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Arthur Leal
University of Tennessee

Kati M. Lawson
University of Florida

Ricky W. Telg
University of Florida

See next page for additional authors

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Technically Speaking: Technical Skills Needed for Agricultural Communication Baccalaureate Graduates

Abstract

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Abstract

The purpose of this national study was to assess the perceived importance of 57 technical skills identified in previous literature, and to determine entry-level, agricultural communication graduates' ability to perform those technical skills as perceived by agricultural communication graduates, communication industry professionals, and agricultural communication faculty members. Participants from the three evaluation groups (n = 193) identified three of the most important technical skills needed by agricultural communication graduates. These skills were communicating in written form, concise and clear writing, and communicating verbally. Graduates placed a higher importance on technical skills than the other two evaluation groups. All three evaluation groups showed some agreement on graduates' highest ability to perform several technical skills: ability to use technology, ability to use Microsoft Word, and ability to adapt to contemporary media. A significant difference was found between the evaluation groups for the ability graduates afforded themselves in telephone etiquette, ability to use Microsoft Word, reading skills, ability to use Instagram, ability to use graphic design software, and ability to use web design software, as compared to the other two evaluation groups. Recommendations included incorporating technical skills into instruction for undergraduate students. Content should be focused in technical-skill areas identified as being of high importance: communicate in written form; communicate verbally; write concisely and clearly; and use of proper punctuation, grammar, and spelling. Faculty members could benefit from research that identifies more effective measures to evaluate technical skills attainment.

Keywords

Technical skills, agricultural communication, program evaluation

Cover Page Footnote/Acknowledgements

The co-authors of this manuscript would like to honor the legacy of Dr. Arthur Leal who unexpectedly passed away during the final preparations of this manuscript.We know we speak for all who knew Arthur that he will be profoundly missed. He was creating a stellar agricultural communication program at the University of Tennessee. He was engaged regionally and nationally in research, teaching, and service. His contributions will benefit the discipline today and for years to come, with his recommendations for improved and enhanced agricultural communication curriculum. This article was presented as a research paper at the National Agricultural Communications Symposium in February 2020 in Louisville, Kentucky.

Authors

Arthur Leal, Kati M. Lawson, Ricky W. Telg, Joy N. Rumble, Nicole LaMee Perez Stedman, and Debbie Treise

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Introduction

Since the first post-secondary agricultural communication program was established in the early 1900s, agricultural communication programs have experienced continual growth. As of 2015, approximately 40 agricultural communication programs existed nationwide with enrollment ranging from 10 to 360 students. These 40 programs averaged 69 students per program, and almost all agricultural communication programs expected to see an increase in student numbers in the next five years (Miller et al., 2015). Industry and student demand have aided in the development of agricultural programs at the post-secondary level.

With the growth of student numbers and the addition of new agricultural communication programs, a significant amount of responsibility has been placed on a limited number of faculty members in these programs (Miller et al., 2015; Weckman et al., 2000). Miller et al. (2015) found agricultural communication programs, on average, had 2.16 full-time and .45 part-time faculty members. The number of faculty members per program has increased since 2000; however, these small faculty groups must divide many responsibilities, including teaching, recruiting, advising, mentoring, graduate placement, and club advisement (Miller et al., 2015; Weckman et al., 2000). Due to a high number of responsibilities placed on a limited number of individuals in agricultural communication programs, faculty members are not able to deliver all core, agricultural communication coursework. As a result, agricultural communication faculty rely on journalism and mass communication departments to help deliver content. The necessary practice of utilizing mass communication and journalism departments to deliver content has formed a barrier between agricultural communication faculty and students when assessing student preparedness (Irani & Doerfert, 2013; Tucker et al., 2003).

Agricultural industry professionals have reported the need for improvements in the technical skillset for agricultural communication graduates (Irlbeck & Akers, 2009). Agricultural communication curricula are regularly evaluated by agricultural communication faculty in an effort to meet the needs of an agricultural communication-focused industry that grapples with fast-paced changes in the agricultural industry and with technology (Doerfert & Miller, 2006; Evans, 2004).

To improve curricula and develop career-ready graduates, researchers have recommended that faculty members consider the results from studies that examine curricular effectiveness and the career-readiness of graduates (Akers et al., 2001; Hart Research Associates, 2015; Irlbeck & Akers, 2009; Robinson, 2006; Terry, et al., 1995). This national study surveyed three agricultural communication groups – agricultural communication graduates, communication industry professionals, and agricultural communication faculty members – to address the lack of literature about three-tiered perspectives on the technical skills of agricultural communication baccalaureate graduates. Therefore, the purpose of this national study was to contribute to current research by exploring the importance of agricultural communication baccalaureate graduates' ability to perform selected technical skills, with the intention of aiding in curricula evaluation and small agricultural communication program development, as perceived by three distinct groups: graduates of agricultural communication undergraduate programs, agricultural communication faculty, and communication industry professionals.

The objectives that guided this study were as follows:

- RO1: Determine the importance of selected technical skills for agricultural communication baccalaureate graduates as perceived by agricultural communication

graduates, communication industry professionals, and agricultural communication faculty members.

