field of experiential education and asked, "…have we positioned ourselves within respective professional communities to produce appropriate change? Or are we…working extremely hard at getting somewhere, but still wondering where it is we are trying to get to?" Gass' suggestion for more productive, professional work was a true integration of practice and theory. This kind of move has proved difficult for a group of educators dedicated to the experience, rather than the "thought experiment." Many have generally acknowledged that an integration of theory into practice, in a manner unique to experiential education's focus on action, will benefit the field as a whole. Constructivist and critical theories have both been suggested as possible candidates for this "synergistic approach."

### Evaluating Experiential Education

The theory/practice tension is recognized in a summary of Conrad and Hedin's (1981) large study, the National Assessment of Experiential Education. The authors begin with the following disclaimer:

*As experience is too immense, too complex, illusive, even too mysterious a phenomenon to fully comprehend, so also is it the case with what is learned from it. There is no pretense in this report that its tables and numbers have miraculously captured that "sensibility" which has eternally eluded the poet. The report's more pedestrian aim has been to capture some small particles of experience, to reduce some part of the mystery to a size and form that can be grasped, understood, manipulated, and from which conclusions may be drawn and lesson learned.*

This study came at a time of increasing interest both in accountability in schools, and in meeting those requirements in creative ways. Accordingly, the authors mention support by funding through Spencer and Rockefeller Foundation grants, and the encouragement to begin the project from the Commission on Educational Issues, a group dedicated to assisting public and private secondary schools on cooperative projects.

A key element of the review was forming the methods around the recommendations of a panel of educators from within the 27 programs being studied, programs associated with both public and private schools. Key participants "were responsible for defining the issues to be studied, for helping to select and develop assessment tools, for implementing the research design, and for helping to interpret the data collected" (Conrad and Hedin, 1981). It is both impressive and appropriate that principal researchers of a large-scale study would give up so much power within the project, but perhaps more likely within a field so focused on knowing by doing and in accord with the empowerment of participants, just as we strive to empower and affirm the roles of students in experiential learning situations.

Programs were evaluated for student outcomes in three major areas: psychological, social, and intellectual/academic development, using self-administered survey assessments, as well as student interviews in the intellectual/academic portion of the study. Overall, it can be said that the experiential programs had a positive effect on learning by students in all three areas. The highest impact of experiences on psychological factors was associated with programs seen as "most intensive, most dissimilar from ordinary school activities and, in the case of increased moral reasoning, when there is a combination of action and systematic reflection" (Conrad and Hedin, 1981).

Social development, in this study, included personal and social responsibility, attitudes towards others (particularly adults), and increased interest and action in students' communities and their own career development. While general positive results of experiential programs were found, certain subgroups of programs seemed to have more specific effects. For instance, a strong seminar reflection component had measurable effect on social growth, suggesting that students made specific social gains based on their reflections with others.

While psychological and social benefits are usually a welcome part of any educational program, intellectual goals tend to be paramount in students' and the public's expectations; experiential programs sometimes find it difficult to support claims of intellectual or academic growth. This study, however, found a significant student-perceived gain in academic knowledge during their participation in

experiential programs, especially within three subgroups of programs or students: those programs that included a formal "seminar/reflective component," and were longer in length, and also with those students who were considered likely to be "disenchanted" with regular classes (students enrolled in alternative programs).

The strongest effect by far was seen in students' personal reports of their individual experiences, rather than any external attribute of programs in general. If students felt that their experiences were "interesting," that they were "appreciated for doing their work," were given some amount of autonomy, and were treated as equals to adults in the program, they tended to both rate their experiences as "excellent" or "good," and to have gains in all three areas measured. (Conrad and Hedin, 1981).

While this study provides a good framework for understanding the potential benefits of experiential education programs, its age and its lack of in-depth description of the programs studied allow it to only provide a general understanding of experiential education and its associated research.

The findings, however, are consistent with our recent experience using end-of-course individual reflection papers written by students in the Norway agroecology MSc program as well as by students in several courses at University of Nebraska. We ask each student to reflect on their own learning style, their role in group activities, and their growth as autonomous learners. What emerges is an intriguing snapshot of the learning process, an additional window for instructors on individual progress on the *internal learning ladder*, and a valuable set of reflections that can help guide the design of future learning activities (Lieblein et al., 2007). In one memorable final oral reflection session several years ago in Norway, we were amazed and saddened by the observation of one student from Italy: "I have been in school for over 20 years, and this is the first time that any instructor has asked my opinions about a course and how to improve it!" Although disturbed by the general testimony on our educational system, we were encouraged by this indication that a safe space had been created in which he was able to voice opinions without fear of judgment.

## Applications in Experiential Learning in Agroecology

How do the historical perspectives of Dewey, the physical involvement promoted by Hahn in Outward Bound, the social consciousness of Freire, the learning cycle developed by Kolb, and the experiences of other educators impact our design of agroecology learning landscapes? The rich literature on experiential learning has informed the design of new educational programs in the Nordic Region and in the U.S. Midwest. Seven case studies in the application of principles of experiential learning are presented in a recent review (Francis et al., 2010), and they have been summarized in Table 1 to illustrate practical use of the concepts. Here we provide a window on the background that led to these applications.

**Table 1. Open-ended cases using experiential learning strategies in the U.S. Midwest and the Nordic Region (from Francis et al., 2010).**

| Location | Educational Program | Description |
|---|---|---|
| Norway | UMB Agroecology Courses | Semester-long modules on farming and food systems using open-ended case study methods to evaluate systems and provide future alternative scenarios |
| U.S. Midwest | Agroecosystems Analysis Course | Summer travel course to farms, with student groups evaluating production, economic, environmental and social perspectives of farming systems |
| U.S. Minnesota | Ecology of Agricultural Systems | Course examining interconnections of agriculture and basic life support systems of food, water, energy and land use that includes action learning components |
| Sweden | Swedish Test Pilots | Course focused on student team evaluation of farming systems in Sweden and VietNam, including both biological and social science research methods |
| U.S. Minnesota | African Agroecology Systems Evaluation | Adventure learning about agroecosystems on a transect from Cairo to Capetown through eight countries using distance learning and on-the-ground experiences |
| U.S. Iowa State | Learning Communities | Curricular learning communities with clustered classes during an academic term, focused on an interdisciplinary theme, with linked classes across departments |
| Nordic Region | On-Line Agroecology Course | Web-based course offered globally from four Nordic universities (Norway, Sweden, Denmark, Finland) using a team approach and case study of a Danish farm |

## *What is Agroecology?*

Evolution of the term *agroecology* has been summarized by Gliessman (1998) and more recently by Wezel et al. (2009). Current applications of an integrative strategy to combining ecology and agriculture grew from the popular books of Altieri (1983) and Gliessman (1984). It is noteworthy that practical applications of knowledge of natural systems in design of agricultural production were not unusual a century ago when researchers were working in the early stages of application of science to agriculture. Yet the disciplines of agronomy and ecology diverged, with agricultural scientists pursuing a mechanistic evaluation of components of food crop production and utilitarian approach to study of production systems, while field biologists embraced the new field of ecology and specialized primarily in natural ecosystems. After a century, we are recognizing common goals in development of environmentally sound and economically productive integrated crop and crop/animal systems, and the need to apply

methods from a range of currently specialized disciplines.

Agroecology was defined as the *ecology of food systems* by Francis et al. (2003), a perspective embraced by Gliessman (2007) in the second edition of his widely-used textbook, *Agroecology: the Ecology of Sustainable Food Systems*. This was a subtle but important advance from the more mechanistic focus of the first edition, *Agroecology: Ecological Processes in Sustainable Agriculture* (Gliessman, 1998). Frequent misunderstandings of the emerging field of agroecology may be based on use of the term to describe a science, a set of practices or systems, or a movement (Wezel et al., 2009). In Germany, there has been a tradition of agroecology as a science, while in France the term has been more synonymous with agronomy and has referred to farming practices. In the U.S. and Brazil, the term has been used to describe all three activities. It is important to be explicit in definition to assure successful communication to students and colleagues. We have found in the Norway MSc program that students are attracted to the course and degree program for different reasons, often related to their own interpretation of the term *agroecology*, and this diversity of expectations creates special challenges in course design and implementation.

### Systems Thinking – an Essential Strategy for Learning

Central to planning educational strategies in agroecology, from recommended literature to design of field projects to reporting and reflection on results, is our focus on a holistic, systemic approach. The key article by Richard Bawden (1991), *Systems Thinking and Practice in Agriculture*, builds on his faculty team's experience at University of Sidney at Hawkesbury in New South Wales. Students in that program worked directly with farmers in evaluation and analysis of their farming and ranching systems, and devised improvements based on science that they implemented jointly with farmers. An important text by Kathleen Wilson and George Morren (1990) on systems approaches in research and education is often used as a reference for students, since this provides an excellent overview and applications of the combination of biological ("hard") and social ("soft") systems methodologies. Their book builds in part on pioneering work on *soft systems methods* (e.g., Checkland, 1981; Checkland and Scholes, 1990) that include interviews, focus groups, surveys, and personal observations to help understand human decision making in farming and food systems.

