Continuing Agricultural Education:

Relationship between Adult Learning Styles and Educational Delivery Method Preferences

THESIS

Presented in Partial Fulfillment of the Requirements for
the Degree Master of Science in the Graduate School of The University of Arizona
Agricultural Education Program

By
Kaylee J. Renick, B.S.

* * * * *

The University of Arizona

2012

Thesis Committee:
Dr. Ryan Foor
Dr. Ed Franklin
Dr. Kurt Nolte
ABSTRACT

The purpose of this study was to identify the learning styles and preferred methods of receiving agricultural information on new or innovative farming practices among Yuma, Arizona area growers, pest control advisors, and industry personnel. A review of the literature suggested there is a continual need for evaluation of instructional methods and technology in adult education (Martin & Omer, 1990). Most studies in adult education in agriculture have focused on the need for adult education (Creswell & Martin, 1993). Those studies which have focused on instructional methods recommended further study was needed on the appropriate methods and tools to use in adult education programs in agriculture (Creswell & Martin, 1993).

As non-experimental correlational research, variables were identified, but were not controlled by the researcher. Furthermore, this study was a small sample of continuing adult agricultural education learners in Yuma County. From this study, learning styles of adult agricultural education learners and their preferred methods of receiving agricultural related information were determined; however the findings of this research are limited only to those who participated at the time of the study.

Conclusions from the study indicated the following: overall, the majority of participants in the study reported a kinesthetic learning modality. A visual learning modality was the second highest reported among participants. Specifically, the majority of growers reported a kinesthetic learning modality, the majority of PCAs reported a visual learning modality, and industry personnel reported an aural modality preference. With diversity in learning styles among adult continuing agricultural education learners, Extension agents and instructors of adults must recognize learning differences among their students to understand how students perceive and
process information. Overall, all participants in the study learn best when agricultural information is delivered by field demonstration methods. Although, when comparing across professions, growers learn best by field demonstrations, PCAs learn best by instructor/lecture workshops, and industry personnel learn best by a one-one-one approach. Overall, participants in the study across the three professions reported that panel discussions were the least effective delivery method. To better meet educational needs of adult continuing agricultural education learners, Extension’s educational program delivery should reflect adult continuing agricultural education learners preferred delivery method among agricultural professions.

A moderate correlation (Davis, 1971) exists between learning styles and the demographic characteristics of age, education, and profession. A low correlation exists between learning styles and the demographic characteristics of gender, and number of years worked in the agricultural industry. Extension agents and instructors of adult continuing agricultural education learners should focus on the demographic characteristics of age, education, and profession when seeking to develop program delivery methods that will effectively meet the needs of these learners. In opposition, Extension agents and instructors of adult continuing agricultural education learners should not focus on the factors of gender or the number of years worked in the agricultural industry when seeking to develop program delivery methods that will effectively meet the needs of these learners.

Overall, all participants in the study learn best when agricultural information is delivered by field demonstration methods. Although, when comparing across professions, growers learn best by field demonstrations, PCAs learn best by instructor/lecture workshops, and industry personnel learn best by a one-one-one approach. Overall, participants in the study across the three professions reported that panel discussions were the least effective delivery method.
To better meet educational needs of adult continuing agricultural education learners, Extension’s educational program delivery should reflect adult continuing agricultural education learners preferred delivery method among agricultural professions.

Low correlations (Davis, 1971) exist between the demographic characteristics (age, years worked in the agricultural industry, education, and gender) and preferred delivery methods of adult continuing agricultural education learners. A moderate correlation (Davis, 1971) exists between the demographic characteristic, profession and preferred delivery methods of adult continuing agricultural education learners.

Extension agents and instructors of adult continuing agricultural education learners should not focus on the demographic characteristics age, years worked in the agricultural industry, education, and gender when seeking to develop program delivery methods that will effectively meet the needs of these learners. However, Extension agents and instructors of adult continuing agricultural education learners should focus on the demographic characteristic (profession) when seeking to develop program delivery methods that will effectively meet the needs of these adult learners.

Overall, low correlations (Davis, 1971) exists between VARK learning styles (visual, aural, read/write, and kinesthetic) and preferred delivery methods of adult continuing agricultural education learners with PCA professions. A moderate correlation (Davis, 1971) exists between VARK learning styles (visual, aural, read/write, and kinesthetic) and preferred delivery methods of adult continuing agricultural education learners with a grower or industry personnel profession.

Extension agents and instructors of adult continuing agricultural education learners should focus on the learning styles of their students when seeking to develop program delivery
methods. To effectively meet the needs of clientele, specifically growers and industry personnel, Extension educators must understand the learning styles of those within these two professions.
Dedicated to my family:

Daddy, Momma, Kelese, Steven and all of my animals. Without your help and support with school and work, my achievements would not have been possible.
ACKNOWLEDGEMENTS

Thank you to Dr. Foor, Dr. Franklin, and Dr. Nolte for taking the time to participate on my research committee. Your help and guidance in conducting this research study is greatly appreciated. Thank you to the University of Arizona for allowing me to further my education in Agricultural Education while working at the Yuma County Cooperative Extension and Yuma Valley Agricultural Center.
VITA

October 12, 1988………………Born – Yuma, AZ
2011………………………….B.S. Agricultural Technology Management
University of Arizona, Yuma, AZ
2012-Present………………….Graduate Student Agricultural Education
University of Arizona, Yuma, AZ

Fields of Study

Major Field: Agricultural Education
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CHAPTER 1

Introduction

Background and Setting

Agriculture production is significantly important in today’s society. Both the farmers and agricultural industry personnel who help produce agriculture crops are essential to the United States supply of agricultural commodities. The United States is a country founded on agriculture, providing consumers inexpensive food sources relative to other countries. Rasmussen (1989) stated that Americans have a safe and sure supply of food at less cost in take home pay than people of any other industrialized nation in the world. Rasmussen (1989) credited that the increase in production and productivity was a result of the efforts from Extension and government research personnel working together with the American farmer, with substantial contributions from the private sector. According to the Farm Journal Foundation (2010), today, one U.S. farmer produces enough food to feed 155 people. However, global demand and consumption of agricultural crops for food, feed, and fuel is increasing at a rapid pace. This demand for plant materials has been expanding for many years (Edgerton, 2009). The Farm Journal Foundation (2010) also noted that the United Nations, global agriculture will have to produce 70 percent more food over the next 40 years compared to today. Increased demand in agricultural commodities will have to be met by using less land, water, labor and applying fewer chemicals (Khush, 2005). Reducing hunger in a world predicted to inhabit nine billion people by 2050 is a truly complicated challenge that calls for a broad range of solutions (Searchinger 2011).

As Rasmussen (1989) described, the establishment of Cooperative Extension has been an integral part of United States history, by working in collaboration with American farmers
directly. Rasmussen (1989) further described that Extension work was to consist of instruction and practical demonstrations in agriculture to persons not attending colleges in several communities and communicating research information through field demonstrations, publications and otherwise.

Specifically in Arizona, statewide Cooperative Extension presently is an educational system incorporating research into communities to help people improve everyday challenges. Arizona’s Cooperative Extension’s mission is to engage people through applied research and education to improve lives, families, communities, and the environment in Arizona and beyond (Arizona Board of Regents, n.d.). As of January 2012, Arizona Cooperative Extension consists of 85 faculty (full time equivalents) delivering statewide programs and 206 staff supporting county programs (Arizona Board of Regents, n.d.). Precisely, 10 of those faculty extension agents and outreach specialists work in Yuma, Arizona. Extension and outreach specialists in the county serve as providers and sources of research based information with a focus on agricultural crops and commodities for local growers, pest control advisors, and industry personnel.

The 2007 Census of Agriculture indicated that in Yuma County there were 210,480 acres used for crop production and 452 farms established. Providing support to these businesses for their production of food and fiber were 411 agricultural-related businesses (Lobeck, 2011). Yuma is commonly referred to as the Winter Salad Bowl, ranking number one in the state and second in the country for the production of winter vegetables. Yuma County accounts for over 86% of the state’s total gross for produce production. The market value of crops sold provided by the 2007 Census of Agriculture was $959,968,000 in the county alone. Agriculture employment in the Yuma area zip codes in 2004 was estimated to have been around 11,050 people, the second-highest employment of the 20 sectors (Economy of Yuma, 2008). However,
the Greater Yuma Economic Development Corporation (2012) noted that during the peak of the winter produce season, approximately 30,000-40,000 Mexican Nationals commute to Yuma every day to harvest crops, work at processing plants, and manufacturing facilities throughout the county.

The Cooperative Extension serves three main categories of clientele within the agricultural industry in Yuma County. Littlefield (2000) noted that Arizona vegetable growers are the main clientele in Cooperative Extension programming, specifically in desert vegetable research. In addition, agricultural pest control advisers (PCAs) are also provided essential continuing education credits from university programming. Further clientele who are kept abreast of current research include industry personnel such as crop production consultants, seed, fertilizer, and agrichemical industry representatives, pesticide applicators, equipment manufacturers, storage operators, and truckers (Littlefield, 2000).

With agriculture being such a prominent industry in Yuma County, the Cooperative Extension service plays a significant role in providing a wide range of information sources on new or innovative farming practices through outreach and Extension programming. However, there is little evidence that the increased availability of information sources has been effectively used by farmers (Riesenberg & Gor, 1989). A communication gap is often seen between researchers and Extension personnel on the one hand and farmers on the other (Riesenberg & Gor, 1989). Various methods, including field trips, guest speakers, group discussions, workshops, on-farm demonstrations, audio-visual materials, printed matter, and interactive telecommunications have been advocated by Extension practitioners for information dissemination in agriculture (Riesenberg & Gor, 1989).
Improving the success of educational programs has been and continues to be a priority both internally and externally for Extension (Strong, Harder, & Carter, 2010). Extension wants to continue providing effective programs for its clientele and change with the times, it must know the attitudes of clients about the information they receive, the effectiveness of agents who deliver the information, the appropriateness of the methods used, and whether programs meet the needs of clientele (Kantner, 1982). Research has demonstrated that learning style preferences and the consideration educators give to learning styles are closely related to learner achievement, dropout rates, and student satisfaction with instruction (Rollins & Yoder, 1993). Although much of this research has not involved adults, the usefulness of learning-style diagnosis in post-secondary formal and non-formal education has been clearly demonstrated (Rollins & Yoder, 1993). In order to effectively disseminate educational information to the agricultural clientele in Yuma County, the current study was conducted to describe the relationship between demographic characteristics, adult learning styles, and educational delivery method preferences of continuing agricultural education learners in Yuma County.

**Statement of Problem**

What are the learning styles and preferred methods of receiving agricultural information on new or innovative farming practices among Yuma growers, pest control advisors, and industry personnel?

**Purpose of the Study**

The purpose of this study is to identify the learning styles and preferred methods of receiving agricultural information on new or innovative farming practices among Yuma growers, pest control advisors, and industry personnel.
Objectives

The objectives of this study include the following:

1. Describe the demographic characteristics of adult continuing education learners in Yuma County with respect to age, profession, number of years in profession, education, and gender.

2. Describe the learning styles of adult continuing agricultural educational learners in Yuma County.

3. Describe the relationship between demographic characteristics among adult continuing agricultural educational learners in Yuma County and their learning styles.
   3a. Describe the relationship between demographics and learning styles of Yuma County growers.
   3b. Describe the relationship between demographics and learning styles of Yuma County pest control advisors.
   3c. Describe the relationship between demographics and learning styles of Yuma County agricultural industry personnel.

4. Describe the preferred educational delivery methods of receiving agricultural information on new or innovative farming practices among adult continuing agricultural education learners in Yuma County.
   4a. Describe the preferred educational delivery method of receiving agricultural information on new or innovative farming practices among Yuma County growers.
   4b. Describe the preferred educational delivery method of receiving agricultural information on new or innovative farming practices among Yuma County pest control advisors.
4c. Describe the preferred educational delivery method of receiving agricultural
information on new or innovative farming practices among Yuma County
agricultural industry personnel.

5. Describe the relationship between demographic characteristics and preferred educational
delivery method among adult continuing agricultural education learners in Yuma County.

6. Describe the relationship between adult continuing agricultural education learners in Yuma
County learning styles and preferred delivery methods.

Definition of Terms

Adult Continuing Agricultural Education Learners: This group of adults includes Yuma County
Growers, Pest Control Advisors, and Agricultural Industry Personnel. These individuals attend
agricultural related workshops to gain knowledge on cropping issues within their professions.

Yuma County Grower: An individual who grows and produces agricultural commodities such as
produce, forage, or tree crops.

Pest Control Advisor: Persons who offer a recommendation on any agricultural use, holds
himself/herself as an authority on any agricultural use, or solicits services or sales for any
agricultural use (Agricultural pest control advisor license packet, 2010).

Agricultural Industry Personnel: An individual who works within an agricultural company who
holds a position in something other than a grower or PCA. Industry personnel can include the
following examples: crop production consultants, seed, fertilizer, and agrichemical industry
representatives, equipment manufacturers, storage operators, and truckers (Littlefield, 2000).

Learning Style: Learning styles are comprised of three categories which include cognitive,
personality, and modality models. The VARK© model stands for visual, aural, read/write, and
kinesthetic learning style modal preferences.
Extension –Outreach Agents: Faculty associated with agricultural research programs such as weed scientists, plant pathologists, and entomologists.

Agricultural Information: Information consists of current data and material in agricultural research. In Yuma County, agricultural information consists of desert vegetable crop production research data and agricultural Extension research materials and data.

Delivery Method: Manner in which the educational information is conveyed to continuing agricultural education learners. (Example: one-on-one, field demonstration, lecture, panel discussion, publications, or websites).

Limitations of the Study

As non-experimental correlational research, variables were identified, but were not controlled by the researcher. Furthermore, this study was a small sample of continuing adult agricultural education learners in Yuma County. From this study, learning styles of adult agricultural education learners and their preferred methods of receiving agricultural related information were determined. The sample is not fully representative of the population of adult continuing agricultural education learners in Yuma County, since purposive sampling was conducted.

Basic Assumptions

Basic assumptions about the population, instrument, sample selection process and the subjects were made to maintain the validity for this study.

- The researcher provided a clear, consistent, and understandable written questionnaire.
The groups of adult continuing agricultural education learners interviewed were willing to participate in the study and provide reliable and valid responses based upon personal characteristics or experiences.

**Significance of the Problem**

In the agricultural industry today, a wide range of information sources on new or advanced farming practices are available to farmers. However, there is little evidence that the increased availability of information sources has been effectively used by farmers (Riesenberg & Gor, 1989). Improving the success of educational programs has been and continues to be a priority both internally and externally for Extension (Strong, Harder, & Carter, 2010). A communication gap is often seen between researchers and Extension personnel on the one hand and farmers on the other (Riesenberg & Gor, 1989). In 1995, the College of Agriculture and Life Sciences conducted an extensive review process of Cooperative Extension outreach efforts and determined that programming was needed to communicate the latest College of Agriculture and Life Sciences research findings to the agricultural community (Littlefield, 2000). This study may potentially allow Cooperative Extension agricultural educators to reassess educational delivery methods in an effort to determine their effectiveness and validity with respect to demographic characteristics, learning styles, and preferred educational delivery methods of the clientele in which they serve.
Chapter Two

Review of Literature

Adult Learning Strategies:

Agricultural Education and Extension

Agricultural education refers to the process of education applied to the body of knowledge which includes such subjects as: needs assessment, formal and informal teaching methods, curriculum and program development, and instructional program delivery approaches (Birkenholz, Harbstreit, & Law, 1990). Dyer & Osborne (1996) stated that over the past decade (prior to 1996), a new commitment to quality instruction and student learning emerged in the educational community. Trede and Whitaker (1998) described Cooperative Extension as a major educational provider in adult and continuing education, particularly for agricultural audiences. Cooperative Extension is America’s first (and only) national system in adult education (Seevers, 1995). Extension and its clientele base continue to evolve with continual program fluctuation. Education, and more specifically agricultural education, is not immune to the effects of change (Murphey & Terry 1998). Changes in the profession, clientele, and recent technological advances require Extension educators to re-think traditional programing delivery methods and formats (Davis, 2006).

A continual dilemma experienced by agricultural educators is how to respond to the changing face of society and stay abreast of the possible impacts that technology could have in the teaching-learning context (Marrison & Frick, 1994). In 1998, Trede and Whitaker described that future Extension program planning and delivery was expected to place more emphasis on the educational outcomes of its clientele and continue as a facilitator in the teaching/ learning process. As part of that community, agricultural educators are reassessing past educational
practices in an effort to determine the effectiveness and validity of methods which have for years been practiced and proclaimed with almost religious fervor (Dyer & Osborne, 1996). Emphasis on continuing education and the trend toward life-long learning necessitates that adjustments be made in educational programs for adults in agriculture (Birkenholz, Harbstreit, & Law, 1990). Gamon, Harrold, and Creswell (1994) described that the cause of the limited adoption of sustainable agricultural practices is the lack of dissemination of clear and reliable information. Birkenholz, Harbstreit, and Law (1990) stated that information acquired in both formal and informal educational settings quickly become outdated as new knowledge is generated. As researchers expand their knowledge about adult learning, Extension staff can communicate information in more meaningful ways (King & Rockwell, 1988). Riesenberg & Gor (1989) stated that charges had been leveled against the Cooperative Extension Service, other change agents, and research centers, that much useful technology had been left sitting idle in research centers for lack of appropriate information dissemination strategies.

Dyer & Osborne (1996) proposed that selection of a teaching method is critical to the learning style of those being served by the instruction. In earlier years, Riesenberg & Gor (1989) stated the contention is that the communication gap lies not in language or cultural differences as in the methods employed for the dissemination of agricultural information. Davis (2006) noted that because we tend to teach the way we learn best when instructional style matches our preferred style of learning, understanding how people prefer to gather and react to information, or learn, is a critical component in the development and delivery of effective educational programming. Strong, Harder, and Carter (2010) addressed that Extension agents should reflect upon the teaching strategies they employ and evaluate those most effective for their adult audiences.
**Adult Learning and Education**

Adult learning refers to a collection of theories and methods for describing the conditions under which the processes of learning are optimized (Trivette, Dunst, Hamby, & O’Herin, 2009). In 1970, Malcolm Knowles, an educator at Boston University introduced the term “andragogy”. Knowles (n.d.) defined andragogy as the art and science of helping adults learn, in contrast to pedagogy as the art and science of teaching children. Andragogy focuses on special needs of adult learners and urges teachers to base curricula on the learners’ experiences and interests (Ota, DiCarlo, Burts, Laird, & Gioe, 2006). Andragogy is the educational theory that utilizes the adult’s life experiences to teach and aid in learning rather than using someone else’s experience in an attempt to teach. Knowles (2005) stated that “A theory is a comprehensive, coherent, and internally consistent system of ideas about a set of phenomena” (Pugalendhi, Sub burethina, Bharathi and Nakkeeran, Senthilkumar, 2011, p. 3).

As adults mature, they become increasingly independent and responsible for their own actions. They are often motivated to learn by a sincere desire to solve immediate problems in their lives. Additionally, they have an increasing need to be self-directing. In many ways the pedagogical model does not account for such developmental changes on the part of adults, and thus produces tension, resentment, and resistance in individuals. The growth and development of andragogy as an alternative model of instruction has helped to remedy this situation and improve the teaching of adults (Hiemstra & Sisco, 1990, p. 1).
Adult educators have a different role from those who educate children. When teaching adult students it is important to understand the principles of teaching adults (Peterson, n.d.). Knowles identified the six assumptions of adult learning: need to know, self-concept, prior experience, readiness to learn, learning orientation, and motivation to learn (Ota et al., 2006). Creswell and Martin (1993) added that adults both desire and enact a tendency toward self-directedness as they mature; an adult’s experiences are a rich resource for learning, adults are aware of specific learning needs generated by real-life tasks or problems, and adults are competency-based learners in that they wish to apply newly acquired skills or knowledge to their immediate circumstances. Understanding the six assumptions in andragogy prepares facilitators to create successful training (Ota et al., 2006).