- RO2: Compare the perceived importance of technical skills for agricultural communication baccalaureate graduates among agricultural communication graduates, communication industry professionals, and agricultural communication faculty members.
- RO3: Determine the ability to perform selected technical skills for agricultural communication baccalaureate graduates as perceived by agricultural communication graduates, communication industry professionals, and agricultural communication faculty members.
- RO4: Compare the perceived ability to perform technical skills for agricultural communication baccalaureate graduates as perceived by agricultural communication graduates, communication industry professionals, and agricultural communication faculty members.

Literature Review

Many employers believe a majority of college graduates who have entered the workforce are not prepared with the skills necessary to fill jobs beyond entry-level positions (Hart Research Associates, 2013). College graduates believe they are better prepared than their employers do, yet employers have reported college graduates lacked comprehensive knowledge of various skills (Casner-Lott & Barrington, 2006; Hart Research Associates, 2015; Northeastern University, 2013). The job performance of Millennials has earned mixed reviews from employers on how Millennials have fared in the workforce (Deal et al., 2010; Oblinger, 2003; Taylor & Ketter, 2010).

Various approaches have been taken by researchers in evaluating the skills and knowledge of agricultural communication graduates, as well as assessing the skills needed by these students. In particular, technical skills – knowledge-based skills required to do a job that are acquired through direct instruction and training – have been an area of interest for researchers and instructors who work with agricultural communication students due to the demand from employers. Technical skills provide a competitive edge for job candidates (Coates, 2006; Schulz, 2008). Morgan and Rucker (2013) explored the skills needed by agricultural communication undergraduates from a faculty perspective and found that some of the highest-ranked skills were professional competence, critical thinking, ability to communicate orally and in writing, ethics, listening, and intellectual prowess (Morgan & Rucker, 2013).

Corder and Irlbeck (2018) provided a synthesis of literature related to the skills, abilities, and knowledge employers and industry professionals seek in agricultural communication curriculum and in agricultural communications graduates and found overlap in skills desired by employers of graduates and skills taught in undergraduate programs for four categories: written communications, character skills, visual and technical skills, and oral and communication skills. In the visual and technical skills category, the researchers found nine skills desired by employers of graduates and also taught in undergraduate programs: Microsoft Office, Adobe Creative Suite programs, graphic design, layout, web design, photography, and advertising and marketing. Two of the other categories, written communication and oral and other communication skills, identify skills this study classifies as “technical skills.” The skills where the researchers identified overlap with the skills desired by employers of graduates and skills taught in undergraduate programs for written communication were writing, journalism, grammar, spelling, punctuation, public relations, and proper editing. Conversely, the skills where the researchers identified overlap with

the skills desired by employers of graduates and skills taught in undergraduate programs for oral and other communication skills were public speaking/verbal skills, general agricultural knowledge, and global agricultural issues.

Methods

This national study was part of a larger study, conducted from January 11, 2016, to February 11, 2016, that utilized an online survey instrument to collect data (Leal et al., 2019). The online survey collected 212 responses, which resulted in 193 usable responses. Agricultural communication graduates within three years of graduation, communication industry professionals, and agricultural communication faculty members served as the three evaluation groups in this study. A total of 46 faculty members representing 25 universities and 66 graduates from 10 universities participated in this study. Eighty-one agricultural communication and communication industry professionals from 58 different organizations were represented in this study: 34 agricultural organizations, 14 non-agricultural organizations, and 10 strategic communication and marketing departments in colleges of agriculture. Additional individuals received the survey via an alumni newsletter, but it was unknown how many individuals received the newsletter. The use of the newsletter served as a limitation, but demographic information was used to ensure that each respondent received a major, minor, or concentration in agricultural communication and that they had graduated within the last 2.5 years.

A purposive sampling technique was used to recruit all three evaluation groups. Agricultural communication faculty members were identified using a study conducted by Miller et al. (2015), which identified all agricultural communication programs in the United States at that time. This information was used to identify agricultural communication graduates and agricultural communication faculty members. This list was used to search university websites to identify agricultural communication faculty in each program (N = 89) and to obtain their email addresses. Alumni lists were requested from faculty member participants to identify 2014 and 2015 agricultural communication graduates, and communication industry professionals were identified via boards of directors and online searches that located membership lists of communication industry professionals from both agricultural and non-agricultural communication industry organizations.

Qualtrics© mailer function was used to distribute the instrument and collect data in this study. A modified Dillman's (2014) Tailored Design was used in the distribution of the survey instrument. Initial email invitations were sent to all industry professionals, faculty members, and graduates. Four contacts were used with each group, as response from the fifth contact and beyond have been shown to produce minimal additional data (Israel & Gouldthorpe, 2013). [University] offered to promote this study in its departmental newsletter since they were unable to share graduates' email addresses due to privacy issues.

Using two different versions of the survey instrument – graduate survey instrument and industry and faculty survey instrument – respondents were presented with 57 skills in the technical skills area, which were adapted from previous studies that assessed needed skills for agricultural communication graduates to be successful in the workforce (Bailey-Evans, 1994; Irlbeck & Akers, 2009; Morgan & Rucker, 2013; Morgan, 2010; Robinson, 2006; Terry et al., 1995). To ensure each evaluation group was assessed entry-level agricultural communication graduates, communication industry professionals were asked to rate newly hired graduates' ability to perform the selected skills, faculty members/instructors were asked to rate graduates'

ability to perform the selected skills by graduation day, and graduates were asked to rate their current ability to perform the selected skills. Part of a larger study, respondents were also asked demographic questions regarding their career, education, and upbringing; however, those demographic questions were not part of this manuscript's analysis.

