

Delphi Study on Requirements for Master's Degrees from the Perspective of Agricultural Communications Faculty

Introduction & Literature Review

Agricultural communications was a practice long before it was discipline. The first instances of mediated agricultural communications date back to the early- to mid-19th century (Boone et al., 2000). In the early 1800s agricultural societies and fairs promoted the exchange of information among agriculturalists. Agricultural journals, such as the *American Farmer* and the *New England Farmer*, also began publication during this time (Burnette & Tucker, 1990). The editors of these early publications lacked training and experience in agriculture. The academic discipline of agricultural communications, then agricultural journalism, did not emerge until the early 20th century after the Smith-Lever Act funded positions for agricultural editors to create and distribute research-based information to the public. These editors would become the first instructors of agricultural journalism (Boone et al., 2000).

The first course in agricultural journalism was offered at Iowa State Agricultural College in 1905, which also established the first agricultural journalism major in 1920. The first department of agricultural journalism was established at the University of Wisconsin in 1908. Prior to the formalized process of educating students in agricultural journalism, training was passed down from working editors through apprenticeships (Boone et al., 2000). Over the next century, the number of undergraduate programs would grow to 48 (Miller et al., 2015).

Undergraduate education in agricultural communications has been studied many times. Often studies have been done to understand necessary competencies of students to operate at an acceptable level in the workplace. These studies are done at regular intervals and examine different areas such as public relations competencies, advocating competencies, and social skills (e.g., Leal et al., 2019; Sitton et al., 2005; Steede et al., 2016). The discipline has grown, and students can now pursue graduate degrees focused on agricultural communications, but these programs, unlike undergraduate programs, remain unexamined.

Examining the Discipline

The current study assessed what faculty members believed should be included in master's programs focused on agricultural communications with a focus on courses, skills, and theories. Even though evaluation has not occurred for graduate programs in agricultural communications, research about undergraduate programs can provide some foundational information. Cannon et al. (2016) analyzed courses in agricultural communications undergraduate programs, and found that courses in online media, writing, and professional development were taught most often in agricultural communications. One of the most prevalent courses taught in agricultural communications programs was a publication production course to create a full magazine (Cannon et al., 2016).

A variety of studies have looked at employer, alumni, and faculty member perspectives of what should be included in undergraduate courses (e.g., Kurtzo, 2016; Morgan, 2010; Morgan & Rucker, 2013). Corder and Irlbeck (2018) summarized the findings of 17 studies addressing employers' perspectives as desired written communications skills (e.g., journalism and grammar), character skills (e.g., time management and teamwork), visual and technical communications skills (e.g., graphic design and video), and oral and other communications skills

(e.g., public speaking and global agricultural issues), with all but character skills being found in agricultural communications curriculum.

Although research activity is not explicitly tied to graduate programs, master's programs will often contribute to academic literature, especially those requiring students to conduct research to graduate. The importance of graduate programs shows up in publication records. Of the 21 most prolific *Journal of Applied Communications (JAC)* authors from 2008 to 2017, only five universities were represented in the authors' terminal degree programs, and all of them were employed in departments that offer graduate degrees (King & Settle, 2019). Mentoring graduate students was linked to being more prolific authors.

For the centennial issue of the *JAC*, three papers were published assessing research in our discipline, including theory use, research themes, and adherence to a research agenda developed for agricultural communications in 2007. Baker and King (2016) identified 87 theories and/or models used in agricultural communications from the previous 20 years of publications. They noted an increase in the use of theory over time and an increase in the number of authors per journal article. The authors posited these changes might be indicative of the growing numbers of graduate programs and the publication of thesis and dissertation work published in agricultural communications. Williford et al. (2016) assessed *JAC*'s research themes and found the four most frequent themes were channel development, use, or research (e.g., work focused on specific channels of communications; 18%); consumers/publics (e.g., audience analysis and messaging; 15%); higher education (e.g., adult learning and curriculum; 15%); and educating professionals (e.g., professionalism and skills; 12%). The researchers noted the findings could be valuable for curriculum development. Rodriguez and Evans (2016) assessed research in *JAC*. They found online media, TV, and magazines were the most frequently researched communications channels. The only theories used in more than 5% of research articles were framing, diffusion of innovations, uses and gratifications, and semiotics. The most frequently used methods were survey, content analysis, focus groups, and interviews. The most frequently assessed populations and samples were communications materials, consumers, students, and agricultural communications professionals and experts.

Undergraduate programs have been studied extensively from multiple viewpoints including current students, alumni, employers, and faculty members (e.g., Corder & Irlbeck, 2018; Irlbeck & Akers, 2009; Leal et al., 2020; Miller et al., 2015; Morgan, 2010; Morgan & Rucker, 2013). Master's programs have not been studied, and research is needed to understand what agricultural communications master's degree programs should look like.

Conceptual Framework

The Delphi methodology was used for this research, thus consensus building served as the framework grounding the study. Consensus building is the idea of trying to build agreement among a group of individuals. To build consensus among members of a group, it is important to note individuals have their own individual goals, and it is easier to build consensus when individuals have fewer differences (Briggs et al., 2005). Conflict may arise when individuals have different meanings for the same terms, have different mental models for how to achieve aims, conflicting information, incompatible goals, and different preferences in general (Briggs et al., 2005). For consensus building to occur, there needs to be a meaningful task and information being accessible to participants (Innes, 2005). In this study, the task was determining what needs to be included in agricultural communications-focused master's programs, and as a part of the

Delphi method, as much information was shared with participants as was feasible throughout the process, including opportunities for participants to provide additional thoughts and clarifications.