Instruction should be task-oriented and should take into account the wide range of different backgrounds of learners. Learners should be able to relate what is being studied to their personal and professional experiences. Learners should be motivated and ready to learn and should be involved in the planning and evaluation of their instruction.

Instruction should be problem-centered rather than content-oriented. Andragogical methods are effective when they can be applied in a community, industry, or corporate situation that are supportive of a self-directed learner (Pugalendhi et al., 2011, p. 5).

Moreover, the advances of andragogy principles have facilitated in the development of teaching adult learners and have advanced research within the adult education field. Knowles' dialogue, debate, and subsequent writings related to andragogy have been a healthy stimulant to some of the growth of the adult education field during the past thirty years (Hiemstra & Sisco,
Carlson (1989) further explained that the greatest danger to the survival of civilization today is not atomic warfare, not environmental pollution, not the population explosion, not the depletion of natural resources, and not any of the other contemporary crises, but the underlying cause of them all, the accelerating human obsolescence. With a changing society, today’s generation of adults should have access to the skills required to function sufficiently in a time of fluctuation. This is the deep need, the awesome challenge, presented to the adult educator by modern society (Carlson, 1989). Pugalendhi et al. (2011) described that the major problems of our age deal with human relations; the solutions can be found only in education. Skill in human relations is a skill that must be learned; it is learned in the home, in the school, in the temple, on the job, and wherever people gather together in small groups (Pugalendhi et al., 2011).

In opposition, andragogical theories have not been short of critics. Carlson (1989) summarized concerns many people had about Knowles with his intense promotion of andragogy. Carlson (1989) referenced Welton (1995) who brought together colleagues who share a more radical philosophy of adult education in which they presented several arguments against aspects of andragogy and self-directed learning. “Andragogy has been alternately described as a set of guidelines (Merriam, 1993), a philosophy (Pratt, 1993), a set of assumptions (Brookfield, 1986), and a theory (Knowles, 1989)” (Knowles, Horton III, & Swanson, 2005, p. 1).

Merriam, in explaining the complexity and present condition of adult learning theory, offers the following: it is doubtful that a phenomenon as complex as adult learning will ever be explained by a single theory, model or set of principles. Where we are headed is toward a multi-faceted understanding of adult learning, reflecting the inherent richness and complexity of the phenomenon (Knowles, Horton III, & Swanson, 2005, p. 1).
Knowles brought considerable attention to the adult education field with his theory of andragogy. Despite years of critique, debate, and challenge, the core principles of adult learning advanced by andragogy have endured, and few adult learning scholars would disagree with the observation that Knowles’ ideas sparked a revolution in adult education and training (Knowles, Horton III, & Swanson, 2005). Knowles, Horton III, and Swanson (2005, p. 2) referenced Brookfield (1986) who posited a similar view; Brookfield asserted that andragogy is the “single most popular idea in the education and training of adults.” Adult educators, particularly beginning ones, find these core principles invaluable in shaping the learning process to be more conducive to adults (Knowles, Horton III, & Swanson, 2005).

Applied correctly, the andragogical approach to teaching and learning in the hands of a skilled and dedicated facilitator can make a positive impact on the adult learner (Knowles, Horton III, & Swanson, 2005). The Rochester Institute of Technology (2012) stated the following: adult learners are more self-guided in their learning and bring and expect more from a learning situation because of their wider experience. Adult learners require learning "to make sense" and will not perform a learning activity just because the instructor said to do it (Rochester Institute of Technology, 2012, p. 1). Pugalendhi et al. (2011) described that a Chief Learning Officer must understand how to motivate employees within an organization and know how to get the information across in a manner that is relative to real life. Pugalendhi et al. (2011) further stated that the society of our age cannot wait for the next generation to solve problems. Our fate rests with the intelligence, skill, and good will of those who are now the citizen-rulers and the instrument by which their abilities as citizen-rulers can be improved is adult education (Pugalendhi et al., 2011). In today’s society, understanding andragogical theories of adult
learning and the improvement of instructional delivery in adult education is critical since adult learners approach learning differently than adolescent learners.

Furthermore, a review of the literature suggested there is a continual need for evaluation of instructional methods and technology in adult education (Martin & Omer, 1990). Most studies in adult education in agriculture have focused on the need for adult education (Creswell & Martin, 1993). Those studies which have focused on instructional methods recommended further study was needed on the appropriate methods and tools to use in adult education programs in agriculture (Creswell & Martin, 1993). Personal experiences of adults who perceive, think, and respond to stimuli and use a variety of resources and methods while learning; develop personal tendencies and preferences or learning styles (Rollins & Yoder, 1993). Nearly all adult learning methods and strategies include at least several of these elements (Trivette et al., 2009). An important element in facilitating learning is helping learners become aware of their own learning styles. Rollins & Yoder (1993) further described that in adult education, learners and teachers must share responsibility for their educational transactions. Once learning styles are identified, adult educators may help learners determine which educational methods and learning activities are best suited to their style of learning (Rollins & Yoder, 1993).

Learning Styles and Models

Learning styles is a generic concept that frequently includes cognitive styles, personality styles, learning styles, sensory modes, and typologies (Boyd & Murphrey, 2004). Research has demonstrated that learning style preferences and the consideration educators give to learning styles are closely related to learner achievement, dropout rates, and student satisfaction with instruction (Rollins & Yoder, 1993). Although much of this research has not involved adults, the
usefulness of learning-style diagnosis in post-secondary formal and non-formal education has been clearly demonstrated (Rollins & Yoder, 1993).

One of the most significant challenges that university instructors face is to be tolerant and perceptive enough to recognize learning differences among their students (Torres & Cano, 1994). Students are coming to institutions of higher learning with more diversity in their learning styles than ever before (Garton, Spain, Lamberson, & Spiers 1999). More attention than ever is needed to meet the challenge of this increasing diversity (Garton et al., 1999). Identifying students’ learning styles helps educators understand how people perceive and process information in different ways (Shih & Gamon, 2001).

The learning styles of students, a context variable, have been found to influence the educational process and students’ opportunity to learn (Garton et al., 1999). Therefore, learning style describes how a student learns, not how much the person learned (Garton et al., 1999). Models have been developed to explain these various learning styles amongst students. Students learning styles are comprised of three categories which include cognitive, personality, and modality models (Boyd & Murphrey 2004). The literature review identified the subsequent models used to exemplify various student learning styles.

In 2006, Davis postulated that the most extensively studied model used to explain learning style and personality type specifically in agricultural education research was the Witkin’s model developed in 1971 by Herman Witkin. This model utilizes the Group Embedded Figures Test to differentiate students as either field-dependent or field-independent (Boyd & Murphrey 2004). In the field-dependence and field-independence learning style dimension, a person can be categorized as preferring a field-dependent, field-independent, or neutral (possessing characteristics of both field dependent and field independent) learning style (Garton
et al., 1999). Field-dependent and field-independent cognitive styles have been extensively studied and have the broadest application to educational concerns (Torres & Cano, 1994). However, current research on field-dependent and field-independent learning styles specifically in colleges of agriculture is limited to a few researchers and to a small number of graduate students and undergraduate students majoring in Agricultural Education (Torres & Cano, 1994).

Additionally, in 1984 the Experiential Learning Theory (ELT) model was developed by David Kolb. Kolb and Boyatzis (1999) defined learning as the process whereby knowledge is created through the transformation of experience. The ELT model portrays two dialectically related modes of grasping experience -- Concrete Experience (CE) and Abstract Conceptualization (AC) -- and two dialectically related modes of transforming experience -- Reflective Observation (RO) and Active Experimentation (AE) (Kolb & Boyatzis, 1999). The experiential learning theory model is commonly used for educational improvement. Kolb and Boyatzis (1999) further noted that the bulk of the ELT studies in education are in higher education (excluding professional education in the specific fields identified). K-12 education ELT studies account for a relatively small number, as does adult learning alone (Kolb & Boyatzis, 1999).

In 1987, Neil D. Fleming developed the VARK© inventory in an effort to improve faculty development and to help students become better learners (Bristol, 2010). VARK© is a model that determines learners sensory modality preferences by utilizing a questionnaire. Fleming (1995) describes the VARK© learning styles as the category of instructional preferences as it deals with perceptual mode; which means that it focuses on the different ways that people take in and give out information. VARK© stands for visual, aural, read/write, and kinesthetic modal preferences (Figure 2.1). A student can have one modal preference or be
multimodal, having more than one preferred sensory mode. Fleming and Baume (2006) stated that VARK© is not technically a learning style, as it provides feedback only on one’s preferred modes of communicating (Bristol, 2010). This model is widely used in schools in the United States, and 177 articles have been published in peer-reviewed journals referring to this model (Bristol, 2010).

**VARK© Inventory Model**

The VARK© questions and results focus on the ways in which people like information to come to them and the ways in which they like to deliver communication (Bristol, 2010). The questionnaire developed at Lincoln University provides teachers and students with a stimulus for reflection and a change in their methods for taking in information (students) and in their methods of presentation (teachers) (Fleming, 1995). In 2006, Fleming and Baume stated that preferences can be matched with learning strategies, and that the learning strategies then can be aligned with the modes (Bristol, 2010).
Figure 2.1

*Descriptions of the VARK© Model Learning Modalities*

<table>
<thead>
<tr>
<th>Sensory Modality</th>
<th>Learning Preference</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Visual</strong></td>
<td>Students with a visual modality prefer to learn content through use of sight. Process information best through the use of graphs, charts, pictures, and diagrams.</td>
</tr>
<tr>
<td><strong>Aural</strong></td>
<td>Students with an aural modality prefer to learn content through use of hearing or speaking. Process information best by listening to lectures, attending discussions, and discussing content with other aural students.</td>
</tr>
<tr>
<td><strong>Read/Write</strong></td>
<td>Students with a read/write modality prefer to learn content through the use of written or displayed words. Process information best by use of books, pamphlets, manuals, and documents.</td>
</tr>
<tr>
<td><strong>Kinesthetic</strong></td>
<td>Students with a kinesthetic modality prefer to learn content through use of hands on approaches. Process information best by use of their senses and embrace the learning by doing approach. Field trips, exhibits, and photographs are preferred learning methods.</td>
</tr>
<tr>
<td><strong>Multimodal</strong></td>
<td>Students with a multimodal modality prefer to learn content through the use of two, three, or all four sensory modalities described above.</td>
</tr>
</tbody>
</table>
**VARK Related Research**

Drago and Wagner (2004) conducted an extensive research study on the VARK inventory and online courses. Research conclusions suggested that online courses seemed to be attracting students with high visual and read-write learning styles (Drago & Wagner, 2004). Further research suggested that the read-write learning style was strongly and negatively associated with the kinesthetic learning style (Drago & Wagner, 2004). Drago and Wagner (2004) further suggested that learning styles do play a part in the decision to take online or traditional courses. The kinesthetic mean for traditional students was slightly higher than for online, although it was not significant (Drago & Wagner 2004).

An additional study was conducted by Bristol (2010) on women within the dairying industry by considering their learning preferences using the VARK learning style inventory. Bristol (2010) noted that from the 100 surveys completed 51.1% of the women recorded a multimodal learning preference. The second preference was read/write with 26.7% of the survey population recording this (Bristol, 2010). The third highest learning preference was the kinesthetic with 13.3% of the population and the visual 5.6% and aural 3.3% were recorded the lowest for the surveyed group (Bristol, 2010).

**Extension Programming and Agricultural Information Delivery Methods**

The value of information as a commodity in today’s information age cannot be overemphasized since it has contributed immensely to the stagnation or progressiveness of many farming operations (Riesenberg & Gor, 1989). Extension has roots in research in the physical sciences, but the method of sharing this information with clientele depends on a social science process (Cole, 1981). Cole (1981) stated that three general classifications of Extension teaching
methods have been identified which include 1) individual contact, 2) group contact, and 3) mass media.

The first two classifications involve a one-to-one and a one-to several ratio of agent teacher to clientele. Both involve personal contact and interaction. The third classification, mass media involves a one-to-many teaching ratio. An additional feature is that the contact is impersonal. The message must be interpreted by the recipient without the benefit of explanation from professional sources, unless the message stimulates further contact with the Extension staff (Cole, 1981, p. 28).

Fitting within the three categories, Riesenber & Gor (1989) further identified methods, including field trips, guest speakers, group discussions, workshops, one-on-one, on-farm demonstrations, audio-visual materials, printed matter, and interactive telecommunications were advocated by Extension practitioners for information dissemination in agriculture.

*Extension Educators*

Extension agents and specialists throughout the U.S. have been actively involved with public issues education for years (Patton & Blaine, 2001). Specifically, the University of Arizona has had a longtime presence in the Yuma community (Lobeck, 2012). As Arizona’s Land Grant University, the institution’s mission was to support agriculture through education, outreach, and research (Lobeck, 2012). That mission remains strong in Yuma County with the University of Arizona Cooperative Extension for outreach and education (Lobeck, 2012). In response to grower’s needs, the University of Arizona College of Agriculture and Life Sciences created its Desert Vegetable Crop Production Program (Littlefield, 2000). Faculty associated with the
program includes weed scientists, plant pathologists, and entomologists in Cooperative Extension who are at the forefront of desert vegetable research (Littlefield, 2000). The small team of specialists and agents are called upon to continue to meet clientele needs for agricultural research and up-to-date information in these competitive times (Taylor et al., 2008). In a study conducted by Kantner (1982), he summarized that if Extension wants to continue providing effective programs for its clientele and change with the times, it must know the attitudes of clients about the information they receive, the effectiveness of agents who deliver the information, the appropriateness of the methods used, and whether programs meet the needs of clientele (Kantner 1982). In the same study, Kantner noted that if agricultural agents want to do a better job of developing a comprehensive agricultural Extension education program and effectively meet the needs of all clientele, they must consider a variety of clientele characteristics including degree of participation in previous Extension education meetings, age, and level of formal education (Kantner 1982). Furthermore, the findings in the Kantner study suggested that Extension program planning should be approached primarily from the point of view of the clientele served, and secondarily from a subject matter point of view. Baker, Hoover, and Rudd (1998) also noted that the traits that Extension professionals and clients bring into the instructional environment impacts instructional outcomes.

**Adult Agricultural Education Learning Groups**

In the state of Arizona, crops are produced annually by growers and managed by registered pest control advisors and commercial applicators (Taylor et al., 2008). Traditionally, Extension has played an important role in providing cutting edge research based information to help producers and pest managers improve crop quality, control pests, maximize profits and minimize risks to people and the environment (Taylor et al., 2008). Meeting the research and education
needs of growers and pest managers has become increasingly challenging with the steady reduction in Extension personnel, particularly County Agents focused on agriculture, over the last several years (Taylor et al., 2008). Littlefield (2000) noted that Arizona vegetable growers are the main clientele in Cooperative Extension programming, specifically in desert vegetable research. Additional clientele who are kept abreast of current research include industry personnel such as crop production consultants, seed, fertilizer, and agrichemical industry representatives, pesticide applicators, equipment manufacturers, storage operators, and truckers (Littlefield, 2000).

**Learning Styles Research: Extension and Adult Continuing Agricultural Education Learners**

A study conducted by Baker, Hoover, and Rudd (1998) noted that in formal education programs, the background and demographic characteristics that both learner and the educator bring into the classroom influence the teaching and learning process. This study identified learning styles, value systems, and demographic characteristics of 56 Extension professionals in north Florida (Baker, Hoover, Rudd 1998). The 1998 study suggested that in terms of program delivery, presentation and learning experiences must be differentiated based upon the learning styles of clients. No clear patterns emerged in regards to learning style and gender, age range, or geographical region in which the Extension professionals attended high school (Baker, Hoover, Rudd 1998). Baker, Hoover, and Rudd (1998) also noted that Extension professionals differed only slightly in regard to their learning styles and demographic characteristics.

A research study conducted by Richardson (1994) noted that learning preferences of targeted Extension audiences and new agents clearly reflect those theories and principles that have long been espoused by leaders in the field of education. Richardson (1994) noted the demographic analysis indicated that most respondents were adults from 30 to 65 years old.
Among the clientele, about one-third were farmers, 13% were full-time homemakers, and the remainder indicated their primary occupation as other than farming or homemaking (Richardson, 1994). To determine the single most preferred way of learning by targeted clientele, they were given the choices of hearing, seeing, touching/feeling, doing, tasting, smelling, and discussing (Richardson, 1994). Among these options, the research indicated an overwhelming preference for “doing” at 70% of respondents. When clientele were asked why they preferred a combination of learning modes, their responses indicated that the learning process was positively enhanced (Richardson, 1994). Richardson’s (1994) research further indicated the learning process is further enhanced by providing opportunities for the learners to also see and discuss the information. Thus, the development and implementation of a comprehensive program delivery system that includes these components will be in the best interest of all who are involved in both delivering and receiving Extension information.

In an additional study conducted by Franz, Piercy, Donaldson, Westbrook, and Richard (2010) the learning preferences of farmers were identified. Eighty-six of 94 farmers in the study completed a survey and discussed the ways they prefer to learn (Franz et al., 2010). The top six preferred learning methods were: hands on (99%), demonstration (96%), farm visit (94%), field day (88%), discussion (87%), and one-on-one (85%) (Franz et al. 2010). Farmers had mixed preferences for online-Web, newsletters, books/manuals, on-farm tests, meetings, and lectures (Franz et al. 2010). The project reported by Franz et al. (2010) gave the farmers the opportunity to voice their ideas for enhancing the delivery of Extension education programs and identified that farmers thought that Extension’s educational program delivery should reflect farmer’s preferred learning styles.
**Related Research**

Adult education programs in agriculture were identified as important components of agricultural education programs in local communities (Birkenholz, Harbstreit, & Law 1990). Teachers of agriculture should accept that students and teachers differ in learning styles and use that knowledge to better facilitate learning (Dyer & Osborne, 1996). Both student learning style and teaching approach are important variables which should be addressed for maximum achievement to be attained (Dyer & Osborne, 1996). In a study conducted by Seevers (1995) it was determined that employees exhibited low levels of knowledge related to basic adult education principles and practices. In another study conducted by Creswell and Martin (1993), the major implication to educational practice drawn was that Extension education professionals have a need to spend more time with the processes of education.

The six adult learning method characteristics constituting the focus of investigation provide guidance and structure for developing effective training and technical assistance programs and practices (Trivette et al., 2009). The common element of adult learning methods that are most effective is active learner participation in the learning process (Trivette et al., 2009). Trivette et al. (2009) further described that the more adult learning method characteristics that are incorporated into a training program or practice, the more likely the learning experiences will have optimal positive benefits. In an additional study conducted by Trede and Whitaker (1998) respondents supported lifelong learning and thought that a variety of information sources should be consulted to solve complex farming problems. Regarding the delivery of beginning farmer education, in the study conducted by Trede and Whitaker (1998), respondents supported the idea of on-site instruction, single issue meetings, and consulting public institutions for unbiased information. Strong, Harder, and Carter (2010) found that hands-on experience was the
most preferred strategy by farmers for learning, while learning in groups was least preferred. Based on their findings, Strong et al. (2010) suggested the integration of practical and hands-on teaching and learning strategies would increase farmers’ motivation to participate in adult education.

