

# College of Agriculture Faculty Perceptions of Student Skills, Faculty Competence in Teaching Areas and Barriers to Improving Teaching

Shannon M. Blickenstaff<sup>1</sup>, Kattlyn J. Wolf<sup>2</sup>,  
Jeremy M. Falk<sup>3</sup> and John C. Foltz<sup>4</sup>  
University of Idaho  
Moscow, ID



## Abstract

Demand for educational reform is echoing across the nation. Diverse job markets in a constantly evolving agricultural industry have created a need for college graduates who possess transferrable competencies such as critical thinking, problem-solving and effective communication skills. Land-grant colleges and universities must revitalize their services if they wish to continue preparing the next generation for innovative agricultural careers. A researcher-designed questionnaire was used to describe University of Idaho College of Agriculture faculty perceptions of valuable graduate skills, perceived levels of competence and importance of teaching areas and barriers to improving teaching. Faculty reported high self-perceptions in traditional areas of teaching such as lecturing and identified student engagement and critical thinking skill development as the most important aspects of teaching. Teaching areas in need of the most professional development included student engagement and improving reading and writing. Barriers to improving teaching included lack of time and resources as well as limited emphasis and recognition of teaching in the promotion and tenure process. Further research is needed to evaluate student learning and skill attainment, improve faculty teaching and address barriers that hinder the promotion of quality undergraduate education.

## Introduction

An evolving agricultural industry and the expansion of diverse career opportunities have spurred renewed interest in the quality of undergraduate education within colleges of agriculture. Additionally, the demand for educational reform is echoing across the nation (Arum and Roksa, 2011; Bok, 2006; Boyer,

1990; National Research Council, 2009; Selingo, 2013). *“Urgent change is required in agriculture education... so that the agriculture graduates of tomorrow will have the skills and competencies to meet the needs of a changing workplace and world”* (NRC, 2009, p. 25). Institutions of higher education are faced with unprecedented pressure to deliver students a quality educational experience (Selingo, 2013). Public perception holds that realistic experiences and skills are not reflected in higher education and students are not adequately prepared to meet the demands of advanced agricultural job markets (Campbell, 1998; NRC, 2009).

Fulfilling the educational needs of students is the most important responsibility of higher education institutions (Arum and Roksa, 2011; Bok, 2006; Campbell, 1998; NRC, 2009). College graduates who possess practical competencies such as critical thinking, problem-solving, analytical reasoning and effective communication skills will be met with an array of career opportunities in the many fields of agriculture (NRC, 2009). A growing concern among employers is graduates leaving universities without adequate critical thinking abilities (Whittington et al., 1997). After interviewing a wide range of employers, Selingo (2013) found that while specialized skills are desirable, employers want to hire individuals who can adapt and learn quickly. Students must be prepared to be broad thinkers capable of solving the world’s problems rather than technical specialists (Acker, 1999).

In order to improve the quality of undergraduate education in America, teachers must provide their students with opportunities to actively engage in the learning process (Arum and Roksa, 2011; Bok, 2006; Estep et al., 2012; NRC, 2009). Rote memorization and

<sup>1</sup>Graduate Teaching Assistant, Agricultural Education, 875 Perimeter; Ph: 208-885-6358

<sup>2</sup>Associate Professor, Agricultural Education; Email: kwolf@uidaho.edu

<sup>3</sup>Assistant Professor, Agricultural Education; Email: jfalk@uidaho.edu

<sup>4</sup>Dean, College of Agricultural & Life Sciences; Ph: 208-885-6681; Email: jfoltz@uidaho.edu

passive acquisition of knowledge should be replaced with experiential educational strategies that “teach students how to learn throughout their lives and careers and to present a more systems orientated, holistic view of agriculture” (Acker, 1999, p. 51). Faculty members need to implement active learning opportunities that teach students to think for themselves and challenge them in the effort to develop critical thinking skills and require students to engage in careful reasoning and analysis (Bok, 2006).