Ability to perform each skill was measured on a five-point Likert-type scale where *0 = I Don't Know, 1 = No Ability, 2 = Low Ability, 3 = Moderate Ability,* and *4 = High Ability.* All evaluation groups were asked to indicate the importance of the technical skills on a four-point Likert-type scale where *1 = No Importance, 2 = Low Importance, 3 = Moderate Importance,* and *4 = High Importance.* Measurement scales were adapted from previous studies (Blackburn et al., 2015; DiBenedetto, 2015), and Cronbach's alpha coefficients were calculated post data collection to confirm the reliability of the constructs used in the survey instruments: technical-skills importance construct ($\alpha = .93$) and technical-skills ability construct ($\alpha = .96$). Real limits were created to prevent gaps between intervals, allowing for clearly defined parameters to help with the interpretation of the importance of and graduates' ability to perform the selected skills (Colwell & Carter, 2012). The real limits set for the importance scale were 1.00 – 1.49 = *no importance,* 1.50 – 2.49 = *low importance,* 2.50 – 3.49 = *moderate importance,* 3.50 – 4.00 = *high importance,* and the real limits set for the ability to perform scale were 1.00 – 1.49 = *no ability,* 1.50 – 2.49 = *low ability,* 2.50 – 3.49 = *moderate ability,* 3.50 – 4.00 = *high ability.* The answer option 0 = *I Don't Know* on the ability scale was treated as a missing value and not included in analysis.

Data were analyzed using SPSS© 22. Descriptive statistics were used to analyze objectives one and three, and data were reported using means and standard deviations. The remaining objectives were analyzed using a one-way, between groups analysis of variance. Gabriel's pairwise tests were used for the follow-up tests.

A Pearson Chi-square analysis was used to compare early and late respondents to address the external validity threat of nonresponse (Miller & Smith, 1983). For the graduate survey instrument used in this study, a Chi-square analysis was used to compare where early and late respondents lived when they grew up ($\chi^2 = 1.63$, $\rho = .44$) and by their immediate family's involvement in the agricultural industry ($\chi^2 = 2.65$, $\rho = .27$). The same statistical comparison was calculated for the industry and faculty survey instrument, using where early and late respondents lived when they grew up ($\chi^2 = 4.38$, $\rho = .22$) and their immediate family's involvement in the agricultural industry ($\chi^2 = .04$, $\rho = .98$). No statistically, significant difference was observed between early and late respondents for either survey instrument.

Results

RO1: Determine the importance of selected technical skills for agricultural communication baccalaureate graduates as perceived by agricultural communication graduates, communication industry professionals, and agricultural communication faculty members.

Importance of Technical Skills

Respondents in this study were presented with 57 technical skills that were identified in previous literature and then updated by industry professionals and faculty members in this study. Respondents were asked to indicate the level of importance they associated with each skill. Level of importance of the selected skills was measured on a four-point Likert-type scale where *1 = No*

Importance, 2 = Low Importance, 3 = Moderate Importance, and *4 = High Importance.* Descriptive analyses were used to report means and standard deviations for the importance of each skill. While differences were found between the level of importance between the skills, it is important to remember that all technical skills were identified as at least moderately important.

Communication industry professionals, when asked to rate the level of importance for technical skills (Table 1) placed the highest mean importance on written communication (*M* = 3.96, *SD* = .19), communicating verbally (*M* = 3.94, *SD* = .24); concise and clear writing (*M* = 3.94, *SD* = .24); proper punctuation, grammar, and spelling (*M* = 3.93, *SD* = .26); ability to use technology (*M* = 3.86, *SD* = .38); active listening (*M* = 3.86, *SD* = .35); ability to use different informational sources (*M* = 3.83, *SD* = .38); reading (*M* = 3.80, *SD* = .43); ability to adapt to contemporary media (*M* = 3.80, *SD* = .43); and researching (*M* = 3.78, *SD* = .42).

Table 1

Importance of technical skills

Skill	Industry (*n*=80)		Graduates (*n*=66)		Faculty (*n*=46)	
	M	*SD*	*M*	*SD*	*M*	*SD*
Communicate in Written Form	3.96	.19	3.95	.21	3.98	.15
Communicate Verbally	3.94	.24	3.94	.24	3.96	.21
Concise & Clear Writing	3.94	.24	3.97	.17	4.00	.00
Proper Punctuation, Grammar, & Spelling	3.93	.26	3.94	.30	3.93	.25
Ability to Use Technology	3.86	.38	3.95	.21	3.89	.32
Active Listening	3.86	.35	3.94	.24	3.89	.32
Ability to Use Different Informational Sources	3.83	.38	3.82	.49	3.80	.40
Reading	3.80	.43	3.79	.51	3.80	.40
Ability to Adapt to Contemporary Media	3.80	.43	3.89	.36	3.83	.38
Researching	3.78	.42	3.71	.49	3.78	.42
Understand Client Needs & Goals	3.77	.53	3.92	.32	3.87	.34
Telephone Etiquette	3.74	.44	3.88	.37	3.61	.54
Interviewing	3.70	.54	3.59	.61	3.80	.45
Ability to Use Microsoft Word	3.67	.55	3.88	.37	3.63	.57
Identify Sources for Stories	3.67	.55	3.71	.58	3.72	.46
Identification of Emerging Issues & Trends in Agriculture	3.60	.59	3.83	.41	3.72	.46
Knowledge of Consumer Trends	3.59	.59	3.82	.43	3.63	.49

