FACTORS THAT INFLUENCED LOCAL MASS MEDIA COMMUNICATION

PRODUCTS OF AGRICULTURE AND NATURAL RESOURCES EXTENSION

AGENTS IN URBAN COUNTIES

by

HEATHER N. KOLICH

(Under the Direction of Dennis Duncan)

ABSTRACT

Cooperative Extension provides research-based community education related to agriculture and other topics. Mass communication is a traditional means of informing county clients, but several previous studies identified limitations with Extension mass media publications. The purpose of this study was to examine how Cooperative Extension Agriculture and Natural Resources county agents interpreted research-based agricultural information into written mass media communication articles for urban audiences. Data were collected using mixed methods to examine:

1) Factors that influenced article topic selection;

2) Factors that influenced how information was presented; and

3) Reading levels of articles written by urban ANR Extension agents.

Findings indicated that client questions and agent assumptions about clients influenced topic selection and content creation. Based on the Flesch Reading Ease formula, articles were within the estimated reading levels of most adult county residents.

INDEX WORDS: Cooperative Extension, Urban populations, Mass communications,

Urban agriculture, Readability

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CHAPTER 1

INTRODUCTION

Overview

Cooperative Extension county agents are responsible for communicating research-based information from land-grant universities to distributed clients who can put the information into use at the local level. Traditionally, Extension agents use a mix of face-to-face programing and mass media communication to provide informal education to county clients. In recent years, the distribution of the U.S. population has shifted away from rural areas, resulting in states with high concentrations of residents in a few urban counties. Mass media communication has the potential to reach a larger audience than face-to-face programs, making it an important communication tool for Extension agents serving densely-populated urban counties. Several previous studies, however, identified various issues limiting the effectiveness of mass communication produced by Extension agents in the Agriculture and Natural Resources program area. This study investigated how a subset of ANR Extension agents, those serving high-population urban counties, interpreted research-based information into locally distributed articles for urban clients.

Statement of the Problem

In densely-populated urban counties, a small number of Agriculture and Natural Resources county Extension agents need to provide research-based information to clients that number in the hundreds of thousands, or in some places, over a million. Educational

mass media articles are an important tool for helping ANR agents reach large audiences, and a recent study indicated that mass media publications can be as effective as face-to-face programs in educating urban Extension clients (Woodson, Lindner, & Lawver, 2008). Unfortunately, previous studies revealed several factors that limit the effectiveness of mass communication products written by county Extension agents. Identified issues included:

- Poor readability of articles (Upchurch, Jr., 1969)

- Lack of training in journalism and unfamiliarity with communication research (Cone, 2011; Register, 1983; Upchurch, Jr., 1969)

- Declining awareness of Extension (Cosner & Key, 1981; Dittman Research & Communications Corporation, 2010; Loible, Diekmann, & Batte, 2010; Radar, 2011)

- Unpopular information delivery methods (Bardon, Hazel, & Miller, 2007; Bowie & Gazda, 2013; Cartmell, Orr, & Kelemen, 2006; Jansen, Steuten, Renes, Aarts, & Lam, 2010; Kanté, Dunkel, Williams, Magro, Traoré, & Camara, 2009)

- Poor discoverability of Extension publications on the Internet (Anderson-Wilk, 2011; Arnold, Hill, Baily, & Meyers, 2012; Radar, 2011)

- Poor placement of articles within newspapers (Lux & Michael, 1925)

- Low agent confidence in the efficacy of written mass communication (Bowie & Gazda, 2013; Telg, Irani, Muegge, Kistler, & Place, 2007).

Purpose and Objectives

The purpose of this study was to examine how Cooperative Extension county agents in the Agriculture and Natural Resources program area interpreted research-based agricultural information into written mass media communication products for urban audiences. The objectives were to determine:

1) What factors influenced agents to select the topics they covered in articles for urban clients;

2) What factors influenced their decisions on how to present information about the selected topics to urban clients; and

3) Whether articles were accessible, from readability and reading grade level measures, to adult clients residing in the agent's county of employment.

How this Study was Unique

Previous studies focused on mass communication practices of rural agricultural agents, agricultural agents in all settings in a state, or on all Extension agents in the state (Lux & Michael, 1925; Bardon et al., 2007; Bowie & Gazda, 2013; Cartmell et al., 2006; Franz, Piercy, Donaldson, Westbrook, & Richard, 2009; Jansen et al., 2010; Kanté et al., 2009; Telg et al., 2007; Register, 1983; Upchurch, Jr., 1969). This study utilized a purposive sample selection (Merriam, 2009) to focus on the small population of Agriculture and Natural Resources Extension agents working in high-population, urban counties in a large southern state. Entire articles were examined through content analysis (Elo & Kyngäs, 2007; Krippendorff, 1989; McQuail, 1992) to identify topic themes, journalistic frames, and article genres used to inform urban clients about agricultural

issues. Readability assessments were expanded to compare mean article readability and grade level scores with the estimated reading level of clients in each county in the study. Finally, whereas other studies used surveys to collect data from Extension agents, this study used semi-structured, qualitative interviews (DeMarrais, 2004; Merriam, 2009) with agents to explore in-depth the factors that influenced the agents' decision process around selecting article topics and packaging the information for urban and suburban clients.

Definition of Terms

For the purpose of this study, the following definitions of terms applied:

Blog – an informal web page that provides an inventory of informational posts (articles) (Wikipedia, 2016).

Cooperative Extension – the community education outreach branch of land-grant colleges and universities. Created by the Smith-Lever Act in 1914, it is funded by federal, state, and local monies (Committee on the Future of Colleges of Agriculture, 1995; UGA College of Agricultural and Environmental Sciences [CAES], 2015b).

County Delivery System – a model of Cooperative Extension through which information and knowledge developed by researchers and departments at the state land-grant university or other reliable sources are transferred to residents in each county through Extension agents, with support of university technical specialists (UGA Cooperative Extension, 1993).

Flesch Reading Ease/ readability – a measure of the clarity of written material based on a mathematical formula that considers the average sentence length (ASL) and

the average number of syllables in words (ASW) contained in the passage. The formula is presented as RE = 206.835 – (1.015 x ASL) – (84.6 x ASW) (Readability Formulas, n.d.b). The formula yields a readability score between 0 and 100. Higher scores indicate greater clarity and imply that the reader will more easily comprehend the meaning of the writing. The Flesch Reading Ease formula is used by many U.S. government agencies and commercial concerns to determine the reading ease of official documents and instruction manuals (Project Gutenberg, 2016; Readability Formulas, n.d.b).

Flesch-Kincaid Grade Level – an indication of the school grade that a reader would need to have completed in order to comprehend a specific written text. Derived from the Flesch Reading Ease score, F-KGL is inversely related to FRE. A high score for reading ease/ readability indicates that a person with lower educational achievement could comprehend the material. The F-KGL score of 9.8 indicates that a reader who has nearly completed the ninth grade should be able to comprehend the text. A F-KGL score of 3.0 would indicate that someone just beginning the third grade should be able to read and understand the material (Readability Formulas, n.d.a).

Framing – a way of presenting information that helps readers categorize it into one of several familiar mental constructs. Framing can influence the lens through which readers view the information presented (Chong & Druckman, 2007; Cissel, 2012; Scheufele, 1999; Scheufele & Tewksbury 2007).

Genetically modified organisms – organisms such as bacteria and agricultural crops that have been modified through biotechnology to manufacture a product (i.e., human insulin) or resist diseases and pests so as to reduce the need for pesticide applications. The DNA of a naturally resistant variety of crop, or DNA of an organism

that can impart resistance, is sequenced to identify the specific segment of the gene that contains the desirable trait. That segment is chemically severed from the host gene and bonded to a receptive gene in the agricultural crop. As a result, the trait that imparts resistance to the disease or pest becomes coded into the DNA of the recipient crop (Evans & Ballen, 2013).

Green industry – horticulture professionals and businesses that produce, sell, and provide services to manage landscape plants, private, public, and corporate landscaped grounds, and urban tree care (Georgia Green Industry Association [GGIA], n.d.).

Green industry professionals – horticulture professionals who propagate, grow, install, and maintain landscape plants and/or to manage landscaped grounds (GGIA, n.d.).

Land-Grant Universities – public colleges and universities established in each state by the Morrill Acts of 1867, 1890, and 1994 for the purpose of teaching agriculture and mechanical arts to a wider range of students (Committee on the Future of Colleges of Agriculture in the Land Grant University System, 1995).

Local newsletters – newsletters produced by county Extension agents for the purpose of providing education and information to residents of that county. Includes newsletters that are printed and mailed as well as newsletters delivered electronically by email and/or posted on the county Extension website.

Local newspapers – Newspapers that are produced and distributed within a county and that carry news about the local community and stories of interest to the local community, including, but not limited to, the legal organ of the county.

Mass media communication – a method through which one person or organization can distribute information, by print materials or electronic transmission, to many communication recipients (Telg et al., 2007).

Plan of work – a two-year plan of activities and educational programs that UGA county Extension agents develop to work toward achieving documented goals relating to an identified state or local issue (UGA CAES, 2015c).

Smith-Lever Act of 1914 – Federal legislation that created Cooperative Extension and established community education outreach as the third mission, along with research and student education, of land-grant colleges (UGA CAES, 2015b).

Urban agriculture – agricultural enterprises that take place in urban settings. These can include community gardens, edible landscaping, farmers markets, urban lot farming, beekeeping, and other food producing activities, as well as the production of ornamental landscape plants and management of urban landscapes and parks (Mendes, Balmer, Kaethler, & Rhoads, 2008; Urban Ag Council, n.d.).

Urbanized areas – locations in which 50,000 or more people live (U.S. Census Bureau, 2015b)

Urban clusters – areas where at least 2,500 people, but fewer than 50,000 people live (U.S. Census Bureau, 2015b)

Urban counties – for the purpose of this study, urban counties are defined as counties having large urbanized areas (USDA, n.d.) and populations exceeding 200,000 people as measured by the 2010 U.S. Census Bureau (2012a).

United States Department of Agriculture (USDA) – comprised of 29 federal agencies, USDA supports economic opportunity, promotes agricultural production, and aids rural U.S. communities (United States Department of Agriculture [USDA], 2015).

Assumptions Related to the Study

Because of the large populations in urban counties ($\geq$200,000 residents for the purpose of the research reported here), the author assumed that ANR Extension agents working in these counties have less individual contact with clients than do agents working in sparsely-populated, rural counties.

The author assumed that published articles were available to all county residents.

The author assumed that public information, such as U.S. census data, was accurate and correct.

The author assumed that interviewees responded truthfully to interview questions.

Limitations of Study

The scope of the study was limited to Cooperative Extension agents in the Agriculture and Natural Resources program area who regularly (weekly, monthly, or quarterly) used written mass media communication to deliver educational information to urban county residents. The scope was further limited to ANR Extension agents working in one of five counties in a southern state with large, urbanized areas and a county population of 200,000 or more residents (U.S. Census Bureau, 2012a; USDA, n.d.).

For the research reported here, content analysis examined topics, information framing, and genre of articles. Readability formulas measured word count, number of

sentences in a paragraph, number of words in a sentence, and number of characters in words to yield a score that estimates how easily a reader can read and understand the material, and what level of education is necessary for comprehension (Readability Formulas, n.d.a., n.d.b.). This analysis did not consider accuracy of spelling, punctuation, grammar, or information.

Because of the small sample size and non-random selection of participants, findings should not be generalized to other areas or different populations.

Summary

Cooperative Extension county agents work with clients at the county level to transfer research-based knowledge and technology from land-grant universities to local communities. Mass communication materials can reach large audiences and educate Extension clients as effectively as face-to-face programs; however, Extension mass media communication publications suffer from numerous issues that diminish their effectiveness. Previously identified issues included poor readability, lack of agent training in journalism, declining public awareness of Extension, unpopular information delivery methods, poor discoverability of Extension publications on the Internet, poor placement of agent-written articles in newspapers, and low agent confidence in the effectiveness of their written mass communication.

The research reported here examined how Cooperative Extension county agents in the Agriculture and Natural Resources program area interpreted research-based agricultural information into written mass media communication products for urban

audiences. The study also determined the readability of these products using the Flesch

Reading Ease and Flesch-Kincaid Grade Level formulas.

CHAPTER 2

LITERATURE REVIEW

Overview

Since the creation of the Cooperative Extension Service in 1914, Extension agents have been providing informal education to state residents at the local level. The sections of this chapter explore the history of Extension, including the circumstances leading to its creation, the community education traditions of county Extension agents, and how the focus of Extension has changed over time. It also provides an overview of advantages and limitations of mass communication efforts of agricultural Extension agents.

History of Cooperative Extension

By tradition and practice, agricultural Extension agents provide a consistent, if not constant, flow of research-based information to clients.

History of Agricultural Education through Public Land-grant Colleges

The Morrill Act. In July of 1862, President Lincoln signed into law a legislative act titled "An Act Donating Public Lands to the Several States and Territories which may provide Colleges for the Benefit of Agriculture and the Mechanical Arts" (Library of Congress [LOC], 2015). Nicknamed the Morrill Act in honor of Justin Morrill, the Vermont congressman who initiated the bill, this legislation created a scheme of selling hundreds of thousands of acres of Federal land (thus the term "land-grant colleges") and

using the revenue to establish public colleges that would make education in agriculture and mechanical engineering accessible to a broader range of the population (LOC, 2015).

Funding from the Morrill Act provided for the establishment of 69 public colleges of agriculture and mechanical arts (LOC, 2015). Subsequent iterations of the Morrill Act in 1890 and 1994 addressed "educational inequality among African Americans and Native Americans" (National Institute of Food and Agriculture [NIFA], n.d.). The 1890 act required states to either prove that race was not a barrier to admission, "or else designate a separate land-grant college for blacks" (Association of Public and Land-Grant Universities [APLU], 2012, p. 5). In 1994, Congress passed legislation conferring land-grant status to 29 Native American colleges (APLU, 2012).

The Hatch Act. The Hatch Act of 1887 expanded the research capacity of land-grant colleges by creating State Agricultural Experiment Stations associated with them (Committee on the Future of Colleges of Agriculture in the Land Grant University System, 1995). The experiment stations were working field laboratories in which students and professors could conduct original research on plant and animal physiology, diseases, and treatments; crop rotation; soil and water analysis; plant fertilization; forage quality; "and such other researches or experiments bearing directly on the agricultural industry of the United States" (Hatch Act, 1887, Sec. 2).

The Hatch Act further stipulated that each SAES must prepare and publish quarterly reports on the progress of projects underway at the station. The reports were to be submitted to each newspaper in the respective state or territory, and mailed to farmers who requested them "as far as the means of the station will permit" (Hatch Act, 1887, Sec. 4).