The combination of natural science and social science methods has been used successfully by several of our agroecology students in Norway in developing thesis research projects. A Norwegian student surveyed both vendors and consumers across nine locations in the first year of farmers' markets in his country, and learned that vendors traveled greater distances than consumers and both were concerned about communication and promotion of local foods (Åsebø et al., 2007). Importance of involving stakeholders in decision making was assessed in three communities in different regions of Norway (Gillebo and Francis, 2006). The widely-known system of cow/calf grazing systems in the Pampas of Argentina was assessed using a life-cycle analysis and energy evaluation of efficiency, and the results used to recommend national policy changes related to agriculture (Rótolo et al., 2007). Bakewell-Stone et al. (2008) evaluated two contrasting organic farming development strategies in Tanzania, cashews for export and vegetables for local use, to determine their effectiveness in improving family incomes and nutritional status of children. The attitudes and actions of farmers related to nature conservation were reviewed in terms of how this affects decisions about farming practices (Ahnström et al., 2008). Organic farming and marketing systems for vegetable crops were evaluated in Sri Lanka, and alternatives provided to increase farmer incomes (Fernando et al., 2009). Numerous current projects are presently being conducted by MSc student in a number of countries. These provide examples of how the experiential learning in agroecology is leading to a systems approach to study of real-world challenges and potential solutions for the future.

### Development of Competencies

One of the major objectives of experiential learning in agroecology is to develop key competencies in our graduates, with the capabilities and motivation to make meaningful and responsible change in their future positions in the public or private sector (Lieblein and Francis, 2007). In practice, this means designing educational programs that are focused on developing the graduate agroecologist and not on specific courses or even the curriculum (Lieblein et al., 2005). As described above, it is essential that graduates have a practical, working knowledge of how systems function and the methods used to evaluate those systems and set priorities among the many research questions that one could pose. We provide a summary of some of the important competencies for agroecologists in a list that is comprehensive but certainly not all inclusive [developed in two workshops in Ames, Iowa and Nodebø, Denmark in 2010, Lieblein et al., 2010a, 2010b]:

• Critical observational skills that include appreciation of the production, economic, environmental, and social dimension of farming and food systems.

• Ability to work in multidisciplinary teams, using communication skills that transcend the language and methods of individual specialties, and negotiate differences with others.

• Knowledge of systems structure and function, and the important interactions among components that can be manipulated through management.

• Understanding the holistic and systemic nature of

inquiry, including knowledge of system boundaries, hierarchies of scale, and multidisciplinary strategies.

• Appreciation of the importance of biological and social science methods, how and where they are applicable, and the ability to design research using integrated approaches.

• Understanding the value and relevance of multiple sources of information, including that derived from science as well as from experiences of clients on farm and in the community.

• Basic statistical skills needed to analyze biological and social data from farms and communities and to evaluate and interpret results for their practical applications.

• Ability to move from evaluation of systems and client goals to development of relevant potential future scenarios that will help clients meet those goals.

• Capacity to sort among client goals and pose appropriate questions to discern priorities among the myriad goals, especially with multiple clients in a community food system.

• Practice the a priori testing of alternative scenarios using available information to determine the impacts of implementation of development plans based on those scenarios.

• Develop professional competence in one of more specific disciplines that will be adequate to secure a position that uses that capacity and provides a platform for systems studies.

We recognize clearly that development of competencies in systems observation, analysis and evaluation comes with an opportunity cost of not developing an in-depth capacity to deal with any single narrow discipline or field of specialization, but the need for systems thinkers is growing as challenges facing humanity become more complex. By immersion in the current context and reality of the farm and community, and building on experiences, each student can bring their skills to a team that is becoming prepared to deal with uncertainty and risk, with complexity, and with multi-objective client groups where the challenges are not simple and may be revealed through continuous interaction with the clients and the local biological, economic, and social environment. The phenomenological approach is clearly within the realm of Dewey's experience-based learning, and the strategy can be understood by study of the steps of Kolb's learning cycle. Social implications of various development strategies and the influence of the political and power structure of the community and of society are better understood when viewed through the lens of Freire's perspective on democracy and decision making.

### Emergence of Integrative Ecology

It is becoming apparent that conventional learning systems are less than adequate for dealing with the complex and difficult challenges facing society in our agricultural and food systems. For this reason, an emerging meta-discipline called integrative ecology has been described by Jordan et al. (2008), one that deals with the intimate interconnections of agriculture and its essential support systems including food, water, energy, and land use. Considered a sub-set of sustainability science (Clark, 2006), integrative ecology embraces what has been discussed above in agroecology and in addition seeks to bring together production, conservation, and continuous adaptation to build resilient systems in the face of what Batie (2008) calls "wicked problems." These are situations where the challenges are seen and defined differently by a range of participants in the systems, and "there may be strong controversy and biocomplexity, in which production, conservation and adaptation are affected by the interplay of biophysical and social factors that are spatially, organizationally, and historically complex" (Francis et al., 2010).

Using this perspective, agriculture and food systems are viewed as complex and coupled "human activity systems," and obviously are coupled human-natural systems (Liu et al., 2007). One key application of this concept has grown out of the strategies of community-based learning and the service learning that has been implemented in courses at University of Minnesota by Nick Jordan and colleagues (Jordan et al., 2005). The students work in teams to develop models as well as activities within the agri-food landscape and embed their work into ongoing efforts of public and private agencies and institutions. This practical application of systems theory is similar to the agroecology courses offered in Norway (Lieblein et al., 2010a) and in the U.S. Midwest (Wiedenhoeft et al., 2003), two of the examples listed in Table 1.

### Open-Ended Case Learning Strategy

The open-ended case approach to learning has proven especially valuable in agroecology courses in the Nordic Region and the U.S. Midwest (Francis et al., 2009). In contrast to conventional case studies where the results are known well to the instructor and to the client (farmer, marketer, food system professional, or other), in open-ended cases a real-world, often complex situation is presented and the student or team is confronted with discovering the major issues and defining the boundaries of the case. Since the "correct answers" are not known to instructor or client, the students join in a search for what is relevant in the situation, working together with the instructor(s) and client(s).

Students often start with exploring the philosophies, goals, and world views of their client or clients, in order to best frame their further questions. By walking the fields and exploring a community, the teams learn about the current farming or community food system, including details about the local resource base, current economic situation, concerns about environmental impacts, and social ramifications of the food system. Rather than seek and

provide solutions or definitive recommendations, students and teams are advised to design a series of potential scenarios and to evaluate *a priori* the potential impacts of each. Thus they determine how likely each of the scenarios will be in helping the client(s) reach their stated goals. Several examples that have proven successful are summarized in Table 1, and these are described in more detail in a review article by Francis et al. (2010). In accord with Dewey (1977) the students bring their prior experiences and integrate new observations and knowledge, and pursue the well-known steps of the Kolb (1984) learning cycle to observe, analyze and evaluate, create future visions, and test those to the extent possible in the time available. The outcomes beyond the scenarios for clients are students who are curious, good observers, and capable of entering a new situation and using both biological and social science methods to achieve their team goals.

## Conclusions

Historical foundations of experiential education are explored as they contribute to our general understanding of this strategy for learning. The seminal contributions of such luminaries as John Dewey in relating learning to personal experience, Kurt Hahn in outdoor education, Paulo Freire in relating education to social conscience and activism, and David Kolb in his structured learning cycle are summarized as they relate to agroecology education. We conclude that each of these educators has provided a part of the framework on which we currently build practical, experiential learning landscapes that produce competent, field-oriented graduates who are primed for practical and responsible action in their future careers.

In order to communicate about experiential learning it is important to have clear definitions of experiential education, experience, reflection, and learning. As programs are developed and implemented, it is useful to clearly define the evolving roles of instructors and students in this innovative learning landscape. Critical to assessment of learning and improvement of learning strategies are understanding the role of reflection and the importance of an embedded and ongoing evaluation component of any program. Connections between theory and practice can be made explicit through the preparation of students for this learning environment; students can then adjust their expectations as experience leads the learning community to shared goals and understandings related to system boundaries, identification of key players in the system, and expected outcomes.

In the applications of theory to the practice of designing education in agroecology, we are compelled to focus not on the specific lectures, courses, or curriculum but rather on the capabilities of graduates who complete the program. What skills and knowledge do they have? What are they prepared to

do through responsible action? What are their attitudes toward the tasks at hand and their relationships with clients? How do their personal ethics inform individual and team decisions as they approach experiential learning?

Shared understanding of experiential agroecology education is complicated by the possible interpretation of agroecology as a science, as a set of environmentally sound practices, or as a social movement further complicated shared understanding. It is important to choose and share explicit definitions of the goals and outcomes of a learning program. Although this could be said of any learning situation, the uncertain boundaries and outcomes of the study of agroecology make this even more important in facing current challenges in the food system.

The multiple and complex dimensions of agroecological analysis of a farm or a local food system takes into account the natural resource endowment, the current and potential productivity of farms, the economics of farming and local food systems alternatives, the environmental impacts of these activities, and the socio-cultural milieu in which the system operates (Rickerl and Francis, 2004). The interwoven challenges among these different dimensions of the food system and the larger environment in which they are embedded plus the uncertainties of weather and economics clearly throw these challenges into the arena of what Batie (2008) calls "wicked problems," those that are perceived differently by different clients in the food system. The emerging strategy of integrative ecology (Jordan et al., 2008) and the learning provided by open-ended cases (Francis et al., 2009) are central to what we now perceive as part of the foundation for designing learning landscapes that will provide compelling educational experiences for students now and in the future.

