Skills Students Need in the Real World: Competencies Desired by Agricultural and Natural Resources Industry Leaders

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Abstract

The competencies addressed by undergraduate agricultural education programs should be assessed so programs are effective in supplying a well-prepared agricultural- and natural resources-oriented workforce, and so human capital is optimized. In this study, agricultural and natural resources leaders were surveyed to determine the workforce competencies they believed graduates of post-secondary agricultural education programs should have obtained. An Internet-based survey was distributed to graduates of an agricultural leadership development (ALT) group and a natural resources leadership development (NRLT) Group. The highest-rated workforce competency categories for the ALT group were being dependable (n = 103), critical thinking (n = 101), strategic planning (n = 98), and clear communication (n = 98); the highest-rated categories for the NRLT group were active listening (n = 73), clear communication (n = 72), and problem solving skills (n = 72). The personal and leadership skills subscales were not significantly different, but natural resources leaders ranked communication competencies as more important than agricultural leaders. Agricultural educators should evaluate the workforce competencies offered in their undergraduate programs and have deliberate conversations about meeting industry needs to better prepare a future workforce.

Key words: Competency, Communication, Leadership, Leaders, Employability, Personal Skills

Introduction

All societies have an obligation to provide young citizens with the required education and skills to become productive and prosperous members of society (Symonds, Schwartz, & Ferguson, 2011). However, in the United States, young adults suffer from a skills gap where they do not have the necessary competencies and work ethic to obtain employment and maintain a middle-class lifestyle. Today's workforce demands that most members have some form of post-secondary

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education or training. Thoron, Myers, and Barrick (2016) called for research that explores the ways practitioners can collaborate to deliver education programs as part of the *American Association for Agricultural Education National Research Agenda*. The AGree report on *Food and Agricultural Education the United States* also underscored the need for the agricultural education system to supply a workforce prepared to face mounting challenges in agriculture (Mercier, 2015). As the array of issues facing the agriculture community and the content imperative to the solving emerging problems continues to expand, the agricultural education system must broaden and refine itself to address the challenges associated with supplying food globally while sustaining a natural system. Hurst et al. (2015) and Zubović, Domazet, and Stošić (2009) reinforced these claims and demonstrated their application to a global level. To become more competitive, agricultural and natural resource businesses need to adapt to changes in the global market. The agricultural education system plays a vital role in achieving this goal by supplying a workforce prepared to fit into the current needs of the global system (Hurst et al., 2015; Zubović et al., 2009).

An average of 57,900 positions will open annually for graduates with a bachelor's degree or higher in the areas of food, agriculture, renewable natural resources, and the environment (Goecker, Smith, Fernandez, Ali, & Theller, 2015). However, only 61% of these openings are projected to be filled by graduates with degrees in these areas. Approximately 7,000 of those positions will be in the area of education, communication, and governmental services. Agricultural education and communication programs need to prepare students to meet the evolving needs of agricultural employers in order to address the challenges of the 21st century (Andelt, Barrett, & Bosshamer, 1997; Hurst et al., 2015; Maiga, Cartmell, Edwards, & Robinson, 2013; Mercier, 2015; Morgan 2010; Robinson & Garton, 2008; Sargent, Pennington, & Sitton, 2003).

The quality of undergraduate programs must be tied to the abilities of its graduates to be hired within their industry (Andelt et al., 1997). For programs to produce employable graduates, the program and learning environment must be considered purposefully and systematically (Knight & Yorke, 2003). It is vital for university professors who develop program requirements and coursework to remain up-to-date with the current demands of the workforce and integrate feedback from students, researchers, practitioners, and the community (Hurst et al., 2015; Maiga et al., 2013). The literature has recommended agricultural curriculum be evaluated every two to five years to ensure the program is effectively preparing students for the workforce (Andelt, et al. 1997; Morgan, 2010; Morgan, 2012; Morgan & Rucker, 2013). In order to evaluate academic curriculum and ensure it is meeting the relevant needs of the current workforce, researchers must collect data from industry leaders to identify the skills expected from entry-level employees (Maiga et al., 2013; Morgan, 2010; Morgan, 2012). From this feedback, institutes of higher education can make decisions about coursework, competencies, and objectives of undergraduate programs to connect them to relevant industry needs (Andelt et al., 1997; Maiga et al., 2013; Morgan, 2010; Morgan, 2012; Zubović et al., 2009).