The beginnings of educational outreach. Although agricultural technology development proceeded at the experiment and research stations, transfer of that technology to farmers in rural locations was problematic. Many land-grant colleges engaged in educational outreach, sending educators to locations distant from the campus to deliver lectures to farmers on topics such as soil, plant fertilization, and animal nutrition (Committee on the Future of Colleges of Agriculture, 1995). In 1908, UGA launched "College on Wheels," an educational train pulling cars that featured exhibits of livestock and technologically advanced farm equipment (UGA Extension, 2014). The train made calls at 150 Georgia towns, where college faculty demonstrated new machinery and described new, research-tested farming practices (UGA Extension, 2014).

These were ambitious efforts to spread new agricultural knowledge and technology beyond the university campus gates, but the events were sporadic and limited in the number of people they could reach. The colleges and agricultural experiment stations weren't well enough staffed to be able to spare personnel for time-consuming distance education excursions, and "a gap was developing between professors on the campus and farmers in the fields" (Committee on the Future of Colleges of Agriculture, 1995, p. 67). In 1914, passage of the Smith-Lever Act established the Cooperative Extension Service to fill that gap.

Table 2.1 provides an overview of the legislative acts that created agricultural education institutions in the U.S.

Table 2.1
Legislative acts establishing systems of agricultural education in the U.S.

Year	Legislation	Purpose
1862	Morrill Act of 1862	Created system of public land grant colleges in each state to provide higher education in agriculture and mechanical arts
1887	Hatch Act of 1887	Provided for establishment of state agricultural experiment stations attached to land grant colleges for agricultural research and technology development
1890	Morrill Act of 1890	Addressed issues of racial discrimination at land grant colleges and "provided for annual appropriations to each state to support its land grant college" (Committee on the Future of Colleges of Agriculture, 1995, p. 1).
1914	Smith-Lever Act	In cooperation with USDA, created Cooperative Extension service to help disseminate research-based knowledge in agriculture, home economics, and energy to U.S. residents through the land-grant colleges of each state
1994	Land Grant for Native American Colleges	Conferred land-grant status on 29 Native American colleges and provided funding to support them.

Note. Several federal legislative acts built upon the original Morrill Act of 1862 to create the systems of agricultural education in place in the U.S. today.

Formalization of Cooperative Extension. Two U.S. senators, Hoke Smith from

Georgia and Frank Lever from South Carolina, authored federal legislation designed to

facilitate the transfer of agricultural technology from land-grant universities to the

farmers who could put the innovations to use in their fields (Manor, n.d.b). When

President Woodrow Wilson signed the legislation into law on May 8, 1914, "agricultural

extension work" (Smith-Lever Act, 1914, Sec. 1) became the third leg of the tripartite

mission of land-grant colleges: residential education, experimental research, and

educational outreach (Committee on the Future of Colleges of Agriculture, 1995; UGA

CAES, 2015b).

Patterned on the demonstration agent idea pioneered by USDA special agent Seaman A. Knapp, the Smith-Lever Act created Cooperative Extension, the community educational outreach branch of these colleges and universities (Manor, n.d.b). Using federal, state and local funding (hence the "cooperative" aspect), universities hired Extension agents "to aid in diffusing among the people of the United States useful and practical information on subjects relating to agriculture, home economics, and rural energy, and to encourage the application of same" (Smith-Lever Act, 1914, Sec. 1).

Role of Extension Agents in Technology Transfer

Since the establishment of the Extension system of community education over 100 years ago, the goal of all Extension work has been to extend the geographic reach of university research-based information so as to affect some element of change in the general population (Franz, 2014; UGA CAES, 2015b). Extension agents are change agents. To achieve the desired outcome of persuading farmers to adopt new practices and new technology, agricultural agents utilize several channels of communication. As described in the language of the Smith-Lever Act, these channels include:

> . . .the development of practical applications of research knowledge and giving of instruction and practical demonstrations of existing or improved practices or technologies in agriculture, home economics, and rural energy, and subjects relating thereto to persons not attending or resident in said colleges in the several communities, and imparting information on said subjects through demonstrations, publications, and otherwise and for the necessary printing and distribution of information in connection with the foregoing. . . (Smith-Lever Act, 1914, Sec. 2).

When people first hear about a new technology, process, or product, they usually

resist the idea that it is better than what they are already using. Through the

communication channels described in the Smith-Lever Act – teaching, demonstrations,

and written information – Extension agents help clients work through the five time-

ordered stages of the innovation-decision process, shown in Table 2.2. The speed with

which individuals move through the five stages of the innovation-decision process

depends on personality characteristics of the person (Rogers, 2003).

Table 2.2
Five stages of the innovation-decision process

Sequence	Stage	Process
1)	Knowledge	Person (or group) learns about the innovation and gains some understanding of it
2)	Persuasion	Person seeks information and forms an opinion, either favorable or unfavorable, about the innovation
3)	Decision	Person assesses the "innovation's advantages and disadvantages for his or her own particular situation" (p. 21). Decision may be to adopt or reject the innovation.
4)	Implementation	Person actively uses the innovation. Adopter may modify or "reinvent" the innovation during this stage (p. 17).
5)	Confirmation	Person seeks reinforcement of his or her decision to adopt or reject the innovation. The decision is still subject to change.

Note. When faced with new ideas or technology, people move through five time-ordered
stages before deciding whether to adopt or reject the new ideas (Rogers, 2003).

Adoption of innovations doesn't happen all at once in a community; it occurs over

time, as people observe benefits the innovation provides to their neighbors who have

adopted it. Once about 10-20 percent of the population adopts the innovation, diffusion of

it through the community accelerates. At the point where most of the population that is

going to adopt the innovation has done so, the rate of adoption slows down. This process

creates the S-shaped curve, depicted in Figure 2.1, that characterizes the diffusion of an innovation throughout a social group (Rogers, 2003).
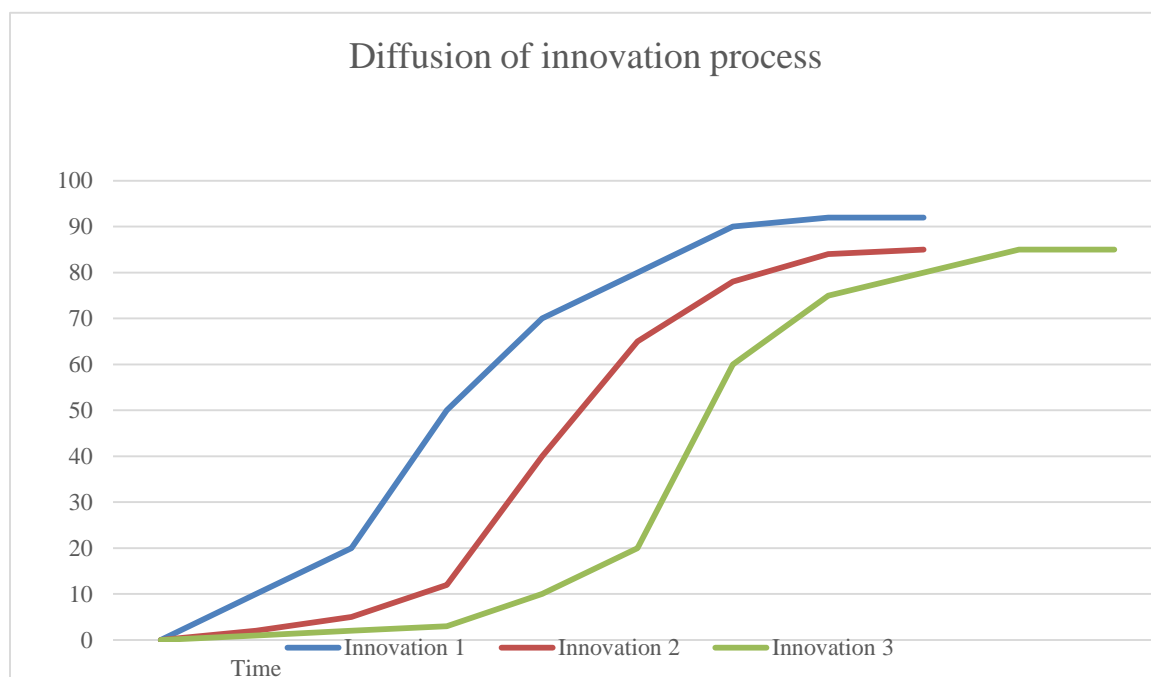
Figure 2.1. Percentage of adoption of new technology in a community over time.
Diffusion of an innovation through a social system occurs over time. Diffusion accelerates after about 10-20 percent of the community adopts the new technology, then slows at the point when most people who will adopt it have done so. This process creates a characteristic S-shaped curve (Rogers, 2003).

Shifting Population Brings New Priorities

As the nation's population shifted away from rural farms and into urban settings following World War II, Extension efforts expanded to include education in areas such as low income nutrition, family life and relationships, and urban agriculture. Home economics became Family and Consumer Sciences, and 4-H transitioned into 4-H Youth Development, supplementing traditional agricultural production and food preservation

projects with specialty clubs, such as photography club and wildlife judging, that are more appealing and practical for urban students (UGA CAES, 2015b).

Some land-grant universities use the County Delivery System, working in cooperation with local governments to employ Extension agents in counties throughout the state (UGA Extension, 2012). Under this system, Extension agents in each program area work with local stakeholders to develop programs of education that meet the needs of county residents. While not every program area is represented in every county, some counties employ Extension staff in additional program areas, such as SNAP-Ed and EFNEP. SNAP-Ed agents educate clients enrolled in the Federal Supplemental Nutrition Assistance Program (SNAP) about making healthy choices based on USDA guidelines for nutrition and active lifestyles (USDA Food and Nutrition Service, 2015). Extension agents supporting EFNEP, the Expanded Food and Nutrition Education Program, help low-income families learn to make healthy, economical food decisions and adopt food safety practices (UGA College of Family and Consumer Sciences [FACS], 2014).

Reaching the Masses through Written Materials

While face-to-face communication, public lectures, and educational demonstrations are part of "base programming" for ANR Extension agents, these activities typically reach a limited number of clients (Register, 1983). From the early days of Extension, ANR agents engaged in mass media communication through news articles and columns in local newspapers (Lux & Michael, 1925; Upchurch, Jr., 1969). Skill in creating written communication is considered one of the top competencies Extension agents need to have in order to be effective in their jobs (Benge, Harder, & Carter, 2011; Cone, 2011; James, Estwick, & Bryant, 2014; Lakai, Jayaratne, Moore, &

Kristler, 2012). When writing mass communication texts, county Extension agents function as information mediators (McQuail, 1992). Reports generated by university researchers and subject area specialists form the basis of ANR Extension agent publications (Committee on the Future of Colleges of Agriculture, 1995). County agents must take these science- and technology-dense research reports and interpret the information into documents that are comprehensible and relevant to the farmers, homeowners, and lay people who are the agents' targeted reading audiences.

Advantages of Mass Communication for Extension Agents

With urban clients, mass media communication can be as effective as face-to-face Extension programs for educating residents, and it has the potential to reach a much larger learning audience (Woodson et al., 2008). This is important for urban Extension agents, whose service areas may include hundreds of thousands to millions of residents. By U.S. Census Bureau 2015 population estimates, for example, over 47% of Texas' 27 million residents is concentrated into six counties. One third of Georgia's 10 million residents live in four metropolitan counties (U.S. Census Bureau, n.d.).

Studies have shown that people view Extension agents as reliable and trusted sources of information (Bowie & Gazda, 2013; Dittman Research & Communications Corporation, 2010). Trust in the source of information is a factor in whether or not the intended audience accepts the information (Hoban, 1998; Perry & Nigg, 1985).

Limitations of Extension Mass Media Written Communication

Despite the importance of mass communication efforts in disseminating information to Extension clients, numerous previous studies have identified limitations with Extension publications.

Poor readability of agent-written articles. Upchurch, Jr. (1969) identified the poor readability of agricultural Extension agent articles as a factor limiting their effectiveness in community education. Using the Farr-Jenkins-Paterson Reading Ease formula, he analyzed the readability of 500 articles written by 100 North Carolina Agricultural Service agents, and found that only seven of the 100 agents wrote in the "standard" readability range. The other 93 agents wrote in the fairly difficult to very difficult to understand ranges. Similar to the Flesch Reading Ease formula, the Farr-Jenkins-Patterson formula is based on the frequency of single syllable words and overall length of sentence. While Upchurch, Jr. (1969) acknowledged that readability is only one measure of article quality, he points out that "readability is an important factor . . . which may be strongly associated with the effectiveness of the article upon the reader" (p. 1).

Lack of training in journalism and unfamiliarity with communication research. Although Extension agents are information mediators between researchers and clients who may not be science oriented, many ANR agents have received no education or training in journalism or creative writing (Register, 1983; Upchurch, Jr., 1969). Because these agents are unfamiliar "with research relating to communicating and making decisions about scientific and technical topics" (Cone, 2011, Abstract), they may have difficulty making complex subject matter readable and understandable to lay audiences (Cone, 2011). If readers cannot understand what they read, the effectiveness of the article in creating a change of knowledge, attitude, or behavior in county clients is limited.

Declining public awareness of Extension. Several studies indicated that even if Extension agents create high quality, easy to understand articles, they may fail to connect

with potential readers because of declining awareness of Extension. Younger generations have much less awareness of Extension than older generations do (Cosner & Key, 1981; Dittman Research & Communications Corporation, 2010; Loibl et al., 2010). In a study conducted in 2011, Heidi Radar found that internet searches for 'extension service' in 2010 were almost 50% fewer than in 2004.

Unpopular information delivery methods. Several studies concluded that Extension agents distribute information through communication channels that are not popular with their intended readers (Bardon et al., 2007; Bowie & Gazda, 2013; Cartmell et al., 2006; Jansen et al, 2010; Kanté et al., 2009). Preferences varied depending on the demographics of clients as well as their interest in the topic, but for many, old-fashioned direct mail was the most preferred method to receive information, or was high on the list (Bardon et al., 2007; Bowie & Gazda, 2013; Cartmell et al., 2006). In a survey of Alaska residents, however, the two preferred methods of receiving Extension information were through the Extension website and as online publications (Dittman Research & Communications Corporation, 2010).

Poor discoverability of Extension publications on the Internet. For clients who seek information through the Internet, Extension communication products seem plagued by discoverability issues. Although Extension is the third branch of the tripartite mission of land-grant universities, Arnold and colleagues (2012) found that a link to Extension was included in just over half of the university websites. In a separate study, a search for the phrase "how to garden" returned 81 results ahead of the first Extension-authored article listed (Radar, 2011). Even when she searched within an Extension website, Radar (2011) discovered a general article about gardening only after clicking through four other

screens. Along the journey, she found irrelevant and outdated information advertising past events (Radar, 2011). Broken links also thwarted client attempts to access Extension information through the Internet (Anderson-Wilk, 2011).