Knowledge of the Agricultural Industry	3.58	.61	3.77	.52	3.74	.49
Message Development	3.56	.74	3.77	.42	3.76	.43
Reporting	3.56	.67	3.44	.64	3.61	.61
Business Writing	3.53	.65	3.80	.47	3.61	.54
Copy Editing	3.52	.67	3.65	.57	3.59	.54
Ability to Use Facebook	3.52	.62	3.62	.55	3.39	.58
Translation of Technical Information	3.52	.59	3.62	.67	3.61	.54
Ability to Use PC Computers	3.51	.87	3.83	.41	3.43	.69
Ability to Use Twitter	3.49	.62	3.47	.71	3.30	.66
Knowledge of Agricultural Industry Terminology	3.49	.59	3.77	.49	3.65	.53
Project Management	3.47	.79	3.80	.44	3.52	.55
Press Release Creation & Editing	3.46	.76	3.64	.57	3.52	.59
Knowledge of Agricultural Business	3.46	.61	3.68	.56	3.37	.53
Public Relations	3.43	.63	3.82	.43	3.72	.46
Identify Communication Barriers	3.35	.62	3.80	.53	3.54	.50
Newsletter Creation and Editing	3.31	.70	3.45	.64	3.22	.66
Knowledge of Marketing Principles	3.30	.68	3.80	.40	3.35	.64
Ability to Use Microsoft PowerPoint	3.26	.80	3.56	.73	3.33	.56
Associated Press Style	3.26	.77	3.65	.54	3.46	.55
Ability to Use Instagram	3.26	.74	3.38	.72	3.26	.61
Knowledge of Environmental Issues	3.26	.67	3.61	.65	3.41	.50
Give Oral Presentations	3.25	.72	3.83	.41	3.65	.53
Ability to Use Microsoft Excel	3.22	.79	3.44	.73	3.11	.67
Select & Edit Photos	3.22	.76	3.44	.66	3.24	.60
Knowledge of Science	3.17	.65	3.33	.69	3.28	.46
Knowledge of File Formats	3.16	.72	3.67	.62	3.30	.51
Photography	3.01	.73	3.12	.69	3.37	.61
Conduct an Audience Analysis	2.95	.76	3.44	.73	3.50	.51
Budgeting	2.90	.87	3.52	.64	3.24	.48
Knowledge of Agricultural Industry Laws	2.75	.70	3.59	.63	3.04	.52
Write a Crisis Communication Plan	2.74	.83	3.36	.78	3.11	.57

Advertising	2.74	.76	3.55	.61	2.93	.57
Page Layout	2.73	.76	3.61	.55	3.20	.62
Videography	2.70	.70	3.14	.76	3.09	.66
Graphic Design	2.68	.70	3.44	.70	3.26	.54
Ability to Use Web Design Software	2.65	.80	3.29	.67	2.93	.68
Ability to Use Graphic Design Software	2.64	.80	3.41	.68	3.22	.59
Web Design	2.63	.74	3.33	.62	2.83	.74
Edit Video Footage	2.51	.73	3.09	.70	3.04	.60
Supervising Others	2.38	.70	3.32	.64	2.89	.61

Note: 1.00 – 1.49 = no importance, 1.50 – 2.49 = low importance, 2.50 – 3.49 = moderate importance, 3.50 – 4.00 = high importance. Skills are ordered from most important to least important per communication industry professionals.

The highest mean importance for technical skills as perceived by agricultural communication graduates was placed on concise and clear writing (*M* = 3.97, *SD* = .17), communicate in written form (*M* = 3.95, *SD* = .21), ability to use technology (*M* = 3.95, *SD* = .21), communicate verbally (*M* = 3.94, *SD* = .24), active listening (*M* = 3.94, *SD* = .24), proper punctuation, grammar, and spelling (*M* = 3.94, *SD* = .30), understanding client needs and goals (*M* = 3.92, *SD* = .32), telephone etiquette (*M* = 3.88, *SD* = .37), and ability to use Microsoft Word (*M* = 3.88, *SD* = .37).

Agricultural communication faculty members placed the highest mean importance for technical skills on concise and clear writing (*M* = 4.00, *SD* = .00), communicating in written form (*M* = 3.98, *SD* = .15), communicating verbally (*M* = 3.96, *SD* = .21), proper punctuation, grammar, and spelling (*M* = 3.93, *SD* = .25), ability to use technology (*M* = 3.89, *SD* = .32), active listening (*M* = 3.89, *SD* = .32), understanding client needs and goals (*M* = 3.87, *SD* = .34), and the ability to adapt to contemporary media (*M* = 3.83, *SD* = .38).