The Delphi method is commonly used for building consensus and curriculum development. The method has been used in agricultural communications for undergraduate programs (Morgan, 2010; Morgan & Rucker, 2013), as well as other disciplines, such as social studies (Martorella, 1991), pharmacy (Olsen et al., 2021), nursing (Foth et al., 2016), engineering (Gesun et al., 2021), and medical education (Humphrey-Murto et al., 2017). While commonly used, Delphi studies do not have a standardized set of consensus criteria and often lack clarity in their methods (Humphrey-Murto et al., 2017; Olsen et al., 2021), so care is needed when reporting the methodology.

Purpose

The purpose of this research was to document the most important skills, courses, and theories needed in an agricultural communications master's degree program, as identified by agricultural communications faculty. The overarching reason for this study was to fill gaps in the literature related to master's degree program needs and provide a framework for universities that want to start a master's degree program in agricultural communications.

Methods

To accomplish this study's purpose, a modified Delphi was conducted with agricultural communications faculty members in the U.S. The goal of the Delphi method is to have experts reach a consensus for a research question (Okoli & Pawlowski, 2004). The Delphi is an iterative process of surveying the panel until the desired consensus level is reached (Okoli & Pawlowski, 2004). In the current study, there were three rounds of surveying before consensus was reached. The first round consisted of developing a pool of items, which were then evaluated in rounds two and three. While qualitative methods, such as interviews or case studies, would have allowed for more in-depth exploration of individual programs and perspectives, the Delphi method allowed for broader perspectives to be represented while still allowing the data to be driven by the respondents, as opposed to researcher-developed options to be selected from.

In the first round, respondents were asked open-ended questions about what skills, courses, and theories should be included in an agricultural communications master's degree. The results were compiled to eliminate duplicate responses. If it could be argued responses were different, both were kept for subsequent rounds of the survey. As such, some items in rounds 2 and 3 were similar to each other.

In the second round, respondents were asked to indicate if the skills, courses, and theories developed from round one should be required, optional, or excluded, and a *do not know* option was provided if they did not know about individual items. The optional choice was included to provide more nuance to respondents' perspectives. Items were grouped so similar items were in the same sections for skills and courses (e.g., research skills, technology skills, theory skills). For the following sections, an additional item was added to require the course only for leveling purposes: technology skills (e.g., basic Adobe CC skills), other communications skills (e.g., AP style), communications skills courses (e.g., digital media production), strategy courses (e.g., crisis and risk communications), and application courses (e.g., agriscience writing course). Theories were displayed as one list. Open-ended items were provided for each section so that

respondents could provide additional thoughts about what should be included in each area, as well as an open-ended item for the overall questionnaire about what should be required for agricultural communications master's students in their programs of study.

Items where at least 50% of respondents believed it should be required were moved forward to round three. The instrument was then simplified for respondents to indicate required or not required to move toward reaching a consensus for skills, courses, and theories that should be required for agricultural communications master's programs. Items were deemed as meeting consensus if 80% of respondents believed it should be required. There was also an open-ended item at the end of the questionnaire asking for any additional thoughts about what should be required for agricultural communications master's students in their programs of study. Consensus in Delphi studies varies both in terms of threshold of agreement, with 75% being the median percentage threshold used in one study, as well as other factors being assessed, such as goals for the evaluated items (Diamond et al., 2014). In this research, the goal was to develop a potential framework for those wanting to create or amend master's degree programs so there was a need to ensure the chosen threshold would help faculty prioritize what they choose to include in their programs. The 80% threshold allowed for a reasonable cutoff point for all three areas, with courses being less numerous given credit hour limitations of master's programs compared to the number of theories and skills that would reasonably be included in a degree program.

To populate the expert list, faculty members listed on the Society of Agricultural Communications Scholars were used as the starting point, but we checked for any additions or deletions needed to the list. Individuals were removed if they were not agricultural communications faculty members, had left their positions, or were authors of the present study. The final list consisted of 84 individuals from 32 universities, including administrators, tenure-track, and non-tenure track faculty. The list included faculty from multi-faculty member programs, as well as individual-faculty programs and faculty who had agricultural communications backgrounds but were not at programs with an agricultural communications graduate program. There were 30 respondents for round 1 (35.7%), 32 for round 2 (38.1%), and 27 for round 3 (32.1%). The response rate is a limitation, indicating some perspectives may not be represented in the data.

Results

Rounds One & Two

For the first round of the study, after removing duplicate responses, respondents identified 119 skills (Table 1), 66 courses (Table 2), and 65 theories (Table 3). For round two, 22 courses, 32 theories, and 77 skills met the 50% required response threshold to move forward to round 3. No theories had unanimous support for being required in round two, though agenda setting (87.1%), framing (83.9%), theory of planned behavior (83.9%), elaboration likelihood model (80.6%), and cognitive dissonance (80.6%) had the highest levels of support. For courses, only statistics had unanimous support, followed by research methods (96.9%), data analysis and presentation (93.8%), communication theory (90.6%), and data analysis (90.6%). Two skills – understanding of communication process and critical thinking – had unanimous support for being required, followed by connect theory and research (96.9%), ability to think critically about agricultural/natural resources issues (96.9%), and audience analysis (96.8%).