Placement of articles in newspapers. Lux and Michael (1925) of the University of Nebraska Agricultural College Extension service conducted a six-week survey of 147 weekly newspapers in Nebraska to determine how often the editors published agricultural news items submitted by the college and by county agents, and where published items were placed within the newspaper. They concluded that placement of county agent submissions within the newspaper depended on the type of article written. Lux and Michael (1925) described two types, "one of straight news style and well worth the space it occupied, and the other a mixture of propaganda and news" (p. 5). Editors placed straight news "according to its relative news value in the paper" (p. 5), but sequestered the propaganda mixes in special sections, such as a Farm Bureau department or County Extension Agent column.

Low agent confidence in efficacy of written mass communication. Recent research pointed out persisting limitations relating to the efficacy, both actual and self-perceived, of mass media communication authored by Extension agents. A study of Florida Extension agents following the 2004 hurricane season found that written materials were the most often used form of mass communication (Telg et al., 2007). Over half of these agents (53%) believed that their efforts were only marginally effective in communicating with the general public, and 20% of the agents believed their written communication failed (Telg et al., 2007). In another study by the University of Georgia, participants of focus groups organized in Sumter County (11 participants), Burke County

(9 participants), Morgan County (7 participants) and Fulton County (6 participants) indicated that Extension agent were credible sources of information, but the overall perception of the participants was that Extension was primarily a soil testing service (Bowie & Gazda, 2013).

Theoretical Framework

Framing Theory

Extension agents are change agents. They provide local clients with research-based information with the objective of raising awareness, knowledge, and/or facilitating a change in behavior about a particular issue.

One of Extension's more recent priority areas is supporting and informing people about urban agriculture. Definitions of urban agriculture vary by locality, but may include small scale food production, urban beekeeping, community greening, school and community gardens, landscape plant production, and landscape management (Mendes et al., 2008; University of Maryland Extension, 2016; Urban Ag Council, n.d.). In densely populated urban settings, ANR agents must try to reach hundreds of thousands or more clients with information. News articles and columns, distributed through mass communication channels, are Extension program activities that can effectively educate large numbers of urban clients (UGA Extension, 2015c; Woodson et al., 2008).

Learning from Extension, however, is voluntary behavior on the part of the targeted reading audience (Upchurch, Jr., 1969). To engage the attention of prospective readers and learners, Extension agents must present science-based information to lay audiences in a way that makes it relevant to their lives. Frames are a valuable tool to

"reduce the complexity of an issue" (Scheufele & Tewksbury, 2007, p. 12) and anchor it on concepts that are socially familiar (Scheufele, 1999).

Writers use frames to package information into a familiar mental model to help audiences organize and interpret the information. For example, a quantitative content analysis study that examined newspaper coverage of outbreaks of foot and mouth disease found that journalists used a fear frame that blamed agricultural practices for creating a human health threat (Cannon and Irani, 2011). Another study used qualitative content analysis to examine the television news frames used to report on a food-related outbreak of *Salmonella,* and found that most media frames were neutral and informative (Irlbeck, Akers, & Palmer, 2011). The manner of presentation of information influences how readers think about a topic and may also affect their behavior (Chong & Druckman, 2007; Neuman, Just, & Crigler, 1992; Rumble, Holt, & Irani, 2014; Scheufele, 1999; Scheufele & Tewksbury, 2007).

As science communicators, Robinson (2013) urged Extension agents to thoughtfully use framing theory to engage clients. However, frames may be subconscious constructions (Irlbeck et al., 2011). Numerous factors can influence how a journalist frames an issue. These include internal factors, such as personal experiences, journalistic routines, assumptions about the audience, and expectations from the organization with which the writer is affiliated; and external factors, including social or cultural norms and the availability of informants (Cannon & Irani, 2011; Neuman et al., 1992; Sheufele, 1999).

This study used mixed methods to determine which factors influenced the frames ANR Extension agents used to interpret science-based agricultural information into mass media articles prepared for urban county residents.

Summary

As the third branch of the tripartite mission of land-grant colleges and universities, Cooperative Extension has a long history of providing research-based information to rural residents in states throughout the U.S. Concentration of large segments of the population into urban environments has created a shift in priorities in Extension education, including a new focus on urban agriculture.

Mass media communication is an essential tool for transmitting information to audiences that number in the hundreds of thousands to over a million people. Although ANR Extension agents have a long tradition of writing mass media articles to inform and educate clients, several studies identified limitations in their effectiveness. This study utilized mixed methods to examine how a small subset of ANR Extension county agents, those working in densely-populated urban counties, framed research-based information about agriculture in mass media articles that provided information to urban clients.

CHAPTER 3

METHODS

Purpose and Objectives

The purpose of the study was examine how ANR county Extension agents interpret research-based agricultural information into written mass media communication products for urban audiences. The objectives were to determine:

1) What factors influenced agents to select the topics they covered in articles for urban clients;

2) What factors influenced their decisions on how to present information about these topics in articles for urban clients; and

3) Whether articles were accessible, from readability and reading grade level measures, to adult clients residing in the agent's county of employment.

Research Design

Content Analysis

The study used mixed methods to conduct content analysis of articles written by ANR Extension agents for urban clients, as well as qualitative content analysis of interviews with some of the agent-authors. By examining texts "within a specific context" (Krippendorff, 1989), researchers can learn more than the face value of the information. With sufficient samples of documents analyzed within a particular context, media content can provide information from which researchers can draw inferences. In

addition to yielding clues about the author, his or her society, institutional cultures, and intended audiences, data from content analysis can uncover trends and patterns in communication within the specified context (Elo & Kyngäsh, 2008; Krippendorff, 1989; McQuail, 1991).

Scope

The study examined 165 mass media articles written from 2008 to 2015 for a general adult audience by six ANR Extension agents working in five densely populated (>200,000 residents) urban counties in a southern U.S. state. Through one-on-one interviews, the researcher further explored the factors that influenced article topic selection and information packaging for three of these six agents. By 2015 U.S. Census Bureau estimates, populations in these five counties ranged from 235,900 to 1,010,562 (U.S. Census Bureau, n.d.).

Purposeful Sample Selection

The study utilized purposeful sampling (Merriam, 2009) to gain knowledge and insight into a particular situational experience, that of Agriculture and Natural Resources county Extension agents who regularly used mass media articles to communicate agricultural information to adult clients residing in densely-populated urban counties. Although agents in these circumstances may serve hundreds of thousands to millions of county clients, they represented a small subset of the population of ANR Extension agents in the state selected for the study.

Criteria for study participation. To be included in the population sample, study participants were required to meet the following criteria:

1) Participants must be county Extension agents (not Extension associates, program assistants, or other Extension staff members) with primary responsibility in the Agricultural and Natural Resources program area.

2) Participants must be working in, or recently retired from, counties that met the following criteria as measured by 2010 U.S. Census data:

   a. Population of 200,000 or more residents and

   b. A large urbanized area, defined as having 50,000 or more residents, or one or more urban clusters, defined as having at least 2,500 but not more than 50,000 residents (U.S. Census Bureau, 2015b).

3) Participants must have been working in the stipulated position for more than six months at time of data collection.

4) Participants must have written informative articles for mass media distribution through some channel to local county residents at approximately regular intervals (weekly, monthly, and/or quarterly).

5) Participants must make a representative sample of articles, preferably spanning a 12 month range, available to the researcher, either directly or indirectly through a mass communication venue, such as an internet website.

Identification of qualified participants. Nine counties within the state met the county criteria by having populations of 200,000 or more residents and large urbanized areas. Within these nine counties, the researcher identified 11 agents who met the first three criteria for study participation. Nine were active ANR Extension agents, representing seven counties, and two were recently retired ANR agents, representing two

counties with vacant ANR agent positions. Two of the counties had two ANR agents on

staff. All of the agents in this population (N=11) were male. Two were African-

American, one was Latino, and the remaining eight were Caucasian. Experience in their

positions for active agents ranged from nine months to over 30 years.

Invitation to participate in the study. All 11 agents were contacted by email and

invited to participate in the study (see Appendix A). Follow-up contacts were made by

email, telephone, and in person where possible.

Protection of study participants. The invitation to participate informed agents

that the study had been approved by the Institutional Review Board of the university in

which the researcher was enrolled. Agents were further informed that their participation

was entirely voluntary, and there would be no penalties or repercussions if they declined

to participate. They were also free to withdraw from the study at any time without penalty

or loss of benefits. To protect their identity, findings were presented in summary form.

No incentives were offered for study participation. There were no known or anticipated

risks associated with participating in the study.

Participant selection. From the pool of 11 active and recently retired agents, four

agents, representing four counties, did not meet the fourth criterion for participation

because they did not write articles for distribution to county clients through any mass

communication channel, or did not produce mass media content with sufficient

frequency. This finding reduced the pool to seven qualified participants.

Of those seven, three actively working agents agreed to participate fully in the

study, providing copies of articles that were not available online, and engaging in semi-

structured interviews with the researcher. A fourth actively working agent provided

copies of articles, but was unavailable to participate in an interview. A fifth agent agreed on several occasions to participate, but did not follow through by providing copies of articles. After several unproductive reminders, the researcher concluded that this agent had tacitly declined to participate. His articles were not available online, so he did not meet the fifth criterion for participation.

Although the two retired agents did not respond to the invitation to participate, nor to follow-up efforts, their articles were available online. The researcher collected these articles for use in the content analysis phase of the study.

In summary, four of the 11 ANR agents working in the urban counties within the scope of the study did not meet criteria for participation because they did not produce mass communications for distribution to county clients with regular frequency. A fifth agent did not meet the fifth study participation criteria because he did not make his mass media articles available to the researcher. His articles were not available online, so he was disqualified for participation.

Of the six ANR urban county agents who met all criteria for participation (one African-American and five Caucasian males), three (50%) were willing and available to participate in the second phase of the study, individual, semi-structured interviews.

Data Collection

This study utilized mixed methods to collect both quantitative and qualitative data.

Phase 1 – Content Analysis

In phase one of the study, content analysis, the researcher collected 165 mass media articles written by six ANR Extension agents working in five of the nine counties in the state that were identified as densely-populated urban counties. Most of the agent-specific article collections spanned a variable 12 month cycle from 2014 to 2015. This time period was chosen because the researcher believed it would yield a sufficient number of articles from each agent to be a representative sample of his work, and because it might reveal themes of topic selection reflective of the seasonal and cyclical nature of agriculture and natural resources. It is also similar to the time span of North Carolina agricultural agent articles analyzed for readability in an earlier study (Upchurch, Jr., 1969).

For four of the five urban counties ultimately included in the study (the four counties without ANR Extension agent articles available for the study were eliminated from consideration), UGA ANR Extension agent-created mass media articles were available on the Internet. Seventeen newsletter articles were retrieved from a county Extension website; 106 articles were retrieved from online newspaper archives; 18 articles were retrieved from a blog site. Two agents provided their articles (N=24) through email as collections of Microsoft Word documents.

Data pertaining to population, demographics, and estimated reading competencies of adult populations in each of the five counties within the scope of the study were gathered from public documents. Information regarding newspaper, newsletter, and blog circulation and publication frequency was collected from public records and from agents participating in the interview phase of the study.

Phase 2 – Individual Interviews

   Three agents agreed to participate in interviews about their article creation decision process during phase two of the study. The semi-structured interview guide was developed with input from study committee members and influenced by theories of mass communication and framing, as well as information collected, by surveys, from Extension agents in previous studies about mass media communications (DeMarrais, 2004; McQuail, 1992; Merriam, 2009; Neuman et al., 1992; Register, 1983; Scheufele, 1999; Scheufele & Tewksbury, 2007; Upchurch, Jr., 1969). Ten open-ended questions sought information about mass communication outreach practices and the decision process around creating content for urban county clients. Pre-scripted probes followed some interview questions as a means to ask the question in a different way and to encourage participants to elaborate on responses (Merriam, 2009). Eight additional questions collected demographic information and personal information about the agent's education and media habits, similar to information collected in previous studies of Extension agent mass communications (Register, 1983; Upchurch, Jr., 1969).

   Interview questions. Interview questions and probes for additional information were organized by interest area and typed into a guide used by the researcher for each interview (Merriam, 2009). The questions and probes were:

1. What forms of mass media do you use to deliver information to your clients?

2. How often do you publish articles in each type of media you use?

3. What factors influence your topic selection?

a. (Probe) How does your institutional affiliation influence your topic selection?

b. (Probe) How does your relationship with community leaders influence topic selection?

c. (Probe) How does your plan of work influence topic selection?

d. (Probe) What assumptions do you make about your audience?

e. (Probe) How does your work schedule/ work load influence your topic selection?

4. What factors influence how you present information?

5. How do you change your writing or information presentation for different media platforms?

a. (Probe) Do you think there's a different audience for the different forms of mass media you use?

6. How do you decide which facets of a topic to emphasize and which to deemphasize?

7. How do you connect agricultural topics to non-agricultural/ urban/ suburban audiences?

8. How do you decide how much information your clients need?

9. How do you interpret technical research findings for your audience?

a. (Probe) Do you use metaphors, analogies, simpler language?

10. What feedback do you get from your audience?

11. What types of mass media do you read?

12. How often do you read these media?

13. How does what you read influence your writing?

14. How many years have you worked in Extension?

15. What is your plan of work?

16. What degrees do you hold?

      a.   (Probe) What was your college major?

17. What training have you had in journalism?

18. How would you describe your race, ethnicity, gender, and age?

Interview methods. Interviews were scheduled for a time and setting that was mutually convenient for both the participant and the researcher. One interview was conducted face-to-face in the researcher's office. The other two were conducted over the telephone while both parties were in their own offices. Interviews were recorded using an Olympus digital recorder. For telephone interviews, the researcher used an earbud microphone that captured the voices of both parties.

Data Analysis

Phase 1 – Content Analysis

For content analysis, articles collected from the Internet were copied and pasted or, where necessary, transcribed verbatim, into Microsoft Word. Two agents provided their articles via email as Microsoft Word documents. Using the following methods, the collection of articles (N=165) was analyzed and the collected information distilled into nine major themes, eight genres, and six frames.

Topic, genre, and frame identification. Using an inductive approach to content analysis (Elo & Kyngäs, 2007), the researcher read each article (N=165) and coded it with a preliminary identification of the topic and genre. These were entered into a Microsoft Excel spreadsheet, along with the date and title of each article, as the topics and genres emerged. After the initial coding of all articles for topic and genre, the researcher reread each article and recoded them as necessary into more representative topic or genre categories that may have emerged after the first reading. Articles with similar topics were then grouped together into themes. From this process, nine major topic themes and eight article genres emerged (Leedy & Ormrod, 2013).