Riesenberg (1989) stated that when the methods of receiving agricultural information are classified as interpersonal and mass media methods, farmers prefer interpersonal methods of receiving information on new or innovative farming practices, (e.g., on farm demonstrations, tours, and field trips) over the mass media methods (e.g., computer assisted instruction and home study). Research has indicated that adult learners dislike lecture as a teaching strategy (Strong, Harder, & Carter 2010). Agents determined providing hands-on experiences was the most effective teaching strategy due to their experiences as instructors and face-to-face feedback received from adult learners (Strong, Harder, & Carter 2010). Agents determined lectures were the least effective teaching strategy due to summaries of evaluations where adult learners commonly cited lectures were dull, uninteresting, or boring (Strong, Harder, & Carter 2010). Furthermore, Strong, Harder and Carter (2010) found that agents tended to limit their teaching to the use of a few strategies rather than a wide variety.

**Summary**

The Chapter 2 framework summary (Figure 2.2) started with adult learning strategies and strategically moved clockwise around the framework. The next topic included Extension programming delivery methods. The final topic discussed adult continuing agricultural education learning groups.

In today’s agricultural industry, survival often depends on having an edge on information related to the market, efficient allocation of available resources, and use of new or innovative
farming practices (Riesenberg & Gor, 1989). Improving the success of educational programs has been and continues to be a priority both internally and externally for Extension (Strong, Harder, & Carter, 2010). Successful adult educators employ a variety of instructional techniques and strategies depending on program content, expected outcomes, the learning environment, and available educational resources (Creswell & Martin, 1993). A teacher must structure a learning situation so that students can learn (Creswell & Martin, 1993). Diagnosing learning styles may help adult educators understand adults’ assumptions about teaching and learning and their behavior in instructional situations (Rollins & Yoder, 1993). Instructional techniques and strategies often evolve naturally from what has to be taught (Creswell & Martin, 1993). However, not one teaching technique is suited to every situation, but Extension educators may not venture beyond a few tried and true teaching methods (Creswell & Martin, 1993).
Figure 2.2: Literature Review Conceptual Framework Summary

Chapter 2 followed the figure 2.2. The chapter framework summary started with adult learning strategies and strategically moved clockwise around the framework. Subtopics in the first section included: Agriculture Education and Extension, Adult learning and Education, Learning Style Models, and the VARK© Inventory Model. The next topic included Extension programming delivery methods. The subtopics in this section discussed: the roles of Extension Educators, Individual Contact Methods, Group Contact Methods, and Mass Media Methods. Finally, the last topic discussed Adult Continuing Agricultural Education Learning Groups. Subtopics in this section included the three categories of professionals included in the research study. The three professional groups discussed in the literature review included Yuma County Growers, Pest Control Advisors, and Industry Personnel.
Chapter Three

Methods

The purpose of Chapter 3 was to describe how the study was conducted. Chapter 3 contains the following sections: (a) purpose of the study; (b) research questions of the study; (c) research design; (d) population and subject selection; (e) instrumentation; (f) data collection procedures; and (g) data analysis.

Purpose of the Study

The purpose of this study is to identify the learning styles and preferred methods of receiving agricultural information on new or innovative farming practices among Yuma growers, pest control advisors, and industry personnel. Furthermore, the study sought to describe the relationship between demographic characteristics, learning styles, preferred delivery methods. To guide this study, the following research objectives were developed.

Research Objectives

1. Describe the demographic characteristics of adult continuing education learners in Yuma County with respect to age, profession, number of years in profession, education, and gender.

2. Describe the learning styles of adult continuing agricultural educational learners in Yuma County.

3. Describe the relationship between demographic characteristics among adult continuing agricultural educational learners in Yuma County and their learning styles.

3a. Describe the relationship between demographics and learning styles of Yuma County growers.
3b. Describe the relationship between demographics and learning styles of Yuma County pest control advisors.

3c. Describe the relationship between demographics and learning styles of Yuma County agricultural industry personnel.

4. Describe the preferred educational delivery methods of receiving agricultural information on new or innovative farming practices among adult continuing agricultural education learners in Yuma County.

4a. Describe the preferred educational delivery method of receiving agricultural information on new or innovative farming practices among Yuma County growers.

4b. Describe the preferred educational delivery method of receiving agricultural information on new or innovative farming practices among Yuma County pest control advisors.

4c. Describe the preferred educational delivery method of receiving agricultural information on new or innovative farming practices among Yuma County agricultural industry personnel.

5. Describe the relationship between demographic characteristics and preferred educational delivery method among adult continuing agricultural education learners in Yuma County.

6. Describe the relationship between adult continuing agricultural education learners in Yuma County learning styles and preferred delivery methods.
Research Design

The design used for this study was non-experimental descriptive correlational research, which allows the researcher to “identify variables and look for relationships among them, but does not manipulate the variables” (Ary, Jacobs, & Sorensen, 2010, p.26). Three types of data were collected for the study. First, data were collected to describe the learning styles of adult continuing agricultural education learners using the VARK inventory model developed by Neil Flemming (1987). The second type of data were collected to establish the preferred delivery methods of agricultural education information. Third, descriptive demographic data were collected pertaining to adult continuing agricultural education learners with respect to age, profession, years in the agricultural industry, education, and gender.

Relationships were examined between learning styles and selected demographic characteristics (age, profession, number of years in the agricultural industry, education, and gender) of adult continuing agricultural education learners. Additionally, relationships were examined between preferred delivery method and selected demographic variables (age, profession, number of years in the agricultural industry, education, and gender) of adult continuing agricultural education learners. Moreover, relationships were examined between learning styles and preferred delivery methods of adult continuing agricultural education learners.

Population and Subject Selection

Research Sample

The target sample consists of adult agricultural education learners in Yuma County. Non-probabilistic sampling was used, specifically convenience sampling. Three sub-groups of adult continuing agricultural education learners were formed. These groups include: Yuma County
growers, pest control advisors, and industry personnel. The target research sample consisted of 30 growers, 30 pest control advisors, and 30 industry personnel (N=90). However, 47 growers, 30 pest control advisors, and 59 industry personnel responded to the questionnaire. Therefore, the number of individuals participating in the study consisted of N=136. Yuma, Arizona area PCAs and industry personnel were selected for the study based upon attendance at two different fall 2012 agricultural workshops that were held in Yuma County. Yuma growers were selected from the Yuma County Cooperative Extension business directory.

**Sampling Error**

Non-probabilistic convenience sampling was utilized for the study. The convenience sample was comprised of adult agricultural education learners in Yuma County. This sample may not have been representative of the population of adult agricultural education learners because not all adult agricultural education learners contained in the Cooperative Extension Yuma Agricultural business directory were included in the study among those who received mailed questionnaires.

**Selection Error**

Selection error was avoided by obtaining an up-to-date Cooperative Extension Yuma Agricultural business directory for the current year. This was a reliable frame, as it is updated annually by the Yuma County Cooperative Extension Office.

**Frame Error**

Frame error was avoided by obtaining the current, up-to-date Cooperative Extension Yuma Agricultural business directory for the current year. This was a reliable frame, as it is updated annually by the Yuma County Cooperative Extension Office.
Instrumentation

Description of Instrument

The data collection instrument that was utilized for this descriptive-relational study was a three part booklet questionnaire containing 29 open and closed-ended questions (Appendix G). The booklet questionnaire was created by the researcher, but contained VARK© copyrighted questions. The questionnaire was comprised of three sections. The first section contained VARK© questions focusing only on modality preference. In May of 2012, Fleming granted formal permission to use the VARK items for the study. The second and third sections contained questions created by the researcher. These questions identified delivery method preferences of adult agricultural education learners and their demographics with respect to age, gender, education, number of years in the agricultural industry, and profession. The three sections of the instrument obtained information on the demographic background, learning style modality preferences, and preferred methods of receiving agricultural information on new or innovative farming practices amongst adult continuing agricultural education learners.

Validity Procedures

Validity was determined through utilizing a panel of experts of three individuals who have a knowledge base in the subjects of agricultural education and learning styles of students. The panel was comprised of Dr. Ryan Foor, Dr. Kurt Nolte, and Dr. Ed Franklin. The panel was chosen based upon their expertise and knowledge within the agricultural education field. Dr. Ryan Foor is an Assistant Professor and is the Director for Graduate Studies in the Agricultural Education Department. He started at the University of Arizona in 2010. Dr. Kurt Nolte currently serves as Agriculture Agent as well as Yuma County Extension Director. Since 2011, Nolte has also taken on the role of Yuma Agricultural Center Interim Director and Regional Vegetable
Production Specialist. He has been with the University since 2006. Dr. Ed Franklin currently serves as Assistant Professor in the Department of Agricultural Education at the University of Arizona and serves as the Undergraduate Coordinator for Agricultural Technology Management. Dr. Franklin has been with the University of Arizona since 2000. The panel of experts determined if the instrument has face and content validity. The panel of experts examined the questionnaire for determination of content validity, instrumentation, and insight on the subject. For content validity, the panel examined items for appropriateness and clarity.

**Reliability Procedures**

The questionnaire developed at Lincoln University provides teachers and students with a stimulus for reflection and a change in their methods for taking in information (students) and in their methods of presentation (teachers) (Fleming, 1995). Part I reliability estimates for the scores of the VARK subscales were .85, .82, .84, and .77 for the visual, aural, read/write, and kinesthetic subscales, respectively which are considered adequate (Leite, Svinicki, & Shi, 2010). Gliem (2008) suggested that a Cronbach’s alpha coefficient of .70 or higher was sufficient to establish reliability of the data collection instrument. The literature review noted that if agricultural agents want to do a better job of developing a comprehensive agricultural Extension education program and effectively meet the needs of all clientele, they must consider a variety of clientele characteristics including degree of participation in previous Extension education meetings, age, and level of formal education (Kantner 1982). Reliability of the instrument was established for Part II by conducting a pilot study among 15 adult continuing agricultural education learners not included in the study. Reliability was assessed in SPSS by computing a Cronbach’s alpha coefficient. The Cronbach’s alpha coefficient for the questions within Part II of the questionnaire used in this study was .51. The researcher recognizes that this is a low
reliability estimate, so post-hoc reliability was also conducted. The post-hoc reliability was assessed in SPSS and was .62.

**Data Collection**

Data were collected using a mailed questionnaire (Appendix G) guided by Dillman’s (2000) recommendations. Human Subjects Research and Institutional Review Board approval was granted on September 13, 2012 (project number 12-0664-00). The same questionnaire template was used throughout the study. Data collection started October of 2012, by distributing a booklet questionnaire to the accessible population. Data collection consisted of two phases. The convenience sample was comprised of adult agricultural education learners in Yuma County, specifically pest control advisors and industry personnel who attended the fall 2012 workshops and growers who received mailed questionnaires.

**Phase 1- Workshop Data Collection**

On October 1st 2012, a flyer (Appendix A) was emailed to adult agricultural education learners in Yuma County making them aware of the questionnaire that would be distributed at the forthcoming workshop. At the workshop, a short presentation was given discussing the purpose and significance of the research. A workshop cover letter (Appendix B) was also attached to the questionnaire packet, discussing the purpose and significance of the research. The questionnaire was then distributed to the convenience samples present at the Yuma County Cooperative Extension agriculture workshops. Respondents were able to access the questionnaire in booklet form. Once completed, the respondents then turned the questionnaire back in to the administrator. Once the researcher received the accepting sample data, the information gathered was analyzed using SPSS 20.0 statistical software.

**Phase 2- Mailed Questionnaire Data Collection**
Prior to the questionnaire disbursement, a cover letter (Appendix C) was sent directly to the grower via U.S. mail discussing the purpose and significance of the research. A packet containing a cover letter and booklet questionnaire (Appendix G) was then mailed and distributed to the convenience samples selected from the Yuma County Cooperative Extension Growers business directory. Respondents were able to access the questionnaire in booklet form. Once completed, the respondents mailed back the questionnaire in a pre-post marked envelope.

An email reminder (Appendix D) was sent out one week after the questionnaire as a follow up reminder and thank you for those who had responded. Those who had not responded at two weeks, a second questionnaire (Appendix G) was mailed along with a reminder letter (Appendix E). A final mailed letter reminder (Appendix F) was distributed expressing the significance and importance for the individual’s participation. Data collection ceased November 1, 2012.

A total of 136 questionnaires were returned yielding a usable response rate of 82%. Among the 136 usable responses, 77 were collected during the workshop. The remaining 59 responses were collected from mailed in questionnaires. 43 individuals responded to the initial mailing, while 16 individuals responded to the second mailing. A timeline of the research activities conducted can be seen in Figure 3.1.
Figure 3.1

*Timeline of Research*

<table>
<thead>
<tr>
<th>Date</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>May 2012</td>
<td>Obtained Permission to use VARK©</td>
</tr>
<tr>
<td>May 2012</td>
<td>Development of Instrument</td>
</tr>
<tr>
<td>October 2012</td>
<td>Disperse Questionnaire to Recipients</td>
</tr>
<tr>
<td>October 2012</td>
<td>Mail Questionnaire to Non-Respondents</td>
</tr>
<tr>
<td>October 2012</td>
<td>Initial Email Reminder</td>
</tr>
<tr>
<td>October 2012</td>
<td>Final Email Reminder</td>
</tr>
<tr>
<td>November 2012</td>
<td>Analysis of Information</td>
</tr>
<tr>
<td>December 2012</td>
<td>Presentation of Findings</td>
</tr>
</tbody>
</table>
Data Analysis

Data were analyzed using the Statistical Package for the Social Sciences 20.0 for Windows (SPSS). There were 136 questionnaires that were completed with all questions answered. Descriptive statistics were used to describe the population of adult continuing agricultural learners in Yuma County with regard to the purpose and research objectives of the study. Descriptive statistical procedures included frequencies, percentages, means, and standard deviations. Correlation coefficients were calculated to assess relationships between the selected characteristics. The Eta correlation coefficient was calculated to describe the relationship between a multichotomous nominal variable and an interval or ratio variable. The Cramer’s V statistic was calculated to describe the relationship between multichotomous nominal variables and dichotomous or multichotomous nominal variables. The Eta squared values provided indications of the proportion of variance.

Data collected in Part I of the instrument, were judged to be nominal scale data. For Part II, data collected were judged to be nominal data. For Part III, the demographic characteristics (age and years worked in the agricultural industry) were judge to be interval scale data. The demographic characteristics (profession, education, and gender) were judge to be nominal scale data.

The scale of measurement of the variables influenced the calculations used to describe the relationships between the selected variables (Table 3.4 and Table 3.5). Eta correlations were used to describe the relationship between learning styles and the demographic variables age and years worked the agricultural industry. Eta correlations were also used to describe the relationship between preferred delivery methods and the demographic variables age and years worked in the agricultural industry. Cramer’s V statistic was computed to describe the
relationships between learning styles and preferred delivery methods. The Cramer’s V statistic was also used to describe the relationship between learning styles and the demographic variables (profession, education, and gender). The Cramer’s V statistic was also used to describe the relationship between preferred delivery methods and the demographic variables (profession, education, and gender). Correlation coefficients were calculated to assess relationships between the selected characteristics. The Eta correlation coefficients were interpreted according to Davis’ (1971) conventions (Table 3.2). Eta squared correlations were interpreted according to Cohen’s Criteria (Pagano, 2010). Eta squared interpretations are found in (Table 3.3). Cramer’s V correlations were interpreted according to (Davis, 1971) conventions (Table 3.2).

Table 3.2

**Conventions used to describe Eta and Cramer’s V correlations**

<table>
<thead>
<tr>
<th>Description</th>
<th>Coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>Negligible</td>
<td>.01 and under .09</td>
</tr>
<tr>
<td>Low</td>
<td>.10 and under .29</td>
</tr>
<tr>
<td>Moderate</td>
<td>.30 and under .49</td>
</tr>
<tr>
<td>Substantial</td>
<td>.50 and under .69</td>
</tr>
<tr>
<td>Very Strong</td>
<td>.70 or greater</td>
</tr>
</tbody>
</table>

Note: Conventions used to describe Eta and Cramer’s V correlations. (Davis, 1971)

Table 3.3

**Cohen’s Criteria for interpreting the value of Eta squared**

<table>
<thead>
<tr>
<th>Interpretation</th>
<th>Proportion of Variance-Eta squared</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small Effect</td>
<td>0.01-0.05</td>
</tr>
<tr>
<td>Medium Effect</td>
<td>0.06-0.13</td>
</tr>
<tr>
<td>Large Effect</td>
<td>≥0.14</td>
</tr>
</tbody>
</table>

Note: Cohen’s Criteria for interpreting the value of Eta squared. (Pagano, 2010)
Table 3.4

*Scale of Measurement*

<table>
<thead>
<tr>
<th>Scale of Measurement Variable 1</th>
<th>Nominal</th>
<th>Scale of Measurement Variable 2</th>
<th>Ordinal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dichotomous</td>
<td>Phi Coefficient</td>
<td>Cramer's V Statistic</td>
<td>Treat ordered categories as nominal scale and calculate phi coefficient or Cramer's V Statistic</td>
</tr>
<tr>
<td>Multichotomous</td>
<td>Cramer's V Statistic</td>
<td>Cramer's V Statistic</td>
<td></td>
</tr>
</tbody>
</table>

CATEGORICAL VARIABLES: NOMINAL OR ORDINAL
Table 3.5

Statistics used to describe the relationship between learning styles, preferred delivery methods, and demographic variables.

<table>
<thead>
<tr>
<th>Objective</th>
<th>Variable</th>
<th>Statistical Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>1A</td>
<td>Age</td>
<td>Descriptive</td>
</tr>
<tr>
<td>1B</td>
<td>Profession</td>
<td>Frequency</td>
</tr>
<tr>
<td>1C</td>
<td>Years in Profession</td>
<td>Descriptive</td>
</tr>
<tr>
<td>1D</td>
<td>Education</td>
<td>Frequency</td>
</tr>
<tr>
<td>1E</td>
<td>Gender</td>
<td>Frequency</td>
</tr>
<tr>
<td>2</td>
<td>Learning Style</td>
<td>Frequency</td>
</tr>
<tr>
<td>3A</td>
<td>Age x Learning Style</td>
<td>ETA</td>
</tr>
<tr>
<td>3B</td>
<td>Profession x Learning Style</td>
<td>Cramer’s V</td>
</tr>
<tr>
<td>3C</td>
<td>Years in Profession x Learning Style</td>
<td>ETA</td>
</tr>
<tr>
<td>3D</td>
<td>Education x Learning Style</td>
<td>Cramer’s V</td>
</tr>
<tr>
<td>3E</td>
<td>Gender x Learning Style</td>
<td>Cramer’s V</td>
</tr>
<tr>
<td>4</td>
<td>Preferred Delivery Method</td>
<td>Frequency</td>
</tr>
<tr>
<td>5A</td>
<td>Age x Preferred Delivery Method</td>
<td>ETA</td>
</tr>
<tr>
<td>5B</td>
<td>Profession x Preferred Delivery Method</td>
<td>Cramer’s V</td>
</tr>
<tr>
<td>5C</td>
<td>Years in Profession x Preferred Delivery Method</td>
<td>ETA</td>
</tr>
<tr>
<td>5D</td>
<td>Education x Preferred Delivery Method</td>
<td>Cramer’s V</td>
</tr>
<tr>
<td>5E</td>
<td>Gender x Preferred Delivery Method</td>
<td>Cramer’s V</td>
</tr>
<tr>
<td>6</td>
<td>Learning Style x Preferred Delivery Method</td>
<td>Cramer’s V</td>
</tr>
</tbody>
</table>
Chapter 4

Findings

Chapter 4 reports the findings of the study. Included in Chapter 4 are the following sections: (a) purpose of the study; (b) research questions of the study; (c) demographic characteristics of adult continuing agricultural education learners in Yuma County; (d) learning style data of adult continuing agricultural education learners in Yuma County; (e) preferred delivery methods of agricultural information data of adult continuing agricultural education learners in Yuma County; (f) and relational data.