Review of Literature

Businesses expect college graduates to enter the workforce prepared with the skills needed to be successful employees (Knight & Yorke, 2003; Robinson & Garton, 2008; Sargent et al., 2003). Sleezer and Denny (2004) acknowledged the important role human capital, specifically knowledge and innovation capacities, will play in the new economy. They noted the number of highly qualified workers is declining, which will continue to be problematic over the coming years, creating a high demand for college-educated workers if the U.S. wants to continue to develop and apply new technologies. The authors highlighted creating a workforce development infrastructure as one of the four strategies to meet the demand of filling the highly skilled worker deficit, emphasizing the role of educational institutions to "systematically integrated educational resources

with business needs" (Sleezer & Denny, 2004, p. 47). Holzer (2012) also underscored the deficit of middle and highly skilled workers to fill the good-paying positions and suggested education and skills of prospective employees fail to keep pace with employer needs. He noted even graduates with degrees do not possess the sector-required skills to receive good-paying jobs, placing the blame on disconnection between the labor market and the school systems (Holzer, 2012).

University programs need to be sensitive to the needs of employers (Andelt et al., 1997). Although employers want college graduates to come prepared with transferable skills, many graduates have not demonstrated these skills at their jobs, creating a skills gap between employer expectations and employee competencies (Andelt et al., 1997; Symonds et al., 2011). Robinson and Garton (2008) found graduates entering the workforce do not believe they can perform the employability skills at the level required for success in their positions. Similarly, Andelt et al. noted graduates have been unable to obtain employment because during college, they had not developed the knowledge, skills, and competencies required by employers. Employers in the United States complained that young adults are not entering the workforce with the skills necessary to compete in the 21st century (Symonds et al., 2011). The *2015 State of the Industry* report completed by the Association for Talent Development reported organizations spent an average of $1,229 per employee learning in 2014, a 1.7% increase from 2013 (Association of Talent Development, 2015). These results confirmed a skills gap exists between employer demands and employee capabilities (Andelt et al., 1997; Robinson & Garton, 2008; Symonds et al., 2011).

Morgan (2010) highlighted the highly dynamic nature of the agricultural communications field today and identified the needs of the field through a Delphi study. Communication-area competencies encompassed a broad variety of communication skills with oral communication identified as most important; listening and writing skills were also essential. In the general education core area, proper use of grammar and writing skills were desired, along with general technology skills and an understanding of business. However, when Morgan and Rucker (2013) identified differences between the skills agricultural communication professors believed were important for undergraduate students to employ upon graduation compared to the competencies which agricultural industry professionals identified as important for entry-level employees, they found while the professors focused on specific, academic skills of communication and thinking, industry professionals desired more general workplace competencies such as ethics and soft skills. Professionals in the field desired graduates with a holistic approach to communications; employers were interested in an employee with the ability to use a variety of communication skills rather than those focused on one area (Morgan, 2010). Since professors play a vital role in the development of their own curriculum, this disconnect between professors' perceptions of industry needs and the actual needs of the industry can be problematic in preparing employment ready graduates (Morgan & Rucker, 2013). Through curriculum and internship opportunities, academics need to find ways to bridge the gaps that exist so graduates are more prepared to meet the expectations of employers.