Table 1*Round Two: Skills Agricultural Communications Faculty Members Believe Should be Required for Master's Students*

Skill	Required	Optional	Excluded	Leveling Only	Don't Know
Understanding of communication process	100.0	0.0	0.0	NA	0.0
Critical thinking	100.0	0.0	0.0	NA	0.0
Connect theory and research	96.9	3.1	0.0	NA	0.0
Ability to think critically about agricultural/natural resources issues	96.9	3.1	0.0	NA	0.0
Audience analysis	96.8	3.2	0.0	NA	0.0
Conducting literature review	93.9	6.3	0.0	NA	0.0
Data analysis	93.8	6.3	0.0	NA	0.0
Research methods	93.8	3.1	0.0	NA	3.1
Research writing	93.8	3.1	3.1	NA	0.0
Analytical skills	93.8	3.1	0.0	NA	3.1
Application of social science theories	93.8	6.3	0.0	NA	0.0
Foundation in theory	93.8	3.1	0.0	NA	3.1
Professional writing	93.8	0.0	6.3	NA	0.0
Problem solving	93.5	6.4	0.0	NA	0.0
Knowledge of conducting research in discipline	90.6	9.4	0.0	NA	0.0
Report descriptive statistics	90.6	9.4	0.0	NA	0.0
Understanding theory	90.6	9.4	0.0	NA	0.0
Describe and Explore Primary Theoretical Frames Related Communication and Their Relevance to Agricultural Communications	90.6	6.3	0.0	NA	3.1
Ethics/ethical behavior	90.6	6.3	3.1	NA	0.0
Synthesizing Information in Larger Quantities While Translating It Into Common Language for Everyday Information Consumers	90.3	6.5	0.0	NA	3.2
Data collection	87.5	9.4	0.0	NA	3.1
Professionalism	87.5	9.4	3.1	NA	0.0
Broad cultural perspective of agriculturalists and consumers	87.5	6.3	0.0	NA	6.3

Skill	Required	Optional	Excluded	Leveling Only	Don't Know
Critically assess complex situations	87.1	9.7	0.0	NA	3.2
APA style	84.4	12.5	3.1	NA	0.0
Understanding of academic systems ability to read and evaluate journal science ^a	83.9	16.1	0.0	NA	0.0
Critically evaluate science publications	83.8	16.1	0.0	NA	0.0
Quantitative research	81.3	18.8	0.0	NA	0.0
Research elements	81.3	6.3	0.0	NA	12.5
Apply skills to research	80.6	12.9	0.0	NA	6.5
Assessment of the impact of communication efforts	80.6	16.1	0.0	NA	3.2
Interpret research results from different methodological approaches	78.1	21.9	0.0	NA	0.0
Strategic communications	77.4	22.6	0.0	NA	0.0
Qualitative research	75.0	25	0.0	NA	0.0
Effectively design research instruments	75.0	25	0.0	NA	0.0
Goal/task skills	75.0	25	0.0	NA	0.0
Presentation skills	75.0	18.8	6.3	NA	0.0
Written communication skills	75.0	9.4	0.0	15.6	0.0
Original data collection from start to finish	71.9	28.1	0.0	NA	0.0
Write across a variety of platforms	71.9	28.1	0.0	NA	0.0
Interpersonal skills	71.9	21.9	6.3	NA	0.0
Cultural competence	71.9	28.0	0.0	NA	0.0
Adaptability	71.9	35.0	3.1	NA	0.0
Leadership and teamwork	71.9	25.0	3.1	NA	0.0
Planning communication	71.9	21.9	3.1	NA	3.1
Message development	71.9	21.9	0.0	6.3	0.0
Science communications	71.9	18.8	0.0	9.4	0.0
Work/life balance skills	68.8	28.1	3.1	NA	0.0
Audience segmentation	68.8	25.0	0.0	6.3	0.0

Skill	Required	Optional	Excluded	Leveling Only	Don't Know
Broad view of agriculture	68.8	21.9	0.0	NA	0.0
Project management	67.7	29.0	3.2	NA	0.0
Creativity	67.7	32.3	0.0	NA	0.0
Message targeting	65.6	28.1	0.0	6.3	0.0
Strong verbal communication	65.6	15.6	0.0	18.8	0.0
Strategic planning	64.5	35.5	0.0	NA	0.0
Writing for electronic communication	62.5	18.8	0.0	18.8	0.0
Time management	62.5	34.4	3.1	NA	0.0
Risk communications	62.5	34.4	0.0	3.1	0.0
Deep editing for message, flow, conciseness, and overall purpose	62.5	25	3.1	6.3	3.1
Resourceful(ness)	61.3	29	9.7	NA	0.0
Systems thinking	61.3	32.3	0.0	NA	6.5
Convergence: communication channel experience using multiple platforms	59.4	40.6	0.0	0	0.0
Interpersonal communication	59.4	31.3	0.0	8.6	0.0
Participate in a growing academic conversation about agricultural communications	58.1	35.5	0.0	NA	6.5
Survey	56.3	40.6	0.0	NA	3.1
Communication campaign development	56.3	25.0	0.0	18.8	0.0
Basic editing for grammar, spelling, and punctuation	56.3	3.1	0.0	40.6	0.0
Historical considerations	54.8	45.2	0.0	NA	0.0
Relational skills	53.1	40.6	0.0	NA	6.3
Group communication	53.1	31.3	3.1	9.4	3.1
Knowledge of communication software	50.0	25.0	3.1	21.9	0.0
Management skills	50.0	43.8	3.1	NA	3.1
Evaluation	46.9	53.1	0.0	NA	0.0
Persuasive communications	46.9	53.1	0.0	NA	0.0
Basic office skills	46.9	34.4	18.8	NA	0.0