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# Communications and Business Curricular Needs of Agribusiness Employees

### Thomas H. Bruening and Dennis C. Scanlon

### Background

Agricultural businesses are plagued with intense competition and narrow profit margins set in a dynamic workplace environment (Harris, 1989). To remain solvent, many businesses have found they must increase efficiency. This situation has lead to greater scrutiny of existing and potential employees. A typical university reaction to this trend is to increase the technical requirements of graduates so they appear better equipped to function in the marketplace. This action reduces the opportunity for students to take electives and supporting courses. Some theorize that students should specialize in their undergraduate programs to enhance their employability, others contend that students should seek a well-rounded education to develop the whole person. Theories abound, but little information is sought from employers regarding their needs for employees.

In 1976 a group of researchers sampled 450 business college graduates, looking at communication in particular. Communication skills ranked as most important to job success included: 1) listening, 2) persuading, 3) advising, 4) instructing, and 5) small group problem solving. Furthermore, these former students were asked what communication skills they wished they had been taught in college. In descending order they ranked listening, public/speaking, presentations of technical information, writing, small group leadership and problem solving communication, human relations and persuasion and attitude theory (DiSalvo, Larsen, & Seiler, 1976). In a 1983 study, Warren reviewed the skills indicated as important by the Midwest College Placement Association. He found the top four of 18 skills were 1) verbal communication, 2) responsibility, 3) initiative, and 4) interpersonal skills. More recently, some researchers tried to determine the most important communication skills needed when college students interview. Bjorkquist (1987) found that employers considered a candidate's oral communication skill as the most influential variable affecting recruitment. According to Zinn, Faustman and Riesen, (1993) a primary objective of undergraduate education in the college of agriculture should be to produce graduates with sufficient communication skills to be successful in the workplace. Some believe that interpersonal skill development is as important as technical agricultural skills for job security and promotion. Dodge and Foster (1990) found that students could benefit from courses in interpersonal skill development.

In the last three decades, improvements in science, technology and communication caused remarkable changes to occur in agriculture. To keep pace with advances and to meet the new demands of the workplace, colleges and universities found it necessary to continually evaluate and revise their offerings and curricula. Intensity of competition along with advances in science caused those in charge of agricultural curricula to begin to reevaluate their courses with regard to business and communication. In this light it is clear that some businesses believe communication skills are important for their employees to possess, yet it is not apparent what agribusiness employers believe are important communication skills. Moreover, what specific types of communication skills should be taught at the university? In addition to technical content, what other skills should college graduates possess? How can universities improve the educational offering to meet the needs of the agribusiness community?

Although the literature is ripe with general suggestions for curriculum modifications, Krueger (1988) suggested any revision should start with a thorough overview of the needs of the targeted clientele group. In addition, Krueger identified the shortcoming of traditional survey research and suggested that valid data can only be obtained via open ended research techniques. He argued that these data gathering methods offer respondents ample opportunity to comment and to share and explain experiences. This technique is especially valuable because data about the "why" behind behavior is revealed best through group interactions (Lederman, 1990). Focus groups endeavor to secure information by seeking intersubject agreement among participants and result in better planning and participation for educational programs (Bruening, 1992).

Therefore, based on the review of literature dealing with programmatic revisions and appropriate data gathering techniques, the researchers applied the focus group technique to a curriculum revision model. This was an investigation regarding curricula revisions within the Department of Agricultural and Extension Education at The Pennsylvania State University.

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## Purpose of the Study

The purpose of the study was to identify appropriate business and communication curricula modifications and revisions to existing and potential courses offered by the Department of Agricultural and Extension Education at The Pennsylvania State University. Objectives of the study were to: identify specific business and communication skills needed by agribusiness employees; and determine curricula revisions based on information gathered from focus group participants.

## Methodology

Four focus group interviews were conducted in the spring of 1992 according to guidelines established by Krueger (1988). The participants were purposively selected according to their perceived ability to discuss agricultural business interests or because they currently serve on college advisory committees. Individuals in the focus groups represented a wide range of technical and business skills. Participants were identified by agricultural education and extension professionals from the geographical location where the focus group interviews were conducted. Two focus groups consisted of agribusiness individuals and the other two focus groups included representatives to advisory committees for the College of Agricultural Sciences at Penn State. The first focus group consisted of agribusiness people from southeast Pennsylvania, second focus group included agribusiness people from the western region of the commonwealth, the third focus group included representatives from the Advisory Council for the Department of Agricultural and Extension Education, and the fourth group included representatives from the Advisory Committee to the Dean of the College of Agricultural Sciences.

As suggested by Krueger (1988), one moderator led the focus group discussions using identical questions. The number of participants in each focus group ranged from eight to 15 individuals. A total of 42 individuals participated in the four focus group discussions which were each limited to 90 minutes. The discussion in each group was recorded on a cassette tape and later transcribed.

Questions were designed to elicit information regarding business and communication curricula needs for students in the College of Agricultural Sciences. The content validity of the questions was established by four faculty in the Department of Agricultural and Extension Education at Penn State. A pilot test was performed by asking graduate students the same set of questions. It was determined that this activity provided face validity.

Synchronic reliability was established in this study. This type of reliability involves examining observations within the same time period for similarities and consistency (Kirk & Miller, 1986). Synchronic reliability was judged acceptable by the investigators via comparison of data elicited from the four different focus group discussions.

## Findings

A post observation analysis was performed by the research team consisting of a moderator and an assistant moderator. The analysis discerned patterns and trends developed among each of the group's participants as well as across focus groups. The team identified congruent statements and highlighted contrasting comments which were organized into categories by question using the "bins" approach suggested by Miles and Huberman (1984).

The participants' responses were grouped into four main categories: intellectual, management, communication competence and interpersonal skills. The participants' point of view regarding changes were gathered through questions related to general opinions on communication value and needs, business concepts needed by graduates, and specific changes needed in the curriculum.

### Intellectual Skills

Understanding the importance of human relations as well as organizational structure and management behavior were attributes repeatedly suggested by participants as critical to the agricultural industry. A practical sense of economics, critical/analytical thinking, problem solving, and decision making were also identified as an individual's processing capacity that needs to be included in any business related curriculum. The following comments are representative of the remarks made by the focus group participants.

*"Decision making. The process of analytical thinking and decision making all of the data in the world will not do a lot of good if the person cannot process it in their mind and find all of the options and make the decisions that are required."*

*"I think that is real critical to our business is getting people to know how to solve problems."*

*"I think a term of some of the things we are saying now would be "Organizational Management Behavior" type courses where you look at the different power structures in a company..."*

*"Just understanding organizational structure and how to function in an agribusiness."*

*"Probably need to throw in a management course, personnel management or managing people."*

*"Labor relations. First thing that comes to mind where you pick up the paper. You see a company somewhere is having a problem with union and management."*

*"I think it is important to have a general understanding of organizational behavior, human relations, and some experience in finance and marketing, production economics."*

*"I think that is real critical to our business setting — people to know how to solve problems."*

## Management

According to most of the focus groups' participants, students should be instructed in quality control, accountability, business cycle, planning, and time management concepts in order to be better qualified for the job market. The weight of the comments indicates that these employers believed graduates need to have a greater awareness regarding the responsibility for work that is produced. The following comments were made in the focus group interviews:

*"I think maybe the business cycle is probably one of the more important things for students to understand."*

*"Quality control. Not necessarily that you are working in a manufacturing plant somewhere and you are responsible for so many widgets, but it is the whole idea that your contribution is important and the quality of your work, be it in manufacturing or in publications or marketing, really accounts for something and you should be accountable for your work in that respect also."*

*"I think the theory of business and why...The planning process, it is part of selling. I think understanding the role of business cycle."*

*"I would say time management. How to know how to go about doing the job and carrying it through and getting it done in a reasonable amount of time and also what to do first and how to plan that."*

*"I think the other one is the whole area of accountability. When you're working for someone else the importance of accountability and chain of command and why you need reports and what type of reports need to be made so that people know things are happening the way they're supposed to be happening. And how you have good accountability."*

## Communication Competence

Strong communication skills were mentioned most frequently by the focus groups' participants as the primary skill looked by employers when hiring new employees. The ability to write and speak in public were considered critical skills needed in a new employee. The capacity to choose the appropriate communication level and adapt to communicate both in oral and written forms were extensively discussed in the focus interviews. Listening and the ability to read people were frequently mentioned as critical skills employees need in today's work world. Typical response included:

*"I would look for those people [who] have strong communication skills verbally and in written forms."*

*"...if they can't communicate and work in teams they are not going to make it in the business world..."*

*"I think writing has to be up there at the top of the list. If you can't write and communicate and do it in a brief format, you're not going to get anywhere. I think writ-*

*ing would be the top thing, at least the top thing I'd look at."*

*"I think flexibility in both oral and written communications is very important because depending on who you're trying to communicate with, you may need to bring yourself down to their level or you may need to be more technical..."*

*"Certainly the ability to communicate these days is probably the premier thing you are looking for."*