Upon a third reading, the researcher identified and coded six frames that the agents used to help readers categorize and understand the information presented (Chong & Druckman, 2007; Cissel, 2012; Scheufele, 1999; Scheufele & Tewksbury, 2007).

Article topic themes, subthemes, and genres were tallied to determine the frequency of use for each agent-author (N=6) and for the data set as a whole (N=165 articles). This analysis provides a secondary source of information against which to validate analysis and interpretation of agent responses to interview questions.

Readability analysis. Microsoft Word document review software distilled the following data from each article:

- Word count

- Sentences per paragraph (averaged by article)

- Words per sentence (averaged by article)

- Characters per word (averaged by article)

- Percentage of passive sentences

- Flesch Reading Ease

- Flesch-Kincaid Grade Level

Flesch Reading Ease is a measure of the clarity of written material, referred to as reading ease and readability, based on a mathematical formula that considers the average sentence length (ASL) and the average number of syllables in words (ASW) contained in the passage. The formula is presented as RE = 206.835 – (1.015 x ASL) – (84.6 x ASW) (Readability Formulas, n.d.b). The formula yields a readability score between 0 and 100. Higher scores indicate greater clarity and imply that the reader will more easily comprehend the information in the text. The FRE formula is used by many U.S. government agencies and commercial concerns to determine the reading ease of official documents and instruction manuals (Project Gutenberg, 2016; Readability Formulas, n.d.b).

Flesch-Kincaid Grade Level is an indication of the school grade that a reader would need to have completed in order to comprehend a specific written text. Derived from the FRE score, F-KGL is inversely related to FRE. A high score for reading ease/ readability indicates that a person with lower educational achievement could comprehend the material. The F-KGL score of 9.8 indicates that a reader who has nearly completed the ninth grade should be able to comprehend the text. A F-KGL score of 3.0 would indicate that someone just beginning the third grade should be able to read and understand the material (Readability Formulas, n.d.a).

These measures were selected to determine the readability of articles in this study because:

1) They are the standard used by several U.S. agencies to determine readability of documents for official use (Project Gutenberg, 2016);

2) They are similar to the readability formula used to determine the readability of North Carolina agricultural agent written articles in an earlier study (Upchurch, Jr., 1969); and

3) As a standard feature of Microsoft Word, they are readily available to county Extension agents.

The distilled readability data was entered into the Microsoft Excel spreadsheet by author and article. During the topic, genre, and frame analysis, two articles were determined to be exact duplicates of two other articles in the agent's collection of articles. The duplicate articles (N=2) were excluded from readability analysis. Six additional articles submitted by an agent were interview-style articles. Since these articles (N=6) were predominantly the words of people other than the agent, they were excluded from the readability analysis, as well.

Excel functions were used to calculate mean and standard deviation for FRE and F-KGL across all other articles (N=157) for each author (range = 6 to 56 articles from each author). The range of FRE and F-KGL scores for each author was also determined.

In summary, eight of the 165 collected articles were excluded from the readability analysis because they were redundant or because they were not representative of the writing of the agent. Only 157 articles were included in results for FRE (readability) and F-KGL (reading grade level). The number of articles analyzed for each agent ranged from a minimum of six to a maximum of 56.

Phase 2 – Interview Data Analysis

Analysis of agent interviews included the following processes, based on Creswell's (2007) data analysis spiral:

- Listening to the audio recordings of the interviews and transcribing them verbatim into Microsoft Word documents

- Reviewing the transcripts several times to get an overall feel for the data as a whole

- Open coding to highlight recurring words and themes to help organize the data

- Memoing to identify categories among the agents' responses

- Organizing categories by similarity to identify themes

- Quantifying category related responses to estimate strength of the various influences on topic selection and information presentation

- Synthesizing and summarizing the findings

Validity and Trustworthiness Concerns

The researcher identified the following issues that may threaten the validity or trustworthiness of the findings. Steps taken to mitigate each threat are discussed with each threat.

Researcher Bias.

The researcher in this study is a county Extension agent working in the Agriculture and Natural Resources program area in a county that is in transition from a rural agriculture base to a densely populated suburban environment. Although her

undergraduate degree is in animal science, she had a 15 year career as a freelance writer before becoming an ANR county agent in 2014. In addition to "insider" knowledge about journalism and Extension, she had a professional acquaintance and working relationship with some of the ANR agents who participated in the study.

Steps taken to mitigate the threat. To reduce the issue of researcher bias, the investigator designed the study to collect similar data from different sources, a technique referred to as triangulation (Tracy, 2010). The agents who participated in the interview phase of the study provided primary data and multiple voices. Articles written by the agents, the physical manifestation of the cognitive decision process explored through agent interviews, provided secondary data and additional information about Extension agents in similar circumstances and environments as the interviewed agents. Public records provided a third source of information related to the study.

Questions for the semi-structured interview were open-ended and purposely broad to allow interview participants to voice their thoughts. Probes to elicit respondents to offer additional thoughts related to the interview questions were suggested in the interview guide the researcher used to ensure a degree of uniformity with each interview (Merriam, 2009). Committee members reviewed the questions to identify leading questions or biased language. The researcher made suggested alterations to the interview guide, which included reducing the both the number of questions and the specificity of some.

During interviews, the researcher practiced the art of listening, limiting her own input and allowing interviewees to fully finish expressing their thoughts. She used probes and vocal prompts (small sounds like "um-hmm") to ensure the interviewee that she was

still listening with interest and to encourage participants to expand upon the information offered.

Differences in Interview Setting.

With telephone interviews, both parties lose the nonverbal information that is conveyed through facial expressions and body language.

Steps taken to mitigate threat. In past years, several researchers held that building rapport and finding a comfort zone is more difficult with telephone interviews. In our modern culture, however, the telephone has become a familiar form of communication for both formal and informal uses (Irvine, Drew, & Sainsbury, 2013). Because of the collaborative nature of Extension work, the researcher had a pre-existing acquaintance with each of the interview participants. This professional connection was the foundation upon which she built rapport and ensured the comfort of each participant before introducing questions from the interview guide (DeMarrais, 2004).

Technical Difficulties.

Due to operator error, the recording equipment failed to record participant responses during the first interview attempt.

Steps taken to mitigate threat. Although the participant agreed to repeat the interview, the researcher did not wish to fatigue the participant with an immediate repeat of the interview, so both parties agreed to put some time between the first attempt and a repeat performance. The interview was repeated three months later, using the same semi-structured interview questions and in the same setting as in the initial interview.

Discrepancies can occur with repeated interviews. Although their study was conducted under different circumstances, Herligh, Scragg, and Turner (2002) concluded

that for non-traumatic memories, there was no interaction between number of discrepancies and length of interval between interviews. Since no record was made of the initial interview attempt, there was no data to determine whether, and to what extent, discrepancies in information may have occurred. In comparison to the interviews with the other two participants, however, the responses recorded during the repeated interview with this participant were at least as considered and fulsome.

To prevent a repetition of the audio recording failure, the researcher tested the recording equipment prior to each subsequent interview.

Data Skewing due to Sample Size Differences for Readability Analysis

Because the number of articles in each agent-specific collection varied so widely, the researcher was concerned that difference in the quantity of articles might skew the readability results.

Steps taken to mitigate threat. To ensure reliability of the data, she used an online random number generator to select six unique articles from the collections of each agent. One agent provided only six unique articles, so those six articles were used again in the second readability analysis. A Chi-square test indicated that the FRE and F-KGL scores were not significantly different (p= 1 for both FRE and F-KGL) between the set of all articles (N=157) and the randomly selected subset of articles (N=36). Because of this finding, the full readability data set (N=157) was used to determine the mean FRE and F-KGL for the articles in each author-specific collection (range = 6 to 56 articles).

Summary

The purpose of this study was to examine how ANR county Extension agents interpreted research-based agricultural information into written mass media communication products for urban audiences. The objectives were to determine the factors that influenced selection of topics for articles, factors that influenced decisions on how agents presented information about these topic in articles for urban clients, and whether the readability of the articles matched the estimated reading competencies of adult county residents. The scope of the study was limited to ANR Extension agents who wrote mass media articles with regular frequency to inform clients in one of five high-population urban counties in a southern state. Study participants were purposefully selected. Mixed methods were used to collect both quantitative and qualitative data.

CHAPTER 4

RESULTS/ FINDINGS

Overview

This chapter presents the findings from the study. Each of the three research questions are discussed in separate sections. For Research Question 1 and Research Question 2, the section is divided into findings from the interviews and findings from the article content analysis. Research Question 3 only relates to article content analysis findings and U.S. Census data about county demographics.

Purpose and Objectives

The purpose of the study was to examine how Cooperative Extension county agents in the Agriculture and Natural Resources program area interpreted research-based agricultural information into written mass media communication products for urban audiences. The objectives were to determine:

1) What factors influenced agents to select the topics they covered in articles for urban clients;

2) What factors influenced their decisions on how to present information about the selected topics to urban clients; and

3) Whether articles were accessible, from readability and reading grade level measures, to adult clients residing in the agent's county of employment.

Study Population

Characteristics of Counties Represented

Nine counties in the selected southern state met study criteria for population density and urbanization, but only five met all criteria for inclusion in the study. By 2010 U.S. Census data, 22% of the state's population resided in these five counties. At the time of the study, the 2.2 million people in the five counties were served by five ANR Extension agents (U.S. Census Bureau, n.d.).

Client demographics by county. Figures 4.1 through 4.5 provide a demographic picture of residents in each of the five counties included in the study. Data are based on 2010 U.S. Census Bureau records (2012a); however, the names of the counties have been changed to aid in protecting the identities of the agents participating in the study.

Figure 4.1 shows the percentages of residents in three age brackets, under 18 years, age 19-64, and 65 and older, in each of the five counties included in the study.

Comparison of resident ages by county

	BAINES	MILHOUS	RUDOLF	EARL	WILSON
65+	12.40%	9.20%	0.00%	6.80%	11.30%
19-64	65.00%	63.30%	77.10%	64.10%	64.10%
<18	22.60%	27.50%	23.90%	29.10%	24.60%

Legend: ■ <18 ■ 19-64 ■ 65+
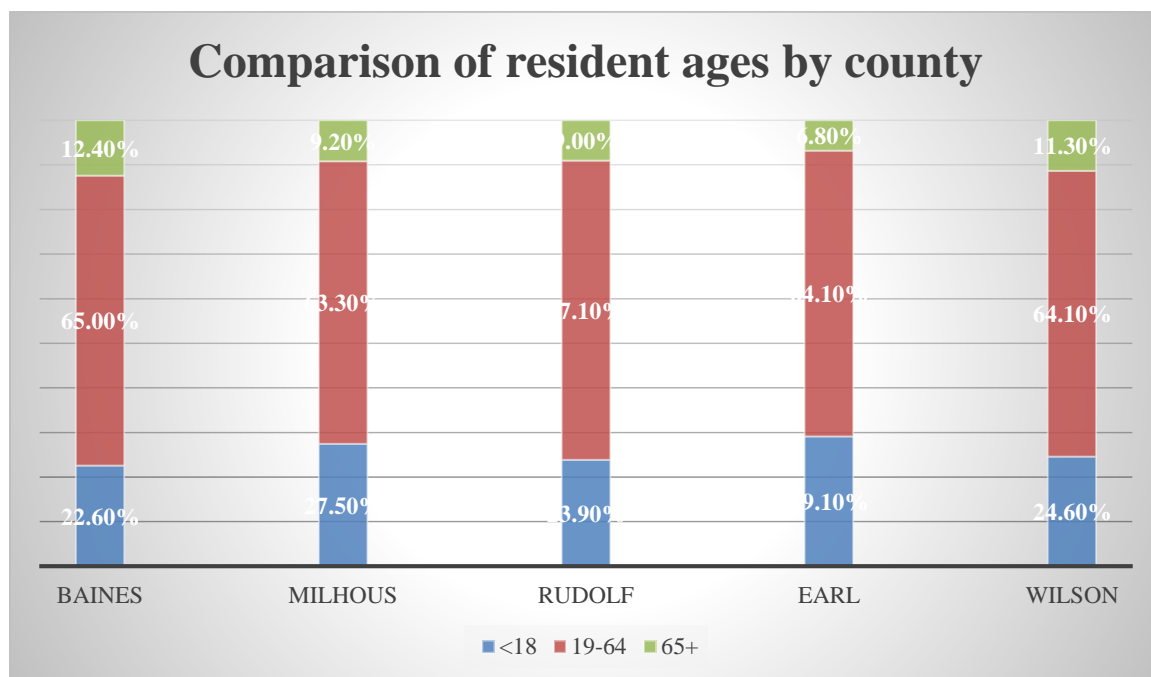
Figure 4.1: Relative ages of residents in five southern state, urban counties included in the study (U.S. Census Bureau, n.d.)

Figure 4.2 represents the racial/ ethnic composition of each of the five counties. Numbers shown are percentages of each race or ethnicity in each county.
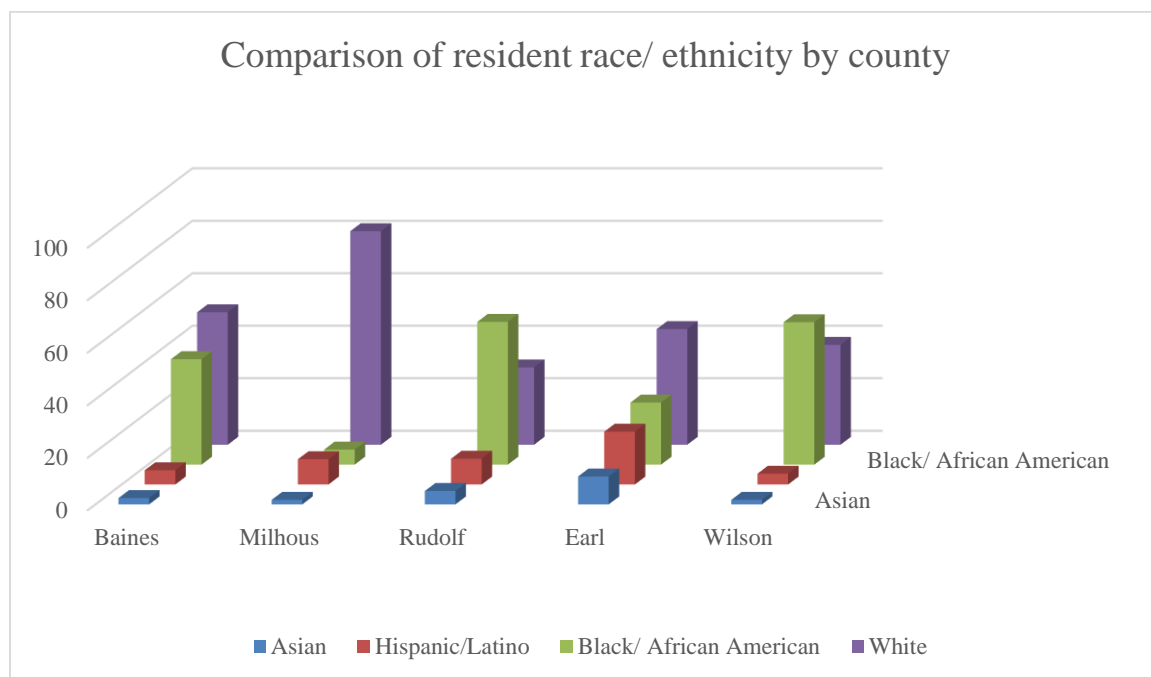
Figure 4.2: Race/ ethnicity percentages of population in southern state, urban counties included in the study (U.S. Census Bureau, n.d.)