Purpose of the Study

The purpose of this study is to identify the learning styles and preferred methods of receiving agricultural information on new or innovative farming practices among Yuma growers, pest control advisors, and industry personnel. Furthermore, the study sought to describe the relationship between demographic characteristics, learning styles, preferred delivery methods. To guide this study, the following research objectives were developed.

Research Objectives

1. Describe the demographic characteristics of adult continuing education learners in Yuma County with respect to age, profession, number of years in profession, education, and gender.

2. Describe the learning styles of adult continuing agricultural educational learners in Yuma County.

3. Describe the relationship between demographic characteristics among adult continuing agricultural educational learners in Yuma County and their learning styles.
3a. Describe the relationship between demographics and learning styles of Yuma County growers.

3b. Describe the relationship between demographics and learning styles of Yuma County pest control advisors.

3c. Describe the relationship between demographics and learning styles of Yuma County agricultural industry personnel.

4. Describe the preferred educational delivery methods of receiving agricultural information on new or innovative farming practices among adult continuing agricultural education learners in Yuma County.

   4a. Describe the preferred educational delivery method of receiving agricultural information on new or innovative farming practices among Yuma County growers.

   4b. Describe the preferred educational delivery method of receiving agricultural information on new or innovative farming practices among Yuma County pest control advisors.

   4c. Describe the preferred educational delivery method of receiving agricultural information on new or innovative farming practices among Yuma County agricultural industry personnel.

5. Describe the relationship between demographic characteristics and preferred educational delivery method among adult continuing agricultural education learners in Yuma County.

6. Describe the relationship between adult continuing agricultural education learners in Yuma County learning styles and preferred delivery methods.
Research Objective #1A- Demographic Characteristics

Demographic characteristics surveyed in the current study included: age, profession, number of years worked in the agricultural industry, education, and gender. The following sections provide a description of each demographic characteristic.

Age of surveyed Adult Continuing Agricultural Education Learners

The average age of adult continuing agricultural education learners in Yuma County surveyed in this study was 46 years (SD = 12.87). Table 4.1 describes the ages of respondents (n=136). The average age of growers surveyed in this study was 45 years (SD = 12.71) (n=47). The average age of a pest control advisors surveyed in this study was 43 years (SD = 14.09) (n=30). The average age of industry personnel surveyed in this study was 47 years (SD = 12.24) (n=59).

Table 4.1

<table>
<thead>
<tr>
<th>Age</th>
<th>N</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall</td>
<td>136</td>
<td>23.00</td>
<td>71.00</td>
<td>45.65</td>
<td>12.87</td>
</tr>
<tr>
<td>Growers</td>
<td>47</td>
<td>25.00</td>
<td>71.00</td>
<td>45.46</td>
<td>12.71</td>
</tr>
<tr>
<td>PCAs</td>
<td>30</td>
<td>25.00</td>
<td>63.00</td>
<td>42.50</td>
<td>14.09</td>
</tr>
<tr>
<td>Industry</td>
<td>59</td>
<td>23.00</td>
<td>69.00</td>
<td>47.40</td>
<td>12.24</td>
</tr>
</tbody>
</table>
**Research Objective #1B- Demographic Characteristics**

**Profession of surveyed Adult Continuing Agricultural Education Learners**

The professions of adult continuing agricultural education learners in Yuma County were surveyed in this study. Table 4.2 describes the frequencies of respondents' professions (n=136). The frequency of growers surveyed in this study was (n=47) accounting for 34.6% of respondents. The frequency of pest control advisors surveyed in this study was (n=30) accounting for 22.1% of respondents. Industry personnel (n=59) accounted for 43.4% of respondents.

Table 4.2

**Professions of Respondents**

<table>
<thead>
<tr>
<th>Profession</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Growers</td>
<td>47</td>
<td>34.6</td>
<td>34.6</td>
<td>34.6</td>
</tr>
<tr>
<td>PCAs</td>
<td>30</td>
<td>22.1</td>
<td>22.1</td>
<td>56.6</td>
</tr>
<tr>
<td>Industry Personnel</td>
<td>59</td>
<td>43.4</td>
<td>43.4</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>136</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>
Research Objective #1C- Demographic Characteristics

Number of Years Worked in the Agricultural Industry

The number of years worked in the agricultural industry among adult continuing agricultural education learners in Yuma County was surveyed in this study. Overall (n=136) respondents have worked an average of 24 years (SD = 14.19) in the agricultural industry. The average number of years worked in the agricultural industry for growers surveyed in this study was 25 years (SD = 13.65) (n=47). The average number of years worked in the agricultural industry for pest control advisors surveyed in this study was 21 years (SD = 15.34) (n=30). The average number of years worked in the agricultural industry for industry personnel surveyed in this study was 25 years (SD = 14.02) (n=59). Table 4.3 describes the number of years participants worked in the agricultural industry (n=136).

Table 4.3

<table>
<thead>
<tr>
<th>Years in Industry</th>
<th>N</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall</td>
<td>136</td>
<td>1.00</td>
<td>65.00</td>
<td>24.24</td>
<td>14.19</td>
</tr>
<tr>
<td>Growers</td>
<td>47</td>
<td>2.00</td>
<td>65.00</td>
<td>24.91</td>
<td>13.65</td>
</tr>
<tr>
<td>PCAs</td>
<td>30</td>
<td>1.00</td>
<td>45.00</td>
<td>21.00</td>
<td>15.34</td>
</tr>
<tr>
<td>Industry</td>
<td>59</td>
<td>3.00</td>
<td>64.00</td>
<td>25.35</td>
<td>14.02</td>
</tr>
</tbody>
</table>
Research Objective #1- Demographic Characteristics

Educational Background of surveyed Adult Continuing Agricultural Education Learners

The educational backgrounds of adult continuing agricultural education learners in Yuma County were surveyed in this study. Table 4.4 describes the frequencies of respondents educational backgrounds (n=136). The frequency of growers surveyed in this study was 47. The frequency of pest control advisors surveyed in this study was 30. The frequency of industry personnel survey in this study was 59.

Half of the participants surveyed in the study acquired a Bachelor’s degree (50%, n=86). Twenty-seven respondents (19.9%) acquired an Associate’s degree, while (n=25) 18.4% of respondents noted a high school diploma. Nine respondents (6.6%) reported having their PhD and 3.7% of respondents (n=5) reported a Master’s Degree. Of the remaining respondents, 1.5% (n=2) graduated from a vocational/ technical program.

The majority of growers (49%, n=23) surveyed in this study had a bachelor’s degree. 23.4% of growers (n=11) had a high school diploma. While (17%, n=8) of growers had an associate’s degree. Four growers, (8.5%) had a master’s degree or above.

The majority of PCAs (66.6%, n=20) surveyed in this study had a bachelor’s degree. While (26.7%, n=8) of PCAs had an associate’s degree. One respondent (3.3%) had a high school diploma. Additionally, one PCA respondent (3.3%) had graduated from a vocational/ technical program.

Industry personnel participants (42.4%, n=25) surveyed in this study had a bachelor’s degree. 22% of industry personnel (n=13) had a high school diploma. Associates degrees were acquired among 18.6% (n=11) of industry personnel participants. A total of ten industry personnel (17%) had a master’s degree or above.
Table 4.4

Education of Respondents

<table>
<thead>
<tr>
<th>Education of Respondents</th>
<th>Frequency Growers</th>
<th>%</th>
<th>Frequency PCAs</th>
<th>%</th>
<th>Frequency Industry Personnel</th>
<th>%</th>
<th>Frequency Overall</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>High School</td>
<td>11</td>
<td>23.4</td>
<td>1</td>
<td>3.3</td>
<td>13</td>
<td>22.0</td>
<td>25</td>
<td>18.4</td>
</tr>
<tr>
<td>Vocational/Tech</td>
<td>1</td>
<td>2.1</td>
<td>1</td>
<td>3.3</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>1.5</td>
</tr>
<tr>
<td>Associate Degree</td>
<td>8</td>
<td>17.0</td>
<td>8</td>
<td>26.7</td>
<td>11</td>
<td>18.6</td>
<td>27</td>
<td>19.9</td>
</tr>
<tr>
<td>Bachelors in Ag</td>
<td>21</td>
<td>44.7</td>
<td>19</td>
<td>63.3</td>
<td>16</td>
<td>27.1</td>
<td>56</td>
<td>41.2</td>
</tr>
<tr>
<td>Bachelors in Other</td>
<td>2</td>
<td>4.3</td>
<td>1</td>
<td>3.3</td>
<td>9</td>
<td>15.3</td>
<td>12</td>
<td>8.8</td>
</tr>
<tr>
<td>Masters</td>
<td>1</td>
<td>2.1</td>
<td>0</td>
<td>0</td>
<td>4</td>
<td>6.8</td>
<td>5</td>
<td>3.7</td>
</tr>
<tr>
<td>PhD</td>
<td>3</td>
<td>6.4</td>
<td>0</td>
<td>0</td>
<td>6</td>
<td>10.2</td>
<td>9</td>
<td>6.6</td>
</tr>
<tr>
<td>Total</td>
<td>47</td>
<td>100.0</td>
<td>30</td>
<td>100.0</td>
<td>59</td>
<td>100.0</td>
<td>136</td>
<td>100.0</td>
</tr>
</tbody>
</table>
Research Objective #1 - Demographic Characteristics

Gender of surveyed Adult Continuing Agricultural Education Learners

The genders of adult continuing agricultural education learners in Yuma County were surveyed in this study. Table 4.5 describes the frequencies of respondents’ gender (n=136). The majority of respondents were males (83.8%, n=114). Females (n=22) made up 16.2% of respondents.

Growers surveyed in this study were 85.1% (n=40) male and 14.9% (n=7) female. Pest control advisors surveyed in this study were 96.7% (n=29) male and 3.3% (n=1) female. Industry personnel surveyed in this study were 76.3% (n=45) male and 23.7% (n=14) female.

Table 4.5

*Gender of Respondents*

<table>
<thead>
<tr>
<th>Gender</th>
<th>Frequency Growers</th>
<th>%</th>
<th>Frequency PCAs</th>
<th>%</th>
<th>Frequency Industry Personnel</th>
<th>%</th>
<th>Frequency Overall</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>40</td>
<td>85.1</td>
<td>29</td>
<td>96.7</td>
<td>45</td>
<td>76.3</td>
<td>114</td>
<td>83.8</td>
</tr>
<tr>
<td>Female</td>
<td>7</td>
<td>14.9</td>
<td>1</td>
<td>3.3</td>
<td>14</td>
<td>23.7</td>
<td>22</td>
<td>16.2</td>
</tr>
<tr>
<td>Total</td>
<td>47</td>
<td>100.0</td>
<td>30</td>
<td>100.0</td>
<td>59</td>
<td>100.0</td>
<td>136</td>
<td>100.0</td>
</tr>
</tbody>
</table>
Research Objective #2- Learning Styles

Learning Styles of surveyed Adult Continuing Agricultural Education Learners

The learning styles of adult continuing agricultural education learners in Yuma County were surveyed in this study. Table 4.6 describes the frequencies of respondents learning styles (n=136). The kinesthetic learning style accounted for 32.4% (n= 44) of respondents. Of the remaining respondents 25.7% (n=35) were visual learners; 19.1% (n=26) were read/write learners; 17.6% (n=24) were aural learners; 5.1% (n=7) multimodal learners.

Of the growers, 44.7% (n=21) reported a kinesthetic learning style, while 19.1% (n=9) reported a visual learning style. Of the remaining grower participants, 17% (n=8) reported a read/write learning style; 12.8% reported an aural learning style, and three growers (6.4%) reported a multimodal learning style.

The majority of PCAs, 53.3% (n=16), reported a visual learning style. Of the remaining PCA respondents, 36.7% (n=11) reported a kinesthetic learning style; and 6.7% (n=2) reported a read/write learning style. One respondent (3.3%) reported an aural learning style.

Aural learning styles accounted for 28.8% (n=17) of industry personnel respondents. Of the remaining industry personnel respondents, 27.1% (n=16) reported a read/write learning style and 20.3% (n=12) reported a kinesthetic learning style. Four industry personnel respondents, 6.8% reported a multimodal learning style. Table 4.6 summarizes the distribution of learning styles among respondents.
Table 4.6

Learning Styles of Respondents

<table>
<thead>
<tr>
<th>VARK Learning Style</th>
<th>Frequency Overall</th>
<th>%</th>
<th>Frequency Growers</th>
<th>%</th>
<th>Frequency PCAs</th>
<th>%</th>
<th>Frequency Industry Personnel</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visual</td>
<td>35</td>
<td>25.7</td>
<td>9</td>
<td>19.1</td>
<td>16</td>
<td>53.3</td>
<td>10</td>
<td>16.9</td>
</tr>
<tr>
<td>Aural</td>
<td>24</td>
<td>17.6</td>
<td>6</td>
<td>12.8</td>
<td>1</td>
<td>3.3</td>
<td>17</td>
<td>28.8</td>
</tr>
<tr>
<td>Read/Write</td>
<td>26</td>
<td>19.1</td>
<td>8</td>
<td>17.0</td>
<td>2</td>
<td>6.7</td>
<td>16</td>
<td>27.1</td>
</tr>
<tr>
<td>Kinesthetic</td>
<td>44</td>
<td>32.4</td>
<td>21</td>
<td>44.7</td>
<td>11</td>
<td>36.7</td>
<td>12</td>
<td>20.3</td>
</tr>
<tr>
<td>Multimodal</td>
<td>7</td>
<td>5.1</td>
<td>3</td>
<td>6.4</td>
<td>0</td>
<td>0</td>
<td>4</td>
<td>6.8</td>
</tr>
<tr>
<td>Total</td>
<td>136</td>
<td>100.0</td>
<td>47</td>
<td>100.0</td>
<td>30</td>
<td>100.0</td>
<td>59</td>
<td>100.0</td>
</tr>
</tbody>
</table>
**Research Objective #3**

Describe Relationship between Learning Styles and Demographic Variables

This section reports findings pertaining to the relationship between learning styles and the selected demographic variables. Eta correlations were calculated to describe the relationship between adult continuing agricultural education learners learning styles and selected demographic variables: age and years worked in agricultural industry. Cramer’s V correlations were calculated to describe the relationship between adult continuing agricultural education learners learning styles and selected demographic variables: profession, education, and gender. Table 4.7 describes the relationships between learning styles and demographic variables (age and number of years worked in the agricultural industry) using Eta correlations. Table 4.8: describes the relationships between learning styles and demographic variables (profession, education, and gender) using Cramer’s V correlations.

**Eta Correlations: Learning Style and Age**

Among all the participants surveyed in the study (n=136) a moderate correlation (Davis, 1971) (Eta = .32) was found between age and learning styles of the participants. Ages among all respondents account for 10% of the variance in learning styles of respondents. According to Cohen’s criteria, the value of Eta squared (.10) indicates a medium effect (Pagano, 2010).

Among the growers (n=47) surveyed in the study, a low correlation (Davis, 1971) (Eta = .29) was found between age and learning style of the grower. Ages among growers account for 8.4% of the variance in growers’ learning styles. According to Cohen’s criteria, the value of Eta squared (.08) indicates a medium effect (Pagano, 2010). Among the PCAs (n=30) surveyed in the study, a low correlation (Davis, 1971) (Eta = .22) was found between age and learning style of the PCAs. The ages among PCAs account for 4.6% of the variance in learning styles.
According to Cohen’s criteria, the value of Eta squared (.046) indicates a small effect (Pagano, 2010). Among the industry personnel (n=59) surveyed in the study, a substantial correlation (Davis, 1971) (Eta = .56) was found between age and learning styles of industry personnel. Ages among industry personnel account for 31.5% of the variance in industry personnel learning style. According to Cohen’s criteria, the value of Eta squared (.315) indicates a large effect (Pagano, 2010). Table 4.7 describes the relationships between learning styles and demographic variables (age and number of years worked in the agricultural industry) using Eta correlations.

**Eta Correlations: Learning Style and Number of Years Worked in the Agricultural Industry**

Among all the participants surveyed in the study (n=136) a low correlation (Davis, 1971) (Eta = .26) was found between learning style and number of years worked in the agricultural industry. The number of years worked in the agricultural industry among all respondents account for 6.6% of the variance in learning styles. According to Cohen’s criteria, the value of Eta squared (.06) indicates a medium effect (Pagano, 2010). Among the growers (n=47) surveyed in the study, a moderate correlation (Davis, 1971) (Eta = .38) was found between learning style and number of years worked in the agricultural industry. The number of years worked in the agricultural industry among growers account for 14.2% of the variance in learning styles. According to Cohen’s criteria, the value of Eta squared (.14) indicates a large effect (Pagano, 2010). Among the PCAs (n=30) surveyed in the study, a low correlation (Davis, 1971) (Eta = .23) was found between learning style and number of years worked in the agricultural industry. The number of years worked in the agricultural industry among PCAs account for 5.1% of the variance in learning styles. According to Cohen’s criteria, the value of Eta squared (.05) indicates a small effect (Pagano, 2010). Among the industry personnel (n=59) surveyed in the study, a moderate correlation (Davis, 1971) (Eta = .46) was found between learning style and
number of years worked in the agricultural industry. The number of years worked in the agricultural industry among industry personnel account for 26.1% of the variance in learning styles. According to Cohen’s criteria, the value of Eta squared (.26) indicates a large effect (Pagano, 2010). Table 4.7 describes the relationships between learning styles and demographic variables (age and number of years worked in the agricultural industry) using Eta correlations.