*"....being able to choose the right style is almost critical to a good communication process."*

*"I think no matter what field you are in, if you are going to be dealing with other people, you need to be a good listener."*

*"In plain words, is he intelligent enough to know how to come into a new business relationship and talk with his ear rather than his mouth first."*

*"I think that you have to be able to read people. [Know] exactly what they mean in what they say."*

*"I want a person who is willing to listen ..."*

## Interpersonal Skills

Team work, leadership and problem solving skills were identified as interpersonal skills sought in a potential employee. Some individuals interviewed perceived empathy skills, ability to understand and work with people as valuable attributes in a potential employee. Comments related to these skills included:

*"... but the one consistent thing I am looking for in both ends, not only the back office in terms of that position but any position within the company is that of team work. The ability to work well with others and the ability to feel part of the team ... that is [are] consistent thing[s] I am looking for."*

*"... if they can't communicate and work in teams they are not going to make it in the business world or customer service industry and it doesn't matter how intelligent you are..."*

*"Communication skills are very important as well as knowing how to work as a team or with teams."*

*"... so I think [is] basic understanding who is that you are communicating with and what their perspective is."*

*"I would tend to see it in terms of leadership that is something certainly we want in people that we hire in the association."*

### Summary of Findings

The findings indicate selected employers in the agribusiness industry recognized the need for changes in the

curricula that would include thinking and reasoning skills. The business skills most mentioned as needed included human relations, organizational, managerial, and analytical thinking. Communication skills were considered by the four focus group participants as the most critical personal skill needed by an employee. From the standpoint of curricula design, the most challenging comments were those concerning the ability to listen intuitively, to think before speaking and to catch on to the more subtle nature of reading people. Participants in this study reported their eagerness for hiring individuals who have the ability to freely communicate both orally and in written form at a very high level, and to adapt their communication style according to the needs of the clientele. This finding supports Cobia's (1988) findings that indicated a graduates' inability to communicate was a key factor that hindered on the job performance.

## Implications

The results of this study support a need for courses on human labor relations, business organizational structures, managerial theory, problem solving and critical thinking with an agribusiness emphasis in the College of Agricultural Sciences. Courses that focus on rote memorization and regurgitation provide little use for these employers. Not one individual mentioned the need for employees to have a higher level of technical skills coming out of the university.

In addition, the focus group technique confirmed that communication skills are critical for success in the agricultural industry, and that courses developing skills in commercial writing, public speaking and group processing are essential. Furthermore, participants suggested that students need to learn the more subtle communication skills, such as listening, being able to read people, and the ability to understand non-verbal signals. These findings corroborate the literature that indicated the critical importance of both oral and written communication skills of students in the workplace (Zinn et al., 1993; Bjorkquist, 1987; Cobia, 1986). It is apparent from these discussions that employers want the employee to demonstrate communication skills on the job in much the same way that they expect a specified technical skill level or quantification competencies to be demonstrated. Comments offered by the employers in these focus groups indicate that current graduates do not meet the employers' applied communication needs.

As suggested by Zinn et al. (1993), students need the opportunity to develop their communication skills in a variety of classes. For example, students need the opportunity to practice the craft of public presentations. This may mean that universities should increase the inter-curricula requirements for oral communications. Just as the university has developed writing intensive courses, courses should also be developed across the curriculum that enhance students' oral presentation skills. Further, intern programs should provide students with ample opportunities to practice a range of communication skills and to receive evaluation of their progress.

It is apparent that the ability to think and react and communicate in a clear and intelligent manner is in high demand by the agribusiness community. Therefore, it is in the best interest of the students and the university to develop courses and the commitment to enhance communication and business skills that undergraduates need in order to be effective in the highly competitive market place. Through integration of courses in public presentations and oral communication and the intern experience, students could have a better understanding of the needs and expectations they will face in a competitive agribusiness community.

The participants in these focus groups want employees to demonstrate communication skills on the job. Comments offered by the employers in these focus groups indicate that current graduates do not meet the employers' applied communication needs. This finding supports Zinn et al. (1993) in their contention that students need the opportunity to practice the craft of public presentations in courses and curricula offerings at the university. Therefore, universities should increase the inter curricula requirements for oral communications. Through integration of courses in oral communication and business presentations, students could have a better understanding of the needs and expectations they will face in a competitive agribusiness community.

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## Combining Study Case and Learning Group Approaches to Teaching Agricultural Environmental Management Systems

Undergraduates interested in learning Agricultural Environmental Management Systems often observe this applied course late in their college career, resulting in a need for different techniques in teaching beside traditional lecture. Other teaching approaches are needed to enhance student ability to better understand the subject matter and improve the thinking skill to integrate student knowledge into the "real world" problems. One important aspect to consider in teaching agriculture courses is that students learn more about agriculture through experiences that link classroom activity to field work and engaging a broad range of topics (Parr et al., 2007).

Agricultural Environmental Management Systems course have been taught using combination of lecture (90%) and assigned laboratory (10%) activities. Lecturing provides advantages, such as a time-honored teaching approach and a good organization because the materials are derived from published textbooks, and allowing students to have an optimal access relative to resources needed (Little & Sauer, 1997). However, the effectiveness of lecturing as an educational technique has been brought to question for many years (Ahern-Rindell, 1999). Previous studies show lecturing creates passive learning, poor information retention, limited learning and low thinking skills (Aher-Rindell, 1999; Crowther, 1999). Assigned laboratory activities related to soil erosion, aggregation and water movement in soils provides insufficient knowledge for students. Lab reports and informal interactions with students indicated that students' knowledge and understanding of course content was limited. Their skill and understanding to apply the knowledge to new problems and integrate the lab results into what they found in the farm was poor. These students had limited understanding in applying basic concepts of soil aggregation and soil-water relationship to solve practical problems regarding to the impact of agricultural management on soil properties. To address these issues, a combination of study case and learning group approaches were applied.

A study case-based learning provides opportunity for students to more actively engage in the subject matter of course, especially in agricultural sciences (Ha & Shively, 2005 and Simmons et al., 2005). A learning group approach is an important education technique that can effectively assists students regarding to multi-situations in agriculture by interacting various knowledge and foster innovation (Jiggin and Röling, 2000; Jordan et al., 2003). At the beginning, students developed relationship by sharing knowledge, goals and solutions to specific cases to get mutual learning. Finally, new knowledge was created from both individual and shared observations (Röling and Jiggins, 1998) which generated new solutions and innovations. By doing this approach, students' self-esteem and self-confidence increased and the ability to integrate their previous knowledge into more practical problems improved (Rowlands, 1997).

These approaches can bridge the gap between materials learned in class, laboratory and real world problems (Graveel, 1996), as well as provide students with better opportunity to do active learning. Specific cases related to agricultural and environmental problems can help students to investigate the context of the course of materials more deeply. A set of case studies consisting of 20 topics was used as a weekly class activity. The topics were agroforestry, best management practices, biochar, biodiversity, carbon sequestration, conservation reserve program (CRP), cover crops, genetically modified organisms (GMO), deforestation, erosion, land use change, organic farming, overgrazing, pesticides use, soil acidity and salinity, soil quality, tillage practices, traditional ecological knowledge, urban farming, and water pollution.

Students gave positive feedbacks with respect to these teaching approaches. Presentation and discussion of selected cases provided conducive and participatory environment in which the students were taught to be active and more engage to the topics. They eagerly tried to integrate their basic knowledge into the case. These approaches proved that students found better learning environment compared to lecturing technique by allowing them to be more creative in thinking and expressing themselves based on their own opinion and previous knowledge. A student presentation acted as an outlet for capturing student's creativity and communication skills. However, their skill and performance during presentation varied substantially. The better students used diverse techniques to deliver their presentations by using videos, demonstrations, bringing soil and plant samples, posters, nice graphs, and applying instructor's suggestions during presentation practices.

In conclusion, these approaches significantly enhanced student learning and thinking beyond the traditional lecture and laboratory activities. However, continued evaluation of the effectiveness is

still needed because students have diverse ideal learning environments and styles.

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## The Syllabus Contract

We all have a syllabus; each and every class, each and every semester. It is often times referred to as our contract with the students. It informs the students in the class what is expected of them. However, the syllabus rarely presents what is expected of the professor on behalf of the students, with the possible exception of the requisite weekly office hour. I have used an exercise on the first day of class that remedies that situation and gets the semester off on a positive note.

I teach landscape architecture at Texas Tech University. In our design studios, we assign design projects by presenting a problem statement and minimum requirements. Some scholars have referred to our project assignments as the "wicked problem" in that there is no one correct answer and every student will probably (and should) have a different solution. Our goal, along with accuracy and quality graphics, is to have students make critical decisions about design options and be able to defend those decisions. It is often frustrating for students who are used to high school performance tests, multiple choice and true/false questions, or the algebra problem with one correct answer. An important part of the process is one-on-one student/teacher interaction in the design studio. So what does this have to do with the syllabus?