In his seminal work *Scholarship Reconsidered: Priorities of the Professoriate* (1990), Ernest L. Boyer questioned the practices of faculty, related to their duties in research and teaching. He described the shift in priority toward research in institutions of higher education at the expense of quality teaching and student learning. The NRC (2009) echoed this concern by admitting that teaching and learning are central to academic institutions, however; faculty are not adequately evaluated or rewarded based on teaching. Increased pressure to publish as a means to gain academic status is causing some professors to devote less time and effort to quality teaching (Arum and Roksa, 2011; Boyer, 1990; Kenny, 1998; NRC, 2009).

In 1998, the Boyer Commission published a report consisting of specific recommendations on how to restructure the undergraduate educational experience in America’s research universities. The report urged research universities to capitalize on their inquiry-based roots and engage students in active rather than passive learning. The Boyer Commission report further called upon the unique character of research universities; “In a setting in which inquiry is prized, every course in an undergraduate curriculum should provide an opportunity for a student to succeed through discovery-based methods” (Kenny, 1998, p. 26). Several research studies aimed at identifying College of Agriculture faculty members’ knowledge of teaching competencies found that participants were most confident in traditional pedagogies such as effective lecturing, preparing teaching materials, graduate advising and clarity in teaching. Lowest levels of knowledge were reported for less traditional competencies such as alternative teaching activities, using cooperative learning and case studies, distance education basics, undergraduate advising and teaching large class sizes (Harder et al., 2009; Stedman et al., 2011; Wardlow and Johnson, 1999).

Harder et al. (2009) computed mean weighted discrepancy scores (MWDS) for a variety of teaching competencies where a positive MWDS indicated the need for training in that area. The results highlighted a need for professional development in: getting students engaged in learning, teaching critical thinking, questioning techniques and active learning strategies. Critical thinking and active learning were specifically identified as two crucial components to quality education (Bok, 2006; Estep et al., 2012; NRC, 2009).

Foster and Pikkert (1991) offered insight as to why professors may struggle with the incorporation of these

particular competencies; they postulated that faculty may not be equipped with the knowledge or resources needed to integrate critical thinking skill development because of the limited preparation in pedagogy and educational concepts.

### **Purpose/Objectives**

The purpose of this quantitative research study was to describe faculty perceptions related to quality indicators of undergraduate education. Survey research was utilized to describe faculty perceptions of valuable graduate skills, perceived levels of competence and importance of teaching areas and barriers to improving teaching within the College of Agriculture at the University of Idaho. The objectives for this research study included:

1. Identify skills deemed important by faculty for graduates to possess.
2. Describe faculty members’ self-reported levels of perceived competence in selected teaching areas.
3. Describe faculty members’ perceived importance of selected teaching areas.
4. Describe the discrepancy between faculty members’ self-reported levels of competence and importance in selected teaching areas.
5. Describe faculty members’ perceived barriers to improving teaching within the college.

### **Methods**

A researcher-designed questionnaire, distributed through SurveyMonkey®, was used to collect the data. The questionnaire consisted of four parts; respondents’ perceived value of graduate skills, respondents’ competence and self-reported level of importance of teaching competencies, barriers to improving teaching and respondent background and demographic information. As the number of faculty members was relatively small and perceptions of a group can vary from person to person, the researchers conducted a census. A list of all faculty members was received from the dean’s office and cross-referenced with departmental directories to ensure accuracy. Prior to the collection of data, exempt certification for human subject participation was acquired from the University of Idaho’s Institutional Review Board (IRB project number 13-009).

The framework of desired skill sets that graduates should possess was provided by the National Research Council’s (2009) national report. Additional specific skills, pertaining to each skill set, were identified through the relevant literature. Participants used a six-point scale (1 = No Value; 6 = Very Strong Value) to rate their perceived level of value for each skill. The Borich (1980) model of needs assessment was used to measure participants’ perceptions related to their competence and perceived importance of 17 selected teaching competencies. “The needs assessment model is essentially a self-evaluating procedure which relies on teachers’ judgments about their own performances” (Borich, 1980, p. 42). These competencies were identified through a review of literature from similar studies (Harder, et al., 2009;

Stedman et al., 2011; Wardlow and Johnson, 1999; Wingenbach, 2002). Participants used a six-point scale (1 = Extremely Little Competence/Importance; 6 = A Great Deal of Competence/Importance) to rate their level of competence and perceived importance of each teaching competency. Face and content validity of the instrument were established by a panel of experts including Agricultural Education faculty and the Associate Dean.