Figure 4.3 shows a comparison of each county using selected markers, including the number of households in each county, the median value of owner-occupied homes, and the median household income.
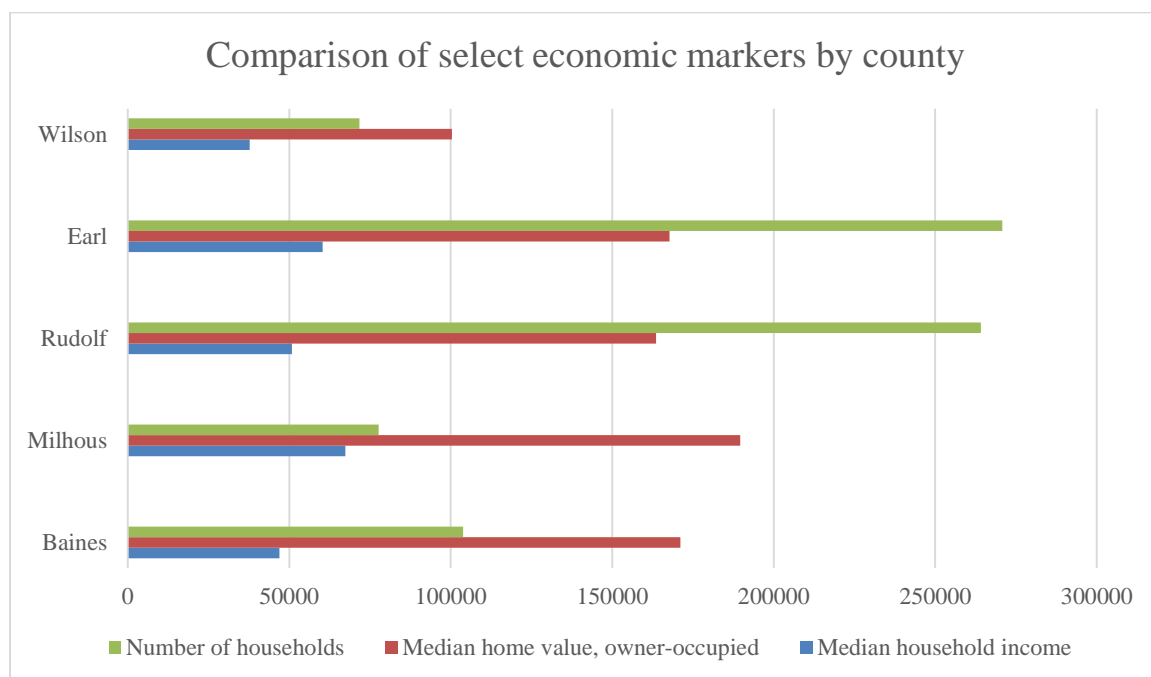
Figure 4.3: Comparison by selected economic markers of residents in each of five southern state, urban counties included in the study (U.S. Census Bureau, n.d.)

Figure 4.4 provides an overview of residents in each county that live with conditions that may limit their ability to read English. These conditions include advanced age, mental or physical disability, poverty, and having emigrated from a nation that does not read and write in English.
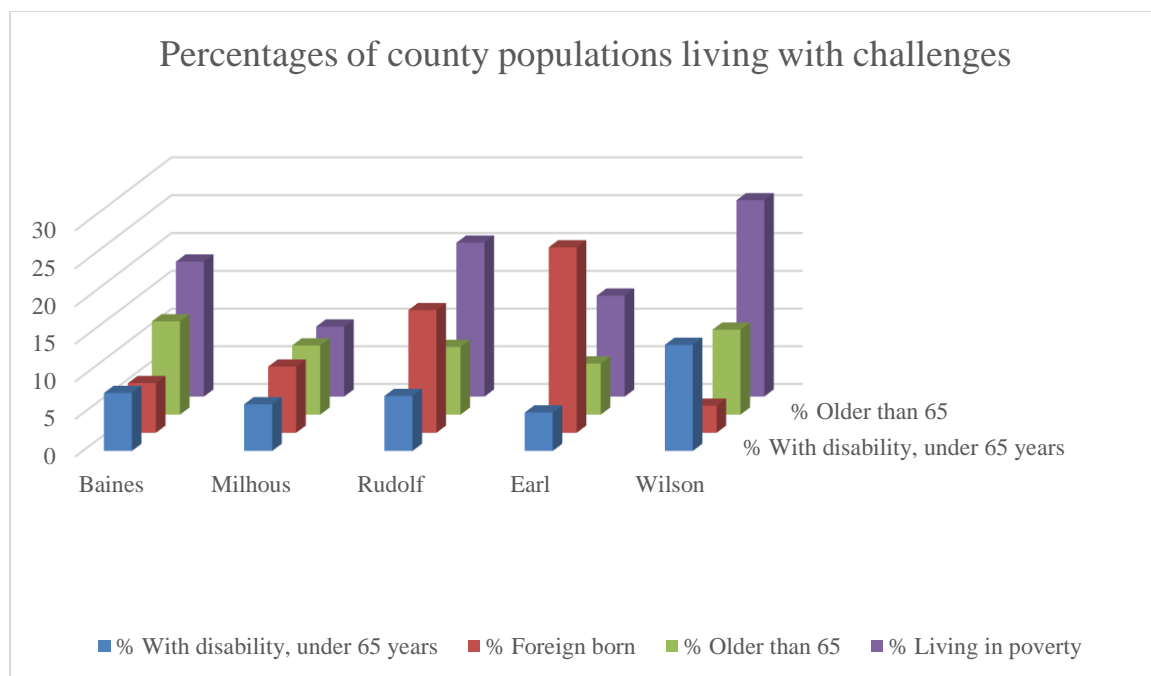
Figure 4.4: Percentages of population in each county that live with challenges that may negatively impact literacy (Dubay, 2008; U.S. Census Bureau, n.d.).

Figure 4.5 shows the percentages of adult residents in each county who have completed high school, the percentages who have earned a bachelor's degree or higher, and the estimated percentages of people in each county who lack basic reading skills.
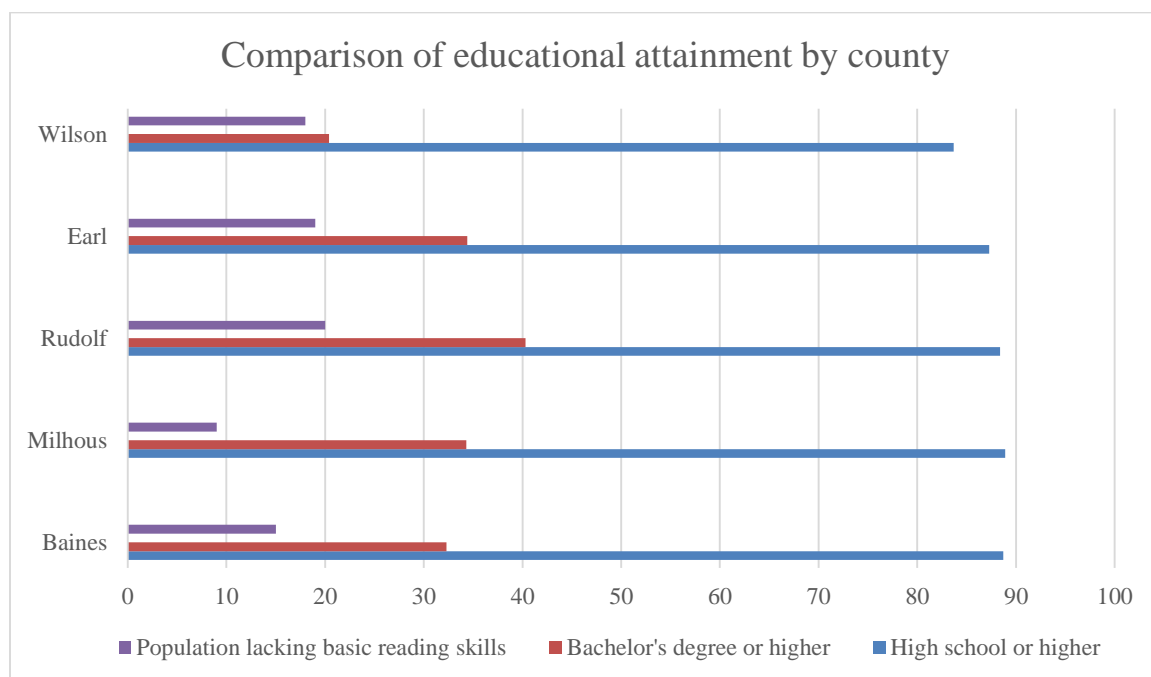
Figure 4.5: Educational attainment of residents in each of five southern state, urban counties included in the study. (National Center for Education Statistics, n.d.; U.S. Census Bureau, n.d.).

Characteristics of Interviewed Agents

Three ANR agents from the five high-population, urban counties voluntarily agreed to participate in one-on-one interviews with the researcher. They shared some similarities and had some differences.

Similarities. All interviewed agents were Caucasian males. All of them wrote articles for more than one form of mass media (newspaper, magazine, newsletter, and/or

blog). All had undergraduate degrees in a field of science (biology or horticulture). Two had Master's degrees in science fields, and one had a Master's degree in a social science field. None of the interviewed agents had any training or prior experience in journalism.

Differences. The agents ranged in age from 34 to 64 years. One was in his first year of employment with Extension, one was mid-career, and one had sufficient years with Extension to be considering retirement.

Two agents worked in highly urbanized counties with the second and third largest populations in the state. The third agent worked in a transitioning county with a population slightly above the minimum threshold for this study. The farm production value in this county ranked about middle of the state and was more than double the combined production value of counties represented by the other two agents participating in interviews.

Research Question 1

Research question 1 asked, "What factors influenced agents to select the topics they covered in articles for urban clients?"

Interview Findings

Identification of factors influencing article topic selection. Through inductive content analysis of the interviews (Elo & Kyngäs, 2007; Leedy & Ormrod, 2013), four dominant themes emerged related to topic selection. They are listed below, along with subthemes and frequency of mentions (f) during interview responses.

1) Relevancy to homeowners (F=45)

    a. Seasonality (f=8)

    b. Client calls/ questions (f=13)

    c. Client interests/ needs (f=13)

    d. Locality/ county connection (f=11)

  2) Personal factors (F=19)

    a. Plan of Work (f=2)

    b. Personal and professional interests (f=12)

    c. Personal reading habits (f=2)

    d. Work schedule/ work load (f=3)

  3) External factors (F=5)

    a. Breaking news (f=3)

    b. Availability of credible resources (f=1)

    c. Unavailability of credible resources (f=1)

  4) Relationship with county leaders (F=3)

    Discussion of factors influencing article topic selection. An explanation of how each of these factors influenced agents to select topics for their articles follows below.

    Relevancy to homeowners (F=45). Agriculture, horticulture, and natural sciences are seasonal and cyclical, and each of the three interviewed agents firmly stated that seasonality was the primary factor that influenced his selection of article topics. Although seasonality received fewer overall mentions (f=8) than responding to expressed client needs did (f=13), client questions were usually "some kind of pest or disease issue" that corresponded to seasonal changes or events. Similarly, agents anticipated the landscape management and pest control questions that homeowners would soon be asking because of seasonal changes. In responding to frequently asked client questions through their

articles, and composing articles to address upcoming landscape and pest issues, the agents were providing seasonally-specific answers to meet homeowner information needs related to lawn and landscape care.

Locality was another factor influencing topic selection. This had both a geographic consideration and a cultural consideration. For example, two agents stated that they would not write about row crop activities because the topic was not relevant in the county, nor was it relevant to county homeowners.

Personal factors (F=19). With only two mentions across all three interviews, plan of work, the two-year program of activities in support of an identified local or state issue, was a negligible influence over article topic selection. One agent's plan of work related to his primary mass media target audience of homeowners. A second agent's plan of work related to landscape service providers, a client group that usually was not the target audience for his primary or secondary mass media communication outlet. The third agent had not yet developed a plan of work.

Although all of the agents read gardening magazines, trade journals, and followed newsletters related to their personal and professional interests, they did not consider their personal reading habits (f=2) to be a strong influence on their writing. Only one stated that something he read had influenced him to write about that topic. Another agent referred to his personal reading as "background information."

Work load (f=3) was a consideration only for the least experienced agent, and had more to do with a drop in frequency of article publication than in topic selection.

The experience divide continued with the factor of personal and professional interests (f=12). The two considerations were combined because for each of the

interviewed agents, in most respects, their personal and professional interests were reflections of each other.

Whereas the article topic selection of the more experienced agents was strongly guided by client input, the agent with less experience cast a much wider net. In addition to addressing immediate client needs, the new agent's topic selections sought to influence clients, raise awareness of Extension, and give readers a broad view of agricultural activities in the county (see *Purpose of communication* in Research Question 2, below). Stating, "It's always easier to write about something that you find interesting," the new agent described writing about things of personal interest to him more often (11 mentions) than the other two agents (1 and 0 mentions).

External factors (F=5). External factors that influenced article topic selection included breaking news (f=3) and access to credible sources of information (f=2). Only two agents said they had covered breaking news. These were rare and memorable events. The mass media formats and frequencies of the third agent did not support covering issues of urgency.

Of the agents who covered breaking news, one replaced a planned topic with the current event, the discovery of an invasive insect in the state. The other agent produced an additional newspaper article about avian influenza, which he asked the newspaper to run as front page material, rather than in the regular, back-of-the-paper gardening column.

Availability of expert informants was the impetus for the avian influenza article. For another agent, a planned article on genetically modified organisms was torpedoed by lack of cooperation from "specialists."