Skill	Required	Optional	Excluded	Leveling Only	Don't Know
Leadership and followership skills	46.9	46.9	6.3	NA	0.0
Organizational communication	46.9	40.6	6.3	6.3	0.0
Interviewing skills	46.9	21.0	0.0	31.3	0.0
Content creation	46.9	34.4	0.0	18.8	0.0
Agricultural policy	46.9	53.1	0.0	NA	0.0
Mass communication	46.0	40.6	0.0	12.5	0.0
Technology skills	43.8	28.1	0.0	18.8	9.4
Emotional intelligence	43.8	53.1	3.1	NA	0.0
Historical understanding of communication as a discipline	43.8	40.6	3.1	12.5	0.0
Understand The Benefits and Challenges of Both Production Agriculture and Organic/Small-Scale Agriculture	43.8	56.3	0.0	NA	0.0
Organizational leadership	40.6	53.1	3.1	NA	3.1
Budgets (management and planning)	40.6	59.4	0.0	NA	0.0
Basic adobe CC skills	37.5	37.5	3.1	21.9	0.0
Social media strategy	37.5	52.1	0.0	9.4	0.0
Social media analytics	37.5	56.3	0.0	6.3	0.0
Online media systems	37.5	50.0	0.0	3.1	9.4
Basic journalistic skills	37.5	6.3	3.1	53.1	0.0
AP style	37.5	18.8	3.1	40.6	0.0
Data visualization/dashboard creation	35.5	64.5	0.0	0.0	0.0
Describe the relevance of the democratization of information	35.5	58.1	3.2	NA	3.2
New media skills	34.4	40.6	3.1	18.8	3.1
Advanced comm skills in writing online	34.4	53.1	0.0	12.5	0.0
Basics of technical food production	31.3	62.5	6.3	NA	0.0
Public relations	29.0	58.1	0.0	12.9	0.0
Organization communications audit	28.1	65.6	3.1	3.1	0.0
Writing for press	28.1	34.4	0.0	3.1	0.0
Newswriting	28.1	25.0	3.1	43.8	0.0

Skill	Required	Optional	Excluded	Leveling Only	Don't Know
Consumer research	25.0	71.9	0.0	NA	3.1
Service mindedness	25.0	65.6	9.4	NA	0.0
Produce a variety of media products	25.0	59.4	0.0	15.4	0.0
Image capture, manipulation, & management	21.9	53.1	3.1	21.9	0.0
Advanced comm skills in social media	18.8	71.9	3.1	6.3	0.0
Videography/video	15.6	59.4	3.1	21.9	0.0
Employee management	15.6	65.6	18.8	NA	0.0
Marketing	15.6	65.6	3.1	15.6	0.0
Entrepreneurship	12.9	80.6	6.5	NA	0.0
Photography	12.5	56.3	6.3	25.0	0.0
Graphic design	12.5	62.5	3.1	21.9	0.0
Layout/design	12.5	43.8	3.1	40.6	0.0
International experience	12.5	81.3	0.0	NA	0.0
Broadcasting skills	6.3	68.8	6.3	15.6	3.1
Advertising	6.3	75.0	3.1	15.6	0.0
Advanced comm skills in design	6.3	71.9	3.1	18.8	0.0
Advanced comm skills in video	6.3	71.9	3.1	18.8	0.0

^aThere was a mistake in the Qualtrics instrument that merged two items. Because we could not know what respondents thought of each item separately, both were moved forward as separate items in round 3.

Table 2*Round Two: Courses Agricultural Communications Faculty Members Believe Should be Required for Master's Students*

Course	Required	Optional	Excluded	Leveling	
				Only	Don't Know
Statistics	100.0	0.0	0.0	NA	0.0
Research methods	96.9	3.1	0.0	NA	0.0
Data analysis and presentation	93.8	6.3	0.0	NA	0.0
Communication theory	90.6	9.4	0.0	NA	0.0
Data analysis	90.6	9.4	0.0	NA	0.0
Thesis/capstone	87.5	12.5	0.0	0.0	0.0
Agricultural communications theory	84.4	15.6	0.0	NA	0.0
Classes that require research writing	81.3	15.6	3.1	0.0	0.0
Agricultural communications foundation	78.1	18.8	3.1	NA	0.0
Quantitative methods	71.9	28.1	0.0	NA	0.0
Crisis and risk communications	65.6	34.4	0.0	0.0	0.0
Contemporary problems/issues in agriculture	65.6	31.3	0.0	NA	3.1
Audience analysis	64.5	25.8	3.2	6.5	0.0
Theory of communicating agricultural and environmental science innovation	62.5	37.5	0.0	NA	0.0
Qualitative methods	62.5	37.5	0.0	NA	0.0
Science communication	62.5	34.4	3.1	0	0.0
Science of science communication	59.4	40.6	0.0	NA	0.0
History of agricultural communication/education	59.4	37.5	3.1	NA	0.0
Ethics	53.1	43.8	3.1	NA	0.0
Public opinion of agriculture and natural resources	50.0	46.9	3.1	0	0.0
Diffusion of innovations	45.2	51.6	3.2	NA	0.0
Public opinion	43.9	53.1	0.0	3.1	0.0
Public issues management	43.8	56.3	0.0	0	0.0
Ethics and culture	43.8	50.0	3.1	NA	3.1
Cultural competency or development communication	43.8	50.0	6.3	NA	0.0

Course	Required	Optional	Excluded	Leveling	
				Only	Don't Know
Advanced writing and editing	37.5	37.5	3.1	21.9	0.0
Campaigns in agricultural communications	37.5	40.6	3.1	18.8	0.0
Mixed methods	31.3	65.6	0.0	NA	0.0
Introduction to agricultural communications	31.3	21.9	6.3	34.4	6.3
Mass communication and media	31.3	62.5	6.3	NA	0.0
Evaluation	28.1	71.9	0.0	NA	0.0
Technical writing	28.1	46.9	3.1	21.9	0.0
Program planning	25.0	62.5	6.3	3.1	3.1
Action research design	21.9	62.5	6.3	NA	0.0
Methods in technical change	21.9	62.5	3.1	NA	12.5
Public relations	21.9	68.8	9.4	0.0	0.0
Persuasion strategies	21.9	68.8	3.1	6.3	0.0
Disaster communication	21.9	68.8	3.1	3.1	3.1
Framing analysis	18.8	75.0	3.1	NA	0.0
Public policy research	18.8	81.3	0.0	NA	0.0
Grant writing	18.8	81.3	0.0	0.0	0.0
Multimedia storytelling	18.8	68.8	3.1	9.4	0.0
Organizational leadership	18.8	65.6	9.4	6.3	0.0
Policy	18.8	78.1	0.0	3.1	0.0
Philosophy	18.8	65.6	15.6	NA	0.0
Adult education theory	16.1	64.5	19.4	NA	0.0
Electronic communications	16.1	48.4	6.5	25.8	3.2
Multimedia	15.6	62.5	3.1	15.6	3.1
Journalism	15.6	43.8	3.1	37.5	0.0
Career planning course	15.6	65.6	12.5	6.3	0.0
Law	15.6	78.1	6.3	NA	0.0
Digital media production	12.5	59.4	3.1	25.0	0.0