Total Importance of Technical Skills

The total importance for all technical skills as perceived by all three evaluation groups was identified (Table 2) and the highest mean importance for technical skills was placed on communicating in written form (*M* = 3.96, *SD* = .19); concise and clear writing (*M* = 3.96, *SD* = .19); communicating verbally (*M* = 3.94, *SD* = .23); proper punctuation, grammar, and spelling (*M* = 3.93, *SD* = .27); the ability to use technology (*M* = 3.90, *SD* = .32); actively listening (*M* = 3.90, *SD* = .31); adapting to contemporary media (*M* = 3.84, *SD* = .40); understanding client needs and goals (*M* = 3.84, *SD* = .43); using different informational sources (*M* = 3.82, *SD* = .43); and reading (*M* = 3.80, *SD* = .46).

Table 2

Total importance of technical skills

Skill	*M*	*SD*

Communicate in Written Form	3.96	.19
Concise & Clear Writing	3.96	.19
Communicate Verbally	3.94	.23
Proper Punctuation, Grammar, & Spelling	3.93	.27
Ability to Use Technology	3.90	.32
Active Listening	3.90	.31
Ability to Adapt to Contemporary Media	3.84	.40
Understand Client Needs & Goals	3.84	.43
Ability to Use Different Informational Sources	3.82	.43
Reading	3.80	.46
Researching	3.76	.44
Telephone Etiquette	3.76	.45
Ability to Use Microsoft Word	3.73	.51
Identification of Emerging Issues & Trends in Agriculture	3.71	.55
Interviewing	3.69	.55
Identify Sources for Stories	3.69	.54
Knowledge of Consumer Trends	3.68	.52
Knowledge of the Agricultural Industry	3.68	.56
Message Development	3.68	.59
Business Writing	3.64	.58
Public Relations	3.63	.55
Knowledge of Agricultural Industry Terminology	3.63	.56
Ability to Use PC Computers	3.60	.72
Project Management	3.60	.65
Translation of Technical Information	3.58	.61
Copy Editing	3.58	.61
Identify Communication Barriers	3.55	.59
Give Oral Presentations	3.54	.64
Reporting	3.53	.65
Press Release Creation & Editing	3.53	.66
Ability to Use Facebook	3.52	.59
Knowledge of Agricultural Business	3.51	.59
Knowledge of Marketing Principles	3.48	.63
Associated Press Style	3.44	.67
Ability to Use Twitter	3.44	.66
Knowledge of Environmental Issues	3.41	.64
Ability to Use Microsoft PowerPoint	3.38	.73
Knowledge of File Formats	3.37	.67
Newsletter Creation and Editing	3.34	.67
Ability to Use Instagram	3.30	.70
Select & Edit Photos	3.30	.69
Ability to Use Microsoft Excel	3.27	.75
Conduct an Audience Analysis	3.25	.74
Knowledge of Science	3.25	..62
Budgeting	3.19	.76
Page Layout	3.14	.76

Photography	3.13	.70
Knowledge of Agricultural Industry Laws	3.11	.73
Graphic Design	3.08	.75
Advertising	3.06	.76
Write a Crisis Communication Plan	3.04	.80
Ability to Use Graphic Design Software	3.04	.79
Ability to Use Web Design Software	2.94	.78
Videography	2.94	.74
Web Design	2.92	.76
Edit Video Footage	2.83	.74
Supervising Others	2.82	.77

Note: *n*= 192. 1.00 – 1.49 = no importance, 1.50 – 2.49 = low importance, 2.50 – 3.49 = moderate importance, 3.50 – 4.00 = high importance. Skills are ordered from most important to least important per combined evaluation groups' responses.

RO2: Compare the perceived importance of technical skills for agricultural communication baccalaureate graduates among agricultural communication graduates, communication industry professionals, and agricultural communication faculty members

Importance Comparison

The grand mean for the importance of technical skills was 3.34 (*SD* = .25) for communication industry professionals, 3.64 (*SD* = .23) for agricultural communication graduates, and 3.48 (*SD* = .20) for agricultural communication faculty members. A one-way between groups analysis of variance showed there was a significant mean difference in the perceived importance of technical skills between each evaluation group, $F(2, 190) = 29.19$, $p < .001$ (Table 3). A post hoc analysis using the Gabriel's test was conducted, and there was a significant difference between all three evaluation groups. There was a significant mean difference between industry professionals and faculty members ($p = .004$) and industry professionals and graduates ($p < .001$). The results showed industry professionals perceived importance of technical skills was .12 lower than faculty members and .30 lower than graduates. There was also a significant mean difference between faculty members and graduates ($p = .002$), which showed faculty members perceived importance of technical skills was .16 lower than graduates.

Table 3

Comparison of technical skills' importance

	SS	df	MS	*F*	*p*
Between Groups	3.16	2	1.58	29.19	.000
Within Groups	10.29	190	.05		
Total	13.45	192			

RO3: Determine the ability to perform the selected technical skills for agricultural communication baccalaureate graduates as perceived by agricultural communication graduates, communication industry professionals, and agricultural communication faculty members.

Ability to Perform Technical Skills

Respondents in this study were presented with 57 technical skills and were asked to indicate graduates' ability to perform each skill. The ability to perform the selected skills was measured on a four-item Likert-type scale where *0 = I Don't Know, 1 = No Ability, 2 = Low Ability, 3 = Moderate Ability,* and *4 = High Ability.* Descriptive analyses were used to report means and standard deviations for graduates' ability to perform each skill.