Relationship with county leaders (F=3). One agent used some mass communication articles as an effort to gain support of county officials for Extension and local agricultural producers. Although it was not a front-of-the-brain consideration in his topic selection, another agent took guidance from an annual list of issues the county government wanted Extension to address. For the third agent, relationship with county leaders was not a consideration in topic selection.

Affiliation with the state land-grant university was not a factor in topic selection, but it was a consideration in how information about the topic was presented to the reading audiences (see Research Question 2, below).

Article Content Analysis Findings

Identification of topics covered. For content analysis, 165 articles, written by six ANR Extension agents working in urban counties, including the three who agreed to be interviewed, were considered. The researcher read each article several times and coded them by topic covered. The topics were organized by similarity and collapsed into nine major topic themes. The researcher determined frequency of use of topics and prevalence of themes in the articles of the agents written over a variable time span for each agent. Most article collections covered 12 months. Figure 4.6 provides a graphic view of the frequency with which agents in the study wrote about topics in each theme.
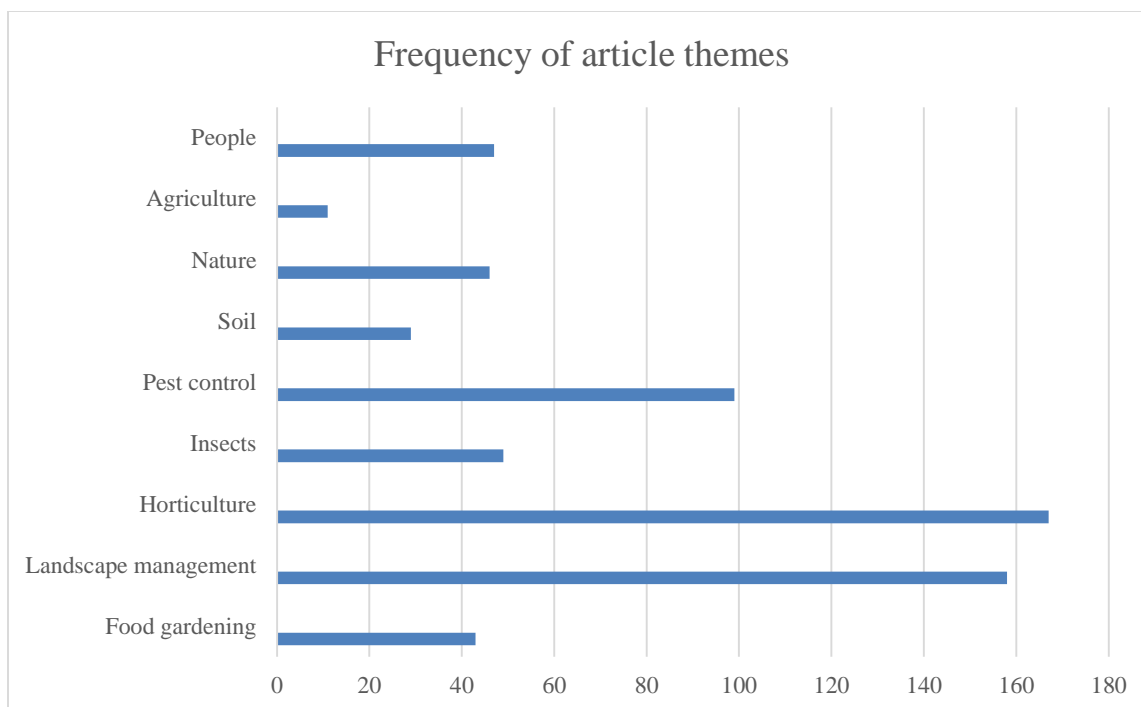
Figure 4.6: Frequency of major topic themes in articles (N=165). Similar topics were grouped together to define major topic themes. Articles often covered more than one theme.

Discussion of topics covered. Articles reviewed for this analysis often spanned more than one theme. For example, an article on apple trees (food gardening) also covered plant selection (horticulture), proper planting (landscape management), and promoted the annual county Extension plant sale (marketing Extension programs).

The high frequency of topics in the horticulture theme (F=167) and landscape management theme (F=159) were consistent with interview findings that relevancy of a topic to county homeowners was the strongest factor influencing the agents to write about particular topics. The theme of pest control had the third highest frequency of use (F=99). This theme included controlling weeds, plant diseases, insects, and rodents through the use of chemical pesticides, as well as by non-chemical means, categorized as cultural

methods. Interview responses indicated that client calls, a strong factor in topic selection, were frequently related to landscape plant and pest problems.

Topic themes, subthemes, and frequency of use by each agent (N=6) are presented in Table 4.1. While the different quantities of articles analyzed by each agent may overly represent agents who wrote with higher frequency, the content analysis provided weak support of interview conclusions that personal and professional interests exerted moderate influence on article topic selection. For example, agents #1 and #5 covered topics in food gardening at least twice as frequently as the other four agents did, accounting for 70% of all articles in the topic theme. Agent #3 accounted for 50% of topic coverage in the landscape management theme. These summary findings cannot be taken entirely at face value, however. Agent #3 also had high representation in the nature theme because he frequently wrote about weather effects on plants, plant diseases, and insects. Nevertheless, he wrote two-thirds (67%) of the articles that shared the wonders of nature with his target audience.

Table 4.1
Article topics and frequency by themes and subthemes (N=165)

Theme/ *subtheme	Agent #1	Agent #2	Agent #3	Agent #4	Agent #5	Agent #6	Totals for theme
Food gardening	**14**	**2**	**7**	**3**	**16**	**1**	**43**
*Vegetables	9	1	4	3	13	1	31
*Fruit	5	1	3	0	3	0	12
Landscape management	**35**	**17**	**79**	**4**	**17**	**6**	**159**
*Lawn care	11	1	14	0	7	0	33
*Weeds	2	0	7	0	5	0	14
*Water	0	0	10	0	1	1	12
*Maintenance	3	4	17	0	1	4	29
*Garden design	2	1	2	0	1	0	6

*Renovation	5	1	6	1	0	1	14
*Planting	11	6	14	3	0	0	34
*Pruning	2	4	9	0	2	0	17
Horticulture	**63**	**28**	**60**	**9**	**7**	**0**	**167**
*Plant selection	27	7	20	3	4	0	61
*Gold Medal plants	1	1	1	0	0	0	3
*Trees	16	14	12	3	1	0	46
*History of plants	3	0	4	1	0	0	8
*Plant diseases	7	4	12	0	1	0	24
*Native plants	3	0	4	0	0	0	7
*Exotic/ invasive plants	3	2	1	1	0	0	7
*Propagation	3	0	5	1	1	0	10
*Houseplants	0	0	1	0	0	0	1
Insects	**21**	**3**	**17**	**3**	**5**	**0**	**49**
*Pests	16	3	12	1	5	0	37
*Beneficial	2	0	1	1	0	0	4
*Incidental/ nuisance	1	0	4	0	0	0	5
*Exotic/ invasive	2	0	0	1	0	0	3
Pest control	**36**	**9**	**42**	**2**	**10**	**0**	**99**
*Herbicides	3	1	6	0	3	0	13
*Fungicides	4	0	3	0	1	0	8
*Insecticides	13	3	12	1	1	0	30
*Cultural methods	16	5	21	1	5	0	48
Soil	**6**	**0**	**7**	**4**	**12**	**0**	**29**
*Testing	3	0	2	1	6	0	12
*Health	2	0	4	2	3	0	11
*Composting	1	0	1	1	3	0	6
Nature	**9**	**3**	**28**	**4**	**1**	**1**	**46**
*Natural resources	1	0	0	0	0	0	1
*Conservation	1	0	0	1	0	0	2
*Weather	3	2	16	0	1	0	22
*Nuisance wildlife	2	1	3	1	0	2	9
*Exotic/ invasive wildlife	0	0	1	0	0	0	1
*Wonders of nature	2	0	8	2	0	0	12
Commercial	**3**	**0**	**1**	**7**	**0**	**0**	**11**

production							
*Forestry	1	0	0	1	0	0	2
*Greenhouse/ nursery	0	0	0	2	0	0	2
*Agriculture/ crops	2	0	1	2	0	0	5
*Animal agriculture	0	0	0	2	0	0	2
People	**24**	**9**	**2**	**8**	**4**	**0**	**47**
*MGEVs	0	1	0	1	2	0	4
*Hiring landscape professionals	6	6	2	0	0	0	14
*Local agricultural/ horticultural producers	0	0	0	6	0	0	6
*Marketing Extension programs	18	2	0	1	2	0	23

Note. Articles often spanned more than one theme and/or subtheme.

Factors that were weakly associated with topic selection in the interview analysis, including breaking news and relationship with county leaders, are addressed in the content analysis discussion of Research Question 2, below.

Summary of Findings for Research Question 1

Through one-on-one interviews, agents described a number of factors that influenced their selection of topics to cover in articles for county clients. Different factors that related to each other were collapsed into themes.

Although agents stated that seasonality was the strongest factor in selecting topics for articles, qualitative content analysis of their responses indicated that the relevancy of topics to homeowners in their county exerted the most influence on topic selection.

Content analysis of 165 articles written for urban clients by the interviewed agents and three other ANR Extension agents in high-population urban counties, showed that the

most frequently covered topics related to themes of horticulture (F=167), primarily landscape plant selection, urban trees, plant diseases, and other issues related to landscape plants; and landscape management (F=159), issues related to caring for the turfgrasses and plants in residential landscapes. The third most frequently covered topics were in the pest control theme (F=99). These results supported interview findings that the informational needs of homeowners in their county about lawn and landscape problems and care were the most influential factors in agents' topic selection for articles for local mass media distribution.

Only one interviewed agent strongly expressed that personal interests influenced his topic selection. While not statistically reliable because of differences in quantities of articles analyzed for each agent, content analysis results indicated that an agent's personal and professional interests may exert some influence on article topic selection. Based on the frequency of mentions in the interviews, other factors had little influence on topic selection.

Research Question 2

Research question 2 asked, "What factors influenced agents' decisions on how to present information about the selected topics to urban clients."

Interview Findings

Identifying factors that influence information presentation. Analysis of agent responses to this question produced three themes. Agents decided how to present information in their articles based on:

1) Their assumptions about the reading audience;

2) The purpose of the communication; and

3) The media channel.

Assumptions about reading audience. Interview responses indicated that agents served two client groups: homeowners (f=59 mentions) and green industry professionals (f=20 mentions). Two agents overwhelmingly referred to homeowners as their primary clients; the third agent spoke slightly more often about professional landscape service providers (f=17 mentions) than homeowner clients (f=14 mentions). All three agents targeted homeowner audiences with their primary mass media channel.

All three agents believed their homeowner audiences had very little knowledge about horticulture and natural sciences (F=14 mentions). One agent described them as "amateur people." Another agent went further, stating that homeowners don't want much information beyond a quick fix for landscape problems.

Based on these assumptions, the agents had all adopted the following practices for interpreting technical and research-based information for their homeowner clients:

1) Keep it simple/ basic/ on the homeowner level (F=23). To achieve this objective, agents said they used simple, everyday words in their writing; avoided technical terms and jargon; and routinely paired scientific words with offset explanations.

2) Focus on important/ key aspects (F=7). In keeping with the idea that homeowners don't want or need excess information, the agents said they singled out the pertinent aspects of an issue and focused the article on those.

"If you make it too complicated," one agent explained, "they're just gonna ignore you."

3) Keep it short (F=4). This tactic served the dual purpose of keeping the information within the presumed capacity of the homeowner's attention span and keeping the article within the word count constraints of print media formats.

4) Make it useful (F=4). While the primary purpose of mass media communication for all of the interviewed agents was to answer client questions and help solve problems (see *Purpose of communications,* below), only one agent specifically referenced providing clients with information that they could actively put into use.

The last two themes, brevity and utility, were paramount considerations for the agent with the most restrictive communication channel (see *Media format,* below).

Purpose of the communication. The purpose of communication influenced how agents organized and framed information in articles. Through analysis of interview responses, four purpose themes emerged.

1) Serving clients' immediate needs (F=29 mentions). Question and answer articles were the primary article genre for one agent, and a regularly recurring genre for another.

2) Educating clients (F=15). Subthemes in this category included providing clients with factual information (f=7) to increase understanding of a topic, and sometimes to correct misconceptions promoted by mainstream media;

and apprising homeowners of new information or breaking news (f=5). To convey information of this type, the agents stressed that they presented readers with facts in a manner that would increase their knowledge and capabilities to handle situations, such as excluding invasive insects from their homes or protecting backyard chickens from avian influenza, without alarming the readers or stoking "emotionalism" about the issue of concern.

3) Evoking a sense of wonder or awakening interest in nature and gardening in clients (F=8). Two agents wrote articles that departed from "plain gardening." One described this type of article as "feature articles," and said he received positive reader feedback on them. Another agent used playful titles and factoids to hook readers. Through these entertaining devices, he hoped to awaken the interests of "borderline gardeners."

4) Raising awareness (F=5). One agent used interview-style articles featuring local producers to raise awareness of agriculture in the county. Another reported that county residents had told him they became aware of Extension because they had read his newspaper articles.

5) Advising clients (F=3). Agents used articles to give clients advice on when and how to perform landscape and gardening tasks. One described using a process approach to this type of communication, breaking the information down into steps. These words (process, breaking down information) were echoed by the other two agents.

Media channel. Media format also influenced how agents presented information to clients through their articles. Print media carries inherent constraints because of space limitations (McQuail, 1992; Scheufele & Tewksbury, 2007). All of the agents had to package information in a manner that would conform to the expected word count for their newspaper, magazine, and/or newsletter articles. Before they could decide which key points of a topic to highlight for readers, they had to decide which one, out of the many facets of a topic, to address.

One agent labored under an additional editorial constraint. The newspaper that provided space for Extension information dictated a question and answer column, split between two program areas. The ANR agent was allowed to respond to two client questions in each column. He had to select questions that could be answered in 2-3 sentences.

Two agents believed that their primary media channel, print newspapers, appealed to older audiences. In addition to concern about missing younger clients, one agent also expressed concern about missing large subsets of clients who don't read English. The agent who used a blog believed that media channel appealed to younger adults, and probably would not be sought out by older people.

Desiring to get more mileage out of their writing efforts, each of the agents revised and expanded articles that were restricted by word count in one media channel, and published the longer version in a different channel that allowed more space. In this manner, they transformed articles that scratched the surface of a topic into products with greater depth of information. They believed that these articles would appeal to readers with more existing knowledge about horticulture or with a higher level in interest. They

also believed that this audience would be motivated to seek out articles that provided more in-depth coverage. For two of the agents, the secondary channel was a quarterly county Extension newsletter distributed to existing Extension clients, primarily those who had attended face-to-face "homeowner" programs, either by email, or by an emailed notification that the new issue was posted to the county Extension website.

