



Chalkboards to Virtual Environments: Technology's Role in Expanding the Classroom to Provide Professional Development and Education for Agricultural Communicators

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Keywords

agricultural communications, education, technology, distance education

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Introduction

Communications education, and more specifically agricultural communications education, has evolved over time, shifting in an effort to meet the needs of students through new approaches, new methods, and new technologies. As articulated by multiple authors (Boone, Meisenbach, & Tucker, 2000; Tucker, Whaley, & Cano, 2003), agricultural communications emerged more than 200 years ago as a result of the need to reach diverse audiences with agricultural information, while the field and teaching of agricultural communications did not emerge until 100 years later.

In 1922, Adams summarized the teaching of agricultural communications as “the training of students ... who will have to write in farm and home terms on agricultural and domestic science topics,

to think honestly and straightforwardly, and to express themselves according to ... Accuracy, Brevity, and Clearness" (p. 40). While the basic premise of this statement remains true today, the field of agricultural communications has expanded far beyond the written word to include areas such as public relations (Sitton, Cartmell, & Sargent, 2005); social media and its impact on beliefs, attitudes, and behaviors (Allen, Abrams, Meyers, & Shultz, 2010; Graybill-Leonard, Meyers, Doerfert, & Irlbeck, 2011); changes in the agricultural industry audiences; and changes in communications practices and technologies related to agriculture (Doerfert & Miller, 2006). This history of expansion from print-only roots continues to challenge agricultural communications educators as they strive to reflect the agricultural industry's shift to more technology integration into their delivery of education.

The delivery of effective instruction has arguably been found through a focus on teaching and learning strategies that account for student's abilities to construct knowledge based on previous experiences (Kort, Reilly, & Picard, 2001). Beyond the student's educational experiences, it is critical to recognize that learners have also changed due to the influx of technology in their personal lives including, but not limited to, television, the Internet, gaming devices, and mobile communications technologies. Resultantly, learners in today's classrooms are foundationally different in how they process information and reason through issues (Prensky, 2001), and the technology used in the classroom exposes students to bodies of information and tools for practice more than ever before (Darling-Hammond & Bransford, 2005). Awareness of how technology can be used to enhance and extend learning within the context of agricultural communications education is critical for our discipline if we are to be successful in adapting to what is required to prepare graduates for entry into our profession and the broader agricultural industry and global society.

Purpose

The purpose of this paper was to explore the evolution of the use of technology in agricultural communications education in regard to processes and methods. Understanding the past provides guidance for the future, and it is the purpose of this paper to provide a concise look back at and a purposeful look forward to educating individuals in the field of communications, specifically in agricultural communications.

Methodology

To accomplish the purpose, we conducted an integrative literature review (Torraco, 2005) related to the history of the processes, methods, and technologies in agricultural communications education because, often times, forward movement benefits from a review of the past. Torraco (2005) suggested conducting an integrative literature review to provide a new way of thinking about old topics or to discuss emerging research. "The integrative literature review is a form of research that reviews, critiques, and synthesizes representative literature on a topic in an integrated way such that new frameworks and perspectives on the topic are generated" (Torraco, 2005, p. 356). The history of the processes, methods, and technology uses in agricultural communications education fits into both categories proposed by Torraco (2005) because of its existence since the 1920s and the continuously changing communication technologies and mediums used in the agricultural communications profession (Boone et al., 2000).

Agricultural communications programs were created because of the need to disseminate agricultural information efficiently and effectively (Duley, Jensen, & O'Brien, 1984). As agricultural science, technology, and communications media evolve, the need for current curriculum and teach-

ing methods and strategies increases. Further, agricultural communications educators are concerned about preparing students with the most up-to-date communications skills without losing sight of the importance of teaching students technical agricultural information. Because of the focus on summarizing and documenting agricultural communications teaching methods and processes, the critique process was based on identifying elements that had been documented regarding teaching processes and technology uses.