Table 4.7

Relationship between Learning Styles and Demographic Variables; Eta Correlation

(Age, Years in Agricultural Industry)

<table>
<thead>
<tr>
<th>Demographic Variable</th>
<th>Group</th>
<th>Eta</th>
<th>Eta Squared</th>
<th>Mean</th>
<th>N</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>Overall</td>
<td>.316</td>
<td>.100</td>
<td>45.65</td>
<td>136</td>
<td>12.87</td>
</tr>
<tr>
<td></td>
<td>Growers</td>
<td>.290</td>
<td>.084</td>
<td>45.46</td>
<td>47</td>
<td>12.71</td>
</tr>
<tr>
<td></td>
<td>PCAs</td>
<td>.215</td>
<td>.046</td>
<td>42.50</td>
<td>30</td>
<td>14.09</td>
</tr>
<tr>
<td></td>
<td>Industry Personnel</td>
<td>.562</td>
<td>.315</td>
<td>47.40</td>
<td>59</td>
<td>12.24</td>
</tr>
<tr>
<td>Years in Ag Industry</td>
<td>Overall</td>
<td>.258</td>
<td>.066</td>
<td>24.24</td>
<td>136</td>
<td>14.19</td>
</tr>
<tr>
<td></td>
<td>Growers</td>
<td>.377</td>
<td>.142</td>
<td>24.91</td>
<td>47</td>
<td>13.65</td>
</tr>
<tr>
<td></td>
<td>PCAs</td>
<td>.225</td>
<td>.051</td>
<td>21.00</td>
<td>30</td>
<td>15.34</td>
</tr>
<tr>
<td></td>
<td>Industry Personnel</td>
<td>.464</td>
<td>.261</td>
<td>25.35</td>
<td>59</td>
<td>14.02</td>
</tr>
</tbody>
</table>

Cramer’s V Correlations: Learning Style and Profession, Education, and Gender

Among all participants surveyed in the study (n=136), a moderate correlation (Davis, 1971) was found between learning style and profession (Cramer’s V = .34). Among all the participants surveyed in the study (n=136), a low correlation (Davis, 1971) was found between learning style and education (Cramer’s V = .28). Among growers (n=47), a moderate correlation (Davis, 1971) was found between learning style and education (Cramer’s V = .40). Among PCAs (n=30), a low correlation (Davis, 1971) was found between learning style and education (Cramer’s V = .23). Among industry personnel (n=59), a moderate correlation (Davis, 1971) was found between learning style and education (Cramer’s V = .34). Among all the participants
surveyed in the study (n=136), a low correlation (Davis, 1971) was found between learning style and gender (Cramer’s V = .16). Among growers (n=47), a moderate correlation (Davis, 1971) was found between learning style and gender (Cramer’s V = .41). Among PCAs (n=30), a low correlation (Davis, 1971) was found between learning style and gender (Cramer’s V = .17). Among industry personnel (n=59), a low correlation (Davis, 1971) was found between learning style and gender (Cramer’s V = .24). Table 4.8: describes the relationships between learning styles and demographic variables (profession, education, and gender) using Cramer’s V correlations.

Table 4.8

*Relationship between VARK Learning Styles and Demographic Variables;*

*Cramer’s V Correlation (Profession, Education, and Gender)*

<table>
<thead>
<tr>
<th>Demographic Variable</th>
<th>Group</th>
<th>Cramer’s V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Profession</td>
<td>Overall</td>
<td>.339</td>
</tr>
<tr>
<td>Education</td>
<td>Overall</td>
<td>.277</td>
</tr>
<tr>
<td></td>
<td>Growers</td>
<td>.397</td>
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<td></td>
<td>PCAs</td>
<td>.226</td>
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<td></td>
<td>Industry Personnel</td>
<td>.343</td>
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<tr>
<td>Gender</td>
<td>Overall</td>
<td>.167</td>
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<tr>
<td></td>
<td>Growers</td>
<td>.412</td>
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<td></td>
<td>PCAs</td>
<td>.174</td>
</tr>
<tr>
<td></td>
<td>Industry Personnel</td>
<td>.242</td>
</tr>
</tbody>
</table>
Research Objective #4

Describe Preferred Educational Delivery Method of Receiving Agricultural Information

The preferred educational delivery methods of receiving agricultural information among Adult Continuing Agricultural Education Learners in Yuma County were surveyed in this study. Table 4.9 describes the frequencies of the overall respondents preferred educational delivery method (n=136). Table 4.10 describes growers preferred educational delivery method (n=47). Table 4.11 describes PCAs preferred educational delivery method (n=30). Table 4.12 describes industry personnel’s preferred educational delivery method (n=59).

Preferred Delivery Method – Previously Encountered Methods

Considering all participants in the study (n=136), the majority of respondents (54.4%, n=74) encountered all the given educational delivery methods identified. Of the remaining respondents, 27.9% (n=38) encountered instructor/lecture workshops; 15.4% (n=21) encountered field demonstrations; and three individuals (2.2%) encountered and received publication materials (Table 4.9). Among the growers (n=47), 46.8% (n=22) encountered all of the given educational delivery methods identified. Of the remaining growers, 29.8% (n=14) encountered instructor/lecture workshops and 23.4% (n=11) encountered field demonstrations (Table 4.10). Among the PCAs (n=30), 63.3% (n=19) encountered all of the given educational delivery methods identified. Of the remaining PCAs, 20% (n=6) encountered instructor/lecture workshops and 16.7% (n=5) encountered field demonstrations (Table 4.11). Among industry personnel (n=59), 55.9% (n=33) encountered all of the given educational delivery methods identified. Of the remaining industry personnel, 30.5% (n=18) encountered instructor/lecture workshops; 8.5% (n=5) encountered field demonstrations; and three individuals (5.1%) encountered and received publication materials (Table 4.12).
**Preferred Delivery Method – I Learn Best**

Considering all participants in the study (n=136), 31% (n=43) learn best by field demonstrations. Thirty six respondents (26.5%) learn best by instructor/lecture workshops. Thirty one respondents (22.8%) learn best by a one-on-one approach. Of the remaining individuals, 9.6% (n=13) learn best by publication materials; 5.1% (n=7) learn best by websites; and 4.4% (n=6) learn best by panel discussion (Table 4.9).

Among growers (n=47), 48.9% (n=23) learn best by field demonstrations. Nine grower respondents (19.1%) learn best by instructor/lecture workshops. Eight grower respondents (17.0%) learn best by a one-on-one approach. Of the remaining growers, 8.5% (n=4) learn best by panel discussion; and 6.4% (n=3) learn best by publication materials (Table 4.10).

Among PCAs (n=30), 43.3% (n=13) learn best by instructor/lecture workshops. Eight PCA respondents (26.7%) learn best by field demonstrations. Six PCA respondents (20.0%) learn best by a one-on-one approach. Of the remaining PCAs, 10% (n=3) learn best by publication materials (Table 4.11).

Among industry personnel (n=59), 28.8% (n=17) learn best by a one-on-one approach. Fourteen industry personnel respondents (23.7%) learn best by instructor/lecture workshops. Twelve industry personnel respondents (20.3%) learn best by a one-on-one approach. Of the remaining individuals, 11.9% (n=7) learn best by publication materials; 11.9% (n=7) learn best by websites; and 3.4% (n=2) learn best by panel discussion (Table 4.12).

**Preferred Delivery Method – Least Effective**

Considering all participants in the study (n=136), 38.2% (n=52) reported that panel discussions were the least effective educational delivery method. Thirty-seven respondents (27.2%) reported websites as least effective delivery method. Twenty-eight respondents (20.6%)
reported publications as least effective method. Of the remaining individuals, 6.6% (n=9) reported field demonstrations as the least effective method; 4.4% (n=6) reported a one-on-one approach as the least effective method; and 2.9% (n=4) reported instructor/lecture workshops as the least effective method (Table 4.9).

Among growers (n=47), 38.3% (n=18) reported that panel discussion were the least effective educational delivery method. Thirteen growers (27.7%) reported websites as least effective delivery method. Eight growers (17.0%) reported publications as least effective method. Of the remaining growers, 12.8% (n=6) reported field demonstrations as the least effective method; 4.3% (n=2) reported instructor/lecture workshops as the least effective method (Table 4.10).

Among PCAs (n=30), 46.7% (n=14) reported that panel discussions were the least effective educational delivery method. Seven PCAs (23.3%) reported publications as least effective method. Six PCAs (20%) reported websites as least effective delivery method. Of the remaining PCAs, 6.7% (n=2) reported a one-on-one approach as the least effective method; and 3.3% (n=1) reported field demonstrations as the least effective method (Table 4.11).

Among industry personnel (n=59), 33.9% (n=20) reported that panel discussions were the least effective educational delivery method. Eighteen industry personnel (30.5%) reported websites as least effective method. Thirteen industry personnel (22%) reported publications as least effective delivery method. Of the remaining industry personnel, 6.8% (n=4) reported a one-on-one approach as the least effective method; 3.4% (n=2) reported field demonstrations as the least effective method; and 3.4% reported instructor/lecture workshops as the least effective method (Table 4.12).
Preferred Delivery Method – Most Understandable and Interesting Method

Considering all participants in the study (n=136), 59.6% (n=81) reported field demonstrations as the method that best covers information in an understandable and interesting way. Twenty-three respondents (16.9%) reported instructor/lecture workshops. Twenty-two respondents (16.2%) reported a one-on-one approach. Of the remaining individuals, 5.1% (n=7) reported panel discussions; 1.5% (n=2) reported websites; and 0.7% (n=1) reported publication materials (Table 4.9).

Among growers (n=47), 57.4% (n=27) reported field demonstrations as the method that best covers information in an understandable and interesting way. Ten growers (21.3%) reported a one-on-one approach. Six growers (12.8%) reported panel discussions. Of the remaining growers, 4.3% (n=2) reported instructor/lecture workshops an 4.3% (n=2) reported websites (Table 4.10).

Among PCAs (n=30), 50% (n=15) reported field demonstrations as the method that best covers information in an understandable and interesting way. Nine PCAs (30%) reported instructor/lecture workshops. Four PCAs (13.3%) reported one-on-one. Of the remaining PCAs, 3.3% (n=1) reported panel discussions and 3.3% (n=1) reported publications (Table 4.11).

Among industry personnel (n=59), 66.1% (n=39) reported field demonstrations as the method that best covers information in an understandable and interesting way. Twelve industry personnel (20.3%) reported instructor/lecture workshops. Eight industry personnel (13.6%) reported a one-on-one approach was the method that best covers information in an understandable and interesting way (Table 4.12).
Preferred Delivery Method – Adopt Practice and Apply to Profession

Considering all participants in the study (n=136), 47.8% (n=65) reported field demonstrations as the method that would allow respondents to adopt practice and apply to profession. Thirty-one respondents (22.8%) reported a one-on-one approach. Twenty-seven respondents (19.9%) reported instructor/lecture workshops. Nine respondents (6.6%) reported panel discussions. Of the remaining individuals, 2.2% (n=3) reported publications and 0.7% (n=1) reported websites (Table 4.9).

Among growers (n=47), 53.2% (n=25) reported field demonstrations as the method that would allow respondent to adopt practice and apply to profession. Twelve growers (25.5%) reported a one-on-one approach. Five growers (10.6%) reported panel discussions. Four growers (8.5%) reported instructor/lecture workshops. Of the remaining growers, 2.1% (n=1) reported websites as the method that would allow respondent to adopt practice and apply to profession (Table 4.10).

Among PCAs (n=30), 43% (n=13) reported field demonstrations and instructor/lecture workshops (43%, n=13) as the methods that would allow respondent to adopt practice and apply to profession. Three PCAs (10%) reported a one-on-one approach. One remaining PCA, 3.3% reported publications (Table 4.11).

Among industry personnel (n=59), 45.8% (n=27) reported field demonstrations as the method that would allow respondent to adopt practice and apply to profession. Sixteen industry personnel (27.1%) reported a one-on-one approach. Ten industry personnel (16.9%) reported an instructor/lecture workshop. Of the remaining industry personnel, 6.8% (n=4) reported panel discussion and 3.4% (n=2) reported publications as the method that would allow respondent to adopt practice and apply to profession (Table 4.12).
Preferred Delivery Method – Remember Information Learned

Considering all participants in the study (n=136), 44.1% (n=60) reported field demonstrations as the method that would allow the respondent to remember information learned. Thirty-four respondents (25%) reported a one-on-one approach. Thirty respondents (22.1%) reported instructor/lecture workshops. Nine respondents (6.6%) reported panel discussions and 2.2% (n=3) reported publications (Table 4.9).

Among growers (n=47), 42.6% (n=20) reported field demonstrations as the method that would allow them to remember information learned. Fourteen growers (29.8%) reported a one-on-one approach. Seven growers (14.9%) reported panel discussions. Six growers (12.8%) reported instructor/lecture workshops as the method that would allow them to remember information learned (Table 4.10).

Among PCAs (n=30), 40% (n=12) reported field demonstrations as the method that would allow them to remember information learned. Eleven PCAs (36.7%) reported an instructor/lecture workshop. Four PCAs (13.3%) reported a one-on-one approach and three PCAs (10%) reported publications as the method that would allow them to remember information learned (Table 4.11).

Among industry personnel (n=59), 47.5% (n=28) reported field demonstrations as the method that would allow them to remember the information learned. Sixteen industry personnel (27.1%) reported a one-on-one approach. Thirteen industry personnel (22.0%) reported instructor/lecture workshops and two others (3.4%) reported panel discussions as the method that would allow them to remember the information learned (Table 4.12).
Table 4.9

*Preferred Delivery Methods- Overall Respondents*

<table>
<thead>
<tr>
<th>Method</th>
<th>Encountered</th>
<th>Best</th>
<th>Least Effective</th>
<th>Interesting</th>
<th>Adopt</th>
<th>Remember</th>
</tr>
</thead>
<tbody>
<tr>
<td>Field Demo</td>
<td>21</td>
<td>43</td>
<td>9</td>
<td>81</td>
<td>65</td>
<td>60</td>
</tr>
<tr>
<td>Panel Discussion</td>
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<td>0</td>
<td>52</td>
<td>7</td>
<td>9</td>
<td>9</td>
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<tr>
<td>Instructor/Lecture</td>
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<td>36</td>
<td>4</td>
<td>23</td>
<td>27</td>
<td>30</td>
</tr>
<tr>
<td>Publications</td>
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<td>13</td>
<td>28</td>
<td>1</td>
<td>3</td>
<td>3</td>
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<tr>
<td>One-on-one</td>
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<td>0</td>
<td>6</td>
<td>22</td>
<td>31</td>
<td>34</td>
</tr>
<tr>
<td>Websites</td>
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<td>37</td>
<td>2</td>
<td>1</td>
<td>0</td>
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<td><strong>136</strong></td>
<td><strong>136</strong></td>
<td><strong>136</strong></td>
<td><strong>136</strong></td>
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</table>
Table 4.10

*Preferred Delivery Methods- Grower Respondents*

<table>
<thead>
<tr>
<th>Method</th>
<th>Encountered f</th>
<th>%</th>
<th>Best f</th>
<th>%</th>
<th>Least Effective f</th>
<th>%</th>
<th>Interesting f</th>
<th>%</th>
<th>Adopt f</th>
<th>%</th>
<th>Remember f</th>
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<td>27</td>
<td>57.4</td>
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<td>53.2</td>
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<td>42.6</td>
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<tr>
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<td>0</td>
<td>4</td>
<td>8.5</td>
<td>18</td>
<td>38.3</td>
<td>6</td>
<td>12.8</td>
<td>5</td>
<td>10.6</td>
<td>7</td>
<td>14.9</td>
</tr>
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<td>Instructor/Lecture</td>
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<td>2</td>
<td>4.3</td>
<td>2</td>
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<td>6</td>
<td>12.8</td>
</tr>
<tr>
<td>Publications</td>
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<td>3</td>
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<td>8</td>
<td>17.0</td>
<td>0</td>
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<td>One-on-one</td>
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<td>8</td>
<td>17.0</td>
<td>0</td>
<td>0</td>
<td>10</td>
<td>21.3</td>
<td>12</td>
<td>25.5</td>
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<td>29.8</td>
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<tr>
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<td>0</td>
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<td>27.7</td>
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<td>4.3</td>
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<td>100.0</td>
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<td>100.0</td>
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<td>100.0</td>
</tr>
</tbody>
</table>
Table 4.11

*Preferred Delivery Methods- PCA Respondents*

<table>
<thead>
<tr>
<th>Method</th>
<th>Encountered</th>
<th>Best</th>
<th>Least Effective</th>
<th>Interesting</th>
<th>Adopt</th>
<th>Remember</th>
</tr>
</thead>
<tbody>
<tr>
<td>Field Demo</td>
<td>5 (16.7%)</td>
<td>8 (26.7%)</td>
<td>1 (3.3%)</td>
<td>15 (50.0%)</td>
<td>13 (43.3%)</td>
<td>12 (40.0%)</td>
</tr>
<tr>
<td>Panel Discussion</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>14 (46.7%)</td>
<td>1 (3.3%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>Instructor/Lecture</td>
<td>6 (20.0%)</td>
<td>13 (43.3%)</td>
<td>0 (0%)</td>
<td>9 (30.0%)</td>
<td>13 (43.3%)</td>
<td>11 (36.7%)</td>
</tr>
<tr>
<td>Publications</td>
<td>0 (0%)</td>
<td>3 (10.0%)</td>
<td>7 (23.3%)</td>
<td>1 (3.3%)</td>
<td>1 (3.3%)</td>
<td>3 (10.0%)</td>
</tr>
<tr>
<td>One-on-one</td>
<td>0 (0%)</td>
<td>6 (20.0%)</td>
<td>2 (6.7%)</td>
<td>4 (13.3%)</td>
<td>3 (10.0%)</td>
<td>4 (13.3%)</td>
</tr>
<tr>
<td>Websites</td>
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<td>0 (0%)</td>
<td>6 (20.0%)</td>
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<td>All of the Above</td>
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<td>Total</td>
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<td>30 (100.0%)</td>
<td>30 (100.0%)</td>
<td>30 (100.0%)</td>
<td>30 (100.0%)</td>
<td>30 (100.0%)</td>
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<tr>
<td>Method</td>
<td>Encountered</td>
<td>Best</td>
<td>Least Effective</td>
<td>Interesting</td>
<td>Adopt</td>
<td>Remember</td>
</tr>
<tr>
<td>---------------------</td>
<td>-------------</td>
<td>-------</td>
<td>-----------------</td>
<td>-------------</td>
<td>--------</td>
<td>----------</td>
</tr>
<tr>
<td></td>
<td>f</td>
<td>%</td>
<td>f</td>
<td>%</td>
<td>f</td>
<td>%</td>
</tr>
<tr>
<td>Field Demo</td>
<td>5</td>
<td>8.5</td>
<td>12</td>
<td>20.3</td>
<td>2</td>
<td>3.4</td>
</tr>
<tr>
<td>Panel Discussion</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>3.4</td>
<td>20</td>
<td>33.9</td>
</tr>
<tr>
<td>Instructor/Lecture</td>
<td>18</td>
<td>30.5</td>
<td>14</td>
<td>23.7</td>
<td>2</td>
<td>3.4</td>
</tr>
<tr>
<td>Publications</td>
<td>3</td>
<td>5.1</td>
<td>7</td>
<td>11.9</td>
<td>13</td>
<td>22.0</td>
</tr>
<tr>
<td>One-on-one</td>
<td>0</td>
<td>0</td>
<td>17</td>
<td>28.8</td>
<td>4</td>
<td>6.8</td>
</tr>
<tr>
<td>Websites</td>
<td>0</td>
<td>0</td>
<td>7</td>
<td>11.9</td>
<td>18</td>
<td>30.5</td>
</tr>
<tr>
<td>All of the Above</td>
<td>33</td>
<td>55.9</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>59</td>
<td>100.0</td>
<td>59</td>
<td>100.0</td>
<td>59</td>
<td>100.0</td>
</tr>
</tbody>
</table>
Research Objective #5

Describe the Relationship between Preferred Delivery Methods and Demographic Variables

This section reports findings pertaining to the relationship between preferred educational delivery methods and the selected demographic variables. Preferred educational delivery methods include the following variables: delivery methods encountered previously; method in which respondents learn best; least effective delivery method; interesting delivery method of agricultural information; preferred method for information adoption; and preferred method for remembering information learned. Eta correlations were calculated to describe the relationship between adult continuing agricultural education learners preferred educational delivery methods and selected demographic variables: age and years in agricultural industry. Cramer’s V correlations were calculated to describe the relationship between adult continuing agricultural education learners preferred educational delivery methods and selected demographic variables: profession, education, and gender. Tables 4.13 thru 4.17 describe the relationships between respondents’ preferred educational delivery methods and selected demographic variables of age, profession, years in agricultural industry, education, and gender.