Data collection in Spring 2013 followed the Tailored Design Method (Dillman et al., 2009). Five points of contact were made. A pre-notice letter was mailed to participants, followed by an email notice sent two days later with a link to the questionnaire. Two reminder emails were sent to non-respondents at one week intervals followed by a final paper-mail delivery to conclude data collection. A total of 197 college faculty members were asked to participate in this study. Of those, 116 participants indicated that they did not teach any undergraduate courses and were removed from the frame. Of the 77 faculty in the target frame, 70 completed the questionnaire for a response rate of 90.9%. The researchers determined that non-response error was not a critical threat due to the low number of non-respondents ( $n = 7$ ). Reliability of the instrument was assessed using the Cronbach's alpha internal consistency reliability coefficient. Cronbach's alpha was used to measure homogeneity of the items for graduate skills, competence in teaching ability, importance of teaching areas and barriers to improving teaching with values of  $\alpha = 0.89, 0.88, 0.88$  and  $0.83$  respectively.

Descriptive statistics were used to describe the data. Following the needs assessment model, mean weighted discrepancy scores (MWDS) were calculated using an Excel-based MWDS calculator (Microsoft 2010, v 14.0) created by McKim and Saucier (2011). Discrepancy scores were calculated for each respondent by subtracting his/her perceived level of competence from the perceived level of importance for each teaching competency. Each discrepancy score was then multiplied by the average for perceived importance of that item. The sum of the weighted discrepancy scores were divided by the total number of respondents; thus providing a MWDS for each competency. Positive MWDS signified a need for professional development training.

## Results

Faculty responded to demographic items to describe the population and the environment in which they teach. Faculty in this study ranged in age from 31 to 68 years old with an average of 49.23 years of age. Forty-eight respondents (73.8%) were male and 17 were female (26.2%). Of those participating, 64.7% were tenured and 35.3% were untenured. There were 4 lecturers/instructors (6.0%), 4 senior lecturers/instructors (6.0%), 15 assistant professors (22.4%), 18 associate professors (26.9%) and 26 full professors (38.8%). The majority of participants believed they were moderately (42.4%) to well prepared (31.8%) for teaching at the college level.

The average number of credits taught by faculty was 8.61 per school year.

Faculty reported their appointment percentage; teaching accounted for the highest average percent ( $M = 39.4, SD = 27.9$ ). Research accounted for an average of 33.4% of faculty appointments while an average of 12.8% of appointments were dedicated to extension. One participant reported having a 100.0% extension appointment but did teach an undergraduate course thus he/she was included in the study. Service and administration represented 6.0% and 8.3% of faculty appointments, respectively.

To describe the conditions for teaching in the college, faculty were asked to report their perceptions of the value that promotion and tenure committees place on appointment areas. These findings are presented in Table 1. The majority of faculty perceived that research was most valued by promotion and tenure committees ( $M = 58.8, SD = 27.1$ ). The perceived average value of research was 25.4% higher than the actual research appointment average of faculty members ( $M = 33.4, SD = 25.3$ ). The opposite effect was seen for the difference between actual teaching appointment and the perceived value of teaching. According to faculty perceptions, the value of teaching ( $M = 25.9, SD = 21.8$ ) is 13.5% lower than the average faculty appointment ( $M = 39.4, SD = 27.9$ ). The remaining three appointment areas were closer in regard to actual appointment percentage and perceived value.

**Table 1. Faculty Appointment Percentage vs Perceived Value by P and T Committees**

Item	Actual Percentage		Perceived Percentage	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Teaching	39.4	27.9	25.9	21.8
Research	33.4	25.3	58.8	27.1
Extension	12.8	26.9	8.40	14.7
Service	6.00	8.90	3.00	4.10
Administration	8.30	22.1	3.80	17.8

