



Agricultural and communications competencies for an agricultural communications curriculum at a land grant institution
by Laurel Lee Olsen

A thesis submitted in partial fulfillment of the requirements for the degree of Master of Science in
Agricultural Education
Montana State University
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Abstract:

The purpose of this study was to identify the importance of specific communications and agricultural competencies needed by students enrolled in a proposed agricultural communications curriculum at Montana State University-Bozeman. Communications competencies that were included in the study were advertising, journalism, graphics, public relations, public speaking, telecommunications, and computer applications. Agricultural competencies in the study were agricultural communications, agricultural economics, agricultural leadership, agronomy, livestock production and management, environmental science, and food science/technology. Further competency statements were listed for an internship experience in agricultural communications.

The population for this study included members of communications-related professional organizations including Agricultural Communicators of Tomorrow (ACT) advisors, Agricultural Communicators in Education (ACE), American Agricultural Editors' Association (AAEA), and the National Association of Farm Broadcasters (NAFB). The population was limited to members of who reside in Montana, North Dakota, South Dakota, Wyoming, Colorado and Idaho. Eighty-four surveys were mailed. Forty-six surveys were returned for a return rate of 58% (5 members were unavailable).

The survey consisted of three sections. The first section focused on communications competencies. The second section focused on agricultural competencies. The third section noted demographic information.

The results of the study indicated that 89% of professionals in agricultural communications who were contacted think an agricultural communications program at Montana State University-Bozeman would be beneficial to the agricultural industry in Montana, North Dakota, South Dakota, Wyoming, Colorado, and Utah. Those professionals offered support in the form of internships, and serving as guest speakers for agricultural communications courses, or at Agricultural Communicators of Tomorrow (ACT) meetings.

The top five communications competencies that should be included in an agricultural communications curriculum were: reporting, apply writing skills; discuss ethical questions, make ethical choices; identify the target audience; know the difference between public relations and journalism; and navigate the Internet, send and receive e-mail. The top five agricultural competencies that should be included in an agricultural communications curriculum were: communicate agriculture to the domestic public; apply agricultural communications concepts; demonstrate reliability and trust, work as a team member; apply human relations skills to solve workplace problems; and demonstrate responsibility and credibility.

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APPROVAL

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Laurel Lee Olsen

This thesis has been read by each member of the graduate committee and has been found to be satisfactory regarding content, English usage, format, citations, bibliographic style, and consistency, and is ready for submission to the College of Graduate Studies.

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ABSTRACT

The purpose of this study was to identify the importance of specific communications and agricultural competencies needed by students enrolled in a proposed agricultural communications curriculum at Montana State University-Bozeman. Communications competencies that were included in the study were advertising, journalism, graphics, public relations, public speaking, telecommunications, and computer applications. Agricultural competencies in the study were agricultural communications, agricultural economics, agricultural leadership, agronomy, livestock production and management, environmental science, and food science/technology. Further competency statements were listed for an internship experience in agricultural communications.

The population for this study included members of communications-related professional organizations including Agricultural Communicators of Tomorrow (ACT) advisors, Agricultural Communicators in Education (ACE), American Agricultural Editors' Association (AAEA), and the National Association of Farm Broadcasters (NAFB). The population was limited to members of who reside in Montana, North Dakota, South Dakota, Wyoming, Colorado and Idaho. Eighty-four surveys were mailed. Forty-six surveys were returned for a return rate of 58% (5 members were unavailable).

The survey consisted of three sections. The first section focused on communications competencies. The second section focused on agricultural competencies. The third section noted demographic information.

The results of the study indicated that 89% of professionals in agricultural communications who were contacted think an agricultural communications program at Montana State University-Bozeman would be beneficial to the agricultural industry in Montana, North Dakota, South Dakota, Wyoming, Colorado, and Utah. Those professionals offered support in the form of internships, and serving as guest speakers for agricultural communications courses, or at Agricultural Communicators of Tomorrow (ACT) meetings.

The top five communications competencies that should be included in an agricultural communications curriculum were: reporting, apply writing skills; discuss ethical questions, make ethical choices; identify the target audience; know the difference between public relations and journalism; and navigate the Internet, send and receive e-mail. The top five agricultural competencies that should be included in an agricultural communications curriculum were: communicate agriculture to the domestic public; apply agricultural communications concepts; demonstrate reliability and trust, work as a team member; apply human relations skills to solve workplace problems; and demonstrate responsibility and credibility.

CHAPTER 1

THE PROBLEM

Introduction

Agricultural communications has emerged within the agricultural industry as a career field and course of study for those aspiring to join the ranks of professional agricultural communicators. Why are agricultural communicators an important part of the agricultural industry?

Agriculture is a constantly evolving industry. Agricultural specialists use technology, research, and current information to respond to the increasing food needs of the world. These producers, researchers, technologists, agri-business men and women, educators, and other workers involved in agriculture and natural resources help provide an abundant food supply to a nation of consumers who are generations removed from the farm. They need to learn what other researchers have done and to pass that information along; in short, they both need to receive and distribute agricultural communications.

In addition, it is important for consumers to have a basic understanding of the industry that produces and distributes their food supply (Birkenholz, 1992). The implications of an agriculturally ignorant society are frightening for two reasons. First of all, the public, by their vote, decides on legislation crucial to agriculture's survival. If the voters do not understand the impact of their decisions on agricultural programs, it could be detrimental to the agricultural industry. Hamlin (1962) stated that:

...Public policy which governs and controls agriculture is policy they (the voters) make, not policy which farmers make. They must (the voters) be sufficiently aware of the revolution in agriculture and its implications to approve policies which will sustain and improve agriculture and be fair to the people who engage in it, recognizing that in their blindness they could "kill the goose that laid the golden egg" (p.58).

In a 1992 publication on Strategies to Promote Agricultural Literacy, Birkenholz stated:

...Graduates of the American educational system can hardly be expected to develop an accurate understanding of, or an appreciation for the role of agriculture in their lives when the subject is virtually ignored in the curriculum (p. 3).

Second, if the public doesn't consider agriculture a viable industry, the college-bound high school graduate may not consider agriculture and natural resource sciences as a viable career choice. The USDA (Goecker, et al, 1999) predicts a shortage of qualified food and agricultural sciences college graduates over the next five years. Strong employment opportunities exist for graduates in several areas including food science and engineering, food and forest products sales, agricultural science education, landscape horticulture, outdoor recreation, and information systems. Without qualified employees, the industry suffers.

Montana's need for agricultural communicators was expressed by the Vision 2005 Task Force created by Montana Governor Marc Racicot. The final report, published in 1998, stated, "As we meet the challenges of a new century, it is imperative that we in the agriculture profession do so with unity and a sense of joint vision" (Montana Department

of Agriculture, 1998). The ability to communicate within the industry, as well as to the consuming public will certainly affect how the goals of Vision 2005 are met.

Purpose of the Study

The purpose of this study was to identify the importance of specific communications and agricultural competencies needed by students enrolled in a proposed agricultural communications curriculum at a land grant university, as identified by members in agricultural communications professional organizations. Communications competencies included in the study were advertising, journalism, graphics, public relations, public speaking, telecommunications, and computer applications. Agricultural competencies included in the study were agricultural communications, agricultural economics, agricultural leadership, agronomy, livestock production and management, environmental science, and food science/technology. Further competency statements were listed for an internship experience in agricultural communications.

Need for the Study

The need for agricultural production information can be traced back to the formation of the United States. George Washington conducted his own investigations into erosion, improved plowing methods, the value of fertilizers, crop rotation, and the exploration of new crops. Washington relied on British publications for information, but these publications were not available to the average farmer (Demaree, 1941).

Almanacs were recognized as a valid source of agricultural information, and the well-respected Philadelphia Agricultural Society resolved in 1816:

That the distribution of agricultural information, and the proposition of questions calculated to excite observations and inquiry, as well as to induce the farmers of our country to communicate their experience in husbandry, through the medium of an Almanack, would be productive of important benefit to society (Demaree, 1941 p. 4).

The common farmer relied upon the Farmer's Almanack, begun in 1818 (Farmer's Almanac, 2000), which suggested farming practices based on the sun, moon, and movement of the earth. The almanac contained farm articles, local calendars, a farmer's calendar, and blank pages for recording data by farmers themselves.

The need for the education of skilled agricultural writers was addressed in 1905 when Iowa State College was given an endowment to fund a course titled "The Agricultural Press." By 1920, a four-year curriculum for a Bachelor of Science in Agricultural Journalism was established at Iowa State College. By 1928, seven colleges of agriculture offered eleven courses in journalism, advertising, research, and editing (Texas Tech, 1993). Doerfort and Cepica reported there were "approximately 30 agricultural communications programs in existence in 1990, and over 75 percent were housed in a college of agriculture and related arts" (1991).

Today's land-grant university plays a role in bridging the gap between society's problems and frontiers of knowledge (Sprecker and Rudd, 1998). With the majority of the population removed from the farm, it is imperative to provide accurate information to the public, which influences the governing of this essential industry.

Land grant institutions are to be criticized when their course offerings do not keep abreast with industry and student needs. For instance, Jack Larson, Agricultural Education instructor at Custer County High School in Miles City, Montana, stated, "I feel that Montana State University is losing some excellent students because of its' inability to keep degree offerings current with individual needs" (Personal interview, March 22, 2000,). Some of those needs were described in the Montana State University-Bozeman program of agricultural education "Vision for Montana" (1999) brochure. It proposed three themes with goals directly related to increasing public relations in agriculture and natural resources. The first theme was to "educate and increase public awareness regarding the importance of the food and fiber industry." The proposed strategy that Montana agricultural educators devised was to involve students in promoting the industry, informing the public media on the value of agricultural industry information, and using the public media to provide public education about the food and fiber industry.

The second related theme was for "agricultural education to form partnerships with parents and teachers with industry, public agencies, researchers and educational institutions." The strategy formulated by Montana agricultural educators was to encourage partnerships with public agencies by involvement in educational and promotional activities.

The third related theme was to "develop partnerships with agriculture industry to utilize industries' instruction in careers." The strategy created by Montana agricultural educators was to promote agricultural education through industry trade shows and by

providing promotional information. These themes and strategies to achieve them provided an insight into the communication role that agricultural education has assumed.

Land-grant institutions have made significant contributions to the agricultural industry, and agricultural communication has been a part of that success. Tucker (1996) asserted that:

“Since the early 1900s, agricultural communicators have indeed shown their value to land-grant research and extension. We have inspired public confidence in agricultural research and personal confidence in ourselves as responsible, efficient communicators. It is clear that much more work will be needed to forge the future of agricultural communication as an academic enterprise, and significant challenges lie ahead” (p. 37).

The need for undergraduate as well as graduate studies in agricultural communications has been identified by industry personnel and those in academic occupations, according to studies by Boone, Paulson, and Barrick (1993), as well as Sprecker and Rudd (1998). Sprecker and Rudd reported that students need a strong foundation in communications, especially writing skills. Boone, Paulson, and Barrick identified a need for highly trained individuals to work in the industry, as well as serve in faculty and research positions in academic occupations. Additionally, the USDA report, “Employment Opportunities for College Graduates in the Food & Agricultural Sciences,” (Goecker, et al, 1999) report predicted a shortage of qualified college graduates to fill jobs in agricultural communications and education through 2005.

Terry (1996) proposed the idea that agricultural communication was integral to achieving the mission of agricultural education by providing education in and about agriculture. The audience of agricultural communicators reaches far beyond the traditional students of agricultural education; therefore, a curriculum unique to agricultural communications was needed.

Terry identified three categories of discipline areas: communications, agriculture, and general education core curriculum. The competencies he identified in agriculture were: agricultural communications, agricultural economics, agricultural leadership, agronomy, livestock production and management, environmental science, and food science/technology. Terry included internship experience with agriculture because these are usually supervised by faculty of colleges of agriculture. The competencies he identified in communication were: advertising, journalism, graphics, public relations, public speaking, telecommunications, and computer applications. Sprecker and Rudd (1998) suggested that, "Competencies needed to become an agricultural communicator have changed with technology and job requirements, indicating an urgent need to examine the curricula in an effort to make it applicable to students and their future employers."

Objectives of the Study

To meet the purpose of this study, which was to identify the importance of specific communications and agricultural competencies needed by students enrolled in a proposed agricultural communications curriculum, the following objectives were proposed:

1. Determine the perceived importance of and need for selected communications and agricultural competencies needed by agricultural communications industry personnel;
2. Determine those competencies that should be included in a proposed agricultural communications curriculum; and
3. Determine the perceived need for an agricultural communications curriculum by agricultural communications professionals.

Assumptions

The researcher realized the following assumptions in this study:

1. There was a set of communication and agricultural competencies that were needed by individuals in the agricultural communications industry;
2. Professionals in the agricultural communications industry were knowledgeable about competencies needed to be successful in the industry.

Limitations of the Study

The researcher realized the following limitations to this study:

1. The data for this study were collected between January and March of 2000;
2. The competencies of the study related to communications included: advertising, journalism, graphics, public relations, public speaking, telecommunications, and computer applications;
3. The competencies of the study related to agriculture included: agricultural communications, agricultural economics, agricultural leadership, agronomy, livestock

production and management, environmental science, food science/technology, and competencies gained through an internship experience;

4. The population surveyed consisted of members of the American Agricultural Editors Association (AAEA), Agricultural Communicators in Education (ACE), National Association of Farm Broadcasters (NAFB), and advisers of Agricultural Communicators of Tomorrow (ACT), who reside in Montana, North Dakota, South Dakota, Wyoming, Colorado, and Idaho.

Definitions

To assure a common understanding of the terms in the study, the following definitions were presented:

1. Agricultural Communications—a profession that applies communication techniques and theory to decisions of companies that represent food, agriculture, or natural resources. (Sprecker and Rudd, 1998).
2. Agricultural Communicator—an individual whose job requires communicating to both rural and urban audiences through a variety of media on matters of importance to food, agriculture, and natural resources (Sprecker and Rudd, 1998).
3. Competencies—The skills, attitudes, and knowledge that allow a person to complete a task, perform a function, and complete an assignment in a satisfactory way.

CHAPTER 2

REVIEW OF LITERATURE

The Review of Literature is presented in three sections. The first section addresses the role of agricultural communicators. The second section discusses agricultural programs of study at colleges and universities. The third section presents information on membership in professional organizations of agricultural communicators.

Role of Agricultural Communicators

Agricultural communicators have been credited with playing an important role in the technological developments and advancements in the industry. Ogilvie (1927) stated that:

The press has been a medium through which the personalities behind it have laid the foundation of an improved agriculture. The accelerated advance in American agriculture, since the birth of the first American farm paper, over a hundred years ago, would tend to substantiate such a presumption (p. v).

Wearley concluded that employees trained in agricultural information systems were critical to the agricultural industry. Policy makers with no concept of agriculture enacted laws and public policy. Wearley discovered that one-third of Montana legislators lack knowledge of the size of the agriculture industry and its contribution to the Gross National Product. They perceived that education about agriculture was becoming more

important, but while educational agencies were currently doing a good job, he concluded that they must increasingly emphasize educating the public about agriculture in the future (Wearley, 1996, p. 36).

Producers rely heavily on accurate information that agricultural communicators provide. In the Montana Agricultural Statistics 1997 report, Ralph Peck, Director of the Montana Department of Agriculture, stated:

Montana's agriculture producers face a multitude of major decisions each year. Decisions such as how many acres to seed, when to market their livestock, how to reduce input costs, and the list goes on. In order to make viable decisions, it is crucial that producers have the most recent information available (Montana Department of Agriculture, 1997).