Several studies have explored how desired skills are delivered to students. Morgan (2010) found many of the agriculture competencies desired by employees, such as ability to meet deadlines, reliability, dependability, and strong work ethic were taught indirectly through university structure as opposed to being taught through curriculum. Conversely, Sargent et al. (2003) evaluated the success of a 15-week, capstone course designed to develop leadership skills vital in the workplace. Although a major purpose of this course was the development of leadership skills in a work-world setting, the results indicated little growth in leadership skills. In order to better prepare graduates with the leadership skills employers desire, the researchers recommended integration of leadership skills throughout the coursework of a program rather than emphasized through a capstone course in the last semester of coursework. Finally, Hurst et al. (2015) took an extensive look at the components which lead to the development of a productive agricultural

workforce in the developing country of Trinidad and Tobago, noting the importance of a comprehensive agricultural education system as a major resource in the development of a skilled workforce. The study suggested the development of a program which is effective and efficient at creating a well-trained and competent workforce extends beyond competency and skill development alone. Effective program development should encompass a broader view of the program curricula, facilities, pedagogical approaches, teacher education, agricultural organizations, student/instructor relationships, connections between the schools and communities, globalization of the curricula, and entry into agricultural careers on the development of a trained and efficient agrarian workforce. The researchers recommended more interaction and communication between educational institutions, improved outreach programs, and integration of co-curricular student organizations.

Research has also investigated what skills alumni in the college of agriculture at the University of Missouri (Robinson & Garton, 2008) and agricultural communication programs (Morgan, 2012) believed were important for graduates to have when entering entry-level positions upon graduation. The top five employability skills identified by Robinson and Garton (2008) were solving problems, ability to work independently, functioning well in stressful situations, maintaining a positive attitude, and listening attentively. These skills encompassed general workplace skills which Morgan (2010) found employers desiring. Skills which emerged from focus groups with agricultural communications alumni included writing and basic communication skills, contextual agricultural knowledge, the ability to find a story, public speaking, and general employability skills, as found by Morgan (2010) and Robinson and Garton (2008). Agricultural communications graduates also emphasized the critical role internships played in their preparation for the workplace during their undergraduate program (Morgan, 2012).

Theoretical Framework

The theoretical framework for this study was Human Capital Theory. Zubović et al. (2009) defined human capital as the "accumulated knowledge, created in the long term process of human resources development, which begins in early stages and lasts all through the life" (p. 1). Human capital encompasses knowledge, skills, and experiences of individuals within an organization "expressed as a function of education and a measure of economic activity" (Kaufman & Geroy, 2007, p. 37). Governments view an investment in human capital as a means to improved economic efficiency and success (Hurst et al., 2015; Maiga et al., 2013).

Since human capital is more valuable than resources such as land, labor, and other capital, it is vital to help individuals develop skills specific to their sector (Maiga et al., 2013; Zubović et al., 2009). Strong program development for agricultural education and communication programs can lead to improvements in the relationships between researchers and the general public through informing, educating, and entertaining. Additionally, the development of human capital among the agrarian population has the potential to increase productivity. Governments, employers, and other stakeholders have expected higher-education institutions to increase human capital by developing a collection of vital skills employees can use to maximize productivity (Knight & Yorke, 2003). Human capital can be developed through "formal/mainstream education, non-formal/extension education, in-service training, and mass-media" (Hurst et al., 2015, p. 143). An investment in higher education should increase human capital, thus enhancing the workforce for economic success (Hurst et al., 2015; Knight & Yorke, 2003).

Since human capital is developed through education and is valued by employers, research should consistently re-evaluate the needs of industry to inform educational institutions so the institutions can overcome the skills gap and prepare the most valuable graduates (Andelt, et al.,