Note. *M* = Mean, *SD* = Standard Deviation

Participants were asked to describe their interests in research versus teaching. They were also questioned about their perceptions regarding the priorities of their department in terms of research and teaching. These findings are reported in Figure 1. None of the participants indicated that their interests or their department's priority leaned exclusively toward research. Likewise, no participants believed their department prioritized only teaching. However, 4.3% ( $n = 3$ ) of participants confirmed that they were exclusively interested in teaching. Thirty-two percent of participants ( $n = 22$ ) stated that they had equal levels of interest between research and teaching and yet only 14 participants (20.3%) believed that their department prioritized the two equally. Thirteen participants (18.8%) indicated that they were mainly interested in teaching and the same number believed that their department mainly prioritized teaching. The discrepancy between interest and department priority increased for "mainly research" and "slightly leaning toward research." Only eight participants (11.6%)

indicated that their interests leaned slightly toward research whereas 23.2% of respondents (n = 18) believed the same of their department. Twelve participants (17.4%) stated that their interests lied mainly in research compared to 16 respondents (23.2%) that said their department mainly prioritized research.

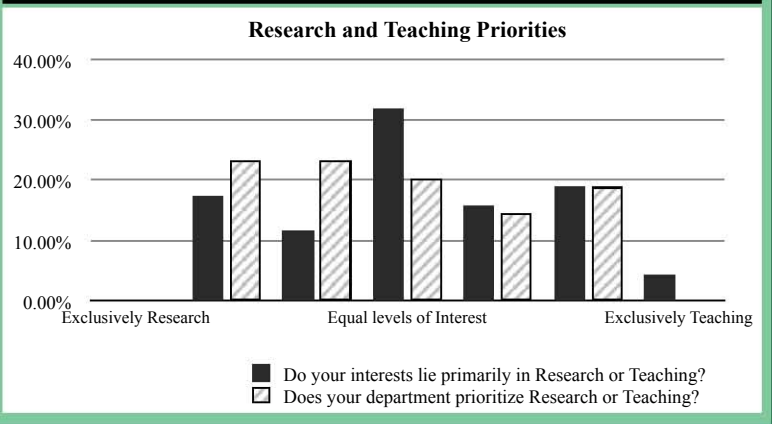
The first objective of this study was to identify skills deemed important for graduates to possess. Faculty perceived all skills to be valuable. These data are presented in Table 2. Problem-solving skills was seen as the most valuable ( $M = 5.66$ ,  $SD = 0.56$ ) skill. Critical thinking ( $M = 5.59$ ,  $SD = 0.81$ ) and the ability to communicate effectively in written form ( $M = 5.59$ ,  $SD = 0.65$ ) were the next most valuable skills as perceived by faculty. The ability to work in diverse communities ( $M = 4.71$ ,  $SD = 1.05$ ) and possessing a multicultural awareness ( $M = 4.69$ ,  $SD = 1.05$ ) were less valued compared to the majority of other skills. However, a similar diversity skill, interacting with people of different backgrounds, was deemed more valuable ( $M = 4.97$ ,  $SD = 0.99$ ). Only one skill, conflict resolution ( $M = 4.65$ ,  $SD = 1.00$ ), received a mode score of 4 (Moderate Value). Managing a budget ( $M = 4.63$ ,  $SD = 0.81$ ) was the least valuable skill according to faculty.

The second and third objectives were to describe faculty members' self-perceived level of competence and importance for teaching competencies. The fourth objective was to calculate mean weighted discrepancy scores (MWDS) for each competency to identify professional development needs. The findings for objective two, three and four are presented in Table 3. Participants were asked to rate their competence in a variety of different teaching areas. Faculty were most confident in their lecturing abilities ( $M = 5.17$ ,  $SD = 0.79$ ); nearly all faculty (98.5%) felt competent in this area. In addition to lecturing, faculty reported high competence in using assignments that are tied to real-life problems ( $M = 5.04$ ,  $SD = 0.97$ ). Faculty felt moderately competent in all remaining teaching areas. Participants were least competent in using web-based technologies for managing courses ( $M = 3.97$ ,  $SD = 1.48$ ).