As the basis of this literature review, we reviewed four journals that publish research articles related to agricultural communications education— *Journal of Applied Communications*, *Journal of Agricultural Education*, *Journal of Extension*, and the North American Colleges and Teachers of Agriculture publication, the *NACTA Journal*. Initially, each journal was reviewed for articles that specifically related to the teaching and learning processes, methods, and technology uses in agricultural communications. However, the search was widened to include articles from a broader perspective of teaching and learning to allow for a more comprehensive picture of teaching and learning methods, processes, and technology uses. The journals were searched using specific key words: *agricultural communications history*, *teaching agricultural communications*, *technology impacts on education*, *multimedia*, *online video conference*, *agricultural communications education*, *instructional design*, *teaching strategies*, and *learning strategies*. In some instances, the search terms were combined to locate articles of interest. Additionally, a broad search utilizing Google Scholar was conducted to identify a variety of additional journal articles related to the key words. Articles had to meet at the least one of the following criteria to be reviewed:

- Historical context of agricultural communications;
- Mention of technology use in agricultural communications;
- Study of teaching methods in the context of agricultural communications or general agriculture; and/or
- Use of technology to teach agricultural communications or general agriculture.

Each article was examined for information that could explain uses of technology as a teaching tool, processes of teaching, or methods to facilitate learning. Only a limited number of articles specifically focused on these topics in the context of agricultural communications. Additionally, information related to teaching crisis communication was used to provide one example of an approach to teaching an agricultural communications topic.

Findings

Historical Background

As shared by Doerfert and Miller (2006), “[t]he first course in agricultural journalism was taught in 1905” (p. 18). Substantial change has occurred since 1905, including both content of courses and teaching methods. The role of technology in the form of print publications, radio, and movies shaped agricultural communications (Tucker et al., 2003) into what it is today much like technology is shaping the way that education is being delivered.

As early as 1989, Extension employees recognized that technology was emerging and that it would alter the way information was distributed. Technologies such as “television, telephone, radio, and data transmissions” (Ezell, 1989, p. 1) were predicted to merge into one communications network with several facets instead of individual networks. Ezell (1989) stated that “the real issue is

how Extension professionals will interact with technology” (p. 4), instead of the technology changes themselves.

A nationwide study conducted by Murphy and Terry (1998) regarding technology use for instruction concluded that “[e]lectronic communication, information, and imaging technologies [would] improve how we teach in agricultural education settings” (p. 34). While the authors agreed that various technologies would be adopted at different rates, technology was predicted to increase access to information and provide “teaching aids to ... meet the needs of the diverse learning styles of students” (p. 31). In fact, the delivery of courses via distance education technologies has become common across agricultural education departments (Roberts & Dyer, 2005).

Technologies can be used in many different ways and combinations for teaching and learning, and not just for distance education. In studies that compared traditional instruction with instruction utilizing multimedia, the latter have been found to reduce student learning time (Marrison & Frick, 1993) and improve information retention (Shanthy & Thiagarajan, 2011). “Increasingly, many concepts and ideas cannot be taught without the aid of technology to represent and manipulate them” (Molnar, 1997, p. 5). However, the use of technology to teach is not without barriers as a study conducted by Irani and Telg (2001) reported the need for distance education training for faculty. Time, resources, and motivation were shared by faculty as critical elements that impact the actual implementation of distance education.

Technology Integration into Education

Research focused on technology use for educational purposes has primarily been conducted in traditional educational settings and has not included a substantial number of studies related to agricultural communications education. Teaching methods and processes have evolved mirroring the evolution of technology from the use of hand drawn images to overhead projectors; video players to YouTube; and face-to-face simulations to online sessions via the Internet. Technology was identified as enhancing learning in settings that included secondary education, university settings, continuing education, Extension programming, and professional development.