Course	Required	Optional	Excluded	Leveling Only	Don't Know
Print publications	12.5	50	6.2	28.1	3.1
PR writing	12.5	50	3.1	34.4	0.0
Social media	12.5	59.4	3.1	25.0	0.0
Agriscience writing course	12.5	59.4	3.1	25.0	0.0
Logic	12.5	68.8	18.8	NA	0.0
Design courses	9.4	62.5	3.1	25.0	0.0
Web	9.4	53.1	6.3	28.1	3.1
Video	9.4	59.4	3.1	28.1	0.0
Advanced visual and auditory communications	9.4	71.9	3.1	15.6	0.0
Publications	9.4	71.9	6.3	12.5	0.0
Advanced leadership theory	6.3	65.6	28.1	NA	0.0
Photography	6.3	53.1	6.3	34.4	0.0
Audio	3.1	65.6	6.3	25.0	0.0
Advanced graphic/layout design	3.1	71.9	3.1	21.9	0.0

Table 3*Round Two: Theories Agricultural Communications Faculty Members Believe Should be Required for Master's Students*

Theory	Required	Optional	Excluded	Leveling Only
Agenda setting ^a	87.1	12.9	0.0	0.0
Framing ^a	83.9	16.1	0.0	0.0
Theory of planned behavior ^a	83.9	16.1	0.0	0.0
Elaboration likelihood model ^a	80.6	19.4	0.0	0.0
Cognitive dissonance ^a	80.6	19.4	0.0	0.0
Uses and gratification ^a	77.4	22.6	0.0	0.0
Spiral of silence	77.4	19.4	0.0	3.2
Diffusion of innovations ^a	74.2	22.6	3.2	0.0
Source credibility ^a	74.2	25.8	0.0	0.0
Knowledge gap ^a	74.2	22.6	3.2	0.0
Gatekeeping ^a	74.2	25.8	0.0	0.0
Risk information seeking and processing model	71.0	29.0	0.0	0.0
Information processing	71.0	29.0	0.0	0.0
Social cognitive theory ^a	67.7	32.3	0.0	0.0
Semiotics ^a	67.7	29.0	0.0	3.2
Selectivity process (exposure attention perception retention recall)	61.3	35.5	0.0	3.2
Situational crisis communication theory	61.3	38.7	0.0	0.0
Echo chamber	58.1	41.9	0.0	0.0
Media dependency ^a	58.1	41.9	0.0	0.0
Theory of reasoned action	58.1	41.9	0.0	0.0
Groupthink	58.1	41.9	0.0	0.0
Motivated reasoning	58.1	32.3	3.2	6.5
Priming	56.7	36.7	6.7	0.0
Cultivation theory	54.8	41.9	0.0	3.2
Schema theory ^a	54.8	38.7	0.0	6.5
Bloom's taxonomy	54.8	38.7	6.5	0.0

Theory	Required	Optional	Excluded	Leveling Only
Maslow's hierarchy of needs	54.8	41.9	3.2	0.0
Shannon weaver model of communication	54.8	32.3	3.2	9.7
Social marketing	51.6	35.5	0.0	12.9
Self-efficacy ^a	51.6	45.2	3.2	0.0
Media richness	51.6	41.9	0.0	6.5
Interpersonal communication model	51.6	38.7	3.2	6.5
Kolb's experiential learning theory ^a	48.4	41.9	9.7	0.0
Social learning	48.4	45.2	0.0	6.5
Uncertainty reduction theory	48.4	38.7	3.2	9.7
Social identity theory ^a	46.7	53.3	0.0	0.0
Social judgement theory	45.2	45.2	3.2	6.5
Human communication process	45.2	51.6	0.0	3.2
Constructivism	45.2	41.9	6.5	6.5
Excellence theory ^a	43.3	56.7	0.0	0.0
Attribution	43.3	53.3	0.0	3.3
Social interaction theories ^a	43.3	53.3	0.0	3.3
Attribution theory	41.9	51.6	0.0	6.5
Social exchange ^a	41.9	48.4	3.2	6.5
Two-step flow/opinion leadership	41.9	51.6	3.2	3.2
Situational theory of publics	38.7	54.8	0.0	6.5
Social judgement theory	38.7	45.2	3.2	12.9
Competing values framework	37.9	51.7	3.4	6.9
Corporate reputation management	35.5	51.6	0.0	12.9
Magic bullet	35.5	48.4	3.2	12.9
Adult learning theory	35.5	54.8	9.7	0.0
Development communication theory	35.5	48.4	3.2	12.9
Argumentation theory	30.0	60.0	0.0	10.0
Idea model	29.0	45.2	3.2	22.6

Theory	Required	Optional	Excluded	Leveling Only
Bystander effect	25.8	64.5	3.2	6.5
Backfire effect	22.6	54.8	3.2	19.4
Attraction-selection-attrition	22.6	61.3	0.0	16.1
Knapp's relationship model	22.6	51.6	0.0	25.8
Positive psychology	22.6	54.8	3.2	19.4
Mental models	22.6	54.8	0.0	22.6
McLuhan's medium theory	19.4	48.4	3.2	29.0
Critical race theory	19.4	74.2	6.5	0.0
Unified field theory	16.1	58.1	3.2	22.6
Media violence	16.1	58.1	12.9	12.9
Attachment theory	12.9	71.0	0.0	16.1

^aTheory identified in Baker and King (2016) as being used more than once in the *Journal of Applied Communications*.