Eta Correlations: Preferred Educational Delivery Method and Age

Among all the participants surveyed in the study (n=136) low to moderate correlations (Davis, 1971) (Eta = .16, .05, .29, .24, .23, and .14) were found between delivery methods encountered previously; method in which respondents learn best; least effective delivery method; interesting delivery method of agricultural information; preferred method for information adoption; preferred method for remembering information learned and age of the respondents. According to Cohen’s criteria, the value of Eta squared among the variables (Table 4.13)
indicates a small effect (Pagano, 2010). Table 4.13 identifies the relationship between preferred educational delivery methods and age among professions.

Table 4.13:

*Relationship between Preferred Educational Delivery Method and Demographic Variables; Eta Correlation (Age)*

<table>
<thead>
<tr>
<th>Age * Preferred Delivery Method</th>
<th>Overall</th>
<th>Growers</th>
<th>PCAs</th>
<th>Industry Personnel</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Eta</td>
<td>Eta Squared</td>
<td>Eta</td>
<td>Eta Squared</td>
</tr>
<tr>
<td>Encountered Methods</td>
<td>.158</td>
<td>.025</td>
<td>.144</td>
<td>.021</td>
</tr>
<tr>
<td>Method to Learn Best</td>
<td>.052</td>
<td>.003</td>
<td>.217</td>
<td>.047</td>
</tr>
<tr>
<td>Least Effective Method</td>
<td>.294</td>
<td>.087</td>
<td>.392</td>
<td>.153</td>
</tr>
<tr>
<td>Interesting Method</td>
<td>.240</td>
<td>.058</td>
<td>.352</td>
<td>.124</td>
</tr>
<tr>
<td>Method of Adoption</td>
<td>.225</td>
<td>.050</td>
<td>.369</td>
<td>.136</td>
</tr>
<tr>
<td>Method to Remember</td>
<td>.140</td>
<td>.020</td>
<td>.181</td>
<td>.033</td>
</tr>
</tbody>
</table>

Note:
Overall: Mean =45.65; N=136; SD=12.87
Growers: Mean=45.46; N=47; SD=12.71
PCAs: Mean=42.50; N=30; SD=14.09
Industry Personnel: Mean=47.40; N=59; SD=12.24
Eta Correlations: Preferred Educational Delivery Method and Number of Years in Ag Industry

Among all the participants surveyed in the study (n=136) low correlations (Davis, 1971) (Eta = .21, .14, .22, .25, .19, and .12) were found between delivery methods encountered previously; method in which respondents learn best; least effective delivery method; interesting delivery method of agricultural information; preferred method for information adoption; preferred method for remembering information learned and number of years in the agricultural industry. According to Cohen’s criteria, the value of Eta squared among the variables (Table 4.14) indicates a small effect (Pagano, 2010). Table 4.14 describes the relationships between preferred educational delivery methods and years in the agricultural industry among professions.
Table 4.14

*Relationship between Preferred Educational Delivery Method and Demographic Variables; Eta Correlation (Years in Agricultural Industry)*

<table>
<thead>
<tr>
<th>Years in Ag Industry * Preferred Delivery Method</th>
<th>Overall</th>
<th>Growers</th>
<th>PCAs</th>
<th>Industry Personnel</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Eta</td>
<td>Eta Squared</td>
<td>Eta</td>
<td>Eta Squared</td>
</tr>
<tr>
<td>Encountered Methods</td>
<td>.206</td>
<td>.042</td>
<td>.231</td>
<td>.053</td>
</tr>
<tr>
<td>Method to Learn Best</td>
<td>.139</td>
<td>.019</td>
<td>.232</td>
<td>.054</td>
</tr>
<tr>
<td>Least Effective Method</td>
<td>.221</td>
<td>.049</td>
<td>.265</td>
<td>.070</td>
</tr>
<tr>
<td>Method of Adoption</td>
<td>.190</td>
<td>.036</td>
<td>.219</td>
<td>.048</td>
</tr>
<tr>
<td>Method to Remember</td>
<td>.116</td>
<td>.013</td>
<td>.263</td>
<td>.069</td>
</tr>
</tbody>
</table>

Note:
Overall: Mean =24.24; N=136; SD=14.19
Growers: Mean=24.91; N=47; SD=13.65
PCAs: Mean=21.00; N=30; SD=15.34
Industry Personnel: Mean=25.35; N=59; SD=14.02
Cramer’s V Correlations: Preferred Delivery Method and Profession

Among all participants surveyed in the study (n=136), low correlations (Davis, 1971) were found between delivery methods encountered previously; least effective delivery method; preferred method for information adoption and profession (Cramer’s V = .19, .20, .28 respectively). Among all participants surveyed in the study (n=136), moderate correlations (Davis, 1971) were found between method in which respondents learn best; interesting delivery method of agricultural information; preferred method for remembering information learned and profession (Cramer’s V = .31, .31, .31 respectively). Table 4.15 describes the relationship between preferred educational delivery method and profession of overall respondents using Cramer’s V.

Table 4.15

<table>
<thead>
<tr>
<th>Profession * Preferred Delivery Method</th>
<th>Overall Cramer’s V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Encountered Method</td>
<td>.188</td>
</tr>
<tr>
<td>Method to Best Learn</td>
<td>.311</td>
</tr>
<tr>
<td>Least Effective Method</td>
<td>.197</td>
</tr>
<tr>
<td>Interesting Method</td>
<td>.308</td>
</tr>
<tr>
<td>Method of Adoption</td>
<td>.281</td>
</tr>
<tr>
<td>Method to Remember</td>
<td>.307</td>
</tr>
</tbody>
</table>

N=136
Cramer’s V Correlations: Preferred Delivery Method and Education

Among all participants surveyed in the study (n=136), low correlations (Davis, 1971) were found between delivery methods encountered previously; method in which respondents learn best; least effective delivery method; interesting delivery method of agricultural information; preferred method for remembering information learned and education (Cramer’s V = .24, .23, .21, .17 respectively). Among all participants surveyed in the study (n=136), moderate correlations (Davis, 1971) were found between preferred method for information adoption and education (Cramer’s V = .34). Table 4.16 describes the relationship between preferred educational delivery method and education among respondents’ professions using Cramer’s V.

Table 4.16

Relationship between Preferred Educational Delivery Method and Demographic Variable

(Education) using Cramer’s V.

<table>
<thead>
<tr>
<th>Education * Preferred Delivery Method</th>
<th>Overall Cramer’s V</th>
<th>Growers Cramer’s V</th>
<th>PCAs Cramer’s V</th>
<th>Industry Personnel Cramer’s V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Encountered Method</td>
<td>.243</td>
<td>.313</td>
<td>.401</td>
<td>.326</td>
</tr>
<tr>
<td>Method to Best Learn</td>
<td>.231</td>
<td>.357</td>
<td>.399</td>
<td>.366</td>
</tr>
<tr>
<td>Least Effective Method</td>
<td>.227</td>
<td>.331</td>
<td>.505</td>
<td>.266</td>
</tr>
<tr>
<td>Method of Adoption</td>
<td>.335</td>
<td>.557</td>
<td>.276</td>
<td>.464</td>
</tr>
<tr>
<td>Method to Remember</td>
<td>.168</td>
<td>.375</td>
<td>.242</td>
<td>.377</td>
</tr>
</tbody>
</table>

N=136 N=47 N=30 N=59
Cramer’s V Correlations: Preferred Delivery Method and Gender

Among all participants surveyed in the study (n=136), low correlations (Davis, 1971) were found between delivery methods encountered previously; method in which respondents learn best; least effective delivery method; interesting delivery method of agricultural information; preferred method for information adoption; preferred method for remembering information learned and gender (Cramer’s V = .11, .18, .13, .20, .28, .10 respectively). Table 4.16 describes the relationship between preferred educational delivery method and education among professions using Cramer’s V.

Table 4.17

Relationship between Preferred Educational Delivery Method and Demographic Variable (Gender) using Cramer’s V.

<table>
<thead>
<tr>
<th>Gender* Preferred Delivery Method</th>
<th>Overall Cramer’s V</th>
<th>Growers Cramer’s V</th>
<th>PCAs Cramer’s V</th>
<th>Industry Personnel Cramer’s V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Encountered Method</td>
<td>.105</td>
<td>.130</td>
<td>.371</td>
<td>.196</td>
</tr>
<tr>
<td>Method to Best Learn</td>
<td>.179</td>
<td>.418</td>
<td>.212</td>
<td>.289</td>
</tr>
<tr>
<td>Least Effective Method</td>
<td>.134</td>
<td>.234</td>
<td>.371</td>
<td>.226</td>
</tr>
<tr>
<td>Interesting Method</td>
<td>.198</td>
<td>.387</td>
<td>.284</td>
<td>.150</td>
</tr>
<tr>
<td>Method of Adoption</td>
<td>.278</td>
<td>.331</td>
<td>.212</td>
<td>.424</td>
</tr>
<tr>
<td>Method to Remember</td>
<td>.102</td>
<td>.021</td>
<td>.244</td>
<td>.167</td>
</tr>
<tr>
<td>N=136</td>
<td>N=47</td>
<td>N=30</td>
<td>N=59</td>
<td></td>
</tr>
</tbody>
</table>
Research Objective #6

Describe the Relationship between Learning Styles and Preferred Educational Delivery Method

This section reports findings pertaining to the relationship between learning styles and preferred educational delivery methods. Cramer’s V correlations were calculated to describe the relationship between adult continuing agricultural education learners learning styles and preferred educational delivery methods. Five questions were asked to the participants to understand their preferred educational delivery method. The questions are as follows: methods participants had encountered in the past, method in which the participant learns best, least effective method, method in which information or practice is most likely adopted, and the method which best allows participant to remember information.

Cramer’s V Correlations: VARK Learning Style and Preferred Delivery Method

Among all participants surveyed in the study (n=136), low correlations (Davis, 1971) were found between VARK learning styles and preferred delivery methods: delivery methods encountered previously; method in which respondents learn best; least effective delivery method; interesting delivery method of agricultural information; preferred method for information adoption; preferred method for remembering information learned and education (Cramer’s V = .25, .24, .26, .20, .18, .22 respectively). Table 4.18 describes the relationship between VARK learning style and preferred educational delivery method among professions using Cramer’s V.
Table 4.18

*Relationship between Learning Styles and Preferred Educational Delivery Method calculated by Cramer’s V*

<table>
<thead>
<tr>
<th>VARK Learning Style*</th>
<th>Preferred Delivery Method</th>
<th>Overall Cramer’s V</th>
<th>Growers Cramer’s V</th>
<th>PCAs Cramer’s V</th>
<th>Industry Personnel Cramer’s V</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Encountered Method</td>
<td>.247</td>
<td>.391</td>
<td>.226</td>
<td>.445</td>
</tr>
<tr>
<td></td>
<td>Method to Best Learn</td>
<td>.239</td>
<td>.325</td>
<td>.312</td>
<td>.295</td>
</tr>
<tr>
<td></td>
<td>Least Effective Method</td>
<td>.256</td>
<td>.305</td>
<td>.248</td>
<td>.421</td>
</tr>
<tr>
<td></td>
<td>Interesting Method</td>
<td>.196</td>
<td>.325</td>
<td>.463</td>
<td>.402</td>
</tr>
<tr>
<td></td>
<td>Method of Adoption</td>
<td>.184</td>
<td>.320</td>
<td>.185</td>
<td>.307</td>
</tr>
<tr>
<td></td>
<td>Method to Remember</td>
<td>.224</td>
<td>.299</td>
<td>.296</td>
<td>.302</td>
</tr>
<tr>
<td></td>
<td>N=136</td>
<td>N=47</td>
<td>N=30</td>
<td>N=59</td>
<td></td>
</tr>
</tbody>
</table>

N=136 | N=47 | N=30 | N=59
Chapter 5
Conclusions/Implications/Recommendations

The purpose of Chapter 5 was to report the conclusions, implications, and recommendations of the current study. The purpose of the study, research objectives of the study, research design, population and subject selection, instrumentation, data collection procedures, and data analysis procedures were reviewed prior to a summary of the findings, followed by a report of the conclusions, implications, and recommendations. The summary of findings was organized according to the order of the research objectives of the current study. Conclusions were drawn based upon the findings and reported with the implications. Finally, recommendations for future study were offered.

Purpose of the Study

The purpose of this study is to identify the learning styles and preferred methods of receiving agricultural information on new or innovative farming practices among Yuma growers, pest control advisors, and industry personnel. Furthermore, the study sought to describe the relationship between demographic characteristics, learning styles, preferred delivery methods. To guide this study, the following research objectives were developed.

Research Objectives

1. Describe the demographic characteristics of adult continuing education learners in Yuma County with respect to age, profession, number of years in profession, education, and gender.

2. Describe the learning styles of adult continuing agricultural educational learners in Yuma County.
3. Describe the relationship between demographic characteristics among adult continuing agricultural educational learners in Yuma County and their learning styles.
   
   3a. Describe the relationship between demographics and learning styles of Yuma County growers.
   
   3b. Describe the relationship between demographics and learning styles of Yuma County pest control advisors.
   
   3c. Describe the relationship between demographics and learning styles of Yuma County agricultural industry personnel.

4. Describe the preferred educational delivery methods of receiving agricultural information on new or innovative farming practices among adult continuing agricultural education learners in Yuma County.
   
   4a. Describe the preferred educational delivery method of receiving agricultural information on new or innovative farming practices among Yuma County growers.
   
   4b. Describe the preferred educational delivery method of receiving agricultural information on new or innovative farming practices among Yuma County pest control advisors.
   
   4c. Describe the preferred educational delivery method of receiving agricultural information on new or innovative farming practices among Yuma County agricultural industry personnel.

5. Describe the relationship between demographic characteristics and preferred educational delivery method among adult continuing agricultural education learners in Yuma County.

6. Describe the relationship between adult continuing agricultural education learners in Yuma County learning styles and preferred delivery methods.
**Research Design**

The design used for this study is non-experimental descriptive correlational research, which allows the researcher to “identify variables and look for relationships among them, but does not manipulate the variables” (Ary, Jacobs, & Sorensen, 2010, p.26). Three types of data were collected for the study. First, data were collected to describe the learning styles of adult continuing agricultural education learners using the VARK inventory model developed by Neil Flemming (1987). The second type of data were collected to establish the preferred delivery methods of agricultural education information. Third, descriptive demographic data were collected pertaining to adult continuing agricultural education learners with respect to age, profession, years in the agricultural industry, education, and gender.

Relationships were examined between learning styles and selected demographic characteristics (age, profession, number of years in the agricultural industry, education, and gender) of adult continuing agricultural education learners. Additionally, relationships were examined between preferred delivery method and selected demographic variables (age, profession, number of years in the agricultural industry, education, and gender) of adult continuing agricultural education learners. Moreover, relationships were examined between learning styles and preferred delivery methods of adult continuing agricultural education learners.

**Population and Subject Selection**

**Research Sample**

The target sample consists of adult agricultural education learners in Yuma County. Non-probabilistic sampling was used, specifically convenience sampling. Three sub-groups of adult continuing agricultural education learners were formed. These groups include: Yuma County
growers, pest control advisors, and industry personnel. The target research sample consisted of 30 growers, 30 pest control advisors, and 30 industry personnel (N=90). However, 47 growers, 30 pest control advisors, and 59 industry personnel responded to the questionnaire. Therefore, the number of individuals participating in the study consisted of N=136. Yuma, Arizona area PCAs and industry personnel were selected for the study based upon attendance at two different fall 2012 agricultural workshops that were held in Yuma County. Yuma growers were selected from the Yuma County Cooperative Extension business directory.

**Sampling Error**

Non-probabilistic convenience sampling was utilized for the study. The convenience sample was comprised of adult agricultural education learners in Yuma County. This sample may not have been representative of the population of adult agricultural education learners because not all adult agricultural education learners contained in the Cooperative Extension Yuma Agricultural business directory were included in the study among those who received mailed questionnaires.

**Selection Error**

Selection error was avoided by obtaining an up-to-date Cooperative Extension Yuma Agricultural business directory for the current year. This was a reliable frame, as it is updated annually by the Yuma County Cooperative Extension Office.

**Frame Error**

Frame error was avoided by obtaining the current, up-to-date Cooperative Extension Yuma Agricultural business directory for the current year. This was a reliable frame, as it is updated annually by the Yuma County Cooperative Extension Office.
**Instrumentation**

**Description of Instrument**

The data collection instrument that was utilized for this descriptive-relational study was a three part booklet questionnaire containing 29 open and closed-ended questions (Appendix G). The booklet questionnaire was created by the researcher, but contained VARK© copyrighted questions. The questionnaire was comprised of three sections. The first section contained VARK© questions focusing only on modality preference. In May of 2012, Fleming granted formal permission to use the VARK items for the study. The second and third sections contained questions created by the researcher. These questions identified delivery method preferences of adult agricultural education learners and their demographics with respect to age, gender, education, number of years in the agricultural industry, and profession. The three sections of the instrument obtained information on the demographic background, learning style modality preferences, and preferred methods of receiving agricultural information on new or innovative farming practices amongst adult continuing agricultural education learners.

**Validity Procedures**

Validity was determined through utilizing a panel of experts of three individuals who have a knowledge base in the subjects of agricultural education and learning styles of students. The panel was comprised of Dr. Ryan Foor, Dr. Kurt Nolte, and Dr. Ed Franklin. The panel was chosen based upon their expertise and knowledge within the agricultural education field. Dr. Ryan Foor is an Assistant Professor and is the Director for Graduate Studies in the Agricultural Education Department. He started at the University of Arizona in 2010. Dr. Kurt Nolte currently serves as Agriculture Agent as well as Yuma County Extension Director. Since 2011, Nolte has also taken on the role of Yuma Agricultural Center Interim Director and Regional Vegetable
Production Specialist. He has been with the University since 2006. Dr. Ed Franklin currently serves as Assistant Professor in the Department of Agricultural Education at the University of Arizona and serves as the Undergraduate Coordinator for Agricultural Technology Management. Dr. Franklin has been with the University of Arizona since 2000. The panel of experts determined if the instrument has face and content validity. The panel of experts examined the questionnaire for determination of content validity, instrumentation, and insight on the subject. For content validity, the panel examined items for appropriateness and clarity.

**Reliability Procedures**

The questionnaire developed at Lincoln University provides teachers and students with a stimulus for reflection and a change in their methods for taking in information (students) and in their methods of presentation (teachers) (Fleming, 1995). Part I reliability estimates for the scores of the VARK subscales were .85, .82, .84, and .77 for the visual, aural, read/write, and kinesthetic subscales, respectively which are considered adequate (Leite, Svinicki, & Shi, 2010). Gliem (2008) suggested that a Cronbach’s alpha coefficient of .70 or higher was sufficient to establish reliability of the data collection instrument. The literature review noted that if agricultural agents want to do a better job of developing a comprehensive agricultural Extension education program and effectively meet the needs of all clientele, they must consider a variety of clientele characteristics including degree of participation in previous Extension education meetings, age, and level of formal education (Kantner 1982). Reliability of the instrument was established for Part II by conducting a pilot study among 15 adult continuing agricultural education learners not included in the study. Reliability was assessed in SPSS by computing a Cronbach’s alpha coefficient. The Cronbach’s alpha coefficient for the questions within Part II of the questionnaire used in this study was .51. The researcher recognizes that this is a low
reliability estimate, so post-hoc reliability was also conducted. The post-hoc reliability was assessed in SPSS and was .62.