When asked to indicate graduates' ability to perform technical skills (Table 4), communication industry professionals placed the highest mean ability on the ability to use technology (*M* = 3.73, *SD* = .53), use Microsoft Word (*M* = 3.68, *SD* = .50), adapt to contemporary media (*M* = 3.63, *SD* = .51), reading (*M* = 3.57, *SD* = .60), use Facebook (*M* = 3.56, *SD* = .60), use PC computers (*M* = 3.54, *SD* = .69), use Twitter (*M* = 3.50, *SD* = .63), use Instagram (*M* = 3.47, *SD* = .69), communicate verbally (*M* = 3.40, *SD* = .57), and the ability to use Microsoft PowerPoint (*M* = 3.34, *SD* = .67).

Graduates' highest mean ability to perform technical skills as perceived by agricultural communication graduates were the ability to use Microsoft Word (*M* = 3.97, *SD* = .17), reading (*M* = 3.95, *SD* = .21), telephone etiquette (*M* = 3.91, *SD* = .29), use Microsoft PowerPoint (*M* = 3.89, *SD* = .43), communicate in written form (*M* = 3.89, *SD* = .31), communicate verbally (*M* = 3.85, *SD* = .36), use technology (*M* = 3.80, *SD* = .40), use PC computers (*M* = 3.80, *SD* = .40), and use Facebook (*M* = 3.79, *SD* = .41).

Agricultural communication faculty members placed graduates' highest mean ability to perform technical skills on the ability to use Microsoft Word (*M* = 3.56, *SD* = .59), use Facebook (*M* = 3.55, *SD* = .59), use PC computers (*M* = 3.52, *SD* = .55), use Instagram (*M* = 3.51, *SD* = .60), adapt to contemporary media (*M* = 3.49, *SD* = .63), use technology (*M* = 3.44, *SD* = .55), reading (*M* = 3.40, *SD* = .63), use Twitter (*M* = 3.39, *SD* = .63), communicate verbally (*M* = 3.37, *SD* = .62), and use Microsoft PowerPoint (*M* = 3.34, *SD* = .62).

Table 4

Graduates' ability to perform technical skills

Measure	Industry (*n*=80)		Graduates (*n*=66)		Faculty (*n*=46)	
	M	*SD*	*M*	*SD*	*M*	*SD*
Ability to Use Technology	3.73	.53	3.80	.40	3.44	.55
Ability to Use Microsoft Word	3.68	.50	3.97	.17	3.56	.59
Ability to Adapt to Contemporary Media	3.63	.51	3.64	.52	3.49	.63
Reading	3.57	.60	3.95	.21	3.40	.63
Ability to Use Facebook	3.56	.60	3.79	.41	3.55	.59
Ability to Use Twitter	3.50	.63	3.42	.82	3.39	.63
Ability to Use PC Computers	3.54	.69	3.80	.40	3.53	.55
Communicate Verbally	3.40	.57	3.85	.36	3.37	.62
Ability to Use Instagram	3.47	.69	3.50	.86	3.51	.60

Knowledge of Agricultural Industry Terminology	3.27	.56	3.50	.61	3.21	.81
Ability to Use Different Informational Sources	3.25	.57	3.65	.57	3.12	.66
Ability to Use Microsoft PowerPoint	3.34	.67	3.89	.43	3.34	.62
Communicate in Written Form	3.32	.67	3.89	.31	3.33	.64
Researching	3.22	.69	3.55	.59	2.86	.74
Knowledge of the Agricultural Industry	3.18	.67	3.56	.59	3.28	.73
Proper Punctuation, Grammar, & Spelling	3.24	.74	3.67	.54	3.09	.65
Knowledge of Agricultural Business	3.08	.60	3.35	.69	3.05	.70
Concise & Clear Writing	3.15	.68	3.71	.46	3.07	.63
Identification of Emerging Issues & Trends in Agriculture	3.08	.62	3.42	.61	3.07	.68
Knowledge of File Formats	3.14	.70	3.38	.70	2.98	.66
Telephone Etiquette	3.14	.71	3.91	.29	2.95	.72
Reporting	3.0	.66	3.23	.70	3.12	.66
Knowledge of Marketing Principles	2.9	.60	3.50	.71	2.91	.68
Ability to Use Microsoft Excel	3.0	.70	3.41	.70	2.93	.82
Give Oral Presentations	3.03	.69	3.71	.49	3.33	.64
Understand Client Needs & Goals	3.04	.70	3.67	.56	2.93	.70
Knowledge of Environmental Issues	2.89	.57	3.29	.70	2.86	.68
Photography	2.94	.63	3.26	.85	2.98	.68
Public Relations	2.95	.64	3.56	.56	3.02	.60
Active Listening	3.0	.75	3.79	.45	3.07	.78
Interviewing	3.01	.75	3.62	.49	3.23	.68
Knowledge of Science	2.81	.57	3.12	.69	2.81	.59
Message Development	2.93	.70	3.35	.73	2.93	.60
Select & Edit Photos	2.88	.67	3.32	.71	2.93	.55
Newsletter Creation and Editing	2.89	.70	3.45	.61	3.09	.65
Knowledge of Consumer Trends	2.89	.70	3.30	.82	2.64	.69
Identify Sources for Stories	2.92	.74	3.52	.59	3.00	.69
Ability to Use Graphic Design Software	2.84	.66	2.91	.99	3.02	.62
Project Management	2.93	.75	3.55	.64	2.86	.72
Ability to Use Web Design Software	2.76	.60	2.58	.88	2.70	.65
Business Writing	2.91	.76	3.4	.66	2.95	.69
Page Layout	2.74	.62	3.32	.66	3.00	.54
Press Release Creation & Editing	2.89	.77	3.39	.63	3.19	.63
Web Design	2.73	.61	2.76	.75	2.57	.59
Identify Communication Barriers	2.75	.64	3.50	.66	2.70	.60
Associated Press Style	2.86	.79	3.53	.61	3.12	.66
Copy Editing	2.81	.74	3.41	.66	2.86	.64
Graphic Design	2.68	.66	2.94	.82	2.88	.63
Videography	2.71	.70	2.82	.91	2.62	.66
Advertising	2.64	.66	3.20	.77	2.70	.61
Translation of Technical Information	2.75	.81	3.30	.74	2.81	.66
Conduct an Audience Analysis	2.64	.77	3.18	.78	2.70	.64
Edit Video Footage	2.61	.75	2.79	.89	2.76	.70
Knowledge of Agricultural Industry Laws	2.55	.69	3.02	.75	2.60	.67