According to Terry (1996), the field of agricultural communications is unique, separate from agriculture, and apart from the general field of communications (p. 286). The agricultural communicator of tomorrow faces many challenges, not the least of which is the use of technology. Hays and Evans (1983) proposed that:

Technological change is not limited to communications, of course, it permeates the wider society, including the farm sector. Agriculture involves far more sophisticated technology than it did a generation ago. And if the farmer is to keep up with new developments, the agricultural communicator probably is going to have to make an important contribution to that awareness. This is not an easy challenge. It means that the agricultural communications student—tomorrow's professional communicator—must be prepared to deal with complicated subject matter as well as advanced communication technology (p. 1).

Beck and Cilley (1994) found evidence that, "Agricultural communicators are accustomed to acting as change agents. Communicators face the challenge of dealing with technological changes that are reshaping their own profession" (p. 1). They said that

individuals training in agricultural communications should consider their role as change agents and the influence that technological advances will have on this career field.

Vestal and Briers (1999) suggested that media also serve gatekeeper roles.

Although the public perceives agriculture as slow and sustaining, agricultural biotechnology and the diffusion of innovation associated with it has been very rapid. Food biotechnology stands out among agricultural innovations, which usually are diffused only among farmers, because consumers perceive it to have a direct effect on the food we eat. Vestal and Briers (1999) found that journalist "knowledge, attitudes and perceptions may enhance the technology transfer and consumer awareness efforts of agricultural educators" (p. 413).

The United States Department of Agriculture Office of Communications has described its mission as to provide information to the public that was helpful to Americans' health and economic well being (USDA, 2000). One objective identified by the Office of Communications was to, "strengthen the public knowledge and understanding of USDA's role in economic and trade opportunities for agricultural producers and other residents—a major goal of USDA." Other objectives related to strengthening the public knowledge and understanding about the USDA's role in providing a safe, nutritious, affordable food supply; and their role in developing a healthy natural environment and ecosystem.

The issue of agricultural literacy has come to the foreground of professional awareness. Thomson and Kelvin stated that, "Individuals must perceive an issue is important to them personally before they decide to become involved with it" (Thomson

and Kelvin, 1996, p.12). As the population has become more removed from the farm and their food source, their dependence on agriculture has become less vivid. Thomson and Kelvin suggested that today's consumers rely on general mass media for information. The mass media "will be among the public's primary sources of information about the relationship between the food they purchase and issues relating to regional agriculture" (p.19). The researchers further stated that, "Understanding the interconnectedness of the issues of a sustainable food system from the field to the consumer is one challenge which media can help the public understand" (p. 12).

The Agricultural Literacy Work Group (Birkenholz, 1992) reported that, "The basic purpose of agricultural literacy programs should be to achieve an awareness and understanding of the significance of agriculture in the lives of all people." Those pursuing careers in agriculture, in agricultural communications or other fields, must understand the issues of agricultural literacy and become an advocate for agricultural education. Frick and Spotanski (1990) identified three major themes of agricultural literacy:

1. Understanding of the applied processes or methods of agriculture. This includes the understanding of agriculture as a system, each component affecting the total outcome;
2. Having a basic vocabulary of agriculture terms. Literacy includes the ability to follow basic public discussions; and
3. Understanding the impact of agriculture on society.

Agricultural Communications Programs of Study at Colleges and Universities

The agriculture and natural resource industry first recognized the need for education in agricultural writing in 1905. Iowa State College was given an endowment to

fund a course titled "The Agricultural Press" (Texas Tech, 1993, p. 6). The presence of agricultural communications programs in colleges of agriculture show that they have recognized the need to train students in agricultural communications. Among those universities that currently offer some type of program in agricultural communication or agricultural journalism are Washington State University, University of Florida, The Ohio State University, Texas Tech University, and Oklahoma State University (Telg, 2000).

According to Terry (1996), "Agricultural communications curriculums have been designed to fulfill two primary needs of graduates: 1) provide a strong basis of both technical agriculture and sources for agricultural information; and, 2) introduce methods of journalistic writing and other communications skills." A curriculum in agricultural communications assists graduates in qualifying for a wide range of job opportunities available (Evans & Bolick, 1982, p. 35).

Reisner identified three basic components of an ideal agricultural communications curricula. The researcher surveyed 30 universities, of which 16 offered courses in agricultural communications. The three components identified were:

1. Micro-level courses that allowed students to combine agricultural subject matter with communications skills;
2. Advanced micro-level skills courses that allowed students to work outside the classroom, often in professional settings to gain practical experience in agricultural communications;
3. Systems courses that dealt with communications transfer among aggregate populations within agriculture (Reisner, 1990, p.24).

Land grant universities have provided agricultural communications education in a variety of ways. According to the University of Florida's Institute of Food and Agricultural Sciences Agricultural Education and Communication Department, their

vision was to "be a national leader in developing and strengthening education and communication professionals in agriculture and natural and human resources through client-centered teaching, research, and extension programs" (University of Florida, 2000). Students enrolled in the Agricultural Communications program at Texas Tech University produce "The Agriculturalist," an award-winning magazine (Texas Tech University, 2000). Ohio State University Agricultural Communications students can choose a special interest area such as advertising, public relations, or broadcasting, or they can develop a double-major program with other departments in the College of Agricultural Sciences and Natural Resources (Ohio State University, 2000).

A 1988 study conducted by The Ohio State University to profile Agricultural Communication graduates found that:

The qualifications needed to become an agricultural communicator have evolved as technology and job requirements changed. Thirty years ago, farmers were still the primary audience of agricultural communicators. Now, agricultural communicators are trying to reach urban audiences, consumers, and the business world (Bowen & Cooper, 1989, p.2).

Bowen and Cooper discovered that 22 percent of the graduates held positions classified as business-marketing, another 22 percent were in public relations, and 19 percent held positions in writing-editing. The graduates indicated that foreign language was the least important basic education requirement for future agricultural communicators, and courses in business and economics were the most important. Also, their satisfaction with selected academic experience was highest for those involved in the College of Agriculture student magazine, advising and counseling, and the Agricultural Communicators of Tomorrow (ACT) student organization (Bowen & Cooper, 1989, p.4).

In his study "Enhancing the Agricultural Communications Curriculum" published in 1996, Terry identified 27 disciplines in three core areas: agriculture, communications, and general education. The disciplines rated highest in agriculture included agricultural communications, agricultural economics, agricultural leadership, agronomy, animal science, environmental science, food sciences technology, and internship experience. The disciplines rated highest in communications included advertising, journalism, mass communications law, photography, public relations, public speaking, and telecommunications. The disciplines identified in the general education core area were English, government/political, science, history, international relations, mathematics, biological sciences, psychology, sociology, business, marketing, and computer applications (Terry, 1996).

According to a study by Evans and Bolick (1982), the majority of academic programs established since 1960 identified their programs as agricultural communications, rather than agricultural journalism, reflecting the wide scope of the degree programs. Many institutions did not offer specific courses in agricultural communications, and instead students took courses in agriculture, and communications and journalism. Some larger, longer-established programs offered specific courses such as Agricultural and Public Affairs Reporting; Writing for Agricultural Media; and Photography in Agriculture (Evans and Bolick, 1982, p. 34).

In their study on curriculum in agricultural journalism and communications programs, Evans and Bolick found that:

Most agricultural journalism or communications programs are designed to pursue the best of two worlds, to produce graduates who know the basics of both agriculture and journalism. Graduates are taught to disseminate agricultural information to farm or non-farm audiences, through various media. Such curricula, therefore, are intended to help graduates qualify for a wide range of job opportunities in the career field (Evans and Bolick, 1982, p. 35).

Wilson, Paulson, and Henderson (1991) identified a need for graduate programs in agricultural communications. In their survey of ACE (Agricultural Communicators in Education) members, the researchers found evidence that a master's degree provided the agricultural industry with "highly trained individuals needed to cope with the issues agriculture is currently facing" (p. 26). Further research by Boone, Paulson, and Barrick (1993) identified a need for faculty as well as a need for further research in order for the field of agricultural communications to mature. The researchers stated that:

The need for graduate studies in agricultural communication was identified by the need for persons with the abilities to conduct research and teach, and demonstrate professional proficiency and technical skills. In general, both academicians and practitioners perceive a need for graduate programs in agricultural communication (Boone, Paulson, and Barrick, 1993, p.23).

Sprecker and Rudd (1998) reported that, "Practitioners agreed that agricultural communicators are not agriculturalists primarily, but communicators who have a specialty" (Sprecker and Rudd, 1998, p.36). They suggested that students needed to be familiar with a wide breadth of agricultural subjects, but build a solid foundation of communication skills, most importantly, writing skills. The researchers also found evidence that, "Courses should teach students to conduct communication campaigns and

to manage issues, especially in crisis situations, because agricultural communicators spend much time responding to issues that develop beyond their control.” (Sprecker and Rudd, 1998, p.36)

According to Linda S. Vance, a writer for Commodity News Service:

Tomorrow’s communicator in agriculture cannot look just to the traditional magazine, newspaper, and radio fields. There are specialized services such as CNS and Reuters. There are newsletters and there are commodity industry public relations and writing jobs. There are growing television and radio network opportunities. There are jobs available for qualified journalists in a variety of new and expanding fields related to agriculture (Hays & Evans, 1983, p. 35).

There were also employment opportunities and a need for researchers and faculty members at colleges and universities offering programs in agricultural journalism (Boone, Paulson, and Barrick, 1993). These researchers found evidence to support developing graduate programs in agricultural communications to fulfill the need for faculty and researchers in this growing academic field.

According to the USDA report “Employment Opportunities for College Graduates in the Food & Agricultural Sciences” (Goecker, et al, 1999), there was a predicted shortage of qualified college graduates to fill jobs in agricultural communication and education over the years 2000 through 2005. While average annual job openings for these fields were predicted to be 6,397; only 6, 223 qualified graduates were expected to be available. Goecker, Whatley, and Gilmore (1999) projected very strong employment opportunities for computer information specialists, advertising representatives, public relations specialists, secondary school agricultural science and

business teachers, and international communication specialists. Stable employment opportunities were predicted for writers, editors and newscasters.

Membership in Professional Organizations of Agricultural Communicators

Professional organizations for agricultural communicators were formed to help their memberships and address specialized needs. The American Agricultural Editors' Association (AAEA) was formed in 1921 by a small group of farm magazine editors who hoped the association would, "be of value to its members and instill values that could be passed on to readers" (American Agricultural Editors' Association, 2000). The National Association of Farm Broadcasters (NAFB) was formed in 1944 because farm broadcasters, "felt that they were not receiving enough attention to their specialized needs" (National Association of Farm Broadcasters, 2000).

Those who participated in professional organizations for agricultural communicators, "contribute directly to growth and collective expertise within the profession itself," according to Buck and Paulson (1995). The researchers stated that, "Professional organizations are valuable to the growth and welfare of any profession and thus serve as catalysts for the professional growth and development of members" (Buck and Paulson, 1995, p.1).

In her research on coursework in agricultural communications programs, Reisner found that instruction in values and ethics in agriculture was missing (1990, p.11). Research conducted by Oliver and Paulson directly reflected the influence professionals in organizations of agricultural communication had on college curriculum. After surveying seven agricultural communication professional organizations, the researchers

identified several areas of ethical issues that face agricultural communicators. These areas were incorporated into courses of study in ethics for agricultural communicators at the college level (1995, p. 19).

The Agricultural Communicators in Education (ACE) international association was organized in 1913. The majority of its membership are faculty and staff members at land grant and sea grant universities throughout the United States and in similar institutions in other nations. According to the ACE websight, "ACE members are the communications backbone of a research and teaching network established in the United States more than a century ago. They plan, prepare, and disseminate research results and extension teaching materials" (Agricultural Communicators in Education, 2000). Tucker concluded in his research:

Since the early 1900's, agricultural communicators have indeed shown their value to land-grant research and extension. We have inspired public confidence in agricultural research and personal confidence in ourselves as responsible, efficient communicators. It is clear that much more work will be needed to forge the future of agricultural communication as an academic enterprise, and significant challenges lie ahead (1996, p.37).

Agricultural Communicators of Tomorrow

Agricultural Communicators of Tomorrow (ACT) is a national organization for students in any major interested in agricultural communications. The American Association of Agricultural Communicators of Tomorrow (ACT) was established in 1970 at the annual convention of Agricultural Communicators in Education (ACE). In 1999, there were over 15 ACT chapters at colleges and universities serving students interested in pursuing careers in agricultural communications.

The purposes of ACT are to:

1. Stimulate interest in and promote agricultural communications careers.
2. Provide leadership experience to members and keep them abreast of developments in the agricultural communications field.
3. Invigorate campus-level programs of study by promoting the exchange of ideas and information among agricultural communication students and faculty members.
4. Recognize and encourage professional excellence and growth in agricultural communication.

(Agricultural Communicators of Tomorrow, 1999)

This organization provides professional contacts in organizations such as American Agricultural Editor's Association, Agricultural Communicators in Education, Agricultural Relations Council, Cooperative Communicators Association, Livestock Publications Council, National Association of Farm Broadcasters, and the National Association of Agricultural Journalists.

CHAPTER 3

METHODOLOGY

This study was designed to identify the importance of specific communications and agricultural competencies needed by students enrolled in a proposed Agricultural Communications curriculum. The Methodology Chapter is organized into four sections: Population Description, Instrument Design, Data Collection, and Data Analysis.

Population Description

The population for this study included four agricultural communications-related professional organizations including Agricultural Communicators of Tomorrow (ACT) advisors, and members of Agricultural Communicators in Education (ACE), American Agricultural Editors' Association (AAEA), and the National Association of Farm Broadcasters (NAFB). The population was limited to members of these organizations who reside in Montana, North Dakota, South Dakota, Wyoming, Colorado and Idaho. The mailing list for ACT was provided by the National ACT Organization, the mailing list for ACE was obtained through their national office, as was the mailing list for AAEA. The NAFB member names were obtained from the NAFB websight. The survey was mailed to 84 members of the named organizations who resided in the selected states. The survey was mailed to 43 members of Agricultural Communicators in Education (ACE), 15 members of American Agricultural Editors' Association (AAEA),

three state advisors of Agricultural Communicators of Tomorrow (ACT), and 23 National Association of Farm Broadcasters (NAFB) members.

Instrument Design

The survey consisted of three sections designed to meet the objectives of this study. The first section focused on communications competencies. The second section focused on agricultural competencies. The third section noted demographic information.

The competencies included were first identified by Dr. Robert Terry, associate professor at Oklahoma State University, in his study "Enhancing the Agricultural Communications Curriculum" (1996). Terry conducted a three-round survey of a panel of 80 individuals representing agricultural communications employers, employees, educators and students. Round one of Terry's study included a section to obtain demographic data, and a section that listed 38 curriculum discipline areas. Survey participants were asked to rate their level of agreement by using a four-point Likert type scale, with ratings of Strongly Agree, Agree, Disagree, and Strongly Disagree that the competency was important to include in an agricultural communications curriculum.

Round two of Terry's study consisted of a list of items from round one with strongly agree or agree ratings by 70% of the respondents. In addition, he added competency statements with each discipline area. Round three of the survey process requested that respondents agree or disagree with items that had been eliminated in round two.

From this three-round survey process, Terry developed a model curriculum. Within this model, Terry identified three categories of discipline areas: communications,

agriculture, and general core. The final step in Terry's research was to determine objectives in each competency area. College faculty representing 24 departments and 6 universities assisted in identifying the objectives.

The researcher referred to the results of Terry's study to form competency statements that were based on competency areas and objectives in agriculture and communications. The researcher did not explore the general core discipline areas as these are, "normally part of the university core curriculum," according to Terry.

The first section of the survey instrument, Communications Competencies, included seven items of communications with specific competency statements for each item. Communications competencies included in the study were advertising, journalism, graphics, public relations, public speaking, telecommunications, and computer applications. The second section of the survey instrument, Agricultural Competencies, included eight items of agriculture with specific competency statements for each item. Agricultural competencies in the study included agricultural communications, agricultural economics, agricultural leadership, agronomy, livestock production and management, environmental science, food science/technology, and internship experience. The internship experience was placed in the list of agricultural competencies because it is usually supervised by academic faculty in colleges of agriculture, according to Terry (1996).