According to participants, getting students engaged in learning was the most important area of teaching ( $M = 5.40$ ,  $SD = 0.99$ ). Encouraging critical thinking skill development ( $M = 5.35$ ,  $SD = 0.75$ ) and using assignments that are tied to real-life problems ( $M = 5.31$ ,  $SD = 0.76$ ) were also perceived as highly important. The remaining competencies were perceived as moderately important. Teaching in multicultural classrooms ( $M = 3.97$ ,  $SD = 1.89$ ) and using web-based technologies for managing courses ( $M = 3.97$ ,  $SD = 1.27$ ) were perceived as least important among the selected teaching competencies.

Mean Weight discrepancy scores were calculated to identify areas where professional development is

**Fig. 1. Ecopedagogy Module Performance: Comparison of Phase 1 (draft) versus Phase 2 (final) Presentations of Student Teachers.**



**Table 2. Faculty's Perceived Value of Graduate Skills**

Item	M	SD	Mo
Possess problem-solving skills	5.66	0.56	6.00
Possess the ability to think critically	5.59	0.81	6.00
Communicate effectively in written form	5.59	0.65	6.00
Communicate effectively in speech	5.51	0.70	6.00
Make ethical decisions	5.40	0.87	6.00
Possess decision-making skills	5.37	0.60	5.00
Engage in evidence-based reasoning	5.36	0.89	6.00
Interpret data and make correct inferences	5.07	0.94	5.00
Work as part of a team	5.06	0.88	5.00
Interact with people of different backgrounds	4.97	0.99	5.00
Manage complex tasks	4.91	0.85	5.00
Work across a variety of disciplines	4.81	0.92	5.00
Have a basic understanding of statistics and probability	4.78	0.88	5.00
Possess leadership abilities	4.76	0.88	5.00
Possess management skills	4.72	0.87	5.00
Work in diverse communities	4.71	1.05	5.00
Possess a multicultural awareness	4.69	1.05	5.00
Possess conflict resolution skills	4.65	1.00	4.00
Manage a budget	4.63	0.81	5.00

Note. M = Mean, SD = Standard Deviation, Mo = Mode, 1 = No Value, 2 = Very Little Value, 3 = Little Value, 4 = Moderate Value, 5 = Strong Value, 6 = Very Strong Value

warranted. Getting students engaged in learning had the highest MWDS (MWDS = 3.87) indicating the highest need for faculty professional development training. Other MWDS above 2.0 included improving student reading/writing (MWDS = 3.08), teaching to a variety of different learning styles of students (MWDS= 2.43) and encouraging critical thinking skill development (MWDS = 2.32). The lowest MWDS were calculated for lecturing (MWDS = -1.89), using technology in teaching (MWDS = -1.51) and creating course syllabi (MWDS = -1.50).

The fifth objective was addressed by asking participants to review a list of barriers and rate the degree to which each one affects their ability to improve their teaching. These data are presented in Table 4. Lack of time ( $M = 4.71$ ,  $SD = 1.42$ ) was reported as the largest barrier to improving teaching. Faculty reported that lack of resources ( $M = 4.12$ ,  $SD = 1.40$ ), lack of emphasis on teaching in the tenure and promotion process ( $M = 3.94$ ,  $SD = 1.51$ ) and lack of recognition or rewards for teaching ( $M = 3.81$ ,  $SD = 1.48$ ) also represented major barriers to improving teaching. Participants indicated that the remaining items did not represent strong barriers. The majority of faculty disagreed that lack of education ( $M = 3.00$ ,  $SD = 1.50$ ) and lack of training ( $M = 2.97$ ,  $SD = 1.37$ ) were barriers.



Sixteen percent of participants agreed that lack of motivation ( $M = 2.26$ ,  $SD = 1.20$ ) served as a barrier. Likewise, 11.5% indicated that their lack of interest to engage in professional development activities ( $M = 2.13$ ,  $SD = 1.20$ ) was a barrier. An open-ended question was provided for participants to reflect on additional barriers that were not included in the questionnaire. Faculty reported limited departmental funding for professors to attend professional development activities as a barrier to improving their teaching. Lack of student preparedness for university level learning was also identified as a barrier. One respondent reflected on the issue with the "pipeline," in which high school students are not being adequately prepared for college thus hindering progress for higher education.