Budgeting	2.41	.75	3.12	.87	2.54	.71
Supervising Others	2.28	.69	3.39	.68	2.42	.66
Write a Crisis Communication Plan	2.32	.85	2.80	.88	2.51	.67

Note: 1.00 – 1.49 = no ability, 1.50 – 2.49 = low ability, 2.50 – 3.49 = moderate ability, 3.50 – 4.00 = high ability. Skills are order from highest ability to lowest ability per communication industry professionals.

Total Ability to Perform Technical Skills

Graduates' total ability to perform technical skills was determined as perceived by all three evaluation groups (Table 5). The highest mean ability to perform technical skills was placed on using Microsoft Word (*M* = 3.76, *SD* = .47), using technology (*M* = 3.69, *SD* = .51), reading (*M* = 3.67, *SD* = .55), using Facebook (*M* = 3.64, *SD* = .55), using PC computers (*M* = 3.63, *SD* = .58), adapting to contemporary media (*M* = 3.60, *SD* = .55), communicating verbally (*M* = 3.56, *SD* = .56), using Microsoft PowerPoint (*M* = 3.54, *SD* = .64), communicating in written form (*M* = 3.53, *SD* = .62), and using Instagram (*M* = 3.49, *SD* = .74). Graduates' total, lowest mean ability to perform technical skills as perceived by all three evaluation groups were writing a crisis communication plan (*M* = 2.54, *SD* = .84), using Web design software (*M* = 2.68, *SD* = .73), budgeting (*M* = 2.70, *SD* = .85), editing video footage (*M* = 2.71, *SD* = .79), supervising others (*M* = 2.72, *SD* = .85), videography (*M* = 2.73, *SD* = .77), knowledge of agricultural industry laws (*M* = 2.73, *SD* = .74), graphic designing (*M* = 2.82, *SD* = .72), and conducting an audience analysis (*M* = 2.85, *SD* = .78).

Table 5

Graduates' total ability to perform technical skills

Scale	*M*	*SD*
Ability to Use Microsoft Word	3.76	.47
Ability to Use Technology	3.69	.51
Reading	3.67	.55
Ability to Use Facebook	3.64	.55
Ability to Use PC Computers	3.63	.58
Ability to Adapt to Contemporary Media	3.60	.55
Communicate Verbally	3.56	.56
Ability to Use Microsoft PowerPoint	3.54	.64
Communicate in Written Form	3.53	.62
Ability to Use Instagram	3.49	.74
Ability to Use Twitter	3.45	.70
Telephone Etiquette	3.37	.72
Proper Punctuation, Grammar, & Spelling	3.36	.69
Ability to Use Different Informational Sources	3.36	.63
Give Oral Presentations	3.35	.68

Knowledge of the Agricultural Industry	3.34	.68
Knowledge of Agricultural Industry Terminology	3.34	.65
Concise & Clear Writing	3.33	.66
Active Listening	3.31	.75
Interviewing	3.29	.70
Researching	3.25	.71
Graduates' total ability to perform technical skills		
Understand Client Needs & Goals	3.24	.73
Identification of Emerging Issues & Trends in Agriculture	3.20	.65
Public Relations	3.19	.66
Knowledge of File Formats	3.19	.71
Knowledge of Agricultural Business	3.17	.67
Associated Press Style	3.16	.76
Ability to Use Microsoft Excel	3.15	.75
Identify Sources for Stories	3.15	.73
Newsletter Creation and Editing	3.14	.70
Reporting	3.14	.67
Press Release Creation & Editing	3.14	.72
Knowledge of Marketing Principles	3.14	.71
Project Management	3.14	.77
Business Writing	3.10	.74
Message Development	3.08	.72
Photography	3.07	.74
Select & Edit Photos	3.05	.68
Copy Editing	3.04	.74
Knowledge of Environmental Issues	3.03	.67
Page Layout	3.01	.66
Identify Communication Barriers	3.01	.74
Knowledge of Consumer Trends	2.98	.79
Translation of Technical Information	2.97	.79
Knowledge of Science	2.92	.64
Ability to Use Graphic Design Software	2.91	.79
Advertising	2.86	.74
Conduct an Audience Analysis	2.85	.78
Graphic Design	2.82	.72
Knowledge of Agricultural Industry Laws	2.73	.74
Videography	2.73	.77
Supervising Others	2.72	.85
Edit Video Footage	2.71	.79
Web Design	2.70	.66
Budgeting	2.70	.85
Ability to Use Web Design Software	2.68	.73
Write a Crisis Communication Plan	2.54	.84