The respondents were asked to indicate their level of agreement or disagreement, whether the competency should be included in the Montana State University Agricultural Communications curriculum. The first two sections asked the population to respond by

using a Likert-type scale. Responses were divided into four areas: agree strongly, agree, disagree, and disagree strongly.

The demographic data obtained provided a profile of the respondents in terms of age, years employed in agricultural communication, background in farming or ranching, agricultural background, and skills utilized. Respondents were also asked to indicate familiarity with university agricultural communications programs.

The survey was tested for face validity in terms of identifying problems in wording, clarity, and format, as well as completion time, during a pilot test by 27 students in the Agricultural Leadership class (AgEd 251) at Montana State University-Bozeman Spring Semester 2000.

Data Collection

The Dillman (1978) Total Design Method (TDM) model was used for maximum return rate. A post-card (Appendix A) was mailed to participants on January 14, 2000, informing them of the forthcoming survey. The survey (Appendix B), along with a cover letter, was mailed to 84 study participants on January 21, 2000. The survey was self-addressed and stamped so the participant could tape it closed and mail it to the researcher. The cover letter (Appendix A) explained the purpose of the survey, instructions, and was signed by Dr. Van Shelhamer, Agricultural Education Professor, and the researcher. A follow-up postcard (Appendix A) was mailed February 9, 2000 to all participants who had not yet responded. A second copy of the survey was mailed February 18, 2000, along with a cover letter (Appendix A) urging them to participate by

returning the survey, and a second follow-up postcard (Appendix A) was mailed March 7, 2000. The last date survey returns were accepted was March 15, 2000. The data in Table 1 indicate an overall return rate of 58% for this study with 8.86% or 7 of the surveys returned after the second mailing of the survey.

Surveys received after February 29, 2000, were classified as late responders. The researcher compared 39 early and 7 late responders using a Mann-Whitney mean analysis as well as the independent groups t-test (Glass and Hopkins, 1996, p.303). Analysis showed no significant difference between the two groups, so all 46 returned surveys were used in computing the results.

The information arranged in Table 1 illustrates the return rate by organization. Members of American Agricultural Editors' Association (AAEA) returned 11 surveys for a 73% return rate, Agricultural Communicators of Tomorrow (ACT) advisors had a return rate of 66% (2 surveys), Agricultural Communicators in Education (ACE) members returned 23 surveys for a 53% return rate, and members of National Association of Farm Broadcasters (NAFB) returned 10 surveys, for a return rate of 43%.

Table 1. Return rate of Agricultural Communications Professionals by mailing date.

Organization:	First Mailing:		Second Mailing:		Total Returned	Percent Returned
	Number Sent	Number Returned	Number Sent	Number Returned		
NAFB	23	8	15	2	10	43%
ACE	43	19	24	3	23	53%
ACT	3	2	1	0	2	66%
AAEA	15	10	5	1	11	73%
Total	84	39	38	7	46	58%*

*Percentage based on a total of 79 available respondents.

Five members of the population were determined to be unavailable (three postcards were returned as not deliverable, one member had died, and one retired member sent a letter asking to be removed from the mailing list), and; therefore, not counted in the entire population of 84 that were sent the survey. Therefore, the return rate of 58% was based on a total of 79 available members of the population.

Data Analysis

Data were collected and saved into a computer system using Remark Office OMR 4.0®. Frequency scores were determined in Remark Office OMR 4.0®. The data files were then converted and analyzed by SPSS 9.0 ® software to determine Mann-Whitney scores, and further analyzed in Microsoft Excel 97®, using the built-in statistical components to determine t-tests, frequencies, mean and standard deviation.

CHAPTER 4

RESULTS OF THE STUDY

The study was designed to determine the communications and agricultural competencies needed by students enrolled in an agricultural communications curriculum at Montana State University, and to determine the need for a proposed agricultural communications curriculum as perceived by agricultural communications professionals. The results of the survey were divided into five areas: 1) Demographic Data, 2) Interest and Support for an Agricultural Communications Program, 3) Communications Competencies, 4) Agricultural Competencies and 5) Competencies Ranked by Means and Organizations.

Demographic Data

Information summarized in Table 2 shows the age distribution of the population. Thirty respondents [12 + 18] (67%) were between the ages of 31 and 50 years old. Five (11%) respondents were between 18 and 30 years old. Seven (15%) respondents were between 51 and 60 years, and 3 (7%) respondents were 61 years or older.

Table 2: Ages of survey participants. (N=45)*

Age Group	Frequency	
	N	%
18-30	5	11
31-40	12	27
41-50	18	40
51-60	7	15
61+	3	7
Total	45	100%

*N less than 46 due to non-response to this item.

The data in Table 3 indicate the length of time respondents have been employed in the agricultural communications career field. Twelve (27%) respondents had 0-5 years of experience. Four (9%) professionals had between 6 and 10 years of experience in agricultural communications. Fifteen (33%) respondents had between 11 and 20 years of experience in the agricultural communications field, eight (18%) respondents indicated they had between 21 and 30 years in the agricultural communications field. Six (13%) respondents had over 31 years of experience in agricultural communications.

Table 3: Number of year's respondents have been employed in agricultural communications. (N=45)*

Years	Frequency	
	n	%
0-5 years	12	27
6-10 years	4	9
11-20 years	15	33
21-30 years	8	18
31+ years	6	13
Total	45	100%

*N less than 46 due to non-response to this item.

The data in Table 4 show the level of education this population of professional agricultural communicators had obtained. Twenty (44%) respondents held a Bachelor's Degree, and 16 (36%) members of the population held a Master's Degree. Three (7%) respondents had a High School Diploma, while one (2%) held an Associate Degree. Four (9%) respondents obtained a Ph.D. Eighty-nine percent [44+36+9] of the population surveyed held Bachelor's degrees or higher.

Table 4: Highest level of education attained by respondents. (N=45)*

Level	Frequency	
	n	%
High School Diploma	3	7
Associate Degree	1	2
Bachelor's Degree	20	44
Master's Degree	16	36
Ph.D.	4	9
Other Certificate	1	2
Total	45	100%

*N less than 46 due to non-response to this item.

Information found in Table 5 shows that 50% of the population surveyed were employed in an academic institution. This reflects the 21 surveys returned by Agricultural Communicators in Education (ACE) members as shown in Table 1. Those employed in a private organization accounted for 35% of the population, and 11% were self-employed. The remaining 4% were employed in a government sector.

Respondents were asked to describe how their careers evolved into agricultural communications. One respondent said, "I knew I needed a specialty subject to attach to a journalism degree. At that time Colorado State University offered Ag Journalism. Best decision I ever made." Another respondent said that they were an Extension Agent

before going into agricultural communications. Another respondent commented, "Grew up on a farm/ranch. Got degree in journalism. Worked at a couple of newspapers before coming to land-grant university to do PR/writing. Here several years." The majority of written comments (Appendix E) indicated the respondents obtained college degrees ranging from journalism, mass communications, and speech communications to extension, animal science, agricultural economics, and zoology.

Table 5: Sectors of agricultural communications respondents were employed. (N=48)*

Employment	Frequency	
	n	%
Private Organization	17	35
Academic Institution	24	50
Government	2	4
Self Employed	5	11
Total	48	100%

*N less than 46 as one respondent was employed in all employment sectors.

Table 6 shows how respondents ranked five skills from the most commonly used to the least frequently used in completing their current work-related duties. Seventeen respondents ranked writing first. Twelve members of the population ranked editing first, and nine respondents ranked public relations first. Public speaking was ranked least used by 16 members of the population. Members of the population were asked to list other skills frequently used in completing work-related duties. Responses included photography, interviewing, various computer skills, administrative skills, special event planning, market analysis, and time management (Appendix E).

Table 6: Skills most commonly used in completing work-related duties.

Skill	Frequency										N*
	Rank 1 st	%	Rank 2 nd	%	Rank 3 rd	%	Rank 4 th	%	Rank 5 th	%	
Writing	17	39	13	30	4	9	8	18	2	5	44
Editing	12	28	12	28	5	12	5	12	9	21	43
Public Relations	9	22	5	12	16	39	9	22	2	5	41
Public Speaking	8	18	3	7	7	16	11	24	16	36	45
Marketing	3	7	8	20	8	20	13	32	9	22	41

*N less than 46 due to non-response by members of survey population.

Interest and Degree of Support for an Agricultural Communications Program

According to the data presented in Table 7, 44 [18+26] (98%) respondents were very familiar or somewhat familiar with university agricultural communications programs. Twenty-six (58%) respondents said they were somewhat familiar, and 18 (40%) agricultural communications professionals indicated they were very familiar with University Agricultural Communications Programs. Only one respondent indicated that he/she was not familiar with University Agricultural Communications Programs.

Table 7: Respondents' familiarity with university agricultural communications programs. (N=45)*

Level	Frequency	
	n	%
Very Familiar	18	40
Somewhat Familiar	26	58
Not Familiar	1	2
Total	45	100

*N less than 46 due to non-response to this item.

Respondents were asked, "Do you think an agricultural communications program at Montana State University would be beneficial to the agricultural industry in Montana,

North Dakota, South Dakota, Wyoming, Colorado, and Utah?" Forty-one (89%) respondents replied yes. Two respondents answered no, with one respondent commenting, "There are not enough graduates, other schools offer similar programs. Ag is not the key, being a good communicator is the key." One respondent created a third choice, "maybe," and one respondent commented, "I'm too pessimistic to answer yes, and too optimistic to say no." The data arranged in Table 8 indicate that 16 respondents offered support to a proposed agricultural communications program by offering internship opportunities. Eleven respondents said they would serve as a guest speaker for a course, nine respondents offered to be a guest speaker for ACT (Agricultural Communicators of Tomorrow), and five respondents offered other support listed in Appendix E.

Table 8: Types of support offered to an agricultural communications program. (N=41)

Type	Frequency	
	N	%
Internship Opportunities	16	39
Guest Speaker for Courses	11	27
Guest Speaker for ACT	9	22
Other Support	5	12
Total	41	100%

There were comments in the Further Comments portion of the survey (Appendix F). One respondent said, "I am unfamiliar with MSU's ag communications program; but given the state of today's ag industry I would be cautious about beginning or expanding an ag comm program. Every day (it seems) mergers are announced that reduce the number of positions available for ag comm professionals. That's why I strongly believe

ag comm students need a broad and diversified background to adapt to the rapidly changing industry." Another respondent commented, "I'm a full-time ag broadcaster but there are only four such jobs in Montana, none in Wyoming, maybe three in Colorado and Idaho. Less than 20 people have jobs like this in the 11 Western states, only 200-250 nationwide. There is a great need for ag communicators in marketing, industry information, sales, public relations, etc, but not many students will become full-time on-air reporters."

Communications Competencies

Seven areas of communication were listed with competency statements for each item. The areas were advertising, journalism, graphics, public relations, public speaking, telecommunications, and computer applications. Respondents were asked to rank their level of agreement between agree strongly, agree, disagree, and disagree strongly that the communications competency should be included in the proposed Montana State University College of Agriculture agricultural communications curriculum. Competency statement means between 1 and 1.49 indicated agree strongly, 1.5 to 2.49 indicated agree, 2.5 to 3.49 indicated disagree, and means between 3.5 and 4.0 indicated disagree strongly. Response rates varied from N=43 to N=46 due to non-response to random questions.

The data arranged in Table 9 show the level of agreement with specific advertising competencies. The mean for the competency, identify target audiences, was 1.41, indicating strongly agree that this item should be included in an agricultural communications curriculum. The competency, design advertising campaign, had a mean

of 1.76, which indicated that most respondents agree that this item should be included in an agricultural communications curriculum. Twenty-seven (59%) population members marked agree with this competency. The competency, demonstrate basic elements of graphic design, had a mean of 1.94, which also indicated agree, yet nine (19%) respondents indicated they disagreed this competency should be included in an agricultural communications curriculum. Twenty-seven (59%) respondents indicated they agree with this statement.

Table 9: Level of agreement with the need for specific advertising competencies. (N=46)

Competency	Frequency								Mean	SD
	Agree		Disagree		Disagree		Disagree			
	Strongly	%	Agree	%	Disagree	%	Strongly	%		
Identify target audiences	28	61	18	39	0	0	0	0	1.41	.50
Design advertising Campaign	15	33	27	59	4	8	0	0	1.76	.60
Demonstrate basic elements of graphic design	10	22	27	59	9	19	0	0	1.94	.68

The data arranged in Table 10 show the level of agreement with specific journalism competencies. The competency statement with the lowest mean, 1.20, was, reporting: apply writing skills, to which 37 (80%) respondents replied agree strongly. The statement, discuss ethical questions, make ethical choices, also rated in the agree strongly range with a mean of 1.33. The remaining statements had means in the agree range of 1.54 to 1.82. The statement, know Associated Press, radio, and television styles, had a mean of 1.54. The statement, discuss methods of dissemination, had a mean of 1.58. The statement, editing: edit using correct marks and symbols, had a mean of 1.72, 18 (39%) respondents said they agree strongly with this statement, 23 (50%) members of the population said agree, and 5 (11%) respondents said they disagreed with the statement.

Twenty-six (58%) respondents agreed with the statement, design and layout publications, which had a mean of 1.82.

Table 10: Level of agreement with the need for specific journalism competencies.

Competency	N*	Frequency								Mean	SD
		Agree		Disagree		Strongly		Strongly			
		Strongly	%	Agree	%	Disagree	%	Strongly	%		
Reporting: Apply writing skills	46	37	80	9	20	0	0	0	0	1.20	.40
Discuss ethical questions, make ethical choices	46	32	70	13	28	1	2	0	0	1.33	.52
Know Associated Press, radio, and TV styles	46	23	50	21	46	2	4	0	0	1.54	.59
Discuss methods of Dissemination	45	22	49	20	44	3	7	0	0	1.58	.62
Editing: Edit using correct marks and symbols	46	18	39	23	50	5	11	0	0	1.72	.66
Design and layout publications	45	16	36	26	58	2	4	0	0	1.82	.62

*N less than 46 due to non-response to specific competency statements.

Information in Table 11 shows the level of agreement with specific graphics competencies. All competency statements for this item were in the range of agree, with means between 1.76 and 2.34. The highest level of agreement was shown by a mean of 1.76 for the competency statement, discuss ethics in photography. The highest level of disagreement for a specific graphics competency was a mean of 2.34 for the statement, process color and black and white prints. Twenty-two (50%) respondents marked disagree with this statement.

Table 11: Level of agreement with the need for specific graphics competencies.

Competency	N*	Frequency								Mean	SD
		Agree		Disagree		Disagree		Strongly			
		Strongly	%	Agree	%	Disagree	%	Strongly	%		
Discuss ethics in photography	45	16	36	24	53	5	11	0	0	1.76	.65
Demonstrate effective Composition for audience	46	15	33	27	59	3	6	1	2	1.78	.66
Discuss photography theory and principles	45	13	29	29	64	3	7	0	0	1.78	.59
Demonstrate care and Function of cameras	45	8	18	27	60	10	22	0	0	2.04	.64
Process color and black and white prints	44	6	14	15	34	22	50	1	2	2.34	.83

*N<46 due to non-response to specific competency statements.

The information in Table 12 shows the level of agreement with specific public relations competencies. Thirty-one (69%) respondents marked agree strongly to the statement, know the difference between public relations and journalism, which had a mean of 1.41. The statement, identify audience and subject, had a mean of 1.50 with 26 (56%) respondents indicating agree strongly. The statement, explore the difference between news and advertising, had a mean of 1.54, with 26 (58%) respondents indicating agree strongly with this competency.