**Discussion**

Faculty in this study perceive that their teaching is less valued by promotion and tenure than their actual teaching appointment. According to the NRC (2009), a common perception is that "tenure criteria are strongly tilted toward faculty members' research productivity and that too little attention is paid to teaching and service" (p. 60). The participants in this study shared similar views in regard to the discrepancy of value between research and teaching within CALS. While teaching accounted for the largest percent of faculty appointments, an overwhelming perception existed that promotion and tenure committees placed greater value on research productivity. The perceived focus on research was inconsistent with faculty interests. The majority of respondents indicated that their interests leaned slightly toward teaching activities. However, when asked to describe their departments' priorities, participant responses shifted toward research. Deans and decision makers should consider teaching as a part of scholarship; it takes time and effort to create the environment required to facilitate real-world application of content and foster critical thinking in their students. Teaching is scholarly (Boyer, 1990) and faculty who excel in teaching should be rewarded and recognized. Although the impacts of teaching may not be as immediate as those of research, they are no less influential.

Faculty were asked their perceptions regarding the importance of graduates' skills. All skills were deemed important, the most valuable being problem solving, critical thinking and writing. These findings support the National Research Council's report (2009) and indicate that faculty value skills that will make students success-

ful in agricultural careers. It is the responsibility of higher education institutions to prepare the next generation workforce for a demanding future (Bok, 2006; Campbell, 1998; Estep et al., 2012; NRC, 2009). The NRC (2009) recommended that the skills be "integrated throughout a curriculum and other student experiences rather than taught in separate courses" (NRC, 2009, p. 40). Further study should include an analysis of student competence in these skills upon graduation from a degree program and a comparison to the perceptions of employers related to graduate proficiency in these skills. Faculty should purposefully plan where and how students will attain these skills; keeping in mind that valuable skills may be attained in out-of-course experiences such as student organizations, study abroad opportunities and student leadership opportunities.

Higher education has a momentous responsibility when it comes to preparing the nation's future workforce. College students "desperately" (p.184) need real-world experience that will help them connect the concepts from class to everyday problems in their future careers (Selingo, 2013). According to faculty, the most valued skills for graduates to possess included problem-solving skills, critical thinking and communication skills both in speech and written form. While these particular skills stood out as especially valuable, participants considered all the listed skill sets to be moderately important for graduates to possess.

**Table 3. Faculty Competence, Importance, and Mean Weight Discrepancy Score of Teaching Areas; ranked by MWDS**

Teaching Area	Competence		Importance		MWDS
	M	SD	M	SD	
Getting students engaged in learning	4.68	0.97	5.40	0.99	3.87
Improving student reading/writing	4.06	1.01	4.76	1.02	3.08
Teaching to a variety of different learning styles of students	4.30	1.16	4.81	1.05	2.43
Encouraging critical thinking skill development	4.91	0.88	5.35	0.75	2.32
Using peer evaluations to improve teaching	4.06	1.25	4.45	1.07	1.76
Discussion-based instruction	4.49	1.31	4.79	1.11	1.55
Using assignments that are tied to real-life problems	5.04	0.97	5.31	0.76	1.28
Hands-on problem-solving activities	4.81	0.97	4.95	1.00	0.73
Questioning techniques	4.52	0.99	4.60	1.06	0.34
Using Web-based technologies for managing courses	3.97	1.48	3.97	1.27	0.18
Cooperative learning (group projects or assignments)	4.44	1.16	4.46	1.25	0.13
Using student evaluations to improve teaching	4.17	1.20	4.21	1.31	0.12
Teaching in lab settings	4.69	1.31	4.67	1.33	-0.41
Teaching in multicultural classrooms	4.19	1.18	3.97	1.89	-0.64
Creating course syllabi	4.78	1.08	4.43	1.14	-1.50
Using technology in teaching	4.51	1.16	4.12	1.33	-1.51
Lecturing	5.17	0.79	4.76	1.01	-1.89

*Note.* M = Mean, SD = Standard Deviation, MWDS = Mean Weighted Discrepancy Score, 1 = Very Little Competence/Importance, 6 = A Great Deal of Competence/Importance