1997; Hurst et al., 2015; Kaufman & Geroy, 2007; Knight & Yorke, 2003; Maiga et al., 2013; Morgan, 2010; Morgan, 2012; Morgan & Rucker, 2013; Robinson & Garton, 2008; Symonds, Schwartz, & Ferguson, 2011; Zubović et al., 2009). Agricultural education programs have limited time and credit hours in which to develop the skills of students and prepare them to enter the workforce (Swortzel, 1999). In order to utilize this time most efficiently, programs should identify which skills are most relevant and vital in meeting the current need of the industry. Once industry-desired competencies have been identified, agricultural education departments should design their curriculum to develop those competencies in their students. Students who develop the industry-required skills should enter the workforce as more productive employees prepared to address the challenges of the 21st century (Andelt, Barrett, & Bosshamer, 1997; Hurst et al., 2015; Maiga, Cartmell, Edwards, & Robinson, 2013; Mercier, 2015; Morgan 2010; Robinson & Garton, 2008; Sargent, Pennington, & Sitton, 2003).

Purpose and Objectives

The purpose of this study was to determine key workforce competencies desired by agricultural and natural resources leaders. The findings will inform the design of courses in agricultural education departments. This study was guided by the following objectives.

1. Determine the personal, communication, and leadership skills desired by agricultural leaders.
2. Determine the personal, communication, and leadership skills desired by natural resources leaders.
3. Compare the personal, communication, and leadership skills desired by agricultural and natural resources leaders.

Methods

A descriptive survey method was employed to assess the competencies desired by agricultural and natural resources leaders (Ary, Jacobs, Sorensen, & Walker, 2014). The population of the study was participants in agricultural and natural resource leadership programs. The agricultural professional population was represented by a census of alumni from an Agriculture Leadership Training Group (ALT) (pseudonym). The ALT is a 22-month program providing leadership training to professionals in agricultural industries. The natural resources leaders were represented by a census of graduates from the Natural Resources Leadership Training Group (NRLT) (pseudonym). NRLT is an eight-month professional development program designed to provide leadership and conflict management training to create a network of leaders prepared to address natural resources issues. These groups were selected to represent those who employ graduates with agricultural communication and leadership degrees.

Data were collected using two identical instruments that were delivered at two separate times. Data were collected between July 1, 2015, to July 21, 2015, for the ALT group and from August 12, 2015, to August 28, 2015, for the NRLT group. Alumni of the programs were used to collect data. The survey was sent to the alumni of nine ALT classes, which consisted of 236 members. Sixteen emails were undeliverable, changing the frame to 220. A response rate of 50% was obtained. Five responses were removed because they did not fully complete the instrument, resulting in 105 usable responses. The instrument was also sent to 235 NRLT alumni. Twelve emails were undeliverable, changing the frame to 223. Responses were received from 77 respondents resulting in a response rate of 34.5%. An Internet-only survey using the Qualtrics program was used for both instruments for this study.

According to Dillman, Smyth, and Christian (2014), one of the major sources of error in survey research is non-response error. Linder, Murphy, and Briers (2001) indicate early and late respondents can be compared using a Pearson X^2 to address non-response error. In this study early respondents were those participants who responded to either the initial response or the first reminder. Late respondents were those who responded more than two days after the first reminder. The early and late respondents were compared separately for the two groups. There were no significant differences in the primary variables of interests between the early and late respondents of either group. According to Radhakrishna and Doamkekpor (2008), the results of a census can be generalizable if early and late respondents are found to be similar.

Survey Instrument

The survey instrument was administered as two separate instruments to the two groups. Both instruments were identical but were administered at different times. This study was part of a larger survey instrument, which had been pilot-tested on graduate students in the agricultural and natural resources field. The instrument used for this study consisted of three parts plus demographic questions. The first portion of the instrument sought to determine personal skills required by employees in the agricultural and natural resources industries. The skills in the instrument were developed by direct interviews with a group of agricultural and natural resources industry leaders. During the interviews, the leaders were asked questions about what skills and competency areas were important for them when hiring employees. Eleven personal skills emerged from the directed interviews. The skills were reviewed by a panel of experts consisting of three faculty members involved in teaching, research, and extension related to agricultural communications and leadership who found the instrument to be valid. Cronbach's alpha was calculated to determine if the instrument was a reliable measure of personal skills. The Cronbach's alpha was .90, which exceeds the minimum acceptable level for cognitive measures recommended by Nunnally (1978).