On a few occasions (when I remembered) on the first day of class, I have presented the syllabus as usual and explained that it describes what I expect from you, the student. I then ask, "What do you expect of me?" I'll even write "Student Expectations" on the white board. After their initial shock subsides, someone will timidly offer a suggestion; then another, and another and eventually other students are nodding their head in agreement. Invariably, they have asked for clear instructions, fairness, time with me at their desk, timely feedback and, in some form or another, respect. In my experience, the exercise accomplishes several things. First, it gives me the opportunity explain again my expectations that they solve their design problems in a logical, creative and well thought out manner. That I'm not going to give them an answer, or say that their design solution is wrong if they can logically defend their solution. I even explain the term "wicked problem" and the notion that good design is "when it no longer makes sense to ask why." (Which is not my quote but I am not able to attribute it to a particular individual.)

Secondly, the exercise lets me know what they are truly concerned about or are fretting over. If they believe I care and will pay attention to their concerns they begin the semester with a little more self confidence. It is important to note here that genuineness is essential or the entire exercise is counterproductive. Finally, it gets them to buy into their side of the responsibilities expressed in the syllabus, if they know I intend to buy into my responsibilities as a professor. Try it, you might like it!

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## Learning by Doing

The guiding principle of designing educational opportunities for youth should reflect both the philosophy of "learning by doing" and focus on content that is based on proven facts (research based). "Learning by doing" is active, hands-on and engaging for students. The goal of this teaching approach is for learners to construct mental models that allow for 'higher-order' performance such as applied problem solving and transfer of information and skills (Churchill, 2003). Essentially, developing lessons plans should focus more on "making, producing, practicing, and observing" exercises rather than teacher directed lecture. How do educators develop such an approach? Here are a few quick tips:

1. **Enable Students To Work Together:** Collaborative learning is a method of teaching and learning in which students explore a significant question or create a meaningful project together as a small group. An example of a collaborative activity is challenging a small group of students to generate a list of skills that are needed to be a successful leader or asking the small group to identify what they think is the best way to generate funds for class project. When facilitating quality collaborative experiences, two things can occur. First, collaborative environments allow students to share their own experiences that in turn translate into teachable moments for others. Students transition from learner to teacher within these small groups. Small group collaborations allow students to learn how to utilize and collectively benefit from the strengths of individual group members. Secondly, students begin to master the skills of group work. Team work, group communication, compromise, and listening are all enhanced by the experience.

2. **Self Directed Group Exploration:** In today's world of internet and multi-media tools, getting fast information and tons of it is easy. Long gone are the days of library card catalogs and copying encyclopedia and journal pages for research projects. With the stroke of a few keys, tons of information is loaded onto the computer screen. The challenge for students, with assistance from educators, becomes wading through information overload to identify what is fact and what is fiction. Promoting self directed investigation and research impels students to rely on the evidence instead of upon authority (text, teacher, parent) (Haury and Rillero, 1994). Most students live in an authoritarian world with little or no opportunity to practice decision-making because nearly everyone tells students what to do and when to do it (Haury and Rillero, 1994). Learning how to navigate through information for the purpose of a group activity will enhance competencies in fact finding and independence. For example, educators may challenge students in a small group to explore what type of pet rabbit is best suited for a cold climate environment or what is the best design for a rocket. Students will begin to learn how to answer their own questions using valid research tools.

3. **Sharing results and products of the activity based experience:** A key component to a successful "learning by doing" approach is providing the opportunity for students to share their results of the experience and self evaluate their performance as a group. After allowing students to summarize their experience or share the knowledge they acquired from an activity it's valuable to ask the question "if you could do the activity over, what would you differently?" or "what improvements would you make?" These types of reflective questions allow students to self-identity improvements and enhance visionary thinking. Educators can also use this sharing period to help students link what they have learned to other life experiences. For example, educators may ask "how is working in this group similar to being a teammate on a sports team?" or "what were some effective ways you communicated with your group that can be used when you are serving on student council?" Lastly, the sharing period of activity based learning is important because it communicates the small group experiences to the larger learning group.

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## Outside of Class Reading of Scientific Journal Articles is Invaluable, and Helps the Instructor Just as Much as the Student

I expect all of the students in my classes [AS 345 Animal Growth and Development; AS 346 Skeletal Muscle Physiology] to be capable of integrating numerous physiological concepts at the same time. I dread each semester, as I know that 3-6 students (out of 25) will likely drop each class, even though my grade standard is such that there (in reality) is no grade pressure on students [A will be given to those within 10% of high individual; B to 20 % of high

individual, so on; F < 55 % of total score possible]. Moreover, I allow students (individually or in groups) to correct missed answers for 1/2 point each. I also place extra credit questions on each quiz and exam, but do not give any credit unless the entire answer is correct. Even with these items in place, I have been told on student evaluations that my classes are quite hard, and that taking my class is an exercise in learning how to take a physiology exam.

Over the years, I have tried a variety of alternative methods to get the students to absorb physiological concepts in the classroom. Some worked well, and others have not. Providing the reference to (very) current scientific papers during lecture, then making it a requirement that each student must review one such paper per semester has worked well. The process is this: I lecture on (say) growth hormone being a catabolic repartitioning agent. During the lecture, I provide students with 2-3 current references to survey papers on the specific topic. The students read, analyze and reduce the content of the paper. Then they begin writing their report to me, which they must address the following: Based upon what I have said on this topic (in class), what have you learned while reading and analyzing this paper? I do not ask about the content, but examples from the paper may be used in their write-up. The students may choose the paper at any time throughout the semester. So, if a topic is more of an interest to a student, then the student has an investment in doing it. After they have their first draft, they are allowed to turn-in the paper for a pre-grade review (by me). Moreover, if they have finished their paper requirement, then any (additional) paper that they might desire to read, they may do so and turn in a similar report (without pre-review) for a few points of extra credit. This process has allowed students that may not do so well on a quiz or an exam to gain points outside of class. In addition, it has allowed students to "bank" points in case their in-class performance may not be as good as they thought.

I (personally) like doing this for an additional reason. For students that do papers over the course of the entire semester, it is neat to see how much their confidence increases. The first paper that they might attempt is usually something like a "Bart Simpson" book report. However, by the end of the semester, most students that do more than one paper firm up their reading/writing and it is easy to see that they have grasped the physiological idea that I wanted them to get. Considering the multitude of pathways, regulation, and concepts that are involved in these two classes....anything that helps the student also helps me be successful in my teaching efforts. Moreover, it should not be about learning how to take an exam.

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## Building a Social Learning Community

Learning takes place inside and outside the classroom, most notably in social environments with stakeholders and other members of the local community. We recognize and foster this engagement of students with instructors, with those outside the immediate agroecology group on campus, and with each other through informal events that bring people together to get to know each other better.

*Learning Objectives* are to 1) promote communication and trust among students and with faculty and stakeholders, especially important in a learning group with people from different countries, native languages, and disciplines, 2) establish a non-hierarchical communication structure among members of the learning community to promote information exchange and trust, and 3) explore personal and cultural interests and promote improved understanding among diverse people through events in a social setting outside traditional classroom and field activities.

*Methods* that have proven especially effective to build social learning among the diverse students and instructors in the Norway MSc Programme in Agroecology include *potluck dinners* organized by faculty. We have taken advantage of the space and facilities available in the university guest house to sponsor two dinners each term where students prepare food and share with the group in an informal setting on a weekend night early in the semester. The first potluck includes dishes made by students to represent local foods from their countries, often a challenge to find needed ingredients if they come from a very different food culture. The second has been a meal prepared entirely with local ingredients, with "local" defined by the group in a short session in class a couple of days before. We debate whether this should be within the county, the agroecoregion of southern Norway, the country, or some larger foodshed area. Most years the decision is to use only Norwegian ingredients, and this presents some challenges. *Informal group dinners* are organized by teams that work together in the field projects, by students in nearby living areas, or around celebrations of birthdays or other events. These are often held in the student dormitory area, and include friends of the current year agroecology students and from previous groups. *Weekend waffle breakfasts* have been organized for several years by visiting faculty to bring small groups of 4-6 students together with people from the local community, and often five or more of these are held to include all students at least once during the term.

*Outcomes* we observe are based on informal observations and discussions with students, and not on any formal evaluation process. In general, the social events are a great surprise to many students who have never found this type of activity as a part of the learning environment. Some come from academic

cultures where instructors just don't invite students to their homes, and instructors are not invited to student gatherings. Since the dormitories are not integrated into the local community, many students do not make the contacts in the Norwegian community that could enrich their cultural experience, and they spend all their time with fellow students. The potluck dinners and breakfasts help to bridge this chasm between town and gown. There are always graduate students, visiting faculty, and other instructors who participate in the agroecology course who are invited to the dinners, and this further expands the student contacts.

In 2010, a student from Iran arrived an hour late, and informed us that he would be able to eat after sunset. He had prepared Persian food to share with the group. He later wrote in our small guest book, "Today is the first day of Ramadan, and I was just so lonely in my flat because this is the first time in my life that I have been outside my country and so far from family and close friends. I almost did not come to the dinner. But then I came and tonight you are my family." What an incredible emergent property from the potluck dinner!

The informal dinners in the dormitories are sometimes organized around a celebration, or a group meeting in the evening, or at times for a seminar on a specific topic that people feel needs enrichment and more information from someone within the group. At times they appear to be spontaneous meals or dessert gatherings, sometimes with music or games, but usually just rich conversation. These often attract flat-mates and friends who are not agroecology students, and faculty are sometimes invited, and we find this a way to expand the ideas of holistic learning and importance of community.