Note: *n* = 169.1.00 – 1.49 = no ability, 1.50 – 2.49 = low ability, 2.50 – 3.49 = moderate ability, 3.50 – 4.00 = high ability. Skills are order from highest ability to lowest ability per combined evaluation groups' responses.

RO4: Compare the perceived ability to perform technical skills for agricultural communication baccalaureate graduates as perceived by agricultural communication graduates, communication industry professionals, and agricultural communication faculty members.

Ability Comparison

The grand mean for ability to perform technical skills per each evaluation group was 3.01 (*SD* = .34) for communication industry professionals, 3.42 (*SD* = .29) for agricultural communication graduates, and 3.02 (*SD* = .37) for agricultural communication faculty members. A one-way between groups analysis of variance showed there was a significant mean difference in graduates' ability to perform the technical skills between each evaluation group, $F(2, 180) = 31.92$, $p < .001$ (Table 6). A post hoc analysis using the Gabriel's test was conducted and a significant difference was observed between the evaluation groups. There was a significant mean difference between industry professionals and graduates ($p < .001$). The results showed graduates' ability to perform technical skills as perceived by industry professionals was .41 lower than graduates. There was also a significant mean difference between faculty members and graduates ($p < .001$), which showed graduates' ability to perform technical skills as perceived by faculty members was .41 lower than graduates.

Table 6

Comparison of graduates' ability to perform technical skills

Measure	SS	df	MS	*F*	*p*
Between Groups	7.05	2	3.53	31.92	.000
Within Groups	19.88	180	.11		
Total	26.93	182			

Discussion, Conclusions, and Recommendations

Assessing the importance of the selected technical skills and graduates' ability to perform those skills was informative and served as a positive reinforcement for faculty members' efforts in preparing graduates, but improvements can help with graduates' competitiveness when seeking employment (Casner-Lott & Barrington, 2006; Hart Research Associates, 2015). Technical skills may be well integrated into agricultural communication curricula; however, technical skills may not be recognized by students if those skills are not clearly identified by the instructor. It is important to identify technical skills that are embedded into curricula, especially if the integration of technical skills is taught in a non-technical course, such as leadership. It is equally important to provide opportunities for students to self-assess or evaluate their technical skills ability. For example, along with explicitly stating the technical skills that are intended to be covered in courses, students may benefit if each assignment that was intended to promote technical skills was discussed beforehand as well as after the assignment is submitted, in either a group setting or in a self-reflective assignment, to give students the opportunity to assess their technical skills acquisition. Internships, apprenticeships, and student organizations are also opportunities for students to practice, use, and evaluate their technical skills (Accenture, 2013; Morgan, 2012; Robinson, 2006; Sprecker & Rudd, 1997).

This study found that each of the evaluation groups did not rate students' writing ability as adequate for the work required of employees who enter the communication and agricultural communication workforce. This could be a byproduct of poor writing education prior to entering college. Because graduates are expected to already have proficient writing skills when they enter college, faculty members/instructors may be placing less focus on the fundamentals of writing and more on advanced writing.

Using the findings in this study, it is recommended that visual communication, oral communication, professional development, and written communication courses be included in the initial curricula additions for agricultural communication programs. Some of the most important technical skills needed for students are found in these courses (Canon et al., 2014).

The graduates' evaluation group ranked skills in written communication and general research, skills that were identified as the most important skills by all three evaluation groups, as high. However, this contrasted with both communication industry professionals and faculty member evaluation groups. The latter two groups did not score recent graduates above moderate ability (3.49) for the most important skills needed, displaying a disconnect between graduates' perceived ability and actual ability as interpreted by industry and faculty.

The differences in opinion between the graduates' and industry professionals and faculty members' assessments of abilities should be researched further. A qualitative study with individuals who fit the criteria for each evaluation group should be conducted to provide thicker

and richer data to help researchers identify gaps between the graduates' and industry professionals and faculty members' assessments of abilities and to provide agricultural communication programs with information on what to focus on to better align instruction with industry needs. Other factors, such as pre-existing skills and prior knowledge that may affect graduates' ability to perform technical skills, should also be looked at more in depth. Perceived ability can be viewed as a subjective evaluation, so the development and use of an instrument, such as a skills test, that could more precisely measure graduates' ability could be developed. A skills test could provide a more definitive measurement of skills attainment.

This study looked at undergraduate programs, but this study should be replicated for graduate agricultural communication programs as well to identify the most important skills needed for graduate students and to assess if graduate students who enter the communication workforce are prepared in those areas as perceived by graduates, industry representatives, and faculty members.

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