The leadership and communication skills were developed by faculty members at the University of Florida to represent competencies currently offered to students. The questions were reviewed by a panel of experts consisting of the director of the Center for Public Issues Education in Agriculture and Natural Resources, the associate director of the Center for Public Issues Education in Agriculture and Natural Resources, an associate professor specializing in communication and leadership education, and the director of ALT. To ensure internal reliability, Cronbach's alpha was calculated on the two constructs *ex post facto*. The Cronbach's alpha was .89 for the leadership skills and .87 for the communication skills, which were in the acceptable range, according to Nunnally (1978).

Data Analysis

The data were imported from Qualtrics into the Statistical Package for the Social Sciences (SPSS) version 22. Frequencies were calculated for each individual group. One-way ANOVAs were calculated to determine mean differences between the subscales for each group. An alpha level of .05 was established as significant *a priori*.

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Results

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Of the ALT participants, 47.6% (n = 50) of the respondents indicated their highest level of education completed was a four-year college degree, 34.5% (n = 36) indicated their highest level of education was a graduate or professional degree, and 17.3% (n = 18) indicated they were high school graduates. Ninety-four percent (n = 99) of the ALT respondents indicated they were white. Of the 105 respondents from the ALT, 66.7% (n = 70) were male and 32.4% (n = 34) were female.

One participant did not indicate their sex. Of the 77 NRLT participants, 46.8% (n = 36) were male and 50.6% (n = 39) were female. Two participants did not indicate their sex. The level of education reported by the NRLT participants was 70.1% (n = 54) earned a graduate or professional degree, 20.8% (n = 16) had a four-year college degree, and 6.5% (*n* = 5) had some college or a two-year degree. Ninety-four percent (*n* = 72) of the NRLT respondents indicated they were white.

Research Objective One

Researchers sought to determine the personal, communication, and leadership skills desired by agricultural leaders. Agricultural leaders were participants from ALT. All of the personal traits had more than half of the respondents indicate they were *very important* or *extremely important* (See Table 1.). The personal skills with the highest frequency of *very important* or *extremely important* responses were being dependable (*n* = 103), problem solving (*n* = 97), and taking initiative (*n* = 97). The personal skills with the highest frequency of *not important* or *somewhat important* were positivity (*n* = 7), being organized (*n* = 4), and flexibility (*n* = 4).

All of the ratings for the importance of leadership traits for the ALT graduates had more than half of the responses as *very important* or *extremely important*, save for the competency showing empathy, which 15 respondents indicated it was *not important* or *somewhat important*. The leadership traits with the highest importance rank were critical thinking (*n* = 101), strategic planning (*n* = 98), and clear communication (*n* = 98). The leadership skill assertiveness had the second-lowest frequency of respondents indicated it was *very important* or *extremely important* (*n* = 57), and had six respondents indicate it was either *not important* or *somewhat important* (See Table 2).

Table 1

Importance of Personal Skills According to ALT (n = 105) and NRLT (n = 77) Graduates