The waffle breakfasts introduce students to a food new for many of them, and to people from the community. With a small group around one table, the simple fare of waffles, fruit, juice, coffee and tea appears to go over well, and we are sometimes joined by graduate students who live in the guest house. People from the community are especially popular, since they can answer many questions about Norway and cultural things that students have observed and not been able to ask about. These social events have been highly popular, and our informal evaluation affirms that all of them should be included each year in the agroecology activities.

Charles Francis, Suzanne Morse, Geir Lieblein, and Tor Arvid Breland
Norwegian University Life Sciences (UMB)

# Use of Structured Debate to Analyze Agricultural Issues: Large Scale Dairy Operation Simulation Exercise

### Instructions for Teacher

This exercise is designed to highlight various perspectives in current agricultural issues. A structured debate provides an opportunity for students to explore various viewpoints and practice effective communication and conflict management techniques. It is suggested that students be assigned their respective role (in teams) within this activity and be given adequate time to research the assigned viewpoint to debate effectively. The students, in this exercise, will be presenting their viewpoints (arguments) to the "Legislative Committee." The "Legislative Committee" (which can be represented by the facilitating teacher or other individual), will give feedback on the effectiveness of their presentations in this hypothetical situation. Explain to the students that they will be presenting their arguments to a "neutral Legislative Committee" with limited direct knowledge of agricultural production. Distribute the "Purpose, Background Information, Situation, and Format" to students in advance of debate time. Approximate time to conduct the activity and concluding discussion: 1.5 to 2 hours. This activity can be reformulated for use in evaluating a number of current issues.

### Purpose

This exercise is designed to increase our awareness and understanding of the diverse perspectives and dimensions of a political agricultural issue. You will be challenged to research and advocate a particular position focused on the possibility of a large scale dairy operation entering "Harmony County."

### Background Information

Participants will be assigned to one of four groups. Each group will play an active role in the simulation.

1. PETA: People for the Ethical Treatment of Animals. This group is actively opposed to the use of animals in production agricultural settings. They are vigorously opposed to large scale livestock operations.

2. Non-Farm Neighbors: The proposed location of the dairy operation has a diverse set of non-farm neighbors. A number are working professionals with limited understanding and exposure to agriculture. A number of newer high-dollar residential homes have been built in the vicinity of the proposed operation.

3. Harmony County Farm Bureau: This group represents Harmony County Farm Bureau. Farm

Bureau is a grassroots farm advocacy group that supports diverse agricultural interests.

4. Milky Meadows Dairy Incorporation: You are the group of operators working to plan, construct, and operate the large-scale dairy operation.

### Situation

Milky Meadows Dairy Incorporation is seeking the approval from the "Legislative Committee" to construct and build a 3,000 cow dairy operation in "Harmony County."

### Format

Each of the four special interest groups will have the opportunity to "lobby" three times during the simulation exercise. Naturally, your goal is to ensure your "voice is heard," and impacts the decision of the Legislative Committee (instructors). Each group will need to present the strongest possible case to the Legislative Committee and to, perhaps, respond to arguments presented by other constituency groups.

First Round Debate (5 minutes for each group)
    PETA
    Farm Bureau
    Milky Meadows Dairy Incorporation
    Non-Farm Neighbors

5 Minute Break (Preparation for Second Round)

Second Round Debate (4 minutes for each group)
    Milky Meadows Dairy Incorporation
    Non-Farm Neighbors
    Farm Bureau
    PETA

5 Minute Break (Preparation for Third Round)

Third Round Debate (3 minutes for each group)
    Non-Farm Neighbors
    Farm Bureau
    PETA
    Milky Meadows Dairy Incorporation

### Discussion/Application Questions for Students

• Was it hard representing your particular group in the debate?

• What teams/groups presented the most powerful statements/arguments in the debate?
• What were those statements/arguments influential?
• How do you think the non-farming public would view this situation and the information presented?
• How can we best present the viewpoints of agricultural production to a "non-farming" public?

Greg Homan
Wright State University Lake Campus
Celina, OH

## Is Our Next Generation of Scholars Going to be Capable of Affording Us?

I am puzzled by the budget situation in our state (Washington)--not because the state budget is in the toilet, but (rather) how distant budget decisions have long-term effects on us in academia. Due to lost revenue at the state level, Washington State University (WSU) has lost millions of dollars in cuts. As Washington State must have a balanced budget, I suspect that we (at WSU) will experience more cuts in the next biennium since we represent a large expenditure at the state level. This same situation exists at all institutions of which I know faculty members. Everyone is trying hard to "get through" the shortfall times.

Our academic leaders are being quite creative in determining how to make cuts work, and how the resultant university will look. At the department level, in many cases, simply to remain in one piece after a major budget cut is something positive. During these "lean" times I have asked myself--what will the long-term effects of this recession do to the (general) future of academia? How many years will it take to recover, or will we ever do so? If we raise tuition to make-up for lost state support, is our next generation of scholars going to be capable of affording us?

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# Book Reviews

## Bringing It to the Table: On Farming and Food

*By Wendell Berry. 2009. Counterpoint Press, Berkeley, CA. Paper, 234 p, $14.95, ISBN 978-1-58243-543-5.*

Perhaps the introduction by Michael Pollan, eminent contemporary environmental author, says it best: "I challenge you to find an idea or insight in my own recent writings on food and farming that isn't prefigured (to put it charitably) in Berry's essays on agriculture. There might be one or two in there somewhere, but I must say that reading and rereading these essays has been a deeply humbling experience." Coming from an informed and expert journalist who is articulate and thoughtful, one of the most widely read authors on food and environment active today, this is extraordinary praise for the intellect and future vision of Wendell Berry.

Bringing it to the Table: on Farming and Food is a collection of essays, presentations, and reflections written by Berry over a period of four decades. Many have been published elsewhere, but here are collected in a flowing and logical sequence that will delight and stimulate the reader to look differently at our current path toward massive monocultures and narrow control of agriculture and the food system. Wendell tells it like it is, from the perspective of a small farmer and careful student of farming people and their communities. The picture he paints of present agriculture, and how he describes the loss of rural culture in the U.S., and the direction we pursue provides cause for reflection on how the system reached the current level of specialization. Berry also suggests that rural people and their quality of life has suffered greatly from this change, and provides some insight on how we could create a more sustainable rural farming landscape, one where people matter and the ownership and benefits are more dispersed.

Part I is focused on farming, the practices and systems that prevailed in a former, highly diverse agriculture in contrast to the current industrial, high-technology model that predominates across the U.S. Midwest. Although interesting in the way that farming systems are described, the greater value in this section is how Berry ties system to the people. He is respectful of intent but highly critical of application of the many government farm programs designed to help farmers and provide sustainable incomes from farming. In questing to maximize returns, including those from farm support programs, farmers have abandoned their traditional values on which biodiverse systems were based. He connects farming to rural culture, and laments the concentration of land and wealth in a few hands and the consequent laundering of much of the value in farming as the majority flows to agribusiness … not to farmers nor to rural communities. Wendell Berry knows this process first hand, as he returned to Kentucky and purchased a farm in 1965 that he has operated since then in a way that he considers sustainable … and totally out of synch with the average industrial model farms in his state and elsewhere. His essays in this section reflect personal experience as well as that of farmers he has interviewed across the region.

The second part is focused on people – the farmers who are involved in alternative practices, enterprises, systems design and marketing. The seven chapters reflect a rich diversity of farmers and experiences, essentially a series of case studies that chronicle Berry's visits and interviews. The author is both a keen observer of practices and perceptive of human nature. What comes through is an amazing range of experiential wisdom that often reflects the world views of these farmers and how they put values into practice on their own farms. Interlaced with the activities and systems are down-to-earth farmer economics, described in terms that reflect a positive contribution to the bottom line as well as careful thought about how farm enterprises impact neighbors and community. One has the impression that these farmers clearly value nearby people in farming as well as in their rural communities, and the section underlines a famous Berry quote, "Would you rather have a neighbor's farm, or have a neighbor?"

Part III is perhaps the least coherent collection of vignettes, as the author warns in his introductory note. The chapters are stories about families, stories focused on food. They reflect the strong concerns rural families have for their food and nutrition, and provide a rich windows on food from the farm and nearby. They also provide insights into the robust food culture in rural areas that is fully entwined with family, friends, neighbors and community. The short chapters reveal a rich family culture closely connected to food and eating.

Similar to another recently published collection of essays, What Matters? Economics for a Renewed Commonwealth (Wendell Berry, Counterpoint Press 2010), this book is a testament to the insight and articulate writing of one of our foremost authors. Berry is at once a critique of the current high-tech, concentrated-ownership food and farming systems, and a careful scholar of farms and farming. He expresses cautious optimism about our potential return to certain rural roots. Although he could be accused of portraying an idyllic older system, there are lessons to be learned from traditional systems,

and strong reasons to seek the blending of conventional farmer wisdom and new technologies. Wendell Berry is an exquisite wordsmith, a master of the language who can clearly turn a phrase and say many things with few words. This is a book recommended to any thoughtful person concerned about our present farming and food systems, and seeking viable alternatives for the future.