Round Three

In the final round, there were 10 courses that met the 80% threshold for consensus: agricultural communications theory (100%), research methods (96.2%), classes that require research writing (88.5%), statistics (84.6%), data analysis and presentation (84.6%), communication theory (84.6%), data analysis (84.6%), thesis/capstone (80.8%), agricultural communications foundation (80.8%), and data analytics (80.8%). These are the results for the remaining courses evaluated:

- Theory of communicating agricultural and environmental science innovation (76.9%),
- Quantitative methods (73.1%),
- Crisis and risk communications (73.1%),
- Audience analysis (73.1%),
- Ethics (73.1%),
- Public opinion of agriculture and natural resources (73.1%),
- Science communication (69.2%),
- Qualitative methods (65.4%),
- Science of science communication (61.5 %),
- Contemporary problems/issues in agriculture (57.7%),
- History of agricultural communication/education (53.8%), and
- Management decision-making (38.5%).

Thirteen theories reached consensus: agenda setting (100%), framing (100%), uses and gratification (100%), theory of planned behavior (96.2%), diffusion of innovations (96.2%), source credibility (96.2%), media dependency (96.2%), gatekeeping (88.5%) social cognitive theory (88.5%). Selectivity processes (84.0%), social marketing (84.0%), and elaboration likelihood model (80.0%). These are the results for the remaining theories evaluated:

- Cognitive dissonance (76.9%),
- Information processing (76.0%),
- Priming (76.0%),
- Spiral of silence (73.1%),
- Knowledge gap (73.1%),
- Theory of reasoned action (69.2%),
- Risk information seeking and processing model (65.4%),
- Shannon weaver model of communication (65.4%),
- Media richness (65.4%),
- Semiotics (64.0%),
- Motivated reasoning (60.0%),
- Cultivation theory (60.0%),
- Groupthink (57.7%),
- Echo chamber (53.8%),
- Interpersonal communication model (53.8%),
- Maslow's hierarchy of needs (52.0%),
- Self-efficacy (52.0%),
- Schema theory (50.0%), and
- Bloom's taxonomy (44.0%).

Forty skills reached consensus. The 12 highest were critical thinking (100%), application of social science theories (100%), evaluate information (100%), understanding of communication processes (96.3%), connect theory and research (96.3%), ability to think critically about agricultural/natural resources issues (96.3%), conducting literature review (96.3%), research methods (96.3%), analytical skills (96.3%), and understanding theory (96.3%), describe and explore primary theoretical frames related to communication and their relevance to agricultural communications (96.3%), and ethics/ethical behavior (96.3%). These are the results for the remaining skills evaluated (please note some respondents skipped some items, which affected percentages):

- Research writing (96.2%),
- Written communication skills (96.2%),
- Professional writing (92.6%),
- Knowledge of conducting research in discipline (92.6%),
- Report descriptive statistics (92.6%),
- Interpret research results from different methodological approaches (92.6%),
- Data collection (92.3%),
- Audience analysis (88.9%),
- Data analysis (88.9%),
- Foundation in theory (88.9%),
- Problem solving (88.9%),
- Synthesizing information in larger quantities while translating it into common language for everyday information consumers (88.9%),
- Professionalism (88.9%),
- Critically assess complex situations (88.9%),
- APA style (88.9%),
- Ability to read and evaluate journal science (88.9%),
- Critically evaluate science publications (88.9%),
- Research elements (88.9%),
- Assessment of the impact of communication efforts (88.9%),
- Message development (88.9%),
- Disseminate information to a variety of audiences and key stakeholders (88.9%),
- Broad cultural perspective of agriculturalists and consumers (85.2%),
- Apply skills to research (85.2%),
- Strategic communications (85.2%),
- Write across a variety of platforms (85.2%),
- Audience segmentation (85.2%),
- Deep editing for message, flow, conciseness, and overall purpose (81.5%),
- Survey (81.5%),
- Quantitative research (77.8%),
- Presentation skills (77.8%),
- Original data collection from start to finish (77.8%),
- Cultural competence (77.8%),
- Planning communication (77.8%),
- Strategic planning (77.8%),

- Basic editing for grammar, spelling, and punctuation (77.8%),
- Effectively design research instruments (74.1%),
- Project management (74.1%),
- Strong verbal communication (74.1%),
- Interpersonal communication (74.1%),
- Self-regulated learning (74.1%),
- Qualitative research (70.4%),
- Goal/task skills (70.4%),
- Message targeting (70.4%),
- Writing for electronic communication (70.4%),
- Risk communications (70.4%),
- Systems thinking (70.4%),
- Convergence: communication channel experience using multiple platforms (70.4%),
- Interpersonal skills (66.7%),
- Adaptability (66.7%),
- Leadership and teamwork (66.7%),
- Science communications (66.7%),
- Broad view of agriculture (66.7%),
- Creativity (66.7%),
- Participate in a growing academic conversation about agricultural communications (66.7%),
- Communication campaign development (66.7%),
- Group communication (61.5%),
- Time management (59.3%),
- Relational skills (59.3%),
- Knowledge of communication software (59.3%),
- Work/life balance skills (55.6%),
- Resourceful(ness) (55.6%),
- Historical considerations (55.6%),
- Management skills (48.1%),
- Understanding of academic systems (37.0%), and
- Teaching methods (29.6%).