Table 12: Level of agreement with the need for specific public relations competencies.

Competency	N*	Frequency								Mean	SD
		Agree		Disagree		Disagree		Strongly			
		Strongly	%	Agree	%	Disagree	%	Strongly	%		
Know difference between P.R. and journalism	45	31	69	12	27	1	2	1	2	1.41	1.11
Identify audience and Subject	46	26	56	17	37	3	7	0	0	1.50	0.62
Explore difference between news and advertising	45	26	58	16	36	2	4	1	2	1.54	0.76

*N<46 due to non-response to specific competency statements.

The data in Table 13 show the level of agreement with specific public speaking competencies. The competency statement, apply effective speaking techniques, was

rated agree strongly by 24 (52%) respondents, and had a mean of 1.57. Four respondents marked disagree with this statement. The competency statement, select topic, compose and present speech, had a mean of 1.76, 18 (40%) respondents marked agree strongly, 20 (44%) respondents said agree, and 7 (16%) respondents said disagree. The statement, use appropriate hand and facial gestures, had the highest mean in this communications competency area with a mean of 2.07. Thirteen (29%) population members responded with disagree, 19 (42%) respondents marked agree, and 12 (27%) respondents indicated agree strongly that this statement should be included in an agricultural communications curriculum.

Table 13: Level of agreement with the need for specific public speaking competencies.

Competency	N*	Frequency								Mean	SD
		Agree		Disagree		Agree		Disagree			
		Strongly	%	Agree	%	Disagree	%	Strongly	%		
Apply effective speaking techniques	46	24	52	18	39	4	9	0	0	1.57	.66
Select topic, compose present speech	45	18	40	20	44	7	16	0	0	1.76	.71
Use appropriate hand and facial gestures	45	12	27	19	42	13	29	1	2	2.07	.81

*N less than 46 due to non-response to specific competency statements.

The information in Table 14 reveals the level of agreement with specific telecommunications competencies. All competency statements had means that fell into the agree range. Write radio broadcast copy material, rated lowest with a mean of 1.53. Two (4%) members of the survey population marked disagree with this statement, 23 (51%) respondents indicated they agree strongly with this statement, and twenty (54%) respondents marked agree. The competency statement, use appropriate broadcasting techniques, had a mean of 1.60, with 20 (45%) respondents indicating they agree this competency should be taught in an agricultural communications curriculum. The

competency statement, create media program formats for TV and radio news, had a mean of 1.73, with five (11%) respondents marking disagree. Eighteen (40%) respondents marked strongly agree, and 22 (49%) respondents marked agree that this competency should be included in an agricultural communications curriculum. The competency statement, write a script, interpret visually, had a mean of 1.77 with 24 (54%) respondents indicating agree. Three (7%) respondents marked disagree to this competency statement, and one (2%) respondent marked disagree strongly.

Table 14: Level of agreement with the need for specific telecommunications competencies.

Competency	N*	Frequency								Mean	SD
		Agree		Disagree		Strongly		Disagree			
		Strongly	%	Agree	%	Disagree	%	Strongly	%		
Write radio broadcast copy material	45	23	51	20	45	2	4	0	0	1.53	.59
Use appropriate broadcasting techniques	45	20	45	24	53	1	2	0	0	1.60	.58
Create media program formats for TV, radio news	45	18	40	22	49	5	11	0	0	1.73	.69
Write a script, interpret visually	44	16	36	24	54	3	7	1	2	1.77	.71

*N<46 due to non-response to specific competency statements.

The information in Table 15 shows the level of agreement with specific computer applications competencies. The competency statement with the lowest mean of 1.61 was, word processing: create, edit, format documents. Twenty-four (54%) respondents indicated they agreed strongly with this statement, 6 (14%) respondents marked disagree. The competency statement, navigate Internet, send and receive e-mail, had a mean of 1.80, with 21 (46%) respondents indicating agree strongly with this statement. Twelve (26%) respondents marked disagree with this competency statement. The highest scoring competency statement was, enter data, create graphs on spreadsheets, with a mean of

2.41. Twenty-one (48%) respondents marked disagree with this statement, and seven (16%) respondents indicated they agree strongly that this statement should be included in an agricultural communications curriculum. Regarding computer application competencies, one respondent commented, "While computer abilities are essential to communications work (i.e. e-mail, word processing, lay-out, photo manipulation, web design, etc.), some of these skills are basic! For example, word processing shouldn't be taught as part of agricultural communications, instead, it should be a requirement for getting into the program. Data-base and spreadsheet management should be taught outside the department and not be required" (Appendix F).

Table 15: Level of agreement with the need for specific computer applications competencies.

Competency	N*	Frequency								Mean	SD
		Agree		Disagree		Strongly		Disagree			
		Strongly	%	Agree	%	Disagree	%	Strongly	%		
Word Processing: create, edit, format documents	44	24	54	14	32	6	14	0	0	1.61	.71
Desktop Publications: perform layout and design	43	15	35	22	51	6	14	0	0	1.78	.66
Navigate Internet, send and receive e-mail	46	21	46	13	28	12	26	0	0	1.80	.83
Transfer and down-load through network	44	14	32	18	41	12	27	0	0	1.95	.78
Design graphics to increase understanding	45	9	20	29	64	7	16	0	0	1.96	.60
Design and produce slides and transparencies	45	9	20	22	49	14	31	0	0	2.09	.70
Design and enter data, access information	45	8	18	19	42	17	38	1	2	2.24	.77
Enter data, create graphs on spreadsheets	44	7	16	15	34	21	48	1	2	2.41	.76

*N<46 due to non-response to specific competency statements.

The standard deviation indicated variations among the groups surveyed. Further analysis was done to determine means for the competency statements by each organization surveyed, and to determine the variation between the groups. This analysis is shown in

Table 24, and discussed in more detail in the section, "Competencies Ranked by Means and Organizations."

Agricultural Competencies

Eight areas of agriculture were listed with competency statements for each item. The areas were: agricultural leadership, agronomy, livestock production, environmental science, food science, and competencies gained through an internship experience. Respondents were asked to rank their level of agreement between agree strongly, agree, disagree, and disagree strongly that the agricultural competency should be included in the proposed Montana State University College of Agriculture agricultural communications curriculum. Competency statement means between 1 and 1.49 indicated agree strongly, 1.5 to 2.49 indicated agree, 2.5 to 3.49 indicated disagree, and means between 3.5 and 4.0 indicated disagree strongly. Response rates varied from N=43 to N=46 due to non-response to random questions.

The information in Table 16 indicates the level of agreement with specific agricultural communications competencies. The statement, communicate agriculture to domestic public, had the lowest mean of 1.49, indicating agree strongly. Twenty-six (58%) respondents marked agree strongly. The competency statement, write articles, take photos of agricultural subjects, had a mean of 1.55, with 22 (50%) respondents marking agree strongly. Two (5%) respondents indicated they disagreed with this statement. The competency statement, discuss agriculture's role in international

relations, had a mean of 1.69, with six (13%) respondents marking disagree. Twenty-one (47%) respondents marked agree strongly, and 18 (40%) respondents marked agree to this statement.

Table 16: Level of agreement with the need for specific agricultural communications competencies.

Competency	N*	Frequency								Mean	SD
		Agree		Disagree		Disagree		Strongly			
		Strongly	%	Agree	%	Disagree	%	Strongly	%		
Communicate agriculture to domestic public	45	26	58	17	38	1	2	1	2	1.49	.66
Write articles, take photos of agriculture subjects	44	22	50	20	45	2	5	0	0	1.55	.59
Discuss agriculture's role in international relations	45	21	47	18	40	6	13	0	0	1.69	.76

*N less than 46 due to non-response to specific competency statements.

The information in Table 17 illustrates the level of agreement with specific agricultural economics competencies. The statement, discuss legislative policy upon agriculture, had the lowest mean of the competency statements at 1.73. Twenty-three (51%) respondents agreed with this statement, two (4%) persons disagreed, and two (4%) respondents disagreed strongly. The competency statement, discuss unique nature of agribusiness, had a mean of 1.86; 14 (32%) respondents marked agree strongly, 24 (55%) respondents marked agree, and five (11%) respondents said disagree. Thirteen (34%) respondents marked disagree to the statement, describe concepts of supply and demand, which had a mean of 2.09. Thirteen (29.5%) respondents marked agree strongly, and 15 (34%) respondents marked agree to this statement. Seven (16%) respondents marked disagree to the statement, describe marketing theories, futures and hedging, which had a mean of 2.05, while 15 (34%) respondents said strongly agree, and 17 (39%) said agree. The highest mean was 2.23 for the statement, discuss factors of economic growth.

Fourteen (32%) respondents marked disagree, and 17 (38%) respondents marked agree this competency should be included in an agricultural communications curriculum. Ten (23%) respondents said agree strongly to this statement.

Table 17: Level of agreement with the need for specific agricultural economics competencies.

Competency	N*	Frequency								Mean	SD
		Agree		Disagree		Agree		Disagree			
		Strongly	%	Strongly	%	Strongly	%	Strongly	%		
Discuss legislative policy upon agriculture	45	18	41	23	51	2	4	2	4	1.73	.75
Discuss unique nature of agribusiness	44	14	32	24	55	5	11	1	2	1.86	.73
Describe marketing theories, futures and hedging	44	15	34	17	38	7	16	5	12	2.05	.99
Describe concepts used to make financial decisions	44	13	30	16	36	12	27	3	7	2.07	.96
Describe concepts of supply and demand	44	13	30	15	33	13	30	3	7	2.09	.97
Discuss factors of economic growth	44	10	23	17	38	14	32	3	7	2.23	.89

*N less than 46 due to non-response to specific competency statements.

The data in Table 18 show the level of agreement with specific agricultural leadership competencies. All of the competency statements in this area had means between 1.82 and 2.34, falling in the range of agree that these competencies should be included in an agricultural communications curriculum. The lowest mean was 1.82 for the statement, discuss ways to influence and motivate others. Sixteen (36%) respondents said they agree strongly with this statement, 21 (48%) respondents said they agree with this statement, and six (14%) respondents marked disagree. The statement, develop a personal mission statement, had a mean of 2.34, with five (11%) respondents indicating disagree strongly, and 16 (36%) respondents marking disagree; eleven (25%) respondents marked agree strongly, and 12 (28%) respondents marked agree. The statement, evaluate

the performance of co-workers, had a mean of 2.34, with 14 (32%) marking disagree, four (9%) respondents indicated disagree strongly. Seventeen (39%) members of the population said agree, nine (20%) said agree strongly with this statement.

Table 18: Level of agreement with the need for specific agricultural leadership competencies.

Competency	N*	Frequency								Mean	SD
		Agree		Disagree		Strongly		Disagree			
		Strongly	%	Agree	%	Disagree	%	Strongly	%		
Discuss ways to influence and motivate others	44	16	36	21	48	6	14	1	2	1.82	.76
Describe impact of ethics on personal development	45	16	36	21	46	7	16	1	2	1.84	.77
Demonstrate decision making skills	44	11	25	24	55	8	18	1	2	1.98	.73
Apply methods of conflict resolution	44	9	20	24	55	9	20	2	5	2.09	.77
Evaluate the performance of co-workers	44	9	20	17	39	14	32	4	9	2.34	.94
Develop a personal mission statement	44	11	25	12	28	16	36	5	11	2.34	.99

*N<46 due to non-response to specific competency statements.

The information in Table 19 shows the level of agreement with specific agronomy competencies. The means for the three statements in this agricultural area were between 2.00 and 2.13, indicating agree. The competency statement, understand basic plant science principles, had a mean of 2.00, 24 (56%) respondents indicated agree, while five (12%) respondents said they disagree with this statement. The competency statement, understand pest management principles, had a mean of 2.07, 25 (58%) respondents marked agree, and six (14%) respondents indicated they disagreed with the statement. Understand soil principles, had the highest mean of 2.13 in this agricultural area.

Twenty-three (53%) respondents marked agree, and eight (19%) respondents indicated disagree. Three (7%) respondents marked disagree strongly for each competency statement in the agronomy competencies.

Table 19: Level of agreement with the need for specific agronomy competencies.

Competency	N*	Frequency								Mean	SD
		Agree		Disagree		Agree		Disagree			
		Strongly	%	Strongly	%	Strongly	%	Strongly	%		
Understand basic plant science principles	43	11	25	24	56	5	12	3	7	2.00	.83
Understand pest management principles	43	9	21	25	58	6	14	3	7	2.07	.81
Understand soil principles	43	9	21	23	53	8	19	3	7	2.13	.82

*N<46 due to non-response to specific competency statements.

The information in Table 20 shows the level of agreement with specific livestock production and management competencies. All competency statement means were over 2.0. The lowest scoring statement was, understand basic principles of animal genetics, which had a mean of 2.09. Twenty-five (57%) respondents marked agree, and eight (18%) respondents marked disagree. Nine (20%) respondents marked agree strongly. The statement, understand live animal evaluation, had the highest mean of 2.31, 15 (34%) respondents marked disagree, and three (7%) respondents marked disagree strongly. Eighteen (41%) respondents said they agree with this statement, and eight (18%) respondents said they agree strongly with this statement.

Table 20: Level of agreement with the need for specific livestock production and management competencies.

Competency	N*	Frequency								Mean	SD
		Agree		Disagree		Disagree		Strongly			
		Strongly	%	Agree	%	Disagree	%	Strongly	%		
Understand basic principles of animal genetics	44	9	20	25	57	8	18	2	5	2.09	.76
Understand nutrition	44	10	23	22	50	9	20	3	7	2.13	.84
Understand livestock reproduction	44	8	18	24	55	9	20	3	7	2.18	.81
Understand live animal evaluation	44	8	18	18	41	15	34	3	7	2.31	.85

*N<46 due to non-response to specific competency statements.

The data arranged in Table 21 show the level of agreement with specific environmental science competencies. The statement, discuss sustainability, impact on ecosystem, had a mean of 1.80, with 21 (48%) respondents indicating agree, and 17 (39%) respondents indicating agree strongly. Four (9%) respondents marked disagree, and two (4%) respondents marked disagree strongly. The second statement, know how organisms relate to their environment, had a mean of 1.98. Twenty-one (48%) respondents marked agree, 13 (30%) respondents marked agree strongly, eight (18%) respondents marked disagree, and two (4%) respondents marked disagree strongly with this statement.

Table 21: Level of agreement with the need for specific environmental science competencies.

Competency	N*	Frequency								Mean	SD
		Agree		Disagree		Disagree		Strongly			
		Strongly	%	Agree	%	Disagree	%	Strongly	%		
Discuss sustainability, impact on ecosystem	44	17	39	21	48	4	9	2	4	1.80	.79
Know how organisms relate to environment	44	13	30	21	48	8	18	2	4	1.98	.82

*N<46 due to non-response to specific competency statements.

Information from Table 22 shows the level of agreement with specific food science/technology competencies. The statement, food safety: describe the basics of food classification, modern processing and quality/safety control, had a mean of 1.98, 20 (44%) respondents indicated agree, 14 (31%) respondents marked agree strongly, nine (20%) respondents marked disagree, and two (5%) respondents indicated they disagree strongly with this statement. The second statement, summarize basic nutrition principles, had a mean of 2.09, 22 (51%) respondents said they agree with this statement, while 10 (23%) respondents marked disagree. Nine (21%) respondents indicated agree strongly to this statement.

Table 22: Level of agreement with the need for specific food science/technology competencies.

Competency	N*	Frequency								Mean	SD
		Agree		Disagree		Agree		Disagree			
		Strongly	%	Agree	%	Disagree	%	Strongly	%		
Describe classification, processing, quality/safety	45	14	31	20	44	9	20	2	5	1.98	.84
Summarize basic nutrition principles	43	9	21	22	51	10	23	2	5	2.09	.91

*N<46 due to non-response to specific competency statements.