Charles Francis
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## Sustainable Landscape Management: Design, Construction, and Maintenance

*By T. W. Cook and A. M. VanDerZanden, 2011, Hoboken, NJ, John Wiley & Sons Inc., 232 pages, ISBN 978-0-470-48093-9 (cloth); ISBN 978-0-470-88039-5 (ebk).*

Thomas W. Cook and Ann Marie VanDerZanden are seasoned specialists and authors in the field of landscape design and construction. Both authors have extensive teaching experience and have each authored several publications in the field. In this textbook, the authors focus on sustainable landscape design, construction and management techniques applicable for both commercial and residential properties.

The book emphasizes that the development of a sustainable landscape design and construction goes beyond aesthetic satisfaction to involve the minimal use of new inputs. It encourages the reuse of existing and recycled materials in the design and construction of a landscape. Since landscape designs evolve overtime, this textbook provides relevant knowledge about how to retrofit an existing landscape in a sustainable manner to minimize environmental impacts. The authors do not lose sight of the fact that constructing a landscape has the ability to alter an existing ecosystem. This textbook therefore describes how a landscape can be developed as an ecosystem. The book recounts that in developing an ecological landscape, the landscape designer goes beyond recreation and aesthetic purposes to develop a design which provides ecosystem services such as air and water purification, pollination, and habitats for other organisms. The authors provide an in depth discussion about environmental concerns associated with landscape construction. This is important because of issues regarding sustainability and environmental justice. The textbook describes the potential human and wildlife risks associated with environmental pollution that could result from the use of fuels, fertilizers and pesticides. It also outlines a number of integrated management practices which will help curb pollution. In terms of constructing a landscape, the book outlines step-by-step how to prepare the soil, plant, fertilize, irrigate, prune, manage, and maintain a landscape in a sustainable manner.

The authors clearly outline a set of learning objectives to be achieved in each chapter. Following these set objectives, adequate information is provided to meet the learning objectives. Information is neatly organized into subsections to guide and better help readers to logically follow what the authors intend to portray. In addition, the book provides a set of questions and a summary at the end of each chapter to enhance the reader's understanding and to help assimilate important facts from the textbook. Even though the authors suggest other reading materials that may enable readers to compare and contrast information not enough reading materials are suggested. With the exception of chapters one, two, three and ten, the remaining six chapters do not provide suggested readings. There are no typographical errors in this textbook, but there are few formatting errors. Consider, for example, a default paragraphing in page 85 (last paragraph in column one).

The book is well-written using a "simple" language (not too technical). This will enable a reader without expertise in the field to read, follow, and apply some of the information. In addition, the authors did well by including many photos. This helps to further illustrate the concepts being discussed. However, a majority of the pictures are black and white; it would be useful if more colored photos were included. The colored pictures are located at the end of chapter four. In Figures 7-1 and 7-2 (pages 122 and123) for instance, one cannot easily differentiate between earthworms and a growing lawn or a top soil and a subsoil, respectively. Although these pictures provide illustrations, it will be better appreciated if they are colored. In the preface of the text (page ix), the authors propose to describe in chapter two, cost-effective landscapes as part of a sustainable landscape design. However, no attempt is made to conduct any financial or benefit-cost analysis to further explain why a sustainable landscape will be more cost-effective than the conventional way of designing and constructing a landscape. The authors do well to raise awareness about the environment when constructing or managing a landscape and also provide insight about existing environmental laws such as the use phosphorus-free fertilizers in Minnesota. However, there is not much information provided about special environmental policy and pollution control models which will either deter pollution or provide incentives for landscape designers and contractors to minimize pollution.

Overall, I found the textbook informative and would recommend for teaching and learning purposes. However, evaluating and addressing some of the suggestions will enhance the quality of the textbook.

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# NACTA 2011 Annual Conference

The 2011 NACTA Annual Conference was held June 14 - 17 at the University of Alberta, Edmonton, Alberta, Canada. The theme was "Get Engaged." During the conference, Jeannette Moore, North Carolina State University, became the 2011 - 2012 NACTA President, and the annual business meeting was held where the Secretary/Treasurer reported.

# Incoming President Comments

We had a wonderful conference at the University of Alberta in Edmonton, and I hope everyone will be able to attend the 2012 conference at the University of Wisconsin River Falls (which is just 45 minutes from the Minneapolis/St. Paul airport). Please continue to be active in NACTA throughout the year and continue to make a difference in the lives of students.

I encourage Graduate Student members of NACTA to renew their memberships and to become involved in one or more NACTA committees. Many of the current faculty members of NACTA began with a graduate student membership. Please encourage other graduate students who have an interest in teaching to join NACTA and to attend the conference.

Faculty, there are many ways you can be involved with NACTA. If you have a graduate program on your campus, please continue to help interested graduate students get teaching experience, and please work with their mentors to help facilitate nominations of deserving individuals for the NACTA Outstanding Graduate Student Award.

Please look around to see if there are teaching faculty who are deserving of a NACTA award, and please help facilitate the nomination by helping their director or department head with the nomination materials. These deserving individuals might be outside your department or even outside of your institution.

Please continue to read and contribute to the NACTA Journal, which is a very well respected peer-reviewed journal. If you are not on the Journal Committee and Editorial Board, consider volunteering for this opportunity of reviewing manuscripts for publication. There are other committees to consider for service and professional development, so please think about being active in them.

As members of NACTA go up for promotion and tenure, please know that officers of NACTA welcome the opportunity to serve as external reviewers and write letters for faculty who have a high percentage teaching appointment.

As you look toward the future, please continue to be dedicated to teaching, advising, and scholarly activity associated with education. Please continue to have a good attitude toward academics, and above all, please continue to interact with other members of NACTA as lifelong colleagues and friends.

Thank you.

Jeannette A. Moore, North Carolina State University
NACTA President 2011-2012

# NACTA Business Meeting Minutes

The Business Meeting was held immediately after the Thursday luncheon. Attendance for this meeting was a major portion of the conference attendees - over 225 of the 271 registered attendees were present. An evaluation of the conference was required as a 'lunch ticket.' The University of Alberta host committee was happy to involve the NACTA Executive Committee in a Flash Mob dance just prior to the meeting. The dance instructors told the Executive Committee they were "good sports" to participate!

Kirby Barrick called the meeting to order at 12:30 p.m. He recognized first time attendees to the conference and the NACTA Executive committee.

### Reports presented:

• Membership Director report by Ron Hanson - Ron reported that the current total number of NACTA memberships is 826 for 2011 compared to 836 memberships a year ago. Eight institutions provided a total of 89 paid NACTA memberships for 2011. These eight institutions were identified and recognized. Appreciation was expressed to each institution for their support of NACTA by sponsoring additional memberships for their respective campus. NACTA members were asked to nominate faculty on their campus for potential NACTA memberships. A nomination form was distributed. A personal letter and NACTA brochure will be sent by the Membership Director to each person nominated at the start of the Fall Semester.

• Secretary report by Marilyn Parker - Membership numbers are mostly stable with a slight decrease in graduate students; Teaching Award of Merit certificates from institutions were encouraged; electronic voting numbers were down from last year; Motion passed to approve the Secretary's report.

• Treasurer report by Marilyn Parker - NACTA is in good financial shape with lower website costs and reduced printing costs. The ending balance in the checking account is $51,440. More memberships are always encouraged. Motion passed to approve the Treasurer's report.

• Journal Editor report by Rick Parker - Increase in manuscripts submissions, new reviewers needed, website activity encouraged and all reports will be on the website.

### Constitution changes presented by Jeannette Moore -

• Changes presented were posted to the website one month prior to the conference. Corrections were made to the associations NACTA has liaisons to, and changes to the Bylaws will be approved by the Executive Committee rather than waiting up to a year for the next Business Meeting. Motion passed to approve the constitution changes.

### Election results presented by Mike Mullen -

• President-elect - Rick Rudd, Virginia Tech
• Eastern Regional Director-Elect - Mark Russell, Purdue University
• Southern Regional Director-Elect - Jean Bertrand, University of Georgia
• Western Regional Director-Elect - Brenda Seevers, New Mexico State University

### Committee Chairs and Liaisons -

• Teacher Recognition Committee chair Prasanta Kalita's term will be finished at the end of this conference and a new chair will be selected
• Historian Jim McKenna stepped down due to retirement and Kevin Donnelly has been nominated and appointed the new Historian

Business Meeting adjourned by Kirby Barrick

### NACTA Foundation meeting opened by Past-president Mike Mullen -

Report given concerning the Foundation monies: The NACTA Foundation fund performance from July 1, 2010 to April 30, 2011 is as follows (a full report from UW-Platteville Foundation comes in July):

• The total return for the fund was $25,176.04.
• $1,219.66 of this gain was placed into the spendable account. This amount represents 2% of the average of twelve trailing quarters of the invested balance. This method of calculating the spendable allocation was adopted by the UW-Platteville Foundation in FY 2011 to smooth out the annual allocations, making them less subject to the volatility of the market.
• The payment to the UW-Platteville Foundation for management of the fund was $1,405.86.
• This leaves a net market gain for this 10 month period of $22,550.52.