	n	Not Important or Somewhat Important		Important		Very Important or Extremely Important	
		f	%	f	%	f	%
Being Dependable							
ALT	105	0	0.0	2	1.9	103	98.1
NRLT	77	2	2.6	5	6.5	70	90.9
Problem Solving Skills							
ALT	105	1	1.0	7	6.7	97	92.4
NRLT	77	1	1.3	4	5.2	72	93.5
Taking Initiative							
ALT	104	0	0.0	7	6.7	97	92.4
NRLT	77	0	0.0	7	9.1	70	90.9
Being Receptive to Changes							
ALT	104	0	0.0	15	14.4	89	85.6
NRLT	77	0	0.0	7	9.1	70	90.9
Being Innovative							
ALT	105	1	1.0	17	16.2	87	82.9
NRLT	77	0	0.0	8	10.4	69	89.6
Flexibility							
ALT	105	4	3.8	14	13.3	87	82.9
NRLT	77	0	0.0	8	10.4	69	89.6
Being Focused							
ALT	105	3	2.9	15	14.3	87	82.9
NRLT	77	1	1.3	15	19.5	61	79.2
Being Open to Feedback							
ALT	105	2	1.9	21	20.0	82	78.1
NRLT	77	2	2.6	10	13.0	65	84.4
Positivity							
ALT	105	7	6.7	18	17.1	80	76.2
NRLT	77	3	3.9	18	23.4	56	72.7
Being Organized							
ALT	105	4	3.8	25	23.8	76	72.4
NRLT	77	4	5.2	11	14.3	62	80.5
Creative							
ALT	104	4	3.8	31	29.8	69	66.3
NRLT	77	1	1.3	13	16.9	63	81.8

Table 2

Importance of Leadership Skill According to ALT (n = 105) and NRLT (n = 77) Graduates

	n	Not Important or Somewhat Important		Important		Very Important or Extremely Important	
		f	*%*	*f*	*%*	*f*	*%*
Critical Thinking							
ALT	105	0	0.0	4	3.8	101	96.2
NRLT	77	0	0.0	6	7.8	71	92.2
Clear Communication							
ALT	105	0	0.0	7	6.7	98	93.3
NRLT	77	0	0.0	5	6.5	72	93.5
Strategic Planning							
ALT	105	1	1.0	6	5.7	98	93.3
NRLT	77	0	0.0	6	7.8	71	92.2
Self-Motivation							
ALT	105	1	1.0	8	7.6	96	91.4
NRLT	77	2	2.6	7	9.1	68	88.3
Decision Making							
ALT	105	0	0.0	9	8.6	96	91.4
NRLT	77	2	2.6	6	7.8	69	89.6
Active Listening							
ALT	104	1	1.0	11	10.6	92	88.5
NRLT	77	0	0.0	4	5.2	73	94.8
Team Work							
ALT	105	0	0.0	14	13.3	91	86.7
NRLT	77	0	0.0	6	7.8	71	92.2
Confidence							
ALT	105	1	1.0	21	20.0	83	79.0
NRLT	76	2	2.6	16	21.1	58	76.3
Assertiveness							
ALT	105	6	5.7	42	40.0	57	54.3
NRLT	77	4	5.2	27	35.1	46	59.7
Showing Empathy							
ALT	105	15	14.3	42	40.0	48	45.7
NRLT	77	5	6.5	17	22.1	55	71.4

Three communications skills reported by the ALT graduates had more than half of the responses as either *very important* or *extremely important* (See Table 3). Those skills were dealing with crisis (*n* = 89), public speaking (*n* = 88), and strong writing skills (*n* = 74). The following communications skills had more respondents rank the competency as *not important* or *somewhat important* compared to *very important* or *extremely important*: graphic design (*n* = 51), photography (*n* = 43), videography (*n* = 41), website design (*n* = 37), and event planning (*n* = 33).

Table 3

Importance of Communications Skills According to ALT (n = 105) and NRLT (n = 77) Graduates