The information in Table 23 shows the level of agreement with competencies gained through an internship experience. The competency statement with the lowest mean of 1.49 was, apply agricultural communications concepts. Twenty-nine (64%) respondents indicated agree strongly, while 12 (26%) respondents indicated agree and two (5%) respondents said disagree to this competency statement. The highest mean of 1.58 was for the competency statement, model professionalism, make positive contributions to the firm. Five (11%) respondents indicated they disagree with this statement, and 26 (58%) respondents said they agree strongly with this statement.

Table 23: Level of agreement with the need for competencies gained in an internship experience.

Internship Experience	N*	Frequency								Mean	SD
		Agree		Disagree		Disagree		Strongly			
		Strongly	%	Agree	%	Disagree	%	Strongly	%		
Apply ag communications concepts	45	29	64	12	26	2	5	2	5	1.49	.79
Demonstrate reliability, trust work as team member	45	27	60	14	31	3	7	1	2	1.51	.73
Apply human relations skills to solve workplace problems	45	27	60	14	31	3	7	1	2	1.51	.73
Demonstrate responsibility and credibility	45	25	56	17	37	2	5	1	2	1.53	.69
Model professionalism, make positive contributions to firm	45	26	58	13	29	5	11	1	2	1.58	.78

*N<46 due to non-response to specific competency statements.

The standard deviation indicated variations among the groups surveyed. Further analysis was done to determine means for the competency statements by each organization surveyed, and to determine the variation between the groups. This analysis is shown in Table 28, and discussed in more detail in the section, "Competencies Ranked by Means and Organizations."

Competencies Ranked by Means and Organizations

The information arranged in Table 24 provides a list of communications competencies listed in order of rank by the means. The competency statement, reporting, apply writing skills, had the highest level of agreement with a mean of 1.20. The next competency statement with the highest level of agreement, discuss ethical questions, make ethical choices, had a mean of 1.33. The competency statements, identify target audience (mean of 1.41); know the difference between public relations and journalism

(mean of 1.41); and identify audience and subject (mean of 1.50), were the remaining three of the first five competencies listed.

The competencies with higher means, indicating less agreement that these competencies should be included in an agricultural communications curriculum, had means over 2.00. The competency statements were: demonstrate care and function of cameras (mean of 2.04); use appropriate hand and facial gestures (mean of 2.07); design, produce slides and transparencies (mean of 2.09); design and enter data, access information (mean of 2.24); process color and black and white prints (mean of 2.34); and enter data, create graphs on spreadsheets (mean of 2.41).

Predictably, those surveyed from organizations with specific needs, such as broadcast journalists, emphasized different skills. For example, photography wasn't important to broadcasters, but write radio broadcast copy material rated strongly agree. The editors emphasized reporting and writing skills, and placed less emphasis on select topic, compose, and present a speech. The educators emphasized competencies such as ethics and audience identification, and placed less emphasis on computer skills such as enter data, create graphs on spreadsheets; and design and enter data, access information.

Table 24: Summary of communications competencies listed in order by rank of population with organization means.

Competency	n	Population		NAFB		AAEA		ACE	
		Mean	SD	Mean	SD	Mean	SD	Mean	SD
Reporting: Apply writing skills	46	1.20	.40	1.40	.52	1.09	.30	1.17	.39
Discuss ethical questions, make choices	46	1.33	.52	1.60	.52	1.18	.40	1.26	.54
Identify target audience	46	1.41	.50	1.50	.53	1.64	.50	1.26	.45
Know diff. between P. R. and journalism	45	1.41	.69	1.60	.70	1.36	.67	1.30	.70
Identify audience and subject	46	1.50	.62	1.70	.67	1.82	.60	1.26	.54
Write radio broadcast copy material	45	1.53	.59	1.20	.42	1.45	.52	1.72	.63
Know Assoc. Press, radio, and TV styles	46	1.54	.59	1.50	.53	1.45	.52	1.57	.66
Explore diff. between news and advertising	45	1.54	.72	1.50	.53	1.27	.65	1.65	.83
Apply effective speaking techniques	46	1.57	.66	1.20	.63	1.73	.79	1.65	.57
Discuss methods of dissemination	45	1.58	.62	2.00	.47	1.55	.69	1.41	.59
Use appropriate broadcasting techniques	45	1.60	.58	1.20	.42	1.45	.52	1.82	.59
Word Proc.: create, edit, format documents	44	1.61	.71	1.60	.52	1.64	.81	1.61	.78
Edit using correct marks and symbols	46	1.72	.66	1.50	.53	1.64	.67	1.83	.72
Create media program formats	45	1.73	.69	1.70	.67	1.45	.52	1.86	.71
Design advertising campaign	46	1.76	.60	1.80	.63	1.64	.67	1.78	.60
Discuss ethics in photography	45	1.76	.65	2.33	.50	1.36	.67	1.70	.56
Select topic, compose, present speech	45	1.76	.71	1.33	.50	2.09	.94	1.74	.62
Write a script, interpret visually	44	1.77	.71	1.40	.53	1.55	.69	2.00	.69
Demo. effective composition for audience	46	1.78	.66	2.00	.47	1.64	.67	1.78	.74
Desktop Pub.: perform layout and design	43	1.78	.66	1.60	.52	1.82	.75	1.87	.69
Navigate Internet, send and receive e-mail	46	1.80	.83	1.33	.50	1.30	.48	2.00	.95
Discuss photography theory and principles	45	1.80	.59	2.11	.33	1.45	.69	1.83	.58
Design and layout publications	45	1.82	.62	2.22	.44	1.73	.79	1.77	.53
Demo. basic elements of graphic design	46	1.94	.68	2.20	.63	1.82	.75	1.91	.67
Transfer and down-load through network	44	1.95	.78	1.78	.44	1.60	.70	2.13	.87
Design graphics to increase understanding	45	1.96	.60	2.00	.50	1.91	.83	1.96	.56
Demonstrate care and function of cameras	45	2.04	.64	2.33	.50	1.64	.81	2.09	.51
Use appropriate hand and facial gestures	45	2.07	.81	1.90	.74	2.00	.89	2.14	.83
Design, produce slides and transparencies	45	2.09	.70	2.00	.71	2.09	.83	2.13	.69
Design and enter data, access information	45	2.24	.77	2.10	.57	2.00	.82	2.39	.84
Process color and black and white prints	44	2.34	.83	2.33	.50	2.09	.94	2.48	.90
Enter data, create graphs on spreadsheets	44	2.41	.76	2.30	.67	2.20	.92	2.55	.74

The information in Table 25 provides a listing of communications competencies ranked in order by American Agricultural Editors' Association (AAEA) members. The competency statement with the lowest mean, indicating highest level of agreement that the competency statement should be included in an agricultural communications

curriculum was, reporting: apply writing skills, with a mean of 1.09. The statement, discuss ethical questions, make ethical choices, had a mean of 1.18. AAEA members ranked the following three statements in the top five: explore difference between news and advertising (mean of 1.27); navigate the Internet, send and receive e-mail (mean of 1.30); and know the difference between public relations and journalism (mean of 1.36). The highest scoring competencies, indicating less agreement that these competencies should be included in an agricultural communications program were: select topic, compose, present speech (mean of 2.09); design and produce slides and transparencies (mean of 2.09); process color and black and white prints (mean of 2.09); and enter data, create graphs on spreadsheets (mean of 2.20).

Table 25: Communications competencies listed in order of AAEA members ranking.

Competency	AAEA			Population		
	n	Mean	SD	n	Mean	SD
Reporting: Apply writing skills	11	1.09	.30	46	1.20	.40
Discuss ethical questions, make choices	11	1.18	.40	46	1.33	.52
Explore difference between news and advertising	11	1.27	.65	45	1.54	.72
Navigate internet, send and receive e-mail	10	1.30	.48	46	1.80	.83
Know difference between P. R. and Journalism	11	1.36	.67	45	1.41	.69
Discuss ethics in photography	11	1.36	.67	45	1.76	.65
Write radio broadcast copy material	11	1.45	.52	45	1.53	.59
Use appropriate broadcasting techniques	11	1.45	.52	45	1.60	.58
Know Associated Press, radio, and TV styles	11	1.45	.52	46	1.54	.59
Create media program formats	11	1.45	.52	45	1.73	.69
Discuss photography theory and principles	11	1.45	.69	45	1.80	.59
Write a script, interpret visually	11	1.55	.69	44	1.77	.71
Discuss methods of dissemination	11	1.55	.69	45	1.58	.62
Transfer and down-load through network	10	1.60	.70	44	1.95	.78
Identify target audience	11	1.64	.50	46	1.41	.50
Editing: Edit using correct marks and symbols	11	1.64	.67	46	1.72	.66
Word Processing: create, edit, format documents	11	1.64	.81	44	1.61	.71
Design advertising campaign	11	1.64	.67	46	1.76	.60
Demonstrate effective composition for audience	11	1.64	.67	46	1.78	.66
Demonstrate care and function of cameras	11	1.64	.81	45	2.04	.64
Apply effective speaking techniques	11	1.73	.79	46	1.57	.66
Design and layout publications	11	1.73	.79	45	1.82	.62
Desktop Publications: perform layout and design	11	1.82	.75	43	1.78	.66
Identify audience and subject	11	1.82	.60	46	1.50	.62
Demonstrate basic elements of graphic design	11	1.82	.75	46	1.94	.68
Design graphics to increase understanding	11	1.91	.83	45	1.96	.60
Use appropriate hand and facial gestures	11	2.00	.89	45	2.07	.81
Design and enter data, access information	10	2.00	.82	45	2.24	.77
Select topic, compose, present speech	11	2.09	.94	45	1.76	.71
Design and produce slides and transparencies	11	2.09	.83	45	2.09	.70
Process color and black and white prints	11	2.09	.94	44	2.34	.83
Enter data, create graphs on spreadsheets	10	2.20	.92	44	2.41	.76

The data arranged in Table 26 show how Agricultural Communicators in Education (ACE) members ranked specific communications competencies. Data from two surveys returned by Agricultural Communicators of Tomorrow (ACT) advisors were included in the ACE data. The top five competency statements were: reporting; apply writing skills (mean of 1.17); discuss ethical questions, make choices (mean of 1.26); identify target audience (mean of 1.26); identify audience and subject (mean of

1.26); and know the difference between public relations and journalism (mean of 1.30).

The competency statements that were ranked last include: enter data, create graphs on spreadsheets (mean of 2.55); process color and black and white prints (mean of 2.48); design and enter data, access information (mean of 2.39); and use appropriate hand and facial gestures (mean of 2.14).

Table 26: Communications competencies listed in order of ACE members ranking.

Competency	ACE			Population		
	n	Mean	SD	n	Mean	SD
Reporting: Apply writing skills	25	1.17	.39	46	1.20	.40
Discuss ethical questions, make choices	25	1.26	.54	46	1.33	.52
Identify target audience	25	1.26	.45	46	1.41	.50
Identify audience and subject	25	1.26	.54	46	1.50	.62
Know difference between P. R. and Journalism	25	1.30	.70	45	1.41	.69
Discuss methods of dissemination	24	1.41	.59	45	1.58	.62
Know Associated Press, radio, and TV styles	25	1.57	.66	46	1.54	.59
Word Processing: create, edit, format documents	25	1.61	.78	44	1.61	.71
Explore difference between news and advertising	25	1.65	.83	45	1.54	.72
Apply effective speaking techniques	25	1.65	.57	46	1.57	.66
Discuss ethics in photography	25	1.70	.56	45	1.76	.65
Write radio broadcast copy material	24	1.72	.63	45	1.53	.59
Select topic, compose, present speech	25	1.74	.62	45	1.76	.71
Design and layout publications	24	1.77	.53	45	1.82	.62
Design advertising campaign	25	1.78	.60	46	1.76	.60
Demonstrate effective composition for audience	25	1.78	.74	46	1.78	.66
Use appropriate broadcasting techniques	24	1.82	.59	45	1.60	.58
Discuss photography theory and principles	25	1.83	.58	45	1.80	.59
Editing: Edit using correct marks and symbols	25	1.83	.72	46	1.72	.66
Create media program formats	24	1.86	.71	45	1.73	.69
Desktop Publications: perform layout and design	25	1.87	.69	43	1.78	.66
Demonstrate basic elements of graphic design	25	1.91	.67	46	1.94	.68
Design graphics to increase understanding	25	1.96	.56	45	1.96	.60
Write a script, interpret visually	24	2.00	.69	44	1.77	.71
Navigate internet, send and receive e-mail	21	2.00	.95	46	1.80	.83
Demonstrate care and function of cameras	25	2.09	.51	45	2.04	.64
Transfer and down-load through network	25	2.13	.87	44	1.95	.78
Design and produce slides and transparencies	25	2.13	.69	45	2.09	.70
Use appropriate hand and facial gestures	25	2.14	.83	45	2.07	.81
Design and enter data, access information	25	2.39	.84	45	2.24	.77
Process color and black and white prints	25	2.48	.90	44	2.34	.83
Enter data, create graphs on spreadsheets	24	2.55	.74	44	2.41	.76

The information in Table 27 shows the ranking of communications competencies by members of the National Association of Farm Broadcasters (NAFB). The competency statements ranked at the top were: write radio broadcast copy material (mean of 1.20); apply effective speaking techniques (mean of 1.20); use appropriate broadcasting techniques (mean of 1.20); select topic, compose, present speech (mean of 1.33); and navigate internet, send and receive e-mail (mean of 1.33). The competency statements that were listed last include process color and black and white prints (mean of 2.33); demonstrate care and function of cameras (mean of 2.33); discuss ethics in photography (mean of 2.33); enter data, create graphs on spreadsheets (mean of 2.30), and design and layout publications (mean of 2.22).

Table 27: Communications competencies listed in order of NAFB members ranking.

Competency	NAFB			Population		
	n	Mean	SD	n	Mean	SD
Write radio broadcast copy material	10	1.20	.42	45	1.53	.59
Apply effective speaking techniques	10	1.20	.63	46	1.57	.66
Use appropriate broadcasting techniques	10	1.20	.42	45	1.60	.58
Select topic, compose, present speech	9	1.33	.50	45	1.76	.71
Navigate Internet, send and receive e-mail	9	1.33	.50	46	1.49	.66
Reporting: Apply writing skills	10	1.40	.52	46	1.20	.40
Write a script, interpret visually	9	1.40	.53	44	1.77	.71
Identify target audience	10	1.50	.53	46	1.41	.50
Know Associated Press, radio, and TV styles	10	1.50	.53	46	1.54	.59
Explore difference between news and advertising	10	1.50	.53	45	1.54	.72
Editing: Edit using correct marks and symbols	10	1.50	.53	46	1.72	.66
Discuss ethical questions, make choices	10	1.60	.52	46	1.33	.52
Know difference between P. R. and Journalism	10	1.60	.70	45	1.41	.69
Word Processing: create, edit, format documents	10	1.60	.52	44	1.61	.71
Desktop Publications: perform layout and design	10	1.60	.52	43	1.78	.66
Identify audience and subject	10	1.70	.67	46	1.50	.62
Create media program formats	10	1.70	.67	45	1.73	.69
Transfer and down-load through network	9	1.78	.44	44	1.95	.78
Design advertising campaign	10	1.80	.63	46	1.76	.60
Use appropriate hand and facial gestures	10	1.90	.74	45	2.07	.81
Discuss methods of dissemination	10	2.00	.47	45	1.58	.62
Demonstrate effective composition for audience	10	2.00	.47	46	1.78	.66
Design graphics to increase understanding	9	2.00	.50	45	1.96	.60
Design and produce slides and transparencies	9	2.00	.71	45	2.09	.70
Design and enter data, access information	10	2.10	.57	45	2.24	.77
Discuss photography theory and principles	9	2.11	.33	45	1.80	.59
Demonstrate basic elements of graphic design	10	2.20	.63	46	1.94	.68
Design and layout publications	9	2.22	.44	45	1.82	.62
Enter data, create graphs on spreadsheets	10	2.30	.67	44	2.41	.76
Discuss ethics in photography	9	2.33	.50	45	1.76	.65
Demonstrate care and function of cameras	9	2.33	.50	45	2.04	.64
Process color and black and white prints	9	2.33	.50	44	2.34	.83

The data organized in Table 28 illustrates the agricultural competencies listed in order by population rank, and also lists organization means. The competency statements listed first were: communicate agriculture to the domestic public; and, apply agricultural communications concepts, which had means of 1.49. The statements: demonstrate reliability, trust, and the ability to work as a team member; and, apply human relations skills to solve problems in the workplace, had means of 1.51 and ranked third. The

statement, demonstrate responsibility and credibility, had a mean of 1.53. These competencies were under the area of internship experience, and thus not directly related to agriculture. The skills ranking at the bottom of the list were: understand livestock reproduction (mean of 2.18); discuss factors of economic growth (mean of 2.23); understand live animal evaluation (mean of 2.31); evaluate the performance of co-workers (mean of 2.34); and develop a personal mission statement (mean of 2.34).