With print media, the agents knew the circulation of the publication, but couldn't know how many people actually read their articles. The blog writer, however, received information about how many people visited the site. This media channel motivated the agent to build and nurture reader relations by enticing them with creative articles that ventured beyond standard problem solving information.

Article Content Analysis Findings

Agents used journalistic devices – genres and frames – to help readers mentally organize and process information.

Genres. Genres are recognizable formulas for organizing articles and presenting information (McQuail, 1992). Examples of journalistic genres include the "inverted pyramid" of news stories, the advice column, and step-by-step how-to articles. The articles analyzed for this study (N=165) fell into one or more of the following eight genres.

Client questions. This genre included Question and Answer articles and Frequently Asked Questions. Q&A articles briefly addressed two or more recent client questions. Actual client questions were included as topic headings in the article, and answers were usually two or three sentences in length. FAQ articles were traditionally constructed articles providing in-depth information about a single topic that had

generated questions from multiple clients. These articles often began with a reference to a high volume of client calls about the covered topic. Using this format, the agent could provide a fulsome answer to a question of high interest.

Breaking news. These were articles that covered currently happening events. Breaking news topics covered were the arrival of an invasive insect, confirmation of the presence of a devastating plant virus in one county, and the 2015 outbreak of highly pathogenic avian influenza.

Advice. Agents used this genre to urge homeowners to take a particular course of action, such as soil testing or selecting particular types of plants for landscape enhancements. Advice articles included reasons supporting the action and benefits to be gained.

Educational. Full articles that included background information to promote a deeper understanding of a topic were categorized as educational. Examples included a pest control article that explained the life cycle of the insect in question, and an article that discussed the plant origins of popular food flavorings.

How-to. These were instructional articles that often contained specific, step-by-step guidance to help homeowners accomplish a particular task, such as planting a tree or dividing plants. Advice and educational articles sometimes included how-to information.

Information. Articles in this category provided list-like information, such as temperatures and rainfall over past weeks, or alerted readers to upcoming Extension classes and events.

Interview. These articles were transcriptions of structured dialogue between the author and a person of interest. Each followed a similar format, with personalities providing answers to a set of questions.

Seasonal. Articles that were timely because of the predictable, cyclical nature of nature were categorized as seasonal. They were relevant during a particular time of year, such as spring, but would be out of place in a different season.

Although agents spoke most often of selecting topics based on relevance to county clients, advice columns were the dominant article genre. Advice (F=95), educational (F=72), and seasonal (F=69) genres often mingled in articles that exceeded 450 words. How-to articles (F=32) never stood alone. Figure 4.7 illustrates the frequency of use of each genre.
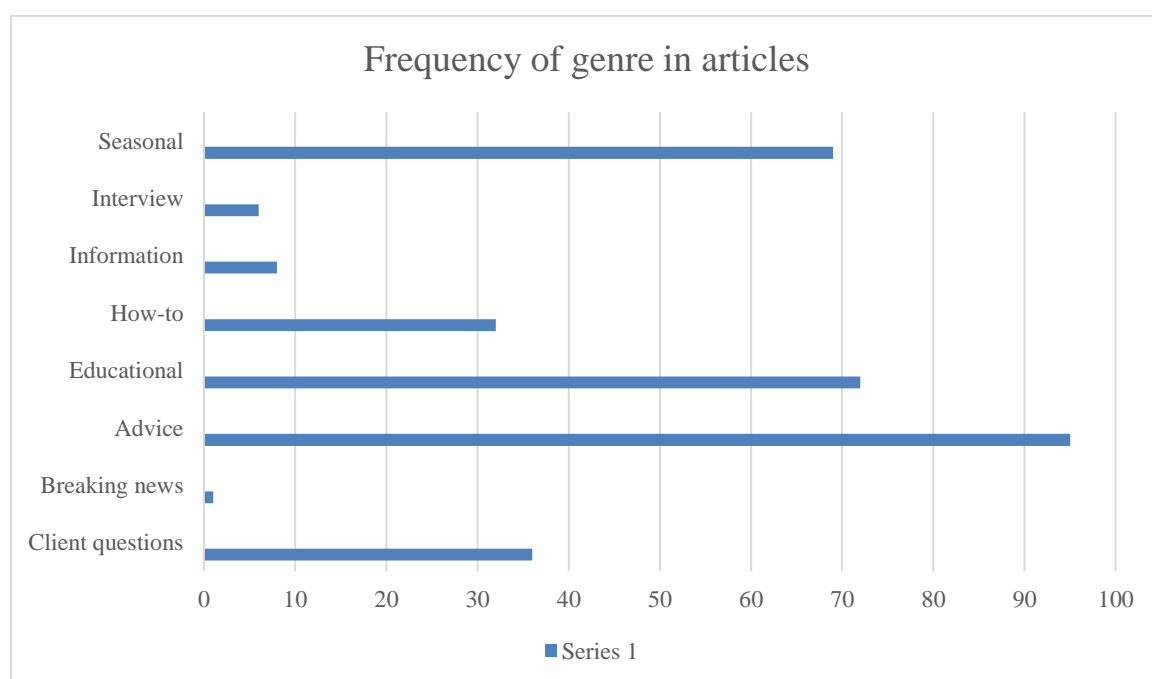

Figure 4.7: Frequency of genres in agent-written articles (N=165).

Frames. Frames help readers zero in on the gist of the story so that they can quickly make sense of what they are reading (Chong & Druckman, 2007; Rumble et al., 2014; Scheufele, 1999; Scheufele & Tewskbury, 2007). The element or aspect of a topic that the agent focused on in an article provided a frame for the information. By packaging information in a particular frame, agents helped readers view the information from the same lens through which they were presenting it.

Qualitative content analysis of the articles indicated that agents used six frames to package information for readers. They were:

- Seasonality (F=54): This issue is relevant because it is happening now.

- Response (F=32): This issue is relevant because you have told me it is.

- Locality/ Community (F=28): This issue is relevant because we are here together.

- Empowerment (F=23): With this information, you can take action to improve conditions.

- Sharing/ Wonder (F=16): You might find this as fascinating as I do.

- Alert (F=11): This is important because it may affect you.

In summary, Research Question 2 examined the factors that influence how ANR Extension agents in urban county present written information to their clients. Qualitative content analysis of interview responses indicate that the assumptions agents make about clients is the dominant influencing factor. The purpose of the article also influences how agents package information. Media format and editorial expectations can limit both depth of coverage and creativity.

Content analysis of agent-written articles provided comparative data. This indicated that agents use genres and frames to package information to help readers quickly grasp its relevance to their situation and organize the information for better understanding. As shown in Table 4.2, identified genres and frames were associated with purpose of communication themes identified through agent interviews.

Table 4.2
Association of purpose of communication, genres, and frames in agent articles.

Purpose of communication	Associated Genres	Associated Frames
Serve client needs	Client questions, Seasonal	Response
Educate clients	Educational, How-to, Breaking news, Seasonal	Response, Seasonality, Empowerment
Awe/ interest	Educational, Seasonal	Sharing wonder
Raise awareness	Information, Interview, Breaking news	Locality/ community, Alert
Provide advice	Advice, How-to, Seasonal	Empowerment, Seasonality, Alert

Note: Genres and frames were associated with certain mass communication purposes.

Summary of Findings for Research Question 2

Qualitative content analysis of interview responses revealed three major themes that influence how agents present information to their readers. These were:

1) Assumptions about the reading audience;

2) The purpose of the communication; and

3) Media format.

Content analysis of agent written articles identified eight genres and six frames that agents used to help homeowners organize and understand information. These journalistic devices were associated with the agents' purpose in writing the article.

Research Question 3

Research question 3 asked whether the articles were accessible, from readability and reading grade level measures, to adult clients residing in the agent's county of employment. To answer this question, 157 of the 165 articles were analyzed for readability. Eight articles were removed from the readability analysis because they were exact duplicates or because they were interview articles that were primarily not the words of the agent.

All of the reviewed articles targeted adult readers. Readability analysis determined that agents generally wrote in the standard readability range, a score of 60-70, as measured by the Flesch Reading Ease formula (Readability Formulas, n.d.b). The Flesch-Kincaid Grade Level score of articles ranged from 7th to 9th grade. Findings of the readability analysis are shown in Table 4.3.

Next, data were retrieved from the U.S. Census Bureau (n.d.) to determine the educational attainment and estimated reading level of adult residents in each county in the study. Over 80% of adult residents in each county had, at a minimum, completed high school (U.S. Census Bureau, n.d.). As Table 4.4 shows, however, level of educational attainment is not a perfect measure of reading skill. Factors other than education impact literacy, including advanced age, mental and physical disability, and immigration from a non-English speaking country (Kirsch, Jungeblut, Jenkins, & Kolstad, 1993). As of 2011, 60.6 million U.S. residents speak a language other than English at home (Ryan, 2013).

Table 4.3
Readability analysis of unique agent-written articles (N=157)

	Agent #1 (n=56)	Agent #2 (n=16)	Agent #3 (n=50)	Agent #4 (n=12)	Agent #5 (n=17)	Agent #6 (n=6)
Average words per article	606.91 SD=87.19	236.06 SD=61.90	764.08 SD=96.30	429.33 SD=222.10	256.18 SD=119.52	298.83 SD=44.83
Range of words per article	442-908	136-376	481-1004	185-826	121-497	249-375
Average sentences per paragraph	5.03 SD=0.97	3.26 SD=0.66	3.18 SD=0.71	3.03 SD=1.07	2.76 SD=1.91	2.55 SD=2.70
Average words per sentence	15.89 SD=1.19	19.89 SD=2.25	16.14 SD=1.93	20.84 SD=2.18	14.79 SD=1.79	15.77 SD=2.87
Average characters per word	4.73 SD=0.19	4.59 SD=0.21	4.59 SD=0.20	4.48 SD=0.29	4.61 SD=0.29	4.77 SD=0.10
Average % of passive sentences	18.13 SD=7.98	7.88 SD=8.60	11.58 SD=5.54	19.33 SD=12.68	5.65 SD=4.18	10.50 SD=6.47
Average FRE score	61.83 SD=6.49	76.14 SD=7.30	64.69 SD=6.61	60.39 SD=8.83	64.83 SD=6.08	64.42 SD=6.45
Range of FRE scores	45.90- 73.70	52.30- 82.30	50.50- 78.50	42.00- 72.80	51.80- 75.80	57.00- 73.00
Average F-KGL score	8.51 SD=1.07	8.18 SD=1.18	8.15 SD=1.11	9.79 SD=1.49	7.81 SD=0.85	8.07 SD=1.47
Range of F-KGL scores	7.20-11.0	6.00-9.90	5.80- 11.30	8.10-13.60	6.10-9.30	6.40- 10.40
Average number of unique scientific terms	1.07 SD=1.81	0.56 SD=0.80	2.26 SD=3.09	1.00 SD=2.00	0.18 SD=0.39	0 SD=0.00

Note. FRE scores in the 60-70 range indicate standard readability. F-KGL scores correlate with standard U.S. academic grade levels (Readability Formulas, n.d.a & n.d.b).

In 2012 and 2014, the Program for the International Assessment of Adult

Competencies found that 51% of U.S. adults between 16 and 65 years of age have

literacy skills in the lowest two levels. At Level 1, a reader can "locate easily identifiable

information in short, commonplace prose test, but nothing more advanced" (National

Center for Education Statistics, n.d.b). Eighteen percent of adult U.S. residents read at or

below Level 1 (National Center for Education Statistics, n.d.a). Table 4.4 shows the

educational attainment of residents in each county in the study, as well as the estimated

percentage of each population that lacks basic English reading skills.

Table 4.4
Educational attainment of persons 25 years of age or older in urban counties
included in the study

	% of population with high school diploma or higher (2010 U.S. census)	% of population with bachelor's degree or higher (2010 U.S. census)	% of population lacking basic reading skills (2003 NCES measures)
Statewide	85.0	28.3	17
Baines County	88.7	32.3	15
Milhous County	88.9	34.3	9
Rudolf County	88.4	40.3	20
Earl County	87.3	34.4	19
Wilson County	83.7	20.4	18

Note. Names of counties are fictionalized to protect identities of study participants.
(National Center for Education Statistics, n.d.n; United States Census Bureau, n.d.)

Drawing from earlier U.S. literacy studies, Dubay (2008) estimated that 105

million Americans adults read at or below the 6th grade level, while 70 million American

adults read between the 7th and 9th grade levels. He further asserted that people who have

completed high school are most comfortable reading at the 8th grade level, and that

motivated individuals will work to comprehend written information that is up to two grade levels beyond their comfort zone (Dubay, 2008).

Based on this information, the researcher concluded that the urban ANR Extension agents in this study typically wrote articles that were accessible to English-language readers with a high school education. Since over 80% of adult residents in each county had graduated high school, the reviewed articles are within the reading comfort level of the majority of the agents' county clients (See Tables 4.3 and 4.4).

<div align="center">**Summary**</div>

Three ANR Extension agents working in urban counties participated in interviews about their decision making process around writing mass media articles to inform county clients. Qualitative content analysis of their responses determined that their selection of topics to write about was heavily influenced by the expressed and assessed information needs of county homeowners. They presented information about these topics based on their assumptions about homeowners and the purpose of the communication. Inductive content analysis of 165 mass media articles written by the interviewed agents and three other ANR Extension agents working in urban counties confirmed that most articles covered topics related to residential lawn and landscape management. Analysis of the articles also determined that agents use eight genres and six frames to help readers understand the information. Articles were generally written at the 7th-9th grade reading levels, and were determined to be within the reading level of most residents of each county.

CHAPTER 5

SUMMARY, IMPLICATIONS, RECOMMENDATIONS, AND CONCLUSIONS

Summary of Findings and Conclusions

At the outset, this study sought to answer three questions:

1) What factors influenced ANR Extension agents in urban counties to choose the topics they addressed in their written mass media communication products for clients?

2) What factors influenced how these county Extension agents presented information about chosen topics in their mass media communication products?

3) How well did the readability of these articles match with the reading skills of their target audiences?

Findings and conclusions for the small population of urban ANR Extension agents in a southern state are summarized below. These findings cannot be generalized to other areas or other populations.

Research Question 1

Findings indicated that, for the ANR Extension agents working in urban counties in one southern state, the immediate information needs of county clients was the dominant factor influencing their topic selection for mass media articles. These needs

were expressed through homeowner questions called in or emailed to the agents. Agents also anticipated homeowner information needs based on cyclical landscape management activities or issues associated with seasonal changes.