	n	Not Important or Somewhat Important		Important		Very Important or Extremely Important	
		f	*%*	*f*	*%*	*f*	*%*
Dealing with Crisis							
ALT	105	6	5.7	10	9.5	89	84.8
NRLT	76	3	3.9	12	15.8	61	80.3
Public Speaking							
ALT	105	7	6.7	10	9.5	88	83.8
NRLT	77	1	1.3	11	14.3	65	84.4
Strong Writing Skills							
ALT	105	9	8.6	22	21.0	74	70.5
NRLT	76	1	1.3	9	11.8	66	86.8
Social Media							
ALT	105	22	21.0	38	36.2	45	42.9
NRLT	77	13	16.9	24	31.2	40	51.9
Website Design							
ALT	105	37	35.2	35	33.3	33	31.4
NRLT	77	23	29.9	26	33.8	28	36.4
Videography							
ALT	105	41	39.0	32	30.5	32	30.5
NRLT	77	24	31.2	31	40.3	22	28.6
Photography							
ALT	104	43	41.3	35	33.7	26	25.0
NRLT	77	17	22.1	39	50.6	21	27.3
Event Planning							
ALT	105	33	31.4	46	43.8	26	24.8
NRLT	77	12	15.6	26	33.8	39	50.6
Graphic Design							
ALT	105	51	48.6	38	36.2	16	15.2
NRLT	77	28	36.4	28	36.4	21	27.3

Research Objective Two

Researchers wanted to determine the personal, communication, and leadership skills desired by natural resources leaders represented by NRLT graduates. The personal skills are represented in Table 1. The personal skills with the highest frequency of *very important* or *extremely important* responses were problem solving skills (*n* = 72), being dependable (*n* = 70), taking initiative (*n* = 70), and being receptive to changes (*n* = 70). All of the personal skills had more than half of the responses as *very important* or *extremely important*.

The majority of respondents indicated the leadership skills were either *very important* or *extremely important*. The most important leadership competencies according the NRLT graduates were active listening (*n* = 73), clear communication (*n* = 72), strategic planning (*n* = 71), critical thinking (*n* = 71), and team work (*n* = 71) (See Table 2). The communication skills that more than half of the respondents indicated were *very important* or *extremely important* were strong writing skills (*n* = 66), public speaking (*n* = 65), dealing with a crisis (*n* = 61), social media (*n* = 40), and event planning (*n* = 39). The communication skills with the highest number of responses in either *not important* or *somewhat important* were graphic design (*n* = 28), videography (*n* = 24), website design (*n* = 23), and photography (*n* = 17) (See Table 3.).

Research Objective Three

Finally, researchers wanted to compare the personal, communication, and leadership skills desired by agriculture and natural resources leaders. Mean scores from each overall scale were calculated. The grand means for each group and the mean difference is displayed in Table 4. Skewness and kurtosis were measured to assure the assumption of normality was not violated. The measures were found to be within the acceptable level as determined by Ferguson and Cox (1993). The mean difference for the personal skills and leadership were not significant. The difference between the group means for communication was significant ($F(1, 180) = 5.40$, $p = .02$).

Table 4

Mean Differences between NRLT and ALT Groups

	ALT		NRLT		
	n	*M (SD)*	*n*	*M (SD)*	Mean Difference
Personal	102	4.24 (0.54)	77	4.28 (0.52)	0.04
Leadership	104	4.25 (0.50)	76	4.29 (0.55)	0.04
Communication	104	3.29 (0.66)	75	3.53 (0.67)	0.24*

Note. **p < .05*

Conclusions and Implications

These findings indicated personal and leadership competencies are important to both agricultural and natural resources leaders. Several competencies in these areas had a high level of importance. The highest level of agreement for personal competencies for both groups were (a) being dependable, (b) problem solving, and (c) taking initiative. The highest level of agreement for leadership competencies for both groups were (a) critical thinking, (b) clear communication, and (c) strategic planning. These skills mirror those skills Robinson and Garton (2008) and Morgan (2010) found to be important in the industry. The mean differences were not significantly different,

which indicates there is not a difference in the personal and leadership competencies desired by the agricultural leaders and natural resources leaders for the personal and leadership competencies subscales.

The communication competencies with the highest level of importance for both groups were (a) dealing with crisis, (b) public speaking, and (c) strong writing skills. The lowest level of importance for the groups were (a) graphic design, (b) photography, and (c) videography. Although these rank as the lowest level of importance, it is important to note some of them still had a majority of leaders ranking them as extremely or very important. The participants of this study did not value these technical communication and design skills to as high of a degree as the personal and leadership skills. While these skills may be important, the critical thinking and teamwork skills may be more important for these programs. These findings are similar to the findings of Morgan (2010), who reported industry leaders valued soft skills and a holistic approach to communication rather than finite competencies related to specific communication modes.