**Data Collection**

Data were collected using a mailed questionnaire (Appendix G) guided by Dillman’s (2000) recommendations. Human Subjects Research and Institutional Review Board approval was granted on September 13, 2012 (project number 12-0664-00). The same questionnaire template was used throughout the study. Data collection started October of 2012, by distributing a booklet questionnaire to the accessible population. Data collection consisted of two phases. The convenience sample was comprised of adult agricultural education learners in Yuma County, specifically pest control advisors and industry personnel who attended the fall 2012 workshops and growers who received mailed questionnaires.

**Phase 1 - Workshop Data Collection**

On October 1st 2012, a flyer (Appendix A) was emailed to adult agricultural education learners in Yuma County making them aware of the questionnaire that would be distributed at the forthcoming workshop. At the workshop, a short presentation was given discussing the purpose and significance of the research. A workshop cover letter (Appendix B) was also attached to the questionnaire packet, discussing the purpose and significance of the research. The questionnaire was then distributed to the convenience samples present at the Yuma County Cooperative Extension agriculture workshops. Respondents were able to access the questionnaire in booklet form. Once completed, the respondents then turned the questionnaire back in to the administrator. Once the researcher received the accepting sample data, the information gathered was analyzed using SPSS 20.0 statistical software.
Phase 2- Mailed Questionnaire Data Collection

Prior to the questionnaire disbursement, a cover letter (Appendix C) was sent directly to the grower via U.S. mail discussing the purpose and significance of the research. A packet containing a cover letter and booklet questionnaire (Appendix G) was then mailed and distributed to the convenience samples selected from the Yuma County Cooperative Extension Growers business directory. Respondents were able to access the questionnaire in booklet form. Once completed, the respondents mailed back the questionnaire in a pre-post marked envelope. An email reminder (Appendix D) was sent out one week after the questionnaire as a follow up reminder and thank you for those who had responded. Those who had not responded at two weeks, a second questionnaire (Appendix G) was mailed along with a reminder letter (Appendix E). A final mailed letter reminder (Appendix F) was distributed expressing the significance and importance for the individual’s participation. Data collection ceased November 1, 2012.

A total of 136 questionnaires were returned yielding a usable response rate of 82%. Among the 136 usable responses, 77 were collected during the workshop. The remaining 59 responses were collected from mailed in questionnaires. 43 individuals responded to the initial mailing, while 16 individuals responded to the second mailing. A timeline of the research activities conducted can be seen in Figure 3.1.

Data Analysis

Data were analyzed using the Statistical Package for the Social Sciences 20.0 for Windows (SPSS). There were 136 questionnaires that were completed with all questions answered. Descriptive statistics were used to describe the population of adult continuing agricultural learners in Yuma County with regard to the purpose and research objectives of the study. Descriptive statistical procedures included frequencies, percentages, means, and standard
deviations. Correlation coefficients were calculated to assess relationships between the selected characteristics. The Eta correlation coefficient was calculated to describe the relationship between a multichotomous nominal variable and an interval or ratio variable. The Cramer’s V statistic was calculated to describe the relationship between multichotomous nominal variables and dichotomous or multichotomous nominal variables. The Eta squared values provided indications of the proportion of variance.

Data collected in Part I of the instrument, were judged to be nominal scale data. For Part II, data collected were judged to be nominal data. For Part III, the demographic characteristics (age and years worked in the agricultural industry) were judge to be interval scale data. The demographic characteristics (profession, education, and gender) were judge to be nominal scale data.

The scale of measurement of the variables influenced the calculations used to describe the relationships between the selected variables (Table 3.4 and Table 3.5). Eta correlations were used to describe the relationship between learning styles and the demographic variables age and years worked the agricultural industry. Eta correlations were also used to describe the relationship between preferred delivery methods and the demographic variables age and years worked in the agricultural industry. Cramer’s V statistic was computed to describe the relationships between learning styles and preferred delivery methods. The Cramer’s V statistic was also used to describe the relationship between learning styles and the demographic variables (profession, education, and gender). The Cramer’s V statistic was also used to describe the relationship between preferred delivery methods and the demographic variables (profession, education, and gender). Correlation coefficients were calculated to assess relationships between the selected characteristics. The Eta correlation coefficients were interpreted according to Davis’
(1971) conventions (Table 3.2). Eta squared correlations were interpreted according to Cohen’s Criteria (Pagano, 2010). Eta squared interpretations are found in (Table 3.3). Cramer’s V correlations were interpreted according to (Davis, 1971) conventions (Table 3.2).

**Summary of Findings**

**Demographic Characteristics**

Demographic characteristics surveyed in the current study included: age, profession, number of years in the agricultural industry, education, and gender. The mean age of adult continuing agricultural education learners in Yuma County surveyed in this study was 46 (SD = 12.87) years. The average age of growers survey in this study was 45 years (SD = 12.71) (n=47). The average age of a pest control advisors surveyed in this study was 42 years (SD = 14.09) (n=30). The average age of industry personnel survey in this study was 47 years (SD = 12.24) (n=59). The frequency of growers surveyed in this study was (n=47) accounting for 34% of respondents. The frequency of pest control advisors surveyed in this study was (n=30) accounting for 22.1% of respondents. 43.4% of respondents included industry personnel (n=59).

The average number of years worked in the agricultural industry among adult continuing agricultural education learners in Yuma County was 24 (SD = 14.19) years. The mean number of years worked in the agricultural industry for growers surveyed in this study was 25 years (SD = 13.65) (n=47). The average number of years worked in the agricultural industry for pest control advisors surveyed in this study was 21 years (SD = 15.34) (n=30). The average number of years worked in the agricultural industry for industry personnel surveyed in this study was 25 years (SD = 14.02) (n=59).

Half of the participants surveyed in the study acquired a Bachelor’s degree (50%, n=86). Twenty-seven respondents (19.9%) acquired an Associate’s degree, while (n=25) 18.4% of
respondents noted a high school diploma. Nine respondents (6.6%) reported having their PhD and 3.7% of respondents (n=5) reported a Master’s Degree. Of the remaining respondents, 1.5% (n=2) graduated from a vocational/technical program. The majority of growers (49%, n=23) surveyed in this study had a bachelor’s degree. 23.4% of growers (n=11) had a high school diploma. While (17%, n=8) of growers had an associate’s degree. Four growers, (8.5%) had a master’s degree or above. The majority of PCAs (66.6%, n=20) surveyed in this study had a bachelor’s degree. While (26.7%, n=8) of PCAs had an associate’s degree. One respondent (3.3%) had a high school diploma. Additionally, one PCA respondent (3.3%) had graduated from a vocational/technical program. Industry personnel participants (42.4%, n=25) surveyed in this study had a bachelor’s degree. 22% of industry personnel (n=13) had a high school diploma. Associates degrees were acquired among 18.6% (n=11) of industry personnel participants. A total of ten industry personnel (17%) had a master’s degree or above.

In terms of gender, the majority of respondents were males (83.8%, n=114). Females made up 16.2% of respondents (n=22). Growers surveyed in this study were 85.1% (n=40) male and 14.9% (n=7) female. Pest control advisors surveyed in this study were 96.7% (n=29) male and 3.3% (n=1) female. Industry personnel surveyed in this study were 76.3% (n=45) male and 23.7% (n=14) female.

Learning Styles of surveyed Adult Continuing Agricultural Education Learners

The learning styles of adult continuing agricultural education learners in Yuma County were surveyed and a kinesthetic learning style accounted for 32.4% (n=44) of respondents. Of the remaining respondents 25.7% (n=35) were visual learners; 19.1% (n=26) were read/write learners; 17.6% (n=24) were aural learners; 5.1% (n=7) multimodal learners.
Of the growers, 44.7% (n=21) reported a kinesthetic learning style, while 19.1% (n=9) reported a visual learning style. Of the remaining grower participants, 17% (n=8) reported a read/write learning style; 12.8% reported an aural learning style, and three growers (6.4%) reported a multimodal learning style.

The majority of PCAs 53.3% (n=16) reported a visual learning style. Of the remaining PCA respondents, 36.7% (n=11) reported a kinesthetic learning style; and 6.7% (n=2) reported a read/write learning style. One respondent (3.3%) reported an aural learning style.

Aural learning styles accounted for 28.8% (n=17) of industry personnel respondents. Of the remaining industry personnel respondents, 27.1% (n=16) reported a read/write learning style and 20.3% (n=12) reported a kinesthetic learning style. Four industry personnel respondents (6.8%) reported a multimodal learning style. Table 4.6 summarizes the distribution of learning styles among respondents.

Relationship between Learning Style and Age

Among all the participants surveyed in the study (n=136) a moderate correlation (Davis, 1971) (Eta = .32) was found between age and learning styles of the participants. Ages among all respondents account for 10% of the variance in learning styles of respondents. According to Cohen’s criteria, the value of Eta squared (.10) indicates a medium effect (Pagano, 2010).

Relationship between Learning Style and Number of Years Worked in the Agricultural Industry

Among all the participants surveyed in the study (n=136) a low correlation (Davis, 1971) (Eta = .26) was found between learning style and number of years worked in the agricultural industry. The number of years worked in the agricultural industry among all respondents account for 6.6% of the variance in learning styles. According to Cohen’s criteria, the value of Eta squared (.06) indicates a medium effect (Pagano, 2010).
Relationship between Learning Style and Profession, Education, and Gender

Among all participants surveyed in the study (n=136), a moderate correlation (Davis, 1971) was found between learning style and profession (Cramer’s V = .33). Among all the participants surveyed in the study (n=136), a low correlation (Davis, 1971) was found between learning style and educational background (Cramer’s V = .27). Among all the participants surveyed in the study (n=136), a low correlation (Davis, 1971) was found between learning style and gender (Cramer’s V = .17).

Preferred Delivery Method – Previously Encountered Methods

Considering all participants in the study (n=136), the majority of respondents (54.4%, n=74) encountered all the given educational delivery methods identified. Of the remaining respondents, 27.9% (n=38) encountered instructor/lecture workshops; 15.4% (n=21) encountered field demonstrations; and three individuals (2.2%) encountered and received publication materials.

Preferred Delivery Method – I Learn Best

Considering all participants in the study (n=136), 31% (n=43) learn best by field demonstrations. Thirty six respondents (26.5%) learn best by instructor/lecture workshops. Thirty one respondents (22.8%) learn best by a one-on-one approach. Of the remaining individuals, 9.6% (n=13) learn best by publication materials; 5.1% (n=7) learn best by websites; and 4.4% (n=6) learn best by panel discussion.

Preferred Delivery Method – Least Effective

Considering all participants in the study (n=136), 38.2% (n=52) reported that panel discussions were the least effective educational delivery method. Thirty-seven respondents (27.2%) reported websites as least effective delivery method. Twenty-eight respondents (20.6%)
reported publications as least effective method. Of the remaining individuals, 6.6% (n=9) reported field demonstrations as the least effective method; 4.4% (n=6) reported a one-on-one approach as the least effective method; and 2.9% (n=4) reported instructor/lecture workshops as the least effective method (Table 4.9).

**Preferred Delivery Method – Most Understandable and Interesting Method**

Considering all participants in the study (n=136), 59.6% (n=81) reported field demonstrations as the method that best covers information in an understandable and interesting way. Twenty-three respondents (16.9%) reported instructor/lecture workshops. Twenty-two respondents (16.2%) reported a one-on-one approach. Of the remaining individuals, 5.1% (n=7) reported panel discussions; 1.5% (n=2) reported websites; and 0.7% (n=1) reported publication materials.

**Preferred Delivery Method – Adopt Practice and Apply to Profession**

Considering all participants in the study (n=136), 47.8% (n=65) reported field demonstrations as the method that would allow respondent to adopt practice and apply to profession. Thirty-one respondents (22.8%) reported a one-on-one approach. Twenty-seven respondents (19.9%) reported instructor/lecture workshops. Nine respondents (6.6%) reported panel discussions. Of the remaining individuals, 2.2% (n=3) reported publications and 0.7% (n=1) reported websites (Table 4.9).
panel discussions. Of the remaining individuals, 2.2% (n=3) reported publications and 0.7% (n=1) reported websites.

**Preferred Delivery Method – Remember Information Learned**

Considering all participants in the study (n=136), 44.1% (n=60) reported field demonstrations as the method that would allow the respondent to remember information learned. Thirty-four respondents (25%) reported a one-on-one approach. Thirty respondents (22.1%) reported instructor/lecture workshops. Nine respondents (6.6%) reported panel discussions and 2.2% (n=3) reported publications.

**Relationship between Preferred Educational Delivery Method and Age**

Among all the participants surveyed in the study (n=136) low to moderate correlations (Davis, 1971) were found between preferred delivery methods (delivery methods encountered previously; method in which respondents learn best; least effective delivery method; interesting delivery method of agricultural information; preferred method for information adoption; preferred method for remembering information learned) and age of the respondents. According to Cohen’s criteria, the value of Eta squared among the variables indicated a small to med effect (Pagano, 2010). However, a substantial correlation (Davis, 1971) (Eta = .52) was found between PCAs (n=30) preferred delivery method (method to best learn) and age. The ages among PCAs accounts for 51.5% of the variance in PCAs preferred delivery method: (method to best learn). According to Cohen’s criteria, the value of eta squared (.51) indicates a large effect (Pagano, 2010).
Relationship between Preferred Educational Delivery Method and Number of Years Worked in Agricultural Industry

Among all the participants surveyed in the study (n=136) low to moderate correlations (Davis, 1971) were found between preferred delivery methods (delivery methods encountered previously; method in which respondents learn best; least effective delivery method; interesting delivery method of agricultural information; preferred method for information adoption; preferred method for remembering information learned) and number of years in the agricultural industry. According to Cohen’s criteria, the value of eta squared among the variables indicates a small effect (Pagano, 2010). However, a substantial correlation (Davis, 1971) was found between PCAs (n=30) preferred delivery method (method to best learn) and number of years worked in the agricultural industry. The number of years worked in the agricultural industry among PCAs accounts for 53.8% of the variance in PCAs preferred delivery method: (method to best learn). According to Cohen’s criteria, the value of Eta squared (.29) indicates a large effect (Pagano, 2010).

Relationship between Preferred Delivery Method and Profession

Among all participants surveyed in the study (n=136), low correlations (Davis, 1971) were found between delivery methods encountered previously; least effective delivery method; preferred method for information adoption and profession (Cramer’s V = .19, .20, .28 respectively). Among all participants surveyed in the study (n=136), moderate correlations (Davis, 1971) were found between method in which respondents learn best; interesting delivery method of agricultural information; preferred method for remembering information learned and profession (Cramer’s V = .31, .31, .31 respectively).
Relationship between Preferred Delivery Method and Education

Among all participants surveyed in the study (n=136), low correlations (Davis, 1971) were found between delivery methods encountered previously; method in which respondents learn best; least effective delivery method; interesting delivery method of agricultural information; preferred method for remembering information learned and education (Cramer’s V = .24, .23, .23, .21, .17 respectively). Among all participants surveyed in the study (n=136), moderate correlations (Davis, 1971) were found between preferred method for information adoption and education (Cramer’s V = .34). A substantial correlation (Davis, 1971) was found between PCAs (n=30) preferred delivery method (least effective method) and education (Cramer’s V =.51)

Relationship between Preferred Delivery Method and Gender

Among all participants surveyed in the study (n=136), low to moderate correlations (Davis, 1971) were found between delivery methods encountered previously; method in which respondents learn best; least effective delivery method; interesting delivery method of agricultural information; preferred method for information adoption; preferred method for remembering information learned and gender (Cramer’s V = .11, .18, .13, .20, .28, .10 respectively).

Relationship between VARK Learning Style and Preferred Delivery Method

Among all participants surveyed in the study (n=136), low to moderate correlations (Davis, 1971) were found between VARK learning styles and preferred delivery methods (delivery methods encountered previously; method in which respondents learn best; least effective delivery method; interesting delivery method of agricultural information; preferred
method for information adoption; preferred method for remembering information learned and education (Cramer’s V = .25, .24, .26, .20, .18, .22 respectively).

**Conclusions**

The interpretation of data collected in this study produced the following conclusions and implications:

**Conclusion 1:**

Overall, adult continuing agricultural education learners in the study varied among their professions, ages, educations, number of years worked in the agricultural industry, and genders. However, the majority of respondents were males (83.8%, n=114). Females (n=22) made up 16.2% of respondents.

**Implication/Recommendation:**

Extension agents and instructors of adult continuing agricultural education learners must consider a variety of clientele characteristics, to effectively meet the needs of all clientele.

**Conclusion 2:**

Overall, the majority of participants in the study reported a kinesthetic learning modality. A visual learning modality was the second highest reported among participants. Specifically, the majority of growers reported a kinesthetic learning modality, the majority of PCAs reported a visual learning modality, and industry personnel reported an aural modality preference.

**Implication/Recommendation:**

With diversity in learning styles among adult continuing agricultural education learners, Extension agents and instructors of adults must recognize learning differences among their students to understand how students perceive and process information.

**Conclusion 3:**
A moderate correlation (Davis, 1971) exists between learning styles and the demographic characteristics of age, education, and profession. A low correlation exists between learning styles and the demographic characteristics of gender, and number of years worked in the agricultural industry.

Implication/Recommendation:

Extension agents and instructors of adult continuing agricultural education learners should focus on the demographic characteristics of age, education, and profession when seeking to develop program delivery methods that will effectively meet the needs of these learners. In opposition, Extension agents and instructors of adult continuing agricultural education learners should not focus on the factors of gender or the number of years worked in the agricultural industry when seeking to develop program delivery methods that will effectively meet the needs of these learners.

Conclusion 4:

Overall, all participants in the study learn best when agricultural information is delivered by field demonstration methods. Although, when comparing across professions, growers learn best by field demonstrations, PCAs learn best by instructor/lecture workshops, and industry personnel learn best by a one-one-one approach. Overall, participants in the study across the three professions reported that panel discussions were the least effective delivery method.

Implication/Recommendation:

To better meet educational needs of adult continuing agricultural education learners, Extension’s educational program delivery should reflect adult continuing agricultural education learners preferred delivery method among agricultural professions.
Conclusion 5:

Low correlations (Davis, 1971) exist between the demographic characteristics (age, years worked in the agricultural industry, education, and gender) and preferred delivery methods of adult continuing agricultural education learners. A moderate correlation (Davis, 1971) exists between the demographic characteristic, profession and preferred delivery methods of adult continuing agricultural education learners.

Implication/Recommendation:

Extension agents and instructors of adult continuing agricultural education learners should not focus on the demographic characteristics age, years worked in the agricultural industry, education, and gender when seeking to develop program delivery methods that will effectively meet the needs of these learners. However, Extension agents and instructors of adult continuing agricultural education learners should focus on the demographic characteristic (profession) when seeking to develop program delivery methods that will effectively meet the needs of these adult learners.

Conclusion 6

Overall, low correlations (Davis, 1971) exists between VARK learning styles (visual, aural, read/write, and kinesthetic) and preferred delivery methods of adult continuing agricultural education learners with PCA professions. A moderate correlation (Davis, 1971) exists between VARK learning styles (visual, aural, read/write, and kinesthetic) and preferred delivery methods of adult continuing agricultural education learners with a grower or industry personnel profession.

Implication:
Extension agents and instructors of adult continuing agricultural education learners should focus on the learning styles of their students when seeking to develop program delivery methods. To effectively meet the needs of clientele, specifically growers and industry personnel, Extension educators must understand the learning styles of those within these two professions.
References


Marcy, V. (2001). Adult learning styles: How the VARK learning styles inventory can be used to improve student learning. *Journal of the Association of Physician Assistant Programs, 12*(2).