To a lesser degree, personal and professional interests, often one in the same for the interviewed agents, suggested topics. Factors such as breaking news, access to credible informants, and relationship with county leaders were weak influences on topic selection.

Inductive content analysis of 165 mass media articles, written by the three interviewed agents and three other urban ANR Extension agents in the state, determined that the most frequently covered topics were related to horticulture (N= 167), landscape management (N=159), and pest control (N=99). These findings supported the interview findings.

The articles were frequently associated with seasonal events or activities. Some were recycled, verbatim or with very little revision, for use in another year.

Research Question 2

Qualitative content analysis of interview responses from three urban ANR Extension agents indicated that how they presented information in mass media articles was primarily influenced by 1) the assumptions they made about the reading audience, 2) the purpose of the communication, and 3) the mass media channel.

Agents viewed county homeowners as their primary reading audience. The dominant theme about these homeowners was that they had very little knowledge or understanding of horticulture and natural sciences.

To compensate for the perceived elementary level of science knowledge of homeowners, agents wrote simplistic articles that focused on key points. Short articles avoided overwhelming the information capacities of readers and conformed to the space constraints of print media.

Based on interview responses, the purpose of most articles was to provide homeowners with useful information. Purpose themes were:

1) Serving clients' immediate needs

2) Educating clients

3) Evoking wonder/ awakening interest in nature and gardening

4) Raising client awareness

5) Advising clients

From article content analysis, eight common genres and six similar frames emerged. Agents used these journalistic devices to help readers grasp the purpose of articles and mentally organize the information for ease of comprehension.

Genres included client questions, breaking news, advice, educational, how-to, information, interview, and seasonal. The most frequently used genre was advice, often mingled with educational and seasonal genres in higher word count articles. The least used genre was breaking news.

Frames were response, seasonality, locality/ community, empowerment, alert, and sharing wonder, with seasonality being the most frequently used frame. Interviewed agents stressed that they wrote in a manner to provide readers with factual information without sensationalizing the issue.

Media channels also influenced how the agents presented information. Print media limited agents to specified word counts, restricting the scope and depth to which topics could be covered. Editorial preferences constrained one agent to the Q&A genre for Extension columns carried in the local newspaper. Agents also believed that with newspapers and other traditional print media channels, they were reaching mature audiences, but missing younger adults and clients who don't read English.

Using a web-based media channel freed one agent from print media limitations and removed a layer of distance between him and his readers. This channel allowed him to measure the number of readers who actually viewed the article, motivating him to build readership with frequent, innovative articles. He also believed the online format appealed to younger audiences.

Research Question 3

Comparison of the average Flesch Reading Ease and Flesch-Kincaid Grade Level measures of articles written by each agent with the estimated reading level of residents in his county determined that agents generally wrote at a level that was within the reading comfort of most adult county residents. To compensate for the low level of knowledge about horticulture and natural sciences that agents believed to be characteristic of their homeowner readers, agents wrote articles in simple language that provided clients with very basic information. This tactic placed articles in the standard readability range and centered them around the 7th to 9th grade reading levels. Since over 80% of adult residents in each of the urban counties in the study had completed high school, this level of writing was in the reading comfort zone of the majority of clients.

Implications

The mission of Cooperative Extension is to provide research-based information to all audiences at the local level. In densely-populated, urban counties, mass media communication is an important tool for reaching large numbers of clients.

Through a variety of mass media channels, the Agriculture and Natural Resources county Extension agents in the research reported here were responsive to the lawn and landscape management information needs of urban homeowners in their counties. In contrast to an earlier study, the agents produced articles with standard readability, a quality of writing that impacts its effectiveness in communicating information to readers (Upchurch, Jr., 1969). Based on data related to educational attainment of adults in each county, the articles analyzed in the study are within the reading abilities of the majority of residents in each of the agents' county of employment.

Although none of the agents had received education or training in journalism, they used media frames and article genres to help readers quickly determine the salience of a topic to their lifestyle, and to organize and make sense of the information presented.

The agents expressed concern that the media channels they used appealed to readers of certain ages and may not reach audiences outside of that age range. They were probably correct. Overall, newspaper readership has declined in the past decade, but it is lowest among people under the age of 45. In the age brackets that span 18 to 44 years, only around 20% of people read print newspapers. In addition to being older, newspaper readers also tend to be better educated, more affluent, and white (Barthel, 2015). By contrast, millennials, people aged 18-34 years, tend to get news and problem-solving information through electronic newsfeeds and social media (American Press Institute,

2015). One agent also expressed concern that Extension information had no presence in foreign language media that serves large pockets of the population in urban counties.

By choosing article topics largely based on client questions, agents may have adopted a journalistic routine that limited their reading audiences even further. Articles that focused on lawn and landscape issues served the interests of a specific subset of county residents: homeowners with lawns and landscapes to manage. Defaulting to *squeaky wheel* response in their mass communication products represented additional lost opportunities to connect with county residents who have information needs and interests that lie beyond the garden gate. Taking a responsive or reactive position to communication is also antithetical to the educational outreach mission of Extension.

Recommendations

The findings reported here indicate that the ANR agents participating in the study were attentive to the information needs of some members of the community. These tended to be homeowners with an interest in managing lawns and landscapes, or solving pest and disease issues that impacted their yards and gardens. ANR Extension agents should take time to assess the information needs and interests of other segments of the county population. Based on the assessments, they could use their valuable mass media channels to cover a broader range of topics related to urban agriculture, natural resources, conservation, ecosystems, and environmental systems that impact all county residents. These topics could capture the interest of people without landscape concerns, and raise awareness and knowledge levels about natural science in many different segments of the county population.

Internet-based communication has the potential to overcome the restrictions of print media and to reach additional audiences. To facilitate inclusion of internet-based mass communication in urban ANR Extension outreach programs, Extension leaders could encourage, train, and provide urban ANR agents with the tools they need to use internet channels and social media to connect with diverse clients. The training should include tips on improving the discoverability of Extension information that is posted to internet websites.

To reach audiences with limited ability to read English, Extension may need to evaluate urban counties to determine foreign language use, and recruit agents with specific language skills to serve those clients.

Suggestions for Future Research

This study left at least one unanswered question and generated some new ones. Some of the urban counties that met the initial criteria for this study were eliminated because the ANR agent serving the county did not write articles for mass media distribution to county residents. Further study into this might determine the barriers that prevented them from engaging in this important form of educational outreach.

The urban ANR county Extension agents in this study were all males, and most were over 50 years old. How might findings differ if a more diverse group of urban ANR agents were the focus of the study? How might findings differ in other regions of the country?

Some article collections considered in the study spanned more than 12 months and included articles that were exact or nearly exact replicas of articles published at a

similar time in a previous year. One agent also reported covering the same seasonal subject matter year after year. A future study could take a longer look at agent articles to assess how frequently urban ANR agents reuse articles.

Findings from this study indicated that mass media articles written by urban ANR agents in a southern state met the reading comfort level of most residents of the counties the agents served. Another study could look at the other side of the communication to assess reader perceptions of the quality and utility of articles ANR agents write.

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APPENDIX A

INVITATION TO PARTICIPATE IN STUDY

Recruitment
August, 2015
Dear Georgia Agriculture and Natural Resources Extension Agents,

I am a graduate student under the direction of Dennis Duncan, Ph.D. in the Department of Agricultural Leadership, Education, and Communication at the University of Georgia. I invite you to participate in a research study titled "Building agricultural conceptions: How University of Georgia Agriculture and Natural Resources Extension Agents communicate agricultural information to urban clients."

We are contacting you because you meet the study criteria of the study: You are (or until recently were) a UGA Extension Agent working in the Agriculture and Natural Resources program area in an urbanized county with a population greater than 200,000; you routinely write or have written mass communication articles; and you have been in your position long enough to have a representative collection of these articles. The researcher determined your eligibility through public records, internet searches for articles you have written, and personal communication.

The purpose of this study is to examine how UGA Extension agents in the Agriculture and Natural Resources program area use mass media communications to inform clients in urban counties about agricultural topics. In particular, the study will investigate:
- How UGA Extension ANR agents in urban counties decide what topic to address in mass media communications
- How they frame agricultural information
- How they decide how much information and what depth of information urban clients need
- How well these mass media communications match the reading or education level(s) of their target audience(s)

Your participation will involve providing the researcher with copies of your newspaper, newsletter, and/or blog articles for the past 12 months and participating in a 45-60 minute interview with the researcher. This interview will be audio recorded for transcription purposes; recordings will be deleted after transcription. Interviews will be at your convenience and may be conducted by telephone or in person at a place of your choosing. Your involvement in this study is voluntary, and you can choose not to participate or to stop at any time without penalty of loss or benefits to which you are otherwise entitled. This study has been approved by the UGA Institutional Review Board.

The consent form will be distributed to all UGA ANR Extension Agents in counties that were determined by the 2010 U.S. Census to be urban. It explains to participants that this study is part of my graduate research and that your participation is strictly voluntary. Data will be reported in summary form without individual identifiers. All data sets will be destroyed upon completion of this thesis study.

If you have any questions about this research project, please feel free to call me at (404) 862-5141 or send an email to hnkolich@uga.edu; or you may contact Dr. Duncan at (706) 542-1204 or dwd@uga.edu. Questions or concerns about your rights as a research participant should be directed to the Chairperson, University of Georgia Institutional review Board, 609 Boyd GSRC, Athens, Georgia 30602; telephone (706)-542-3199; email address irb@uga.edu.
Thank you for your time and consideration!

Sincerely,
Heather N. Kolich

APPENDIX B

CONSENT LETTER

Consent

August, 2015

Dear Georgia Agriculture and Natural Resources Extension Agents,

I am a graduate student under the direction of Dennis Duncan, Ph.D. in the Department of Agricultural Leadership, Education, and Communication at the University of Georgia. I invite you to participate in a research study titled "Building agricultural conceptions: How UGA Agriculture and Natural Resources Extension agents communicate agricultural information to urban audiences."

The purpose of this study is to examine how UGA Extension agents in the Agriculture and Natural Resources program area use mass media communications to inform clients in urban areas about agricultural topics. In particular, the study will investigate:
- How UGA Extension ANR agents in urban counties decide what topic to address in mass media communications
- How they frame agricultural information
- How they decide how much information and what depth of information clients need
- How well these mass media communications match the reading or education level(s) of their target audience(s)

Your participation will involve providing the researcher with copies of your newspaper, newsletter, and/or blog articles for the past 12 months and participating in a 45-60 minute interview with the researcher. Your involvement in this study is voluntary, and you can choose not to participate or to stop at any time without penalty of loss or benefits to which you are otherwise entitled.

The results of the research study will be published in summary form only. However, published demographic data will indicate a respondent's gender, classification, race/ethnicity, years with Extension, educational level, and college major.

The findings of this project may provide information useful in determining the efficacy of UGA Extension mass communications that interpret agricultural topics for urban clients.

There are no known risks or discomforts associated with this research. Your decision to participate or not will have no bearing on your employment with UGA.

If you have any questions about this research project, please feel free to call me at (404) 862-5141 or send an email to hnkolich@uga.edu; or you may contact Dr. Duncan at (706) 542-1204 or dwd@uga.edu. Questions or concerns about your rights as a research participant should be directed to the Chairperson, University of Georgia Institutional review Board, 629 Boyd GSRC, Athens, Georgia 30602; telephone (706)-542-3199; email address irb@uga.edu.

Thank you for your time and consideration! Please keep this letter for your records.
Sincerely,
Heather N. Kolich

APPENDIX C

INTERVIEW GUIDE

Topical Area	Interview question	What I want to know
Mass Media Communications theory	What forms of mass media do you use to deliver information to your clients?	Variety of media used – newspapers, newsletters, blogs, social media, videos
	How often do you publish articles in each type of media you use?	Frequency of mass communications
	What factors influence your topic selection?	Probing for topic selection decision process, planning process.
	How does your institutional affiliation influence your topic selection?	Prompt
	How does your relationship with community leaders influence topic selection?	Prompt
	How does your Plan of Work influence topic selection?	Prompt
	What assumptions do you make about your audience?	Prompt
	How often do you change your planned topic to cover breaking news?	Prompt
	How does your work schedule/ load influence your topic selection?	Prompt
Framing Theory	What factors influence how you present information?	Probing for decision process in analyzing information and composing articles
	How do you change your writing/ information	Whether agents view different formats as having different audiences;

	presentation in different media forms?	perceptions of constraints or freedoms of different media types; perceptions of advantages of some forms over others
	Do you think there's a different audience for the different forms of mass media you use?	Prompt
	How do you decide which facets of a topic to emphasize and which to deemphasize?	Perceptions of institutional pressures, expectations; perceptions of audience awareness/ knowledge of selected topics; awareness of agent's role as information liaison, change agent; efforts to build research-based awareness/ knowledge in clients; efforts to correct popular misconceptions of agricultural practices/ systems/ processes
Knowledge Gap/ Two Communities theory	How do you connect agricultural topics to non-agricultural/ urban/ suburban audiences?	Thought process for making agriculture relevant to non-agricultural practitioners; connecting a distant world to urban/ suburban reality
	How do you decide how much information your clients need?	Perception of audience awareness/ knowledge; assumptions about level of knowledge needed to be functionally agriculturally literate
	How do you interpret technical research findings for your audience?	Efforts/ ability to recast technical research language into everyday language, build foundations for understanding, and answer the "so what?" question
	Do you use metaphors, analogies, simpler language?	Prompt
	What feedback do you get from your audience?	Whether there's a two-way (dialogic) communication channel
Agent demographic information	How many years have you worked in Extension?	Are there differences in mass media communication usage that are related to agent background?
	What is your Plan of Work?	
	What degrees do you hold?	
	What was your college major?	Prompt

	What training have you had in journalism?	
	What types of media do you read?	
	How often do you read these media?	
	How do you describe your race/ ethnicity/ gender/ age?	

APPENDIX D

IRB APPROVAL

APPROVAL OF PROTOCOL
August 11, 2015
Dear Dennis Duncan:
On 8/11/2015, the IRB reviewed the following submission:
Type of Review: Initial Study
Title of Study: Building agricultural conceptions: How University of Georgia Agriculture and Natural Resources County Extension Agents communicate agricultural information to urban audiences.
Investigator: Dennis Duncan
IRB ID: STUDY00001902
Funding: None
Grant ID: None
The IRB approved the protocol from 8/11/2015.
In conducting this study, you are required to follow the requirements listed in the Investigator
Manual (HRP-103).
Sincerely,
Larry Nackerud, Ph.D.
University of Georgia
Institutional Review Board Chairperson
Office of the Vice President for Research
Institutional Review Board
Phone 706-542-3199 Fax 706-542-3660

629 Boyd Graduate Studies Research Center ◆ Athens, Georgia 30602-7411
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