Discussion & Conclusions

Relative to many other disciplines, agricultural communications is a young but growing discipline. With that growth comes variety. Faculty in agricultural communications, especially of late, have focused their doctoral degrees in the discipline, but we also feature faculty members whose training comes from related programs, such as school-based agricultural education, agricultural leadership, and mass communications. Furthermore, students interested in agricultural communications master's programs have a wide variety of program options as they search the country, including agricultural communications, blending agricultural communications with leadership and education, and programs billed as life sciences communications. As such, there was a need to understand what the discipline believes agricultural communications master's degrees should look like.

This study provides a benchmark for important skills, courses, and theories to include in an agricultural communications curriculum for master's degree students. Commonalities identified required skills, courses, and theories offering insight into what an ideal agricultural communications master's degree may look like. However, results indicate that although overlaps in skills, coursework, and theory exist, no master's program will be identical to another.

The expert panel used in this study reached consensus on 10 courses, 13 theories, and 40 skills. The courses involved a mix of research, theory, foundational, and capstone courses. The theories included media, marketing, and decision-making theories. The results of this study are comparable to the findings of Rodriguez and Evans (2016) and Baker and King (2016) for what theories were published the most often in the discipline, though the level of consensus for the theories being taught was higher than actual use of the theories. As research continues to grow and mature in the discipline, it is possible reaching consensus could be more difficult in the future.

The majority of skills and courses, other than statistics and research courses, were similar to those identified as important in undergraduate curriculum in agricultural communications (e.g., Leal et al., 2019; Sitton et al., 2005; Steede et al., 2016). However, this is not surprising given they will work in the same career field, but the needs and experiences of master's students should be considered when developing a master's degree program. If students have already mastered a particular skill area in their undergraduate program, they should be encouraged to take more advanced or different skills in their master's degree program.

Implications & Recommendations

The results of this study offer implications and recommendations for agricultural communications master's degree programs across the United States. Graduate students tend to have more opportunities to explore coursework related to their area of interest than undergraduate students, thus it is not an expectation that master's programs offer the exact same experience for each student. However, these results provide insight for those seeking to evaluate their current master's programs and/or start a new master's program in agricultural communications.

Those seeking to develop a master's degree in agricultural communications would be well served to keep a steady grounding in research, given it is the clearest distinction between undergraduate and master's programs. While further research would be needed to understand employer expectations of how individuals with master's degrees should differ from those with undergraduate degrees, programs and students should focus on the value that a research-based program has on employability. From tangible actions (e.g., audience analysis) to less tangible areas (e.g., critical thinking), there is a need for programs to show how having a master's degree adds value to students' future careers.

Although a one-size-fits-all model is unlikely to be viable across the board, based on the results of this Delphi study, the following could be a starting point for those wishing to develop or redesign a master's degree focusing on agricultural communications: communication theory, research methods, statistics, thesis/capstone, and an agricultural communications foundation course, with integration of research writing and data presentation within those courses. Assuming three hours per course, that would leave roughly 12-15 hours for programs to have specific areas of concentration and/or for students to have elective credits. For programs with more limited faculty teaching availability, it will be necessary to partner with related programs, such as

school-based agricultural education and mass communications. In that case, the faculty need to determine what they can have others teach and what is most important for them to teach. An agricultural communications foundation course and communication theory may be the most important to focus on in that instance. Programs can also consider online partnerships, such as the AG-IDEA network, which allows students to take courses at other universities in the event the home institution does not have the ability to teach a course.

As it relates to their post-graduate careers, degrees should be promoted for what distinguishes master's degrees from undergraduate degrees, including helping graduate students know how to sell their research experiences outside of academia. Within academia, providing the appropriate skills, courses, and theories will help students be prepared to pursue doctoral degrees and potentially become faculty members who are then able to contribute to the growth of our discipline. As noted in the King and Settle (2021) and Baker and King (2016) studies, graduate school experiences are impacting the literature in our discipline.

A variety of future studies would be beneficial in growing a body of literature related to graduate education in agricultural communications. Regarding master's degrees, other perspectives would be valuable to explore, which is in line with the need to feature a full range of stakeholders in consensus building (Innes, 2004). More specifically, employers, alumni, career counselors, and recruiters would be valuable to study to help triangulate the results of this study. While this Delphi indicates research is the clearest distinguishing factor between master's and undergraduate degrees, those other stakeholders may have different expectations for what a master's degree should provide students. Studying the existing curriculum available and comparing it to the Delphi results would also be beneficial. Moreover, a study focused on the number of graduate programs available in agricultural communications would offer additional benchmarking for the discipline. Future research should also investigate the skills, courses, and theories most important in doctoral programs in agricultural communications to determine how terminal degrees differ from master's and bachelor's degrees. It would also be helpful to examine the history of graduate offerings in agricultural communication across the nation.