Table 28: Summary of agricultural competencies listed in order by ranking of population with organization means.

Competency	n	Population		NAFB		AAEA		ACE	
		Mean	SD	Mean	SD	Mean	SD	Mean	SD
Communicate agriculture to the domestic public	45	1.49	.66	1.30	.48	1.55	.69	1.55	.74
Apply agricultural communications concepts	45	1.49	.79	1.30	.48	1.09	.30	1.82	.96
Demo. Reliability trust, work as team member	45	1.51	.73	1.50	.71	1.27	.47	1.68	.84
Apply human relations skills to solve problems	45	1.51	.73	1.50	.53	1.18	.40	1.73	.88
Demonstrate responsibility and credibility	45	1.53	.69	1.50	.53	1.27	.47	1.73	.83
Write articles, take photos of ag. subjects	44	1.55	.59	1.78	.44	1.36	.50	1.5	.60
Model profess., make pos. contributions to firm	45	1.58	.78	1.40	.70	1.27	.47	1.86	.89
Discuss ag's role in international relations	45	1.69	.76	1.70	.82	1.45	.52	1.77	.87
Discuss legislative policy upon agriculture	45	1.73	.75	1.60	.52	1.36	.50	2.00	.87
Discuss sustainability, impact on ecosystem	44	1.80	.79	1.90	.57	1.45	.69	1.95	.92
Discuss ways to influence and motivate others	44	1.82	.76	1.70	.82	1.64	.81	1.95	.67
Desc. impact of ethics on personal development	45	1.84	.77	1.90	.57	1.36	.67	2.09	.81
Discuss unique nature of agribusiness	44	1.86	.73	1.80	.63	1.64	.67	2.05	.80
Demonstrate decision making skills	44	1.98	.73	2.10	.57	1.64	.67	2.09	.77
Know how organisms relate to their env.	44	1.98	.82	2.10	.74	1.73	.79	2.10	.89
Desc. food class., quality/safety control	45	1.98	.84	2.00	.67	1.73	.90	2.14	.89
Understand basic plant science principles	43	2.00	.83	1.60	.52	1.91	.83	2.23	.92
Desc. mktng theories, hedging, futures contracts	44	2.05	.99	1.67	.71	1.64	.81	2.41	1.10
Desc. concepts used to make fin. decisions	44	2.07	.96	1.80	.63	1.82	.87	2.36	1.09
Understand pest management principles	43	2.07	.81	1.80	.42	1.91	.83	2.72	.94
Describe concepts of supply/demand	44	2.09	.97	1.90	.74	1.73	.90	2.36	1.09
Apply methods of conflict resolution	44	2.09	.77	2.10	.57	1.82	.75	2.19	.87
Understand basic principles of animal genetics	44	2.09	.76	1.90	.32	2.00	.89	2.23	.87
Summarize basic nutrition principles	43	2.09	.91	2.20	1.03	1.91	.94	2.19	.87
Understand soil principles	43	2.13	.82	1.90	.57	2.00	.89	2.32	.89
Understanding of nutrition	44	2.13	.84	1.80	.42	2.00	.89	2.36	.95
Understanding of livestock reproduction	44	2.18	.81	1.90	.32	1.91	.83	2.45	.91
Discuss factors of economic growth	44	2.23	.89	2.10	.57	1.82	.98	2.52	.93
Understand live animal evaluation	44	2.31	.85	2.00	.47	2.09	.94	2.55	.91
Evaluate the performance of co-workers	44	2.34	.94	2.30	.82	1.82	.87	2.62	.97
Develop a personal mission statement	44	2.34	.99	1.90	.99	1.91	.94	2.81	.87

The data presented in Table 29 shows how members of American Agricultural Editors' Association (AAEA) ranked the agricultural competencies. The top skill listed was apply agricultural communications concepts, with a mean of 1.09. The competency statement, apply human relations skills to solve workplace problems, ranked second, with a mean of 1.18. The remaining three of the top five competencies listed were: demonstrate reliability and trust, work as a team member (mean of 1.27); demonstrate responsibility and credibility (mean of 1.27); and model professionalism, make positive contributions to the firm (mean of 1.27). Agricultural competencies that AAEA members ranked last were: understand basic principles of animal genetics (mean of 2.00); understand soil principles (mean of 2.00); understand nutrition (mean of 2.00); and understand live animal evaluation (mean of 2.09).

Table 29: Agricultural competencies listed in order of AAEA members ranking.

Competency	AAEA			Population		
	n	Mean	SD	n	Mean	SD
Apply agricultural communications concepts	11	1.09	.30	45	1.49	.79
Apply human relations skills to solve workplace problems	11	1.18	.40	45	1.51	.73
Demonstrate reliability and trust, work as team member	11	1.27	.47	45	1.51	.73
Demonstrate responsibility and credibility	11	1.27	.47	45	1.53	.69
Model professionalism, make positive contributions to firm	11	1.27	.47	45	1.58	.78
Write articles and take photographs of agriculture subjects	11	1.36	.50	44	1.55	.59
Discuss legislative policy upon agriculture	11	1.36	.50	45	1.73	.75
Describe the impact of ethics on personal development	11	1.36	.67	45	1.84	.77
Discuss agriculture's role in international relations	11	1.45	.52	45	1.69	.76
Discuss sustainability, impact on ecosystem	11	1.45	.69	44	1.80	.79
Communicate agriculture to the domestic public	11	1.55	.69	45	1.49	.66
Discuss ways to influence and motivate others	11	1.64	.81	44	1.82	.76
Discuss unique nature of agribusiness	11	1.64	.67	44	1.86	.73
Demonstrate decision making skills	11	1.64	.67	44	1.98	.73
Describe marketing theories, hedging, and futures contracts	11	1.64	.81	44	2.05	.99
Know how organisms relate to their environment	11	1.73	.79	44	1.98	.82
Describe food classification, quality/safety control	11	1.73	.90	45	1.98	.84
Describe concepts of supply/demand	11	1.73	.90	44	2.09	.97
Describe concepts used to make financial decisions	11	1.82	.87	44	2.07	.96
Apply methods of conflict resolution	11	1.82	.75	44	2.09	.77
Discuss factors of economic growth	11	1.82	.98	44	2.23	.89
Evaluate the performance of co-workers	11	1.82	.87	44	2.34	.94
Understand basic plant science principles	11	1.91	.83	43	2.00	.83
Understand pest management principles	11	1.91	.83	43	2.07	.81
Summarize basic nutrition principles	11	1.91	.94	43	2.09	.91
Understanding of livestock reproduction	11	1.91	.83	44	2.18	.81
Develop a personal mission statement	11	1.91	.94	44	2.34	.99
Understand basic principles of animal genetics	11	2.00	.89	44	2.09	.76
Understand soil principles	11	2.00	.89	43	2.13	.82
Understanding of nutrition	11	2.00	.89	44	2.13	.84
Understand live animal evaluation	11	2.09	.94	44	2.31	.85

The data arranged in Table 30 show the agricultural competencies listed in order of Agricultural Communicators in Education (ACE) members' ranking. Data from two surveys returned by Agricultural Communicators of Tomorrow (ACT) advisors were included in the ACE data. The top competencies listed were: write articles and take photographs of agriculture subjects (mean of 1.50); communicate agriculture to the domestic public (mean of 1.55); demonstrate reliability and trust, work as a team member

(mean of 1.68); apply human relations skills to solve workplace problems (mean of 1.73); and demonstrate responsibility and credibility (mean of 1.73). The competency statements that ranked at the bottom of the list were: discuss factors of economic growth (mean of 2.52); understand live animal evaluation (mean of 2.55); evaluate the performance of co-workers (mean of 2.62); understand pest management principles (mean of 2.72); and develop a personal mission statement (mean of 2.81).

Table 30: Agricultural competencies listed in order of ACE members ranking.

Competency	ACE			Population		
	n	Mean	SD	n	Mean	SD
Write articles and take photographs of agriculture subjects	24	1.50	.60	44	1.55	.59
Communicate agriculture to the domestic public	25	1.55	.74	45	1.49	.66
Demonstrate reliability and trust, work as team member	24	1.68	.84	45	1.51	.73
Apply human relations skills to solve workplace problems	24	1.73	.88	45	1.51	.73
Demonstrate responsibility and credibility	24	1.73	.83	45	1.53	.69
Discuss agriculture's role in international relations	24	1.77	.87	45	1.69	.76
Apply agricultural communications concepts	24	1.82	.96	45	1.49	.79
Model professionalism, make positive contributions to firm	24	1.86	.89	45	1.58	.78
Discuss sustainability, impact on ecosystem	23	1.95	.92	44	1.80	.79
Discuss ways to influence and motivate others	23	1.95	.67	44	1.82	.76
Discuss legislative policy upon agriculture	24	2.00	.87	45	1.73	.75
Discuss unique nature of agribusiness	23	2.05	.80	44	1.86	.73
Describe the impact of ethics on personal development	24	2.09	.81	45	1.84	.77
Demonstrate decision making skills	23	2.09	.77	44	1.98	.73
Know how organisms relate to their environment	23	2.10	.89	44	1.98	.82
Describe food classification, quality/safety control	24	2.14	.89	45	1.98	.84
Apply methods of conflict resolution	23	2.19	.87	44	2.09	.77
Summarize basic nutrition principles	23	2.19	.87	43	2.09	.91
Understand basic plant science principles	24	2.23	.92	43	2.00	.83
Understand basic principles of animal genetics	24	2.23	.87	44	2.09	.76
Understand soil principles	24	2.32	.89	43	2.13	.82
Describe concepts used to make financial decisions	24	2.36	1.09	44	2.07	.96
Describe concepts of supply/demand	24	2.36	1.09	44	2.09	.97
Understand nutrition	24	2.36	.95	44	2.13	.84
Describe marketing theories, hedging, and futures contracts	24	2.41	1.10	44	2.05	.99
Understand livestock reproduction	24	2.45	.91	44	2.18	.81
Discuss factors of economic growth	23	2.52	.93	44	2.23	.89
Understand live animal evaluation	24	2.55	.91	44	2.31	.85
Evaluate the performance of co-workers	23	2.62	.97	44	2.34	.94
Understand pest management principles	24	2.72	.94	43	2.07	.81
Develop a personal mission statement	23	2.81	.87	44	2.34	.99

The information presented in Table 31 illustrates the agricultural competencies listed in order of National Association of Farm Broadcasting (NAFB) members ranking. The top competencies NAFB members listed were communicate agriculture to the domestic public; and apply agricultural communications concepts, which each had a mean of 1.30. Ranking third was the statement, model professionalism, make positive contributions to the firm (mean 1.40). Three competency statements had means of 1.50: demonstrate reliability and trust, work as a team member; apply human relations skills to solve workplace problems; and demonstrate responsibility and credibility. Competency statements that ranked last were: summarize basic nutrition principles (mean of 2.20); evaluate the performance of co-workers (mean of 2.30), and four statements had means of 2.10: demonstrate decision making skills; know how organisms relate to their environment; apply methods of conflict resolution; and discuss factors of economic growth.

Table 31: Agricultural competencies listed in order of NAFB members ranking.

Competency	NAFB			Population		
	n	Mean	SD	n	Mean	SD
Communicate agriculture to the domestic public	10	1.30	.48	45	1.49	.66
Apply agricultural communications concepts	10	1.30	.48	45	1.49	.79
Model professionalism, make positive contributions to firm	10	1.40	.70	45	1.58	.78
Demonstrate reliability and trust, work as team member	10	1.50	.71	45	1.51	.73
Apply human relations skills to solve workplace problems	10	1.50	.53	45	1.51	.73
Demonstrate responsibility and credibility	10	1.50	.53	45	1.53	.69
Discuss legislative policy upon agriculture	10	1.60	.52	45	1.73	.75
Understand basic plant science principles	10	1.60	.52	43	2.00	.83
Describe marketing theories, hedging, and futures contracts	9	1.67	.71	44	2.05	.99
Discuss agriculture's role in international relations	10	1.70	.82	45	1.69	.76
Discuss ways to influence and motivate others	10	1.70	.82	44	1.82	.76
Write articles and take photographs of agriculture subjects	9	1.78	.44	44	1.55	.59
Discuss unique nature of agribusiness	10	1.80	.63	44	1.86	.73
Describe concepts used to make financial decisions	10	1.80	.63	44	2.07	.96
Understand pest management principles	10	1.80	.42	43	2.07	.81
Understand of nutrition	10	1.80	.42	44	2.13	.84
Discuss sustainability, impact on ecosystem	10	1.90	.57	44	1.80	.79
Describe the impact of ethics on personal development	10	1.90	.57	45	1.84	.77
Describe concepts of supply/demand	10	1.90	.74	44	2.09	.97
Understand basic principles of animal genetics	10	1.90	.32	44	2.09	.76
Understand soil principles	10	1.90	.57	43	2.13	.82
Understand livestock reproduction	10	1.90	.32	44	2.18	.81
Develop a personal mission statement	10	1.90	.99	44	2.34	.99
Describe food classification, quality/safety control	10	2.00	.67	45	1.98	.84
Understand live animal evaluation	10	2.00	.47	44	2.31	.85
Demonstrate decision making skills	10	2.10	.57	44	1.98	.73
Know how organisms relate to their environment	10	2.10	.74	44	1.98	.82
Apply methods of conflict resolution	10	2.10	.57	44	2.09	.77
Discuss factors of economic growth	10	2.10	.57	44	2.23	.89
Summarize basic nutrition principles	10	2.20	1.03	43	2.09	.91
Evaluate the performance of co-workers	10	2.30	.82	44	2.34	.94

CHAPTER 5

CONCLUSIONS, IMPLICATIONS, AND RECOMMENDATIONS

The purposes of this study were to (1) determine the perceived importance and need for selected communications and agricultural competencies by agricultural communications personnel, (2) determine those competencies that should be included in a proposed agricultural communications curriculum at Montana State University-Bozeman, and (3) determine the perceived need for a proposed agricultural communications curriculum at MSU-Bozeman by agricultural communications professionals who reside in Montana, North Dakota, South Dakota, Wyoming, Colorado, and Idaho. To fulfill these objectives, members of agricultural communications professional organizations were surveyed. This section is divided into four areas: 1) Conclusions, 2) Implications, 3) Recommendations for an Agricultural Communications Curriculum, and 4) Recommendations for further study.

Conclusions

Based on the analysis of data, the following conclusions were drawn:

1) The top five communications competencies that should be included in an agricultural communications curriculum, as identified by professionals in agricultural communication were: reporting, apply writing skills; discuss ethical questions, make ethical choices; identify the target audience; know the difference between public relations and journalism; and navigate the Internet, send and receive e-mail.