A review of the *Journal of Agricultural Education* revealed articles focused on technology use and distance education. “Use of Computer Technology by Teacher Education in Agriculture Programs: Student Experiences and Programming Applications” (Bowen, Mincemoyer, & Parmley, 1983) is an early example of an attempt by researchers to document technology use for education. Since then, multiple articles focused on different areas of distance education [e.g., faculty perceptions (Murphrey & Dooley, 2000), perceptions of technologies for teaching (Dooley & Murphy, 2001) and student perceptions (Kelsey, Lindner, & Dooley, 2002)] have been published. More recently, studies have addressed student preferences related to specific technologies. Murphrey, Rutherford, Doerfert, Edgar, and Edgar (2012) found that students accepted content management systems as a “useful educational technology” (p. 56) while other technologies (i.e., Second Life, social networking, and Twitter) were not as accepted. Strong, Irby, Wynn, and McClure (2012) evaluated student satisfaction with courses delivered online and found that the creation of social presence could impact student satisfaction, and the authors recommended the use of social media technologies. However, Settle et al. (2012) reported that instructors should be aware that students hold “discrepant” (p. 137) views of social media when used for educational purposes; those students who are familiar with it are more positive than those that are not.

A review of articles within the *Journal of Extension* revealed a plethora of articles related to using

technology to teach specific topics. Recently, the *Journal of Extension* reported several topics that have been taught using technology (e.g., pork production (Bates et al., 2012), agritourism (Rich et al., 2011), food safety (Mathiasen, Morley, Chapman, & Powell, 2012), livestock bio-security (Stevenson et al., 2011), and agricultural safety (Schwab & Freeman, 2011)). The technologies to enhance instruction reported in these examples varied widely. In the study conducted by Rich et al. (2011), webinars were assessed to see if this technology could meet training needs and researchers found that this form of delivery was able to enhance programming efforts. Mathiasen et al. (2012) focused on the use of training videos to impact awareness and practices related to food safety. They reported that the videos helped meet the training needs.

Thomas, Davis, and Moss (2008) used a combination of elearning tools (i.e., WebEx, Basecamp, iPod, Camtasia, Audacity, Aggregator, Skype, and blogs) to facilitate learning for professionals about the “knowledge economy” and to guide Extension efforts in the use of distance education tools. They found that the tools were well received by participants. Individuals in the study were carefully selected and trained to encourage quality engagement and assessment.

A review of the *NACTA Journal* also revealed a significant number of articles related to teaching with technology. Topics included soil science (Mamo, Kettler, Husmann, & McCallister, 2004), agribusiness (Schurle, Stroade, & Grunewald, 2004), and landscape construction (Henry, Midden, & Lieske, 2004). Further, a study conducted by Jepson et al. (2005) to evaluate workshops intended to increase faculty use of technology in the context of animal science found these workshops to be successful.

However, only a limited number of articles were found that specifically discussed using technology to teach agricultural communications. Elefson (1992) investigated methods of improving agricultural writing but did not refer to the use of any technology. Rhoades, Miller, and Edgar (2012) investigated the use of a capstone course in improving learning, but, once again, this study did not address the use of technology. As noted previously there are many examples of how technology has been assessed to increase learning in other areas. As it has in past years, the way in which technology is used to accomplish instruction continues to evolve.

Agricultural Communications Education

Much like other disciplines, teaching in agricultural communications has evolved from chalkboards and erasers to new and innovative delivery tools. Within the literature, studies exist that have focused on the content that should be included in agricultural communications curriculum, which is guided by educational needs and competencies in the profession. Miller (1995) provided a historical retrospective that explained how agricultural communications programs and focuses have changed over time and how certain projects, associations, and organizations (e.g., The National Project in Agricultural Communications, the American Association of Agricultural College Editors) have impacted the profession.

Several authors have addressed education in agricultural communications (e.g., Adams, 1922; Boone, Paulson, & Barrick, 1993; Elefson, 1992; Reisner, 1990b) and the workplace skills graduates need (e.g., Morgan, 2012). Sprecker and Rudd (1998) reported that “communication skills ... are more important than subject-area knowledge” (p. 31) when preparing students for agricultural communications. Methods of teaching agricultural communications have also been addressed. In an article by Hayes (1990), “role-playing and vigorous class discussion” (p. 9) was reported as a method for teaching ethics in agricultural communications. The authors reported that this process helped

students understand the topic. Researchers have also studied critical thinking (Bisdorf-Rhoades, Ricketts, Irani, Lundy, & Telg, 2005) and learning styles (Cartmell, Majors, Ashlock, & Sitton, 2007) in the context of agricultural communications. Bisdorf-Rhoades et al. (2005) found that agricultural communications students were “highly innovative in their thinking” (p. 25) but not necessarily critical in their thinking. This study spoke to the fact that educators need to encourage and facilitate the critical thinking process of students to better prepare them for the workplace.