References

- Baker, L. M. & King, A. E. H. (2016). Let's get theoretical: A quantitative content analysis of theories and models used in the Journal of Applied Communications, *Journal of Applied Communications* 100(1). <https://doi.org/10.4148/1051-0834.1021>
- Boone, K., Meisenbach, T., & Tucker, M. (2000). *Agricultural communications: Changes and challenges*. Iowa State University Press.
- Briggs, R. O., Kolfshoten, G. L., & Vreede, G. (2005). Toward a theoretical model of consensus building. *AMCIS 2005 Proceedings*.
<https://aisel.aisnet.org/cgi/viewcontent.cgi?article=1543&context=amcis2005>
- Burnett, C. & Tucker, M. (1990). *Writing for agriculture: A new approach using tested ideas* (2nd ed.). Kendall Hunt Publishing Company.
- Cannon, K. J., Specht, A. R., & Buck, E. B. (2017). Agricultural communications: A national portrait of undergraduate courses. *Journal of Applied Communications*, 100(1).
<https://doi.org/10.4148/1051-0834.1018>
- Corder, J., & Irlbeck, E. (2018). Agricultural communications skills, abilities and knowledge desired by employers compared to current curriculum: A literary review. *Journal of Agricultural Education*, 59(4), 177-193. <https://doi.org/10.5032/jae.2018.04177>
- Diamond, I. R., Grant, R. C., Feldman, B. M., Pencharz, P. B., Ling, S. C., Moore, A. M., & Wales, P. W. (2014). Defining consensus: A systematic review recommends methodologic criteria for reporting of Delphi studies. *Journal of Clinical Epidemiology*, 67(4), 401-409.
<https://doi.org/10.1016/j.jclinepi.2013.12.002>
- Foth, T., Efstathiou, N., Vanderspank-Wright, B., Ufholz, L., Dütthorn, N., Zimansky, M., & Humphrey-Murto, S., (2016). The use of Delphi and Nominal Group Technique in nursing education: A review. *International Journal of Nursing Studies*, 60, 112-120.
<https://doi.org/10.1016/j.ijnurstu.2016.04.015>
- Gesun, J., Gammon-Pitman, R., Berger, E., Godwin, A., & Froiland, J. M. (2021). Developing a consensus model of engineering thriving using a Delphi process. *International Journal of Engineering Education*, 37(4), 939-959. https://www.ijee.ie/latestissues/Vol37-4/08_ijee4079.pdf
- Humphrey-Murto, S., Varpio, L., Wood, T. J., Gonsalves, C., Ufholtz, L., Mascioli, K., Wang, C., & Foth, T. (2017). The use of the Delphi and other consensus group methods in medical education research: A review. *Academic Medicine*, 92(10), 1491-1498.
<https://doi.org/10.1097/acm.0000000000001812>
- Innes, J. E. (2004). Consensus building: Clarifications for the critics. *Planning Theory*, 3(1), 5-20. <https://doi.org/10.1177/1473095204042315>
- King, A. E. H., & Settle, Q. (2019). Coauthor network analysis of *Journal of Applied Communications* articles from 2008-2017. *Journal of Applied Communications*, 103(4).
<https://doi.org/10.4148/1051-0834.2283>
- Kurtzo, F., Hansen, M. J., Rucker, K. J., & Edgard, L. D. (2016). Agricultural communications: Perspectives from the experts. *Journal of Applied Communications*, 100(1).
<https://doi.org/10.4148/1051-0834.1019>
- Leal, A., Telg, R. W., Rumble, J. N., Stedman, N. L. P., & Treise, D. M. (2019). Exploring beyond the obvious: Social skills needed for agricultural communication baccalaureate graduates. *Journal of Applied Communications*, 103(2). <https://doi.org/10.4148/1051-0834.2188>

- Martorella, P. H. (1991). Consensus building among social educators: A Delphi study. *Theory & Research in Social Education, 19*(1), 83-94.
<https://doi.org/10.1080/00933104.1991.10505629>
- Miller, J. D., Large, M. M., Rucker, K. J., Shoulders, K., & Buck, E. B. (2015). Characteristics of U.S. agricultural communications undergraduate programs. *Journal of Applied Communications, 99*(4). <https://doi.org/10.4148/1051-0834.1063>
- Morgan, A. C. (2010). Competencies needed by agricultural communication graduates: An industry perspective. *Journal of Applied Communications, 94*(1).
<https://doi.org/10.4148/1051-0834.1184>
- Morgan, A. C., & Rucker, K. J. (2013). Competencies needed by agricultural communication undergraduates: An academic perspective. *Journal of Applied Communications, 97*(1).
<https://doi.org/10.4148/1051-0834.1103>
- Okoli, C., & Pawlowski, S. D. (2004). The Delphi method as a research tool: An example, design considerations and applications. *Information & Management, 42*(1), 15-29.
<https://doi.org/10.1016/j.im.2003.11.002>
- Olsen, A. A., Wolcott, M. D., Haines, S. T., Janke, K. K., & McLaughlin, J. E. (2021). How to use the Delphi method to aid in decision making and build consensus in pharmacy education. *Currents in Pharmacy Teaching and Learning, 13*(10), 1376-1385.
<https://doi.org/10.1016/j.cptl.2021.07.018>
- Rodriguez, L., & Evans, J. F. (2016). Coming of age: How JAC is reflecting a national research agenda for communications in agriculture, natural resources, and life human sciences. *Journal of Applied Communications, 100*(1). <https://doi.org/10.4148/1051-0834.1020>
- Sitton, S., Cartmell, D. D., & Sargent, S. (2005). Developing public relations curricula in agricultural communications. *Journal of Applied Communications, 89*(3).
<https://doi.org/10.4148/1051-0834.1308>
- Steede, G. M., Gorham, L. M., & Irlbeck, E. (2016). Exploring perspectives of the student competencies needed to advocate for agriculture. *Journal of Applied Communications, 100*(4). <https://doi.org/10.4148/1051-0834.1242>
- Williford, B. D., Edgard, L. D., Rucker, K. J., & Estes, S. (2016). Literature themes from five decades of agricultural communications publications. *Journal of Applied Communications, 100*(1). <https://doi.org/10.4148/1051-0834.1022>
- Zagonel, A., Baker, L. M., & King, A. E. H. (2019). Printing and mailing for the brand: An exploratory qualitative study seeking to understand internal branding and marketing within university and extension communication services units. *Journal of Applied Communications, 103*(2). <https://doi.org/10.4148/1051-0834.2236>