2) The top five agricultural competencies that should be included in an agricultural communications curriculum, as identified by professionals in agricultural communication were: communicate agriculture to the domestic public; apply agricultural communications concepts; demonstrate reliability and trust, work as a team member; apply human relations skills to solve workplace problems; and demonstrate responsibility and credibility.

(3) Eighty-nine percent of professionals in agricultural communications who were contacted think an agricultural communications program at Montana State University-Bozeman would be beneficial to the agricultural industry in Montana, North Dakota, South Dakota, Wyoming, Colorado, and Utah, and would offer support in the form of internships, and speaking in courses or to students in Agricultural Communicators of Tomorrow (ACT).

4) Communications competencies of less importance (scoring higher means) were: enter data, create graphs on spreadsheets; process color and black and white prints; design and enter data, access information; design, produce slides and transparencies; use appropriate hand and facial gestures; and demonstrate care and function of cameras.

5) Agricultural competencies of less importance (scoring higher means) were: develop a personal mission statement; evaluate the performance of co-workers; understand live animal evaluation; discuss factors of economic growth; understand livestock reproduction; understand nutrition; and understand soil principles.

6) Communications competencies were ranked by members of the American Agricultural Editors' Association with more emphasis on such competencies related to reporting and writing skills, ethics, and knowing the difference between public relations and journalism. Communications competencies of less importance to AAEEA members included those related to computer skills, public speaking, and processing black and white photographs. The agricultural competencies scoring in the agree strongly bracket include, communicate agriculture to the domestic public; apply agricultural communications concepts; and those competencies gained through an internship experience. The agricultural competencies rated of less importance by AAEEA members included develop a personal mission statement; evaluate the performance of co-workers; and animal science and economics competencies.

7) Members of Agricultural Communicators in Education (ACE) and advisors of Agricultural Communicators of Tomorrow (ACT) ranked the reporting and writing skills among the top competencies to have, along with ethics, audience identification, and know the difference between public relations and journalism. Communications competency statements that had less emphasis included computer skills such as enter data, create graphs on spreadsheets; design and enter data, access information; and photography skills including, process color and black and white prints. The agricultural competencies rated highest by ACE and ACT members included communicate agriculture to the domestic public and apply agricultural communications concepts; as well as those gained through an internship experience such as, demonstrate responsibility and credibility

8) Communications competencies ranked highest by members of the National Association of Farmbroadcasters (NAFB) were related directly to their profession such as

write radio broadcast copy materials; and competencies related to public speaking.

Members had less emphasis on skills in areas such as photography and graphics.

Agricultural competencies ranked highest by members of NAFB included: communicate agriculture to the domestic public; apply agricultural communications concepts; and those competencies gained in an internship experience such as demonstrate reliability and trust.

9) Eighty-nine percent [44+36+9] of the population surveyed held Bachelor's degrees or higher, which suggests that a college degree is the norm for those who wish to pursue careers in the agricultural communications field.

Implications

The following implications are offered:

1) One third of current agricultural communicators surveyed will need to be replaced in the next ten years, since 31% [18+13] have 21+ years of experience in agricultural communications careers and 15% of the respondents were over 51 years of age. This implies possible employment opportunities for agricultural communications graduates.

2) Twelve (27%) respondents had 0-5 years of experience, which implies that individuals with bachelor's degrees were finding opportunities for employment in agricultural communication.

Recommendations for an Agricultural Communications Curriculum

Based on the results of the analysis of data, the following recommendations for a proposed agricultural communications curriculum are offered:

1) Based on the means of communications competencies, which all ranked in the agree or strongly agree range, all communications competencies listed should be included in an agricultural communications program of study. The top ten communications competencies that should be taught in an agricultural communications curriculum are: reporting, apply writing skills; discuss ethical questions, make ethical choices; identify the target audience; know the difference between public relations and journalism; identify target audience and subject; write radio broadcast copy material; know Associated Press, radio, and television styles; explore the difference between news and advertising; apply effective speaking techniques; and discuss methods of dissemination. Other communications competencies should be included according to the area of study of individual students, i.e. broadcasting, public relations, journalism, or communications.

2) Based on the means of agricultural competencies, which all ranked in the agree or strongly agree range, all agricultural competencies listed should be included in an agricultural communications program of study. The top ten agricultural competencies that should be taught in an agricultural communications curriculum are: communicate agriculture to the domestic public; apply agricultural communications concepts; write articles, take photographs of agricultural subjects; model professionalism, make positive contributions to the firm; discuss agriculture's role in international relations; discuss legislative policy upon agriculture; and discuss sustainability, and human impact on the ecosystem. The other three skills, demonstrate reliability and trust, work as a team member; apply human relations skills to solve workplace problems; demonstrate responsibility and credibility; are competencies gained in an agricultural communications

internship experience. Other agricultural competencies should be included according to the area of study of individual students.

3) An agricultural communications curriculum for those students who wish to pursue careers in agricultural broadcasting should include the following communications competencies: write radio broadcast material; apply effective speaking techniques; use appropriate broadcasting techniques; select topic, compose, present speech; navigate the Internet, send and receive e-mail; reporting, apply writing skills; and write a script and interpret it visually. Agricultural competencies should include: communicate agriculture to the domestic public; apply agricultural communications concepts; demonstrate reliability and trust, the ability to work as a team member; apply human relations skills to solve workplace problems; and demonstrate responsibility and credibility.

4) An agricultural communications curriculum for those students who wish to pursue careers in communications, public relations, or writing should include the following communications competencies: reporting, apply writing skills; discuss ethical questions, make ethical choices; identify target audience; identify audience and subject; know the difference between public relations and journalism; discuss methods of dissemination; know Associated Press, radio, and television styles; word processing, create, edit, and format documents; navigate the Internet, send and receive e-mail; discuss ethics in photography; and explore the difference between news and advertising. Agricultural competencies to include in this curriculum are: communicate agriculture to the domestic public; apply agricultural communications concepts; demonstrate reliability and trust, work as a team member; apply human relations skills to solve workplace problems; demonstrate responsibility and credibility; write articles and take photographs

of agriculture subjects; model professionalism, make positive contributions to firm; discuss agriculture's role in international relations; and discuss legislative policy upon agriculture.

Recommendations for Further Study

Research is needed to support the continual development of agricultural communications curriculum, and to refine the data developed in this study. The researcher offers the following recommendations for further study:

- 1) Revise the instrument by refining the competency statements in order to eliminate double meaning sentences, and strive for true content validity.

- 2) Repeat the study with a larger population representing more professional organizations and communications specialties, including public relations personnel in agricultural industry organizations, to determine variations in competencies needed by communication specialist.

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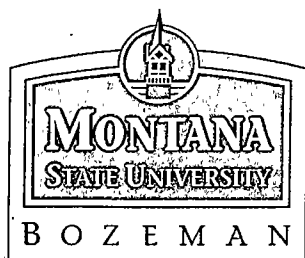
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APPENDICES

APPENDIX A
COVER LETTER AND FOLLOW-UP



Department of Education
 Agricultural and Technology Education
 Cheever Hall
 Bozeman, MT 59717-0374

January 20, 2000

Phone: (406) 994-3201

Fax: (406) 994-6696

Dear Agricultural Communications Professional:

As a graduate student in Agricultural Education at Montana State University-Bozeman, I am conducting a study to determine the communications competencies that should be included in an Agricultural Communications Curriculum at Montana State University-Bozeman. Currently, the College of Agriculture at MSU-Bozeman does not offer any courses in agricultural communications, and the results of this survey will assist in the implementation process.

You have been selected to participate because of your membership in Agricultural Communicators of Tomorrow (ACT), Agricultural Communicators in Education (ACE), American Agricultural Editor's Association (AAEA), and/or the National Association of Farm Broadcasters (NAFB). To keep the perspective in a regional setting, only members from North Dakota, South Dakota, Montana, Wyoming, Colorado, and Idaho have received this survey.

Your response is very important to the success of this study. All information gathered will be kept confidential. The survey instrument is number coded so your name can be removed from the mailing list when your questionnaire is returned. The number will also be used for follow-up purposes if you indicate your interest in receiving results from this study, or willingness to assist with an agricultural communications curriculum. Please feel free to add any additional comments that you feel may be important.

The survey instrument should take approximately 15 minutes to complete. Would you please return the survey by February 4, 2000, in the enclosed stamped, self-addressed envelope? If you have any questions or concerns, please contact me at any time. My phone number is (406) 763-4865, or e-mail llolsen@montana.campuswix.net. I am looking forward to receiving your completed questionnaire.

Thank you for your time.

Sincerely,
 Lauri L. Olsen
 Graduate Student
 Montana State University-Bozeman

Dr. C. Van Shelhamer
 Professor
 Montana State University-Bozeman



Department of Education
Agricultural and Technology Education
Cheever Hall
Bozeman, MT 59717-0374

Phone: (406) 994-3201
Fax: (406) 994-6696

February 17, 2000

Dear Agricultural Communications Professional:

Approximately four weeks ago you should have received a questionnaire regarding agricultural communications competencies that should be included in an agricultural communications curriculum at Montana State University-Bozeman. I have not yet received your questionnaire.

I realize that you are very busy, and I appreciate your effort in taking the time to complete the survey and place it in the mail. Perhaps the original survey was lost in the mail or the shuffle of a busy office, so I am enclosing another one. It should take approximately 15 minutes to complete.

If you have already put your questionnaire in the mail, thank you very much. If not, please take the time to respond to this survey. Your input is very important to the success of this study.

Sincerely,

Lauri L. Olsen
Graduate Student
Montana State University-Bozeman

Dr. C. Van Shelhamer
Professor
Montana State University-Bozeman

Pre-Survey Post Card (Mailed 01/14/00)

Dear AAEA Member,

In approximately one week, you will receive a survey in the mail asking you to rate the importance of communication and agricultural competencies that have been identified. The results of this survey will be used to enhance agricultural communications courses at Montana State University-Bozeman.

This survey is an important tool that will help determine if the needs of the agricultural industry are being met by Montana State University Graduates. Thank you in advance for taking the time to complete this survey.

Sincerely,
Lauri Olsen,
Graduate Student

Van Shelhamer, Professor,
Agricultural Education

First Reminder Postcard (Mailed 02/09/00)

Dear Agricultural Communications Professional,

A survey to identify the importance of communications competencies was sent to you approximately two weeks ago. Unfortunately I have not yet received your completed survey. If you did not receive this survey, please call (406) 994-3201 and ask that an Agricultural Communications Competency Survey be sent to you. If you received the survey and have not completed it, please do so. Please disregard this notice if you have already returned your completed survey. Thank you for your valuable time and assistance.

Sincerely,
Lauri Olsen,
Graduate Student

Van Shelhamer, Professor,
Agricultural Education

Second Reminder Postcard (Mailed 03/07/00)REMINDER

Dear Agricultural Communications Professional,

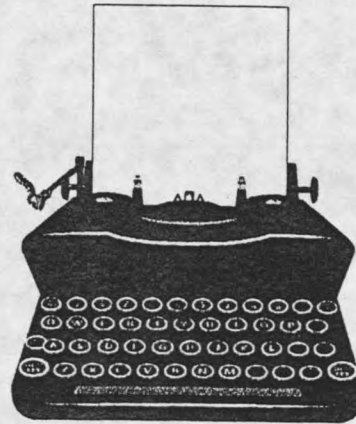
By now you should have received two copies of my survey to identify communications competencies to include in an agricultural communications curriculum. I hope you can take 15 minutes from your busy schedule to complete the survey. The instrument is pre-addressed and pre-stamped, so no postage is necessary. Just tape or staple it closed, and drop it in the mail. I appreciate your assistance with my research. Please disregard this notice if you have already returned your completed survey. Thank you for your valuable time and assistance.

Sincerely,
Lauri Olsen,
Graduate Student

Van Shelhamer, Professor,
Agricultural Education

APPENDIX B
SURVEY INSTRUMENT

**A Survey of
Communications Competencies
That Should Be Included In An
Agricultural Communications
Curriculum at
Montana State University-Bozeman**



Agricultural Education
Montana State University-Bozeman
January 2000

Lauri Olsen
Ag & Technology Education
Cheever Hall
Montana State University-Bozeman
Bozeman, MT 59717

Lauri Olsen
Ag & Technology Education
Cheever Hall
Montana State University-Bozeman
Bozeman, MT 59717



Thank You for Your Time!
Please tape or staple survey booklet and mail.

Dear Agricultural Communications Professional:

Thank you for participating in this research survey. The survey was designed to obtain information in communications and agriculture, as well as obtain information about professionals in agricultural communication careers. The survey takes approximately 15 minutes to complete, and additional comments are encouraged. Space is provided on the last page for your input.

Section I requests your level of agreement or disagreement with communications competency statements.
Section II requests your level of agreement or disagreement with agricultural competency statements.
Section III requests demographic information about respondents.

All responses to the survey will be kept confidential and should be recorded on this survey. After completing the three sections, please staple or tape the survey closed with the return address visible on the outside back cover, and place it in the mail. The postage has been prepaid.

Thank you for your assistance in this research project.

Sincerely,

Lauri Olsen
Agricultural Education Program
Cheever Hall
Montana State University-Bozeman
Bozeman, MT 59717
(406) 994-2132
llolsen@montana.campuswix.net

Section I

Using the four point scale below, please indicate your level of agreement or disagreement about whether the following items should be included in the Montana State University College of Agriculture Agricultural Communications Curriculum.

Agree Strongly this competency should be included in an agricultural communications curriculum
Agree this competency should be included in an agricultural communications curriculum
Disagree this competency should be included in an agricultural communications curriculum
Disagree Strongly this competency should be included in an agricultural communications curriculum

Disagree Strongly-----
Disagree-----
Agree-----
Agree Strongly-----

- 1. Advertising
 - a. Audience: Identify target audiences
 - b. Campaign Planning: design an advertising campaign
 - c. Graphic Design: demonstrate basic elements of design
 - d. Other _____
- 2. Journalism
 - a. Styles: Know Associated Press, Radio, and Television Styles
 - b. Reporting: apply writing skills
 - c. Editing: edit using the correct marks and symbols
 - d. Ethics in Journalism: discuss ethical questions and demonstrate ability to make ethical choices
 - e. Design and Layout of Publications: apply principles of design
 - f. Dissemination Systems: discuss methods and effectiveness for various audiences
 - g. Other _____

Disagree Strongly-----
Disagree-----
Agree-----
Agree Strongly-----

3. Graphics

- a. Composition: demonstrate effective composition for audience comprehension
- b. Photography: discuss theory, principles, lighting, film types
- c. Camera Functions: demonstrate care and proper function of equipment
- d. Ethics in Photography: discuss taking, using, manipulating photos
- e. Printing: apply concepts of processing color and black & white film
- f. Other _____

4. Public Relations

- a. Campaign Planning: identify audience and subject
- b. Know the difference between Public Relations and Journalism
- c. Explore the difference between news and advertising, and when to use each
- d. Other _____

5. Public Speaking

- a. Speech Writing: select appropriate topic based on audience, research and compose speech, and presentation skills.
- b. Oral Communications: apply effective speaking techniques
- c. Nonverbal Communications: use appropriate hand and facial gestures
- d. Other _____

Disagree Strongly-----
Disagree-----
Agree-----
Agree Strongly-----

6. Telecommunications

- a. Script Writing: create media program formats for television and radio news, and longer educational videos.
- b. Broadcasting: write information and use appropriate techniques
- c. Video/Television Production: write a script and interpret it visually
- d. Radio Production: write broadcast copy material
- e. Other _____

7. Computer Applications

- a. Desktop Publications: apply principles of layout and design
- b. Word Processing: create, edit, manipulate and format documents
- c. Presentation Graphics: design and produce slides and transparencies
- d. Graphic Design: design and manipulate graphics to increase understanding of topic
- e. Networking: transfer and down-load through computer network
- f. Database Management: design and enter data, access information
- g. Spreadsheet Development: enter data, calculate, develop graphs
- h. Internet: compose, send, receive e-mail; navigate Internet
- i. Other _____

Section II

Using the four point scale below, please indicate your level of agreement or disagreement about whether the following items should be included in the Montana State University College of Agriculture Agricultural Communications Curriculum.