As indicated by Edgar, Rutherford, and Briers (2009) in a review of research themes in the *Journal of Applied Communications* from 1997 to 2006, there is a need for research on teaching methods and technology uses in agricultural communications. The authors reported that articles related to distance education, electronic media, professional development, and instructional and program delivery approaches were limited. Further, they reported that even secondary research themes revealed only one article focused on curriculum and program development and three focused on instructional and program delivery approaches. One interesting point is that the authors identified “information sources and technology” (p. 29) as the topic that was most highly researched, once again showing the important role of technology.

Considerable attention has been paid to documenting various competencies needed within the agricultural communications field. Sitton et al. (2005) provided a list of public relations proficiencies that agricultural public relations professionals reported as most important in agricultural communications’ curriculums. Computer skills (as well as skills in human relations, editing and writing) were mentioned as frequently used skills by professionals. A study conducted by Doerfert and Miller (2006) focused on gaining input from industry to prepare students for jobs in agricultural communications. Two themes revealed in this study relate to the topic of this paper: “response time for communication-related activities continues to shorten” (p. 27) and “[i]mage is increasing in importance for the agricultural industry and agricultural communications professionals” (p. 27). Both of these themes are directly impacted by ever-evolving communication technologies as information is shared almost instantaneously around the world; thus, impacting the way individuals view the agricultural industry. In fact, a competency study by Morgan (2012) revealed the need for students to have an “understanding [of] how new media is changing the industry and how to use that media effectively” (p. 17).

Technology Integration into Agricultural Communication

Part of what is driving the importance of using technology to teach is related to the rate of change in technology used to communicate. Studies (e.g., Graybill-Leonard, et al., 2011; Pritchett, Naile, & Murphrey, 2013) have been conducted regarding technologies that impact communications in general. These studies illustrate the overarching idea of technology use to further educational efforts in agricultural communications education.

The convergence of innovations impacting communications was shared by Ezell in 1989. The ideas of online conferencing, the importance of images and sounds, and even the idea of artificial reality mentioned in this article have in fact become a reality. Technology has greatly evolved since 1989. Changes in technology have created a need to change what is taught in agricultural communications courses and programs and the delivery of these courses and programs.

Research has been conducted related to technological tools and their uses in the field of communications itself. Video documentaries combined with reflective journaling were studied to determine impact on students’ attitudes and perceptions of agriculture (Meyers, Irlbeck, & Fletcher, 2011).

Video use was reported to provide a means for students to “recognize the variety of opinions about the agricultural industry” (p. 93) that exists to allow students to practice “counter-arguments” (p. 93).

Graybill-Leonard et al. (2011) conducted a study about the use of social networking (specifically Facebook) to communicate, and the “[r]esults indicated that Facebook was a beneficial communication tool to help the social movements reach more individuals” (p. 45). The study revealed that the “social movements explored in this study did not exist before Facebook” (p. 53). The authors emphasized the importance of understanding that social media is being used so messages are more appropriately and effectively targeted at specific audiences.

Another communications tool is Twitter, a microblogging tool that allows individuals to send short messages to various individuals and groups. Allen et al. (2010) shared that, while the value of Twitter varies, recognizing Twitter as a tool is important. This study reported on the use of social media, specifically Twitter, across agriculture and described users as having the role of information providers and information seekers. The authors emphasized that individuals in agriculture should use this form of communication as a way to provide accurate information and provided several examples of agricultural organizations (e.g., American Farm Bureau, National Cattlemen’s Beef Association) that use this form of communication. In fact, the authors reported that the Food and Drug Administration had used Twitter to announce recalls of peanuts during a salmonella outbreak, which lent further evidence to the need for awareness of this new technology. The study conducted by Pritchett et al. (2013) further encouraged the use of this technology for agricultural communications by stating that Twitter encouraged social presence.