**Table 4. Barriers to Improving Teaching Reported by Faculty**

Item	M	SD	Mo
Lack of time	4.71	1.42	6.00
Lack of resources	4.12	1.40	4.00
Lack of emphasis on teaching in the Tenure and Promotion process	3.94	1.51	4.00
Lack of recognition or rewards for teaching	3.81	1.48	5.00
Lack of knowledge and understanding of alternate teaching approaches	3.29	1.47	4.00
Large class sizes	3.20	1.43	3.00
Student resistance to change	3.20	1.37	3.00
Lack of education relating to teaching	3.00	1.50	3.00
Lack of training related to teaching	2.97	1.37	3.00
Lack of motivation	2.26	1.20	1.00
Lack of interest to engage in professional development	2.13	1.20	1.00

*Note.* M = Mean, SD = Standard Deviation, Mo = Mode, 1 = Strongly Disagree, 2 = Slightly Disagree, 3 = Disagree, 4 = Agree, 5 = Slightly Agree, 6 = Strongly Agree

The participants reported being most competent in their ability to lecture and use assignments that are tied to real-life problems. Previous researchers found that agricultural and life science faculty were also the most confident in their ability to lecture (Harder et al., 2009; Stedman et al., 2011; Wardlow and Johnson, 1999). Competency areas in which faculty in this study rated themselves as having low competence included using web-based technology for course management, utilizing peer evaluations and improving student reading and writing. Low competence in improving reading and writing raises a concern considering that effective communication was rated as one of most valuable skills that graduates should possess (Arum and Roksa, 2011; Campbell, 1998; NRC, 2009). According to Campbell (1998), a “common concern expressed by employers of our graduates is their lack of proficiency in communications, both written and spoken” (p. 110). The NRC (2009) recommended that instructors encourage better communication skill development by providing students with opportunities to speak and write about a variety of topics in their coursework.

The proficiency of teaching faculty needs to be thoroughly evaluated in order to create an accurate picture of the current status of undergraduate education in colleges of agriculture. An overwhelming majority of faculty in this study reported high levels of competence in the ability to lecture. Faculty members were less confident in their ability to actively engage students in the learning process. Research strongly suggests that lecturing alone is not enough to promote active learning and the development of critical thinking skills (Arum and Roksa, 2011; Bok, 2006; Kenny, 1998; Selingo 2013; Wood, 2003). “Education by inquiry demands collaborative effort; traditional lecturing should not be the dominant mode of instruction in a research university” (Kenny, 1998, p. 25). Professional development opportunities should be offered to faculty related to pedagogical knowledge to help them adopt techniques that will promote active student learning.

Several options to better promote the importance of quality teaching have been suggested: providing incentives to reward quality teaching, creating tenure-track positions dedicated to educational research, focusing on applicants’ teaching abilities during the hiring process and implementing professional development workshops to improve teaching (Boyer, 1990; Estep et al., 2012; Kenny, 1998; NRC, 2009). The Boyer Commission recognized the importance of establishing a better balance between research and teaching excellence. Regardless of the difficulties associated with effectively evaluating teaching productivity at the college level, it is imperative that more attention be paid to teaching considerations during the hiring process and promotion and tenure decisions.

According to Arum and Roksa (2011), the National Survey of Student Engagement recommended several examples of active learning strategies including class presentations, questioning techniques and the

implementation of collaborative work among students both in and outside of class. Encouraging faculty to adopt an experiential approach to teaching could help college of agricultural and life science instructors to become more effective in their teaching (Estep et al., 2012). Further research is recommended to examine the instructional strategies used by professors in their classrooms. A detailed investigation should be conducted that compares skill development of students to the teaching techniques and cognitive discourse used by professors.

Faculty perceived the following teaching competencies as most important: student engagement, critical thinking skill development and using assignments tied to real-life. Competencies ranking low, but still moderately important included using web-based technologies for course management, teaching in multicultural classrooms and using technology in teaching. It is interesting to note the lack of emphasis devoted to technology in education. According to Selingo (2013), online and hybrid courses are becoming a reality for institutions of higher education. While online education won’t replace traditional classrooms anytime soon, it will play a growing role by giving students more options to fit with their own educational goals. Further investigation into whether faculty are prepared for this online movement and whether they are receptive to participate in professional development training designed for technology-based instruction would be beneficial.