Disagree Strongly-----
Disagree-----
Agree-----
Agree Strongly-----

Agree Strongly this competency should be included in an agricultural communications curriculum
Agree this competency should be included in an agricultural communications curriculum
Disagree this competency should be included in an agricultural communications curriculum
Disagree Strongly this competency should be included in an agricultural communications curriculum

Disagree Strongly-----
Disagree-----
Agree-----
Agree Strongly-----

1. Agricultural Communications
 - a. Communicating agriculture to the public (Domestic):
Develop public relations campaigns to communicate agricultural issues.
 - b. Agricultural publications: write articles and take photographs of agricultural subjects
 - c. Communicating agriculture to public (International):
discuss role of agriculture in international relations
 - d. Other _____
2. Agricultural Economics
 - a. Marketing: describe marketing theories, hedging, futures contracts
 - b. Ag Policy: discuss legislative policy upon ag.
 - c. Macro Economics: discuss factors of economic growth
 - d. Ag Finance: describe the concepts used to make financial decisions
 - e. Agribusiness Management: discuss the unique nature of agribusiness
 - f. Micro Economics: describe concepts of supply/demand
 - g. Other _____

5

3. Agricultural Leadership
 - a. Ethics: describe the impact of ethics on personal development
 - b. Interpersonal Relations: discuss ways to influence and motivate others
 - c. Organizational Dynamics: apply methods of conflict resolution
 - d. Organizational Dynamics: demonstrate decision making skills
 - e. Organizational Dynamics: evaluate the performance of co-workers
 - f. Personal Development: develop a personal mission statement
 - g. Other _____
4. Agronomy: Crop Production and Management:
 - a. Demonstrate an understanding of basic plant science principles
 - b. Demonstrate an understanding of soil principles
 - c. Demonstrate an understanding of pest management principles
 - d. Other _____
5. Livestock Production and Management
 - a. Demonstrate an understanding of basic principles of animal genetics
 - b. Demonstrate an understanding of nutrition
 - c. Demonstrate an understanding of live animal evaluation
 - d. Demonstrate an understanding of livestock reproduction
 - e. Other _____

6

Disagree Strongly-----
Disagree-----
Agree-----
Agree Strongly-----

Section III

6. Environmental Science
- a. Conservation: define sustainability, conservation, and ways in which humans impact the ecosystem
- b. Ecology: summarize the ways in which organisms relate to their environment
- c. Other _____
7. Food Science/Technology
- a. Food Safety: describe the basics of food classification, modern processing and quality/safety control
- b. Nutrition: summarize basic nutrition principles
- c. Other _____
8. Internship Experience
- a. Application of Ag Communications Concepts: master skills to complete given tasks
- b. Development of Personal Skills: demonstrate responsibility and credibility
- c. Development of Interpersonal Skills: demonstrate reliability and trust; ability to work as team member
- d. Problem Solving Ability: apply skills to solve problems in workplace; demo. human relations skills
- e. Employee Responsibilities: model professionalism; make positive contributions to the firm.
- f. Other _____

1. In what age group do you belong?
 18-30
 31-40
 41-50
 51-60
 61+
2. How many years have you been employed in agricultural communications?
 0-5
 6-10
 11-20
 21-30
 31+
3. Did you have a background in agriculture before entering the agricultural communications field?
 No Experience Moderate Experience Extensive Experience
4. What is your level of education?
 High School Diploma Bachelor's Degree
 Associate Degree Master's Degree
 Other Certificate PhD Degree
5. What sector of agricultural communications are you employed?
 Private Organization Government
 Academic Institution Self Employed
6. Please rank the following skills from the most commonly used (1) to the least frequently used (5) in completing your current work-related duties:
- ____ Writing
 ____ Editing
 ____ Public Relations
 ____ Public Speaking
 ____ Marketing
- Other skills frequently used: _____

7. How familiar are you with university agricultural communications programs?

- Very familiar
- Somewhat familiar
- Not familiar

8. Do you think an agricultural communications program at Montana State University would be beneficial to the agricultural industry in Montana, North Dakota, South Dakota, Wyoming, Colorado, and Idaho?

- Yes
- No

9. If you answered yes to number 8, how much support could you provide this program?

- No support
- Internship Opportunities
- Guest Speaker for courses
- Guest Speaker for Agricultural Communicators of Tomorrow
- Other Support: _____

10. Would you like to have a copy of the results of this survey?

- Yes
- No

11. (Optional) Please describe how your career evolved into agricultural communications.

Further Comments: Please feel free to comment on any part of this survey, or make suggestions. Your input is important to the success of this research project.

85

**Thank you for your time and valuable input.
Please close the survey, tape or staple shut,
And return via U.S. Mail.
The postage has been paid.**

APPENDIX C
RESPONSES TO SURVEY QUESTIONS IN SURVEY SECTION 1

Section 1: Communications Competencies

Responses to Other, Additional Comments to Discipline Items

1. (Advertising)
 - People skills
 - Salesmanship
 - Test results through individual sales
 - (a) and analyze

2. (Journalism)
 - Web (Internet) Publishing & web page development
 - Basic photography
 - Knowledge of English, grammar
 - Test methods (dissemination systems)
 - Strong focus on interviewing skills, interview techniques
 - Liberal arts background
 - How to read a market screen

3. (Graphics)
 - *More of a broadcaster
 - Radio
 - Need doing—not just demonstrate—take photography course (a.)
 - Develop competency in still photography, digital conversion, creation of PMT's and Web uploads
 - Digital imaging
 - Audience

4. (Public Relations)
 - You don't use news
 - How to write releases that are news, not fluff
 - Be able to distinguish best media approaches for any given project goal
 - Ethics instruction
 - Audience

5. (Public Speaking)
 - Should be a campus-wide requirement

6. (Telecommunications)
 - See 2g
 - This would be a major financial commitment, this is a specialty within journalism,
 - Few people competent in both print and broadcast
 - Hands-on production experience

7. (Computer Applications)

Create and manage departmental or an industry web page or presence.

Systems development, connectivity, more computer and less content

These should be learned outside the ag comm curriculum

A good communicator does not need to be a subject matter specialist

Note: These are all important skills, but I question if they should be part of a college curriculum.

This will be "old hat" to most future students with the exception of design.

APPENDIX D
RESPONSES TO SURVEY QUESTIONS IN SURVEY SECTION 2

Section 2: Agricultural Competencies:

Responses to Other, Additional Comments to Discipline Items

1. (Agricultural Communications)
Whose agenda? (a)
Forget P.R.—just report
Include hands-on info
Broadcast-oriented class
2. (Agricultural Economics)
I think of these as graduate courses in administration or management, usually see in grad level course my experience is
 - a. Demonstrate?
 - e. Leave to “boss”Learn to use what experts in fields know and make available
3. (Agricultural Leadership)
Why?
4. (Agronomy: Crop Production & Management)
Organic
Need to know about GMO's (Genetically Modified Organisms) and variety development
Biotech in plant sciences
Learn what experts and expertise is available
5. (Livestock Production and Management)
Waste management
Need some vocabulary on livestock diseases, breeds, etc.
Know and use experts and their expertise
6. (Environmental Science)
Natural resources/grazing & rangeland techniques
7. (Food Science/Technology)
Know and be able to spell the main food-borne disease microorganisms: salmonella, e. coli, etc.
Communicate nutrition info and monitor public views on new technology
8. (Internship Experience)
Get in print and have a clipping file, for writers. If broadcast, then need some tapes.
Hands-on work

APPENDIX E
RESPONSES TO DEMOGRAPHICS SURVEY QUESTIONS

Responses to Question 6:

Other skills frequently used in completing work-related duties

Reporting

Graphic design

Photography

Speech writing

Radio

TV

Telephone and in-person interviews

Computer skills

Desktop design, publishing;

Computer programming and training

Computer based e-mail and web page loading and management

Dealing with printers

Research

Problem solving

Data analysis

Administrative

Personnel managing skills

Meeting facilitation;

Training;

Conflict resolution;

Strategic planning;

Rapid-response planning;

Crisis communications;

Special event planning

Sales and instructional design

Market analysis

Time management

I specialize in large projects, particularly special issues of magazines devoted to a single subject.

Responses to Demographics Question 9:

Comments and Other Support offered to an agricultural communications program

We already provide our ag com. students informal and formal internships. These are extremely beneficial to them after graduation.

Information about our ag journalism program.

E-mail/phone consultation.

Radio interviews on applicable topics.

Happy to complete other surveys in the future.

Information on technical aspects of video production

Teach some classes

Responses to Demographics Question 11:

Please describe how your career evolved into agricultural communications.

Told by editor to become farm-ranch reporter-editor, then new opportunities developed.

It's the only industry, besides ranching, in which I have been a full-time employee. I started as a radio disk jockey in the summers during college, and eventually, after graduation, became the Farm Broadcaster at KEYZ radio in Williston, ND. The main reason for that opportunity was a direct result of my internship at KMON.

While still in graduate school at the University of Wyoming, I was working at the local daily newspaper as a features reporter/staff writer. I began interacting with and covering the ag community when an editor position opened at UW (after I finished grad school) I applied and have been learning ever since!

My degree is a general studies degree in zoology and journalism. I have worked as an outdoors/environmental reporter and as a science writer.

From the farm, to army, to college (in ag journ.), to work!

Extension Agent

Graduated MSU w/a BS in Animal science, learned ag broadcasting, ag marketing, and business management on the job, with no formal training. My FFA background in high school and Alpha Gamma Rho leadership experience and peer contacts were and are extremely helpful to my career.

I grew up on a farm and went off to college just when the last farm crisis gripped the Heartland. I knew returning home to farm was no longer an option, so I combined my two greatest loves-- writing and farming-- into a career.

1. Farm & Ranching
2. Farm Magazine Editor
3. Farm Magazine Editor
4. Freelance Writer/Photographer
5. Ag PR Firm—my own
6. Ag Assn. Management
7. Video-Internet Production
8. All of the above today.

KFGO Radio needed a market analyst. I was a Commodity Futures Broker. The match has been a good one.

Grew up on a farm/ranch. Got degree in journalism. Worked at a couple of newspapers before coming to land-grant university to do PR/writing. Here several years. Began as a half-time communications specialist (4-H) while working on my master's degree and had opportunities to advance within the system. Have a strong interest in ag/natural resource issues and their impact on society.

Grew up on Iowa grain and livestock operation, raised my own hogs and pure-bred sheep.

Farm boy goes to college, studies journalism, spends 12 years in metro journalism, long for outdoors and country side, work way to more rural and small town assignments, then state (area) editor of a small daily and finally to ag communications dept of a land-grant university 10 miles from the farm I grew up on. Now near retirement and back to the land.

I was a 4-H and FFA reporter. After winning the state FFA news writing contest, I decided to major in ag journalism at Kansas State University. That B.S. plus an M.S. in ag education is a perfect combination for my work at North Dakota State.

B.S. in Ag Econ and Mass Comm, 2 yrs in newspaper reporting then into University Ag Communications.

I grew up on a farm, but after high school decided to get into radio sports, particularly play-by-play. After eight years of that, my next job was in a news department, working a city beat and also in farm news. My third job was exclusively in farm news and I became very active in the National Association of Farm Broadcasters.

After serving in the army I returned to the farm, farmed several years. The time came to buy the farm or go back to school. I did and chose ag journalism at the University of Nebraska. Growing up in ag is a great help. 24 years in Farm Broadcasting has been a great experience.

Development of interactive multimedia instructional programs

I received 2 bachelor's degrees—one in Animal Science, the other in Speech Communications because Colorado State University only offered Ag Journalism and not ag communications, so I created my own vision/program tailored to fit my needs.

An opportunity became available so I switched from newspaper reporting to PR for an ag organization.

I knew I needed a specialty subject to attach to a journalism degree. At that time Colorado State University offered Ag Journalism. Best decision I ever made.

Farm boy/4-H/Boy Scout

B.A. Speech/Radio/TV (Assist. To Ext Radio Editor)

M.A. Plus-TV/Film Production, Grad Assist. in Ag Comm

Big Eight University-Radio/TV Editor-14 yrs-(Nebraska)

International-Developed Agricultural College in Southern Africa -2 yrs

Television/Telecomm Editor/Producer/Talent & Photographer-17 yrs-smaller Land-Grant (South Dakota State) Retired-33 yrs—Free, Free at Last!

Professional communications to ag comm

Extension education —6 yrs

Ag. Public Relations—4 yrs

Ag. Journalism—6 yrs

APPENDIX F
WRITTEN COMMENTS FROM RESPONDENTS

Further Comments:

Montana has had 3 NAFB Presidents—now Sen. Burns when I was NAFB Pres in '79—more recently Taylor Brown and now Rick Haines—Good Luck! Gene Williams

This survey doesn't allow for suggesting what should be required in the curriculum and what should be optional. It would be impossible to fit all the options into a degree, but students would be allowed the flexibility to focus on, for example, print journalism and livestock or broadcast and ag econ or public relations and food science. I suggest you contact Kris Boone for a copy of the Kansas State curriculum guide. NDSU doesn't have an Ag Com degree, but some students "create" one with a Mass Com major and Ag minor or vice versa.

I think more and more ag journalists and publicists will be writing for the web and e-mail list serves. It's a skill now or soon to be as important as typing, editing, photography—but it seems to be slowly adopted by j-schools as formal study. However, some kids come out of high school having learned this while playing with the technology. It's time to require it of j-school graduates. The workplace expects it and sometimes rewards it.

We don't offer any ag communications courses specifically, but we have a very successful ag journalism program. Ag journalism students take the same courses advertising, news editorial, etc. majors take, simply gearing special reports, articles, etc. toward their ag interests. Lyle D. Olson, South Dakota State University.

I think there is some danger in requiring students to become only familiar with agronomy and livestock. What's important is that journalists and PR professionals understand how to communicate on a layman's level. The closer you get to a subject the harder it is to do that. I think that's a big issue in agriculture today! We don't know how to communicate to urban society in a way that helps them understand what we do, why, and why we matter.

I am unfamiliar with MSU's ag communications program; but given the state of today's ag industry I would be cautious about beginning or expanding an ag comm program. Every day (it seems) mergers are announced that reduce the number of positions available for ag comm professionals. That's why I strongly believe ag comm students need a broad and diversified background to adapt to the rapidly changing industry.

I'm a full-time ag broadcaster but there are only 4 such jobs in Montana, none in Wyoming, maybe 3 in Colorado and Idaho. Less than 20 people have jobs like this in the 11 Western states, only 200-250 nationwide. There is a great need for ag communicators in marketing, industry information, sales, public relations, etc. But not many students will become full-time on-air reporters.

The term "Jack of all trades" is a cliché, but it rings true in farm broadcasting. It's important to be able to converse on a huge variety of subjects.

While computer abilities are essential to communications work (i.e. e-mail, word processing, lay-out, photo manipulation, web design, etc) some of these skills are basic! For example, word processing shouldn't be taught as part of agricultural communications, instead it should be a requirement for getting into the program. Database management and spreadsheet should be taught outside the department and not be required. The subject matter competencies should be part of a student's minor area of study. A good agricultural communicator is like a student--they have to learn about each area in order to effectively communicate about it.

MONTANA STATE UNIVERSITY - BOZEMAN



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