A comparison of the mean scores between the personal and leadership competencies subscales indicated both groups valued these competencies equally. The mean scores for the communication competencies showed agricultural leaders tend to value these competencies less than natural resources leaders. While the difference was statistically significant, the difference of 0.24 on a five-point scale raises the question of practical significance. Bearing that caveat, these findings indicate a possible difference in the communication skills required for graduates pursuing employment in agricultural fields, compared to those pursuing employment in the natural resources field.

The findings of this study call for a review of the competencies taught in agricultural education, communication, and leadership degree programs. These findings are congruent with Morgan (2010), Morgan (2012), and Morgan and Rucker (2013). The high level of importance of the personal and leadership skills highlights the need for developing those skills, which is supported by the findings of Sargent et al. (2003) who recommended incorporating leadership training throughout the entire curriculum. If the success of undergraduate programs is measured on their ability to be hired, as recommended by Andelt, et al. (1997), then the programmatic offering of these programs should be adjusted to focus on developing personal and leadership competencies desired by professionals in the field. Caution should be used when implementing the findings of this study, since the population was exposed to advance training, which could influence their response.

According to Hurst et al. (2015) and Knight and Yorke (2003), investing in higher education is an important way to increase human capital. The findings in this study illuminate where that investment should take place. Agricultural and natural resources leaders value individuals who can think critically and communicate clearly in all situations, including during a crisis or when solving a problem.

Recommendations

Building upon the theoretical framework of human capital, these findings undergird the need to re-evaluate current curriculum to better meet the needs of industry professionals. This study provides an ordered list of the competencies desired by industry professionals. Further studies should be conducted to determine the ideal configuration of courses and instruction within courses to help students meet these competencies. The data show some competencies taught in the programs are not viewed as crucial by agricultural and natural resources leaders. Additionally, Morgan (2012) recommended implementing feedback from alumni to improve programs.

Hurst et al. (2015) underscored the importance of performing a multi-faceted evaluation of programmatic offerings to optimize human capital investments in the ideal blend of competencies, technical skills, and pedagogical approach. Further investigation should be conducted to determine the ideal coursework arrangement to teach students these competencies. Research is also needed to determine the most effective pedagogical practices for developing these abilities. The data in this study highlighted the importance of crisis communication, strong writing skills, and public speaking skills. Based on these findings, we recommend programs develop problem-based instruction that includes real-life crisis management scenarios to teach communication skills, while developing personal and leadership skills. Further research is needed to test the efficacy of this method of teaching.

Furthermore, we recommend programs increase the opportunities for students to practice public speaking and writing skills in real-world application. Perhaps courses could be designed to integrate technical agricultural content with writing, public speaking, and problem solving skills in a transdisciplinary setting. Development of these courses will take collaboration from individuals outside the agricultural education department, including industry leaders and faculty teaching in technical agriculture and/or natural resources disciplines. Promoting involvement in student organizations may also provide more opportunities for students to develop the required leadership skills in a real-world setting. Building on the recommendations of other researchers, we also recommend programs integrate industry professionals' feedback as a priority when university professors create program requirements and coursework, in order to design programs which reflect the needs of the industry (Andelt et al., 1997; Holzer, 2012; Morgan, 2010; Sleezer & Denny, 2004). For example, creating an advisory board that looks over programing changes and provides insight on the most current issues facing the agriculture and natural resources industries would ensure the program is timely and relevant. Those involved in programmatic decisions for agricultural education programs should remain engaged in a deliberate conversation with industry representatives about what competencies should be taught in their programs and how they should best be delivered. These conversations should specifically address how to develop skills, such as dependability and taking initiative, which are difficult to directly teach in a classroom.

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