In addition to utilizing technology in the classroom, teaching in multicultural settings also received a relatively low importance ranking. In regard to skills needed by graduates, faculty ranked similar diversity skills comparatively low. Possessing a multicultural awareness and the ability to work in diverse communities was ranked nearly last by respondents in terms of value. As Harder et al. (2009) postulated, “Perhaps classes in CALS are culturally homogeneous or possibly CALS faculty do not perceive teaching a class of diverse learners requires specific strategies” (p. 54). Regardless, the NRC (2009) believed in the importance of training students to work and speak across traditional disciplinary and cultural boundaries. Workplaces are constantly evolving and becoming more diverse and in order to succeed in these environments and students should be encouraged to gain multicultural awareness.

The results of the mean weighted discrepancy scores (MWDS) identified several teaching areas in need of professional development training. Faculty rated their level of competence below perceived level of importance for well over half of the competencies. Student engagement in learning, reading and writing improvement, teaching to a variety of learning styles and encouraging critical thinking all received high MWDS signifying areas most in need of training. There is strong evidence to support the use of active engagement in teaching environments as a means to improving student learning (Arum and Roksa, 2011; Bok, 2006; NRC;

2009). It was suggested that active learning results in longer term recollection of subject matter compared to lecture-based instruction (Bok, 2006). Although utilizing web-based technology had a low MWDS, it may bear further study to address faculty competence in these areas as well as why they view it as unimportant. Lecturing was also a competency that may benefit from further investigation. Faculty report a higher level of competence than importance, yielding a negative MWDS. However, the literature is critical of lecturing as a stand-alone pedagogy and caution faculty to use it more sparingly (Bok, 2006; Wood, 2003).

Two areas of concern were identified with regard to barriers that instructors face to improve their teaching. Lack of time and resources were the top-ranked barriers according to participants. The next most common theme included barriers relating to recognition of quality teaching by administrators. Lack of emphasis on teaching in the promotion and tenure process and lack of recognition or rewards for teaching rounded out the top four barriers to improving teaching.

Faculty disagree that interest, motivation and education are barriers to improving training. It appears that the barriers are not created by the faculty, but rather the establishment of higher education. Allowing faculty the time and resources to improve teaching, as well as rewarding quality teaching, are factors that can be influenced by the climate of the teaching faculty and leadership in the college. Evaluating teaching appropriately is critical and recognizing achievements in teaching should move away from a competitive process as the ultimate goal is student achievement. The aim of teaching should be to develop skills and impact student success, leading to an improved agricultural industry.

## Summary

College of Agricultural and Life Sciences faculty should take action to improve the quality of undergraduate education by addressing the following concerns. First, faculty claim to appreciate the need for students to acquire transferrable skills throughout college but it is unclear whether students are securing the knowledge and skills they need to be successful. Further research is needed to evaluate student learning; are students leaving college with practical competencies such as critical thinking, problem-solving and effective communication skills? In order to ensure that students develop the skills they need in today's agricultural workforce, College of Agricultural and Life Sciences faculty must address problem areas in their teaching such as student engagement, reading and writing improvement and teaching critical thinking. A follow-up study should be conducted to investigate how to evaluate and improve these areas of teaching. Finally, the barriers to improving teaching identified in this study should be examined further to find possible solutions.

Colleges and universities nationwide are falling short of employer expectations in regard to the preparation of graduates. "More than 90% of employers rate written

communication, critical thinking and problem solving as 'very important' for the job success of new labor market entrants," (Arum and Roksa, 2011, p. 143) and yet only a small percent of graduates are excelling in these areas. If higher education is going to regain public trust, it must embark on a path of reform to restore our education system.

Land-grant institutions were created in response to the desperate needs of society and what society needs now is for higher education to adapt to the demands of a new-age workforce. As Campbell (1998) stated over a decade ago, "The problem is not that these institutions are doing so much wrong but that they have failed to take full account of the changes occurring in the society they serve" (p. 192). In order to implement the changes needed in higher education, it will take a combined effort on behalf of the students, faculty, departments and universities as a whole. The land-grant community needs to commit to a pathway of educational reform by revitalizing their services to increase academic rigor, stimulate higher learning and improve teaching within colleges of agricultural and life sciences.

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