APPENDIX A

WORKSHOP FLYER NOTIFICATION FOR THOSE PARTICIPATING IN RESEARCH AT WORKSHOP
Workshop Flyer Notification for those participating in research at workshop

Research Study Being Conducted at the

October 2012
Field Day Workshop
Yuma Agricultural Center

Voluntarily participate in the:

Continuing Agricultural Education:
Adult Learning Styles and
Educational Delivery Method Preferences
Research Study

Identifying learning styles and preferred methods of receiving agricultural information on new or innovative farming practices among:

Yuma Growers
Pest Control Advisors and
Industry Personnel

An Institutional Review Board responsible for human subjects’ research at The University of Arizona reviewed this research project and found it to be acceptable, according to applicable state and federal regulations and University policies designed to protect the rights and welfare of participants in research.

Your participation in this research study is voluntary. You may refuse to participate in this study. If you decide to take part in the study, you may leave the study at any time. No matter what decision you make, there will be no penalty to you and you will not lose any of your usual benefits. Your decision will not affect your future relationship with The University of Arizona. If you are a student or employee at the University of Arizona, your decision will not affect your grades or employment status. There are no known risks to subjects as a result of participation in this study. You may choose not to answer some or all of the questions. There are no known benefits to subjects as a result of participation in this study. However, presentation of the findings will be administered at future agricultural workshops in Yuma County and may provide insight on learning modality and educational delivery method preferences among adult continuing agricultural education learners. There is no cost to you except your time. This project will span approximately five weeks, however the questionnaire will take about ten minutes for you to complete. For questions about your rights as someone taking part in this study, and you may contact the Human Subject Protection Program at 1-520-626-6721. You may call this number to discuss concerns or complaints about the study with someone who is not part of the research team. Should you have any other questions, please call Kaylee Renick e at 928-726-3904 or email: krenick@cals.arizona.edu. Thank you for your time and cooperation.
APPENDIX B

COVER LETTER FOR THOSE PARTICIPATING IN RESEARCH AT WORKSHOP
**Cover Letter for those participating in research at workshop**

You are being invited to voluntarily participate in the Continuing Agricultural Education: Adult Learning Styles and Educational Delivery Method Preferences research study. This study involves research. The purpose of this research study is to identify the learning styles and preferred methods of receiving agricultural information on new or innovative farming practices among Yuma growers, pest control advisors, and industry personnel.

You were identified as an individual who has a profession in one of the above areas and have been selected to be part of a research study. In order to obtain a valid measure of the learning styles and educational delivery method preferences, please complete the questionnaire and return in the sealed box in the back of the auditorium when the workshop has concluded.

Your participation in this research study is voluntary. You may refuse to participate in this study. If you decide to take part in the study, you may leave the study at any time. No matter what decision you make, there will be no penalty to you and you will not lose any of your usual benefits. Your decision will not affect your future relationship with The University of Arizona. If you are a student or employee at the University of Arizona, your decision will not affect your grades or employment status. There are no known risks to subjects as a result of participation in this study. You may choose not to answer some or all of the questions. There are no known benefits to subjects as a result of participation in this study. However, presentation of the findings will be administered at future agricultural workshops in Yuma County and may provide insight on learning modality and educational delivery method preferences among adult continuing agricultural education learners. There is no cost to you except your time. This project will span approximately five weeks, however the questionnaire will take about ten minutes for you to complete.

To minimize any risk to you, you may be assured of complete confidentiality. Your name will never be placed on the questionnaire. All questionnaires will be held in a secure location and will be shredded once the data entry process is complete. Under no circumstances will individual data be shared or reported.

For questions about your rights as someone taking part in this study, you may contact the Human Subject Protection Program at 1-520-626-6721. You may call this number to discuss concerns or complaints about the study with someone who is not part of the research team. Should you have any other questions, please call me at 928-726-3904 or email: krenick@cals.arizona.edu. Thank you for your time and cooperation.

Sincerely,

Kaylee Renick
Graduate Student
APPENDIX C

COVER LETTER FOR THOSE PARTICIPATING IN RESEARCH VIA MAIL
Cover Letter for those participating in research via mail
October 1, 2012

<First Name> <Last Name>
<Company>
<Address Line 1>
<Address Line 2>
<City>, <State> <ZIP>

Dear <Last Name>:
You are being invited to voluntarily participate in the Continuing Agricultural Education: Adult Learning Styles and Educational Delivery Method Preferences research study. This study involves research. The purpose of this research study is to identify the learning styles and preferred methods of receiving agricultural information on new or innovative farming practices among Yuma growers, pest control advisors, and industry personnel.

You were identified as an individual who has a profession in one of the above areas and have been selected to be part of a research study. In order to obtain a valid measure of the learning styles and educational delivery method preferences, please complete the questionnaire, fold in half lengthwise, and return in the enclosed envelope by October 31, 2012.

Your participation in this research study is voluntary. You may refuse to participate in this study. If you decide to take part in the study, you may leave the study at any time. No matter what decision you make, there will be no penalty to you and you will not lose any of your usual benefits. Your decision will not affect your future relationship with The University of Arizona. If you are a student or employee at the University of Arizona, your decision will not affect your grades or employment status. There are no known risks to subjects as a result of participation in this study. You may choose not to answer some or all of the questions. There are no known benefits to subjects as a result of participation in this study. However, presentation of the findings will be administered at future agricultural workshops in Yuma County and may provide insight on learning modality and educational delivery method preferences among adult continuing agricultural education learners. There is no cost to you except your time. This project will span approximately five weeks, however the questionnaire will take about ten minutes for you to complete.

To minimize any risk to you, you may be assured of complete confidentiality. A number has been placed on the questionnaire for mailing purposes only. The number on the questionnaire will be removed immediately upon confirmation of return and deletion of your name from the mailing list. Your name will never be placed on the questionnaire. All questionnaires will be held in a secure location and will be shredded once the data entry process is complete. Under no circumstances will individual data be shared or reported.

For questions about your rights as someone taking part in this study, you may contact the Human Subject Protection Program at 1-520-626-6721. You may call this number to discuss concerns or complaints about the study with someone who is not part of the research team. Should you have any other questions, please call me at 928-726-3904 or email: krenick@cals.arizona.edu. Thank you for your time and cooperation.

Sincerely,
Kaylee Renick
Graduate Student
Appendix D

EMAIL REMINDER FOR THOSE PARTICIPATING IN RESEARCH VIA MAIL
Email Reminder for those participating in research via mail
October 8, 2012

Dear <Last Name>:

Last week, a questionnaire was sent to you with regarding your participation in the Continuing Agricultural Education: Adult Learning Styles and Educational Delivery Method Preferences research study. The purpose of this study is to identify the learning styles and preferred methods of receiving agricultural information on new or innovative farming practices among Yuma growers, pest control advisors, and industry personnel.

If you have already completed and returned the questionnaire, please accept my sincere appreciation. If you have not yet returned the questionnaire, please do so today. As you know, it is important that your response be included in the study.

Your participation in this research study is voluntary and you may choose to withdraw at any time without penalty or repercussion. You may choose not to answer some or all of the questions. There may be minimal risks from your participation and no direct benefit from your participation is expected. There is no cost to you except your time. This project will span approximately five weeks, however the questionnaire will take about ten minutes for you to complete.

To minimize any risk to you, you may be assured of complete confidentiality. A number has been placed on the questionnaire for mailing purposes only. The number on the questionnaire will be removed immediately upon confirmation of return and deletion of your name from the mailing list. Your name will never be placed on the questionnaire. All questionnaires will be held in a secure location and will be shredded once the data entry process is complete. Under no circumstances will individual data be shared or reported.

If by some chance you did not receive the questionnaire or it was misplaced, please call me at (928) 726-3904 or email: krenick@cals.arizona.edu and I will send you a new questionnaire immediately. For questions about your rights as someone taking part in this study, you may contact the Human Subject Protection Program at 1-520-626-6721.

Sincerely,
Kaylee Renick
Graduate Student
APPENDIX E

SECOND LETTER REMINDER FOR THOSE PARTICIPATING IN RESEARCH VIA MAIL
Second Letter Reminder for those participating in research via mail

October, 15 2012

<First Name> <Last Name>
<Company>
<Address Line 1>
<Address Line 2>
<City>, <State> <ZIP>

Dear <Last Name>:

As you know, I am conducting a study to identify the learning styles and preferred methods of receiving agricultural information on new or innovative farming practices among Yuma growers, pest control advisors, and industry personnel. You have been selected to be part of this research study. I have not yet received your completed questionnaire. Please complete the questionnaire, fold in half lengthwise, and return in the enclosed envelope by October 31, 2012.

Your responses on the questionnaire are critical in being able to describe the relationship among adult continuing agricultural education learners in Yuma County learning styles and preferred delivery methods. Moreover, your responses will assist in describing the factors which facilitate in learning style preferences of adult continuing agricultural education learners. Your input will undoubtedly help in this regard.

Your participation in this research study is voluntary and you may choose to withdraw at any time without penalty or repercussion. You may choose not to answer some or all of the questions. There may be minimal risks from your participation and no direct benefit from your participation is expected. There is no cost to you except your time. This project will span approximately five weeks, however the questionnaire will take about ten minutes for you to complete.

To minimize any risk to you, you may be assured of complete confidentiality. A number has been placed on the questionnaire for mailing purposes only. The number on the questionnaire will be removed immediately upon confirmation of return and deletion of your name from the mailing list. Your name will never be placed on the questionnaire. All questionnaires will be held in a secure location and will be shredded once the data entry process is complete. Under no circumstances will individual data be shared or reported.

For questions about your rights as someone taking part in this study, you may contact the Human Subject Protection Program at 1-520-626-6721. You may call this number to discuss concerns or complaints about the study with someone who is not part of the research team. Should you have any other questions, please call me at 928-726-3904 or email: krenick@cals.arizona.edu. Thank you for your time and cooperation.

Sincerely,

Kaylee Renick
Graduate Student
Appendix F

FINAL LETTER REMINDER FOR THOSE PARTICIPATING IN RESEARCH VIA MAIL
Final Letter Reminder for those participating in research via mail
October 22, 2012

<First Name> <Last Name>
<Company>
<Address Line 1>
<Address Line 2>
<City>, <State> <ZIP>

Dear <Last Name>:

At the beginning of the month, a questionnaire was sent to you with regarding your participation in the Continuing Agricultural Education: Adult Learning Styles and Educational Delivery Method Preferences research study. The purpose of this study is to identify the learning styles and preferred methods of receiving agricultural information on new or innovative farming practices among Yuma growers, pest control advisors, and industry personnel.

If you have already completed and returned the questionnaire, please accept my sincere appreciation. If you have not yet returned the questionnaire, please do so today. As you know, it is important that your response be included in the study.

Your participation in this research study is voluntary and you may choose to withdraw at any time without penalty or repercussion. You may choose not to answer some or all of the questions. There may be minimal risks from your participation and no direct benefit from your participation is expected. There is no cost to you except your time. This project will span approximately five weeks, however the questionnaire will take about ten minutes for you to complete.

To minimize any risk to you, you may be assured of complete confidentiality. A number has been placed on the questionnaire for mailing purposes only. The number on the questionnaire will be removed immediately upon confirmation of return and deletion of your name from the mailing list. Your name will never be placed on the questionnaire. All questionnaires will be held in a secure location and will be shredded once the data entry process is complete. Under no circumstances will individual data be shared or reported.

If by some chance you did not receive the questionnaire or it was misplaced, please call me at (928) 726-3904 or email: krenick@cals.arizona.edu and I will send you a new questionnaire immediately. For questions about your rights as someone taking part in this study, you may contact the Human Subject Protection Program at 1-520-626-6721.

Sincerely,
Kaylee Renick
Graduate Student
APPENDIX G

QUESTIONNAIRE
Continuing Agricultural Education: Adult Learning Styles and Educational Delivery Method Preferences

University of Arizona
Agricultural Education Department

Kaylee Renick
Yuma County Cooperative Extension
2200 W. 28th Street Suite 102
Yuma, AZ 85364

October 2012
You are being invited to voluntarily participate in the Continuing Agricultural Education: Adult Learning Styles and Educational Delivery Method Preferences research study. This study involves research. The purpose of this research study is to identify the learning styles and preferred methods of receiving agricultural information on new or innovative farming practices among Yuma growers, pest control advisors, and industry personnel.

You were identified as an individual who has a profession in one of the above areas and have been selected to be part of a research study. In order to obtain a valid measure of the learning styles and educational delivery method preferences, please complete the questionnaire, fold in half lengthwise, and return in the enclosed envelope by October 31, 2012.

Your participation in this research study is voluntary. You may refuse to participate in this study. If you decide to take part in the study, you may leave the study at any time. No matter what decision you make, there will be no penalty to you and you will not lose any of your usual benefits. Your decision will not affect your future relationship with The University of Arizona. If you are a student or employee at the University of Arizona, your decision will not affect your grades or employment status. There are no known risks to subjects as a result of participation in this study. You may choose not to answer some or all of the questions. There are no known benefits to subjects as a result of participation in this study. However, presentation of the findings will be administered at future agricultural workshops in Yuma County and may provide insight on learning modality and educational delivery method preferences among adult continuing agricultural education learners. There is no cost to you except your time. This project will span approximately five weeks, however the questionnaire will take about ten minutes for you to complete.

To minimize any risk to you, you may be assured of complete confidentiality. A number has been placed on the questionnaire for mailing purposes only. The number on the questionnaire will be removed immediately upon confirmation of return and deletion of your name from the mailing list. Your name will never be placed on the questionnaire. All questionnaires will be held in a secure location and will be shredded once the data entry process is complete. Under no circumstances will individual data be shared or reported.

For questions about your rights as someone taking part in this study, you may contact the Human Subject Protection Program at 1-520-626-6721. You may call this number to discuss concerns or complaints about the study with someone who is not part of the research team. Should you have any other questions, please call me at 928-726-3904 or email: krenick@cals.arizona.edu. Thank you for your time and cooperation.

Sincerely,
Kaylee Renick
Graduate Student
PART 1

The VARK Model- How Do I Learn Best?

Choose the answer which best explains your preference and circle the letter(s) next to it. Please circle more than one if a single answer does not match your perception. Please do not leave any questions blank. Your answers will remain confidential.

1. You are helping someone who wants to go to your airport, the center of town or railway station. You would:
   a. go with her.
   b. tell her the directions.
   c. write down the directions.
   d. draw, or give her a map.

2. You are not sure whether a word should be spelled `dependent' or `dependant'. You would:
   a. see the words in your mind and choose by the way they look.
   b. think about how each word sounds and choose one.
   c. find it online or in a dictionary.
   d. write both words on paper and choose one.

3. You are planning a vacation for a group. You want some feedback from them about the plan. You would:
   a. describe some of the highlights.
   b. use a map or website to show them the places.
   c. give them a copy of the printed itinerary.
   d. phone, text or email them.

4. You are going to cook something as a special treat for your family. You would:
   a. cook something you know without the need for instructions.
   b. ask friends for suggestions.
   c. look through the cookbook for ideas from the pictures.
   d. use a cookbook where you know there is a good recipe.

5. A group of tourists want to learn about the parks or wildlife reserves in your area. You would:
   a. talk about, or arrange a talk for them about parks or wildlife reserves.
   b. show them internet pictures, photographs or picture books.
   c. take them to a park or wildlife reserve and walk with them.
   d. give them a book or pamphlets about the parks or wildlife reserves.
6. You are about to purchase a digital camera or mobile phone. Other than price, what would most influence your decision?
   a. Trying or testing it.
   b. Reading the details about its features.
   c. It is a modern design and looks good.
   d. The salesperson telling me about its features.

7. Remember a time when you learned how to do something new. Try to avoid choosing a physical skill, eg. riding a bike. You learned best by:
   a. watching a demonstration.
   b. listening to somebody explaining it and asking questions.
   c. diagrams and charts - visual clues.
   d. written instructions – e.g. a manual or textbook.

8. You have a problem with your heart. You would prefer that the doctor:
   a. gave you a something to read to explain what was wrong.
   b. used a plastic model to show what was wrong.
   c. described what was wrong.
   d. showed you a diagram of what was wrong.

9. You want to learn a new program, skill or game on a computer. You would:
   a. read the written instructions that came with the program.
   b. talk with people who know about the program.
   c. use the controls or keyboard.
   d. follow the diagrams in the book that came with it.

10. I like websites that have:
    a. things I can click on, shift or try.
    b. interesting design and visual features.
    c. interesting written descriptions, lists and explanations.
    d. audio channels where I can hear music, radio programs or interviews.

11. Other than price, what would most influence your decision to buy a new non-fiction book?
    a. The way it looks is appealing.
    b. Quickly reading parts of it.
    c. A friend talks about it and recommends it.
    d. It has real-life stories, experiences and examples
12. You are using a book, CD or website to learn how to take photos with your new digital camera. You would like to have:
   a. a chance to ask questions and talk about the camera and its features.
   b. clear written instructions with lists and bullet points about what to do.
   c. diagrams showing the camera and what each part does.
   d. many examples of good and poor photos and how to improve them.

13. Do you prefer a teacher or a presenter who uses:
   a. demonstrations, models or practical sessions.
   b. question and answer, talk, group discussion, or guest speakers.
   c. handouts, books, or readings.
   d. diagrams, charts or graphs.

14. You have finished a competition or test and would like some feedback. You would like to have feedback:
   a. using examples from what you have done.
   b. using a written description of your results.
   c. from somebody who talks it through with you.
   d. using graphs showing what you had achieved.

15. You are going to choose food at a restaurant or cafe. You would:
   a. choose something that you have had there before.
   b. listen to the waiter or ask friends to recommend choices.
   c. choose from the descriptions in the menu.
   d. look at what others are eating or look at pictures of each dish.

16. You have to make an important speech at a conference or special occasion. You would:
   a. make diagrams or get graphs to help explain things.
   b. write a few key words and practice saying your speech over and over.
   c. write out your speech and learn from reading it over several times.
   d. gather many examples and stories to make the talk real and practical.
PART 2

Choose the answer which best explains your preference and circle the letter(s) next to it. Please circle only one single answer.

17. What type of method of instruction have you encountered during past agricultural meetings within the last two years?
   a. Field Demonstration
   b. Panel Discussion
   c. Instructor Lecture/Workshop
   d. Publications/Pamphlets
   e. One-on-one
   f. Websites
   g. All of the above

18. I feel that I learn best when agricultural information is delivered by ________.
   a. Field Demonstration
   b. Panel Discussion
   c. Instructor Lecture/Workshop
   d. Publications/Pamphlets
   e. One-on-one
   f. Websites

19. What method of instruction do you believe is the least effective in allowing you to learn about agricultural topics?
   a. Field Demonstration
   b. Panel Discussion
   c. Instructor Lecture/Workshop
   d. Publications/Pamphlets
   e. One-on-one
   f. Websites

20. Which instructional method best covers agricultural information in an understandable and interesting way?
   a. Field Demonstration
   b. Panel Discussion
   c. Instructor Lecture/Workshop
   d. Publications/Pamphlets
   e. One-on-one
   f. Websites
21. I will most likely adopt agricultural practices and apply them to my profession when information is delivered by which method?
   a. Field Demonstration  
   b. Panel Discussion  
   c. Instructor Lecture/ Workshop  
   d. Publications/ Pamphlets  
   e. One-on-one  
   f. Websites  

22. I am most likely to remember information learned in a meeting when delivered by which method?
   a. Field Demonstration  
   b. Panel Discussion  
   c. Instructor Lecture/ Workshop  
   d. Publications/ Pamphlets  
   e. One-