An Example of the Future: Using a Virtual Environment to Teach Crisis Communications

One area in agricultural communications education that has been studied regarding the use of technology to teach is the instruction of skills for crisis communications in the context of agriculture. A study conducted by Leggette et al. (2012) reported how a 3-D virtual world (i.e., Second Life) was used to facilitate experiential learning in crisis communications. The researchers analyzed students’ weekly journals to determine student reaction and perceptions of the technology. The researchers shared that students reported value in using the virtual world for instruction. In fact, the authors reported that students believed that the virtual environment was a “valuable educational tool and an effective way to teach crisis communication” (Leggette et al., 2012, p. 132).

In a related study that also investigated the use of technology to teach crisis communication skills, Witt, Doerfert, Rutherford, Murphrey, and Edgar (2011) analyzed teaching methods including lecture/discussion, reflection logs, case studies, role playing (both in class and online through use of a virtual environment), case study development, and creation of crisis management plans. The authors determined that “students did not identify one singular instructional method as being most beneficial and influential” (p. 34).

Conclusions and Discussion

The mention of technology by Reisner (1990a) more than 20 years ago illustrated that the evolution of technology has been a continuous process. In 1990, educational and communication technologies were not being used like they are today because technology has evolved substantially at a seemingly rapid pace. Changes in curriculum should match the changing technological needs of our students and society. Based on findings from Jepson et al. (2005), it is possible that regular workshops for agricultural communication instructors would be beneficial to increase both the awareness

and subsequent use of new technologies in teaching agricultural communications. Efforts should also be made to evaluate the effectiveness of these training activities including the extent that the training resulted in the integration of technology into educational practice.

Agricultural communications education targets a diverse set of audiences: college students, professionals, and the public. Ultimately, the effectiveness of these efforts impacts overall agricultural literacy and the understanding of agricultural information. In a time when the impact of invested resources is increasingly scrutinized, it is important to approach the educational process with methods and processes that can have the greatest impact.

There is evidence in the literature (Bates et al., 2012; Schwab & Freeman, 2011; Thomas et al., 2008; Mamo et al., 2004) that technology can be used successfully to improve access to education and improve the learning process. However, based on the limited number of studies found that focused on technology use in agricultural communications instruction, it was concluded that additional research is needed in regard to the study of educational technologies specifically for agricultural communications. As indicated by Edgar et al. (2009) in a review of research themes in the *Journal of Applied Communications* from 1997 to 2006, there is a need for research on teaching methods and technology uses in agricultural communications. The findings from this study further support the conclusion that the need continues today.

Just as the art of typing and the use of a typewriter were once deemed important enough to be covered in an educational setting, new technologies should be assessed for similar importance. One cannot assume that students are technologically competent in new technologies, including social media, just because they are users of that technology. There is a difference between understanding how to use a technology for personal use and how to use a technology to efficiently and effectively impact a social movement or spread information about a particular topic. Educators cannot overlook the importance of understanding social media and other technologies in the context of agricultural communications. Technologies such as Facebook (Graybill-Leonard et al., 2011) and Twitter (Allen et al., 2010) have been identified as important tools in the agricultural communications industry. Given that research has indicated that social media is being used in the industry, it behooves educators to provide training and experience for students in the agricultural communications classroom that mirrors industry standards.

Bisdorf-Rhoades et al. (2005) found a need for students to engage and expand their critical thinking skills. One might ask, “is it possible that our use of technology could meet this need?” Doerfert and Miller (2006) indicated that response time is shortening and the importance of image is increasing in communications. Is it possible that both of these themes are being magnified by the changing technology and the way information can be shared because of instant access and changing communication channels?

This study focused on a review of research published in four specific journals. It is possible that studies regarding the use of technology to teach in agricultural communications has been shared at conferences or in other venues not addressed by this study. While it is believed that agricultural communications educators are using new and emerging technologies for education, only limited documentation in the research literature was discovered.

Technology comes in various shapes and sizes. In fact, using technology in teaching often reinvents itself through time. There is a need for research focused on teaching methods and tools related to agricultural communications education. New technologies have the potential to encourage innovative learning experiences. The challenge to agricultural communications educators, however, will be to harness the use of technology to benefit the learner while in college and beyond.

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