Individual donations to the foundation for June 2010 to May 2011 were:

• $500, June 2010
• $50, June 2010, for NACTA Judging contest
• $100 June 2010, for NACTA Judging contest
• $5000 December 2010, for NACTA Judging contest

**Motion passed** to approve Foundation report.

Foundation meeting adjourned.

# Secretary / Treasurer Report

## Secretary's Report

Membership records for NACTA are maintained in a Microsoft Excel file. This provides the least expensive and the most flexible recordkeeping system. The records include addresses, email addresses, year paid, membership type, and region. Records can be sorted and presented in a variety of ways and most NACTA members can be sent an email. Members continue to receive a unique membership number. Regional directors are supplied with lists of members in their regions twice a year or when requested.

A NACTA E-Newsletter is sent out several times during the year to update members. This also helps keep email addresses updated.

Membership notifications go out through email to individuals in the fall. If dues are not paid by the end of February of the next year, their name is taken off the mailing list. Members receive at least two personal reminders for membership renewal. Reminders also go out through the NACTA E-Newsletters. Payment can be taken by credit card or check. Credit card payments can be mailed or faxed. Members continue to take advantage of the 3-year payment option. Every renewing member receives an email thanking them for their renewal. The NACTA Secretary appreciates the involvement of the Membership director and the Regional directors to encourage renewals for general memberships.

Every new member receives a letter welcoming them into NACTA and their name is passed to the Regional Director and the Membership Director.

There are approximately 800 members of NACTA - which includes individuals, institutions, and libraries. Total new members for 2010-2011: 94 Institutional Active plus 79 Institutional Active/Active new members from the 2010 Penn State Conference. There were 23 new graduate students and one new Life membership. Approximately 180 did not renew for 2011 - many of them long time members. Annual membership is calculated in August of each year.

A number of universities/colleges promote NACTA memberships and pay for either a one or three-year membership for individuals. In addition, some schools' departments pay for some faculty NACTA memberships on a yearly basis. Those that have participated this past year are: Pennsylvania State University; Virginia Tech, Purdue University; University of Florida; University of Nebraska; University of Kentucky, University of Illinois; Sam Houston State University, Huntsville, TX, Abilene Christian University, TX. For the record, if you know of some that have been missed, please inform the Secretary.

Several institutions were very late or are still in the process of renewing or did not renew for 2011 - University of Guelph, Arizona State University, Lakeland College, Mattoon, IL, Allen County Community College, University of Tennessee (Dean change with no response), and Sul Ross State University. If you are aware of Dean/leadership changes, the secretary would appreciate the updated information. Regional Directors were very helpful in obtaining some of the institutional membership renewals. We have three new schools due to the NACTA Judging contest - College of Southern Idaho, College of the Redwoods, CA, and Angelo State University, TX.

We have 15 Canadian members; six Canadian Institutions and three Canadian libraries. We have two foreign members, and three foreign libraries.

All member institutions received notification by email of their ability to present the Teaching Award of Merit Certificates and other advantages of Institutional membership. This year 32 Teaching Awards of Merit and 12 Graduate Student Awards of Merit were presented. This is approximately the same as last year. **How can we make them more aware of this award?** This information is available on the NACTA website. There were several current NACTA members that received this award.

The convenience of online voting for NACTA officers does not attract a very large segment of the membership.

_Action Item:_ Encouraging new memberships and retaining memberships is an ongoing theme. Why did 180 members not renew for 2011?

Submitted by:
Marilyn Parker
Secretary
June 2011

## Treasurer's Report

Below is a profit and loss statement created by QuickBooks. The accounting firm of Mayes & Waters, in Rupert, Idaho, provided help in verifying the records. A detailed Profit & Loss statement is available for any NACTA member.

The membership dues are the major factor in keeping NACTA financially viable. In order to totally support the annual teaching awards, the current membership would need to double. The increase in dues in June 2007 put NACTA in the black in 2008-2009. One-time costs associated with the new NACTA website and the first annual hardcopy of the Journal put NACTA in the red for the 2009-2010 year. Website costs were down for 2010-2011. The $8000 from

Oklahoma State University donated to NACTA in October 2010 from hosting the NACTA 2009 conference, will be placed into the Foundation account.

To keep NACTA in the black, it is critical that current memberships levels be maintained or preferably increased.

The ending bank statement for the checking account ending in May 2011 is $51,785.

Submitted by:
Marilyn B Parker
NACTA Secretary/Treasurer

## North American Colleges & Teachers of Agriculture

# Profit & Loss
## June 2010 through May 2011

| | June '10 - May 11 |
|---|---|
| **Ordinary Income/Expense** | |
| **Income** | |
| Book Sales (Conf.) | 616.00 |
| Conference Income | 8,110.00 - $8,000 OK State University |
| Grants/Contributions | 1,000.00 |
| Manuscript Page Charge | 900.00 |
| Membership Dues | 59,559.12 |
| Misc Income | 30.00 |
| Position Announcement | 200.00 |
| Royalties Income | 468.58 - usually less than $100 |
| Transfer from Checking | 0.00 |
| Transfer from Foundation | 4,100.00 |
| **Total Income** | **$74,983.70** |
| | |
| **Expense** | |
| Awards | 5,100.00 |
| Conference Expense | 6,689.32 |
| Credit Card Fees | 1,520.23 |
| Deposit to NACTA checking | 0.00 |
| Fall Exec Mtg | 444.78 |
| Honorariums | 21,050.00 |
| Insurance | 150.00 |
| Journal-Misc Expense | 2,958.75 |
| Journal Printing | 6,880.91 |
| Membership Refunds | 125.00 |
| Misc | 0.00 |
| Misc Expense | 192.95 |
| Postage | 629.74 |
| Professional Fees | 1,664.00 |
| Secretarial Help | 184.00 |
| Supplies | 165.34 |
| Travel | 4,186.95 |
| Web Site Expense | 6,370.00 |
| **Total Expense** | **$58,311.97** |
| **Net Ordinary Income** | **-$16,671.73** |
| **Net Income** | **-$16,671.73** |

# Join NACTA

# NACTA
### north american colleges and teachers of agriculture
### connect | develop | achieve

## Join NACTA today!
### *(North American Colleges and Teachers of Agriculture)*
### *— a professional organization dedicated to advancing the scholarship of teaching and learning in agricultural, environmental, natural, and life sciences.*

- Members receive the quarterly *NACTA Journal,* a professional, peer reviewed journal emphasizing the scholarship of teaching. The Journal also includes book reviews, teaching tips, and abstracts.
- Members attend the annual conference held at different colleges and universities in the U.S. and Canada, and where members present papers on innovative teaching concepts.
- Each year NACTA recognizes outstanding teachers with a variety of awards including: Teaching Awards of Merit, Teacher Fellows, Regional Outstanding Teacher Awards, NACTA-John Deere Award, Teaching Award of Excellence, Distinguished Educator, and Graduate Student Teacher Awards.

### Membership Categories (circle one):
- **Institutional Active Dues are $75/year (if your University/college is a member)**
- **Active Dues are $100/year**
- **Graduate Student $25/year - Emeritus $25/year**
- **Lifetime - $750 -one payment (or $800 if made in four payments of $200)**
- **Institutions ($150 - 4 year schools and $100 - 2-year schools)**

## *To join complete the following form.*

| Name: | Email: |
|---|---|
| Institution: | Telephone: |
| Address 1: | |
| Address 2: | |
| City:          State: | Zip: |

Send a check payable to NACTA for the correct amount or you can pay using a credit card (VISA and MasterCard only); phone calls also accepted 1-208-436-0692:

Name on Card _____

Card Number:_____

Expiration (month/date): _____

Three digits on the back of your card to the right of the signature block: _____

### *Send your completed form to -*

**Marilyn B. Parker
NACTA Secretary/Treasurer
151 West 100 South
Rupert, ID  83350**

### *For more information visit the NACTA website:*
### *www.nactateachers.org*
### *or email nactasec@pmt.org*

# NACTA Committee Members
# 2011 - 2012*

## Journal Awards

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Nick Fuhrman, Chair, University of Georgia
W. Stephen Damron, Oklahoma State University
Sam Doak, Virginia Tech
Kevin Donnelly, Kansas State University
Fred Fairchild, Kansas State University
Harry Field, Oklahoma State University
Jean Gleichsner, Fort Hays State University, KS
Lynn Hamilton, California Polytechnic State University
Alan Hansen, University of Illinois
Ronald J. Hanson, University of Nebraska-Lincoln
Jennifer Henke, University of California
Robin Peiter Horstmeier, University of Kentucky
Dann Husmann, University of Nebraska-Lincoln
Donald M. Johnson, University of Arkansas
Thomas Kuzmic, Oklahoma State University
Mickey Latour, Purdue University
Lurline E. Marsh, University of Maryland
Ed Miller, Oklahoma State University
Foy Mills, Abilene Christian University, TX
Jeannette Moore, North Carolina State University
Michael D. Mullen, University of Kentucky
Tory Parker, University of Illinois
Greg Pillar, Queens University, NC
Bryan Reiling, University of Nebraska
Herman A. Sampson, North Carolina State University
Shelly R. Sitton, Oklahoma State University
Robert J. Stephenson, Fort Hays State University, KS
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## Nominating

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## NACTA Foundation Advisory Council

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*** If you are interested in serving on one of the committees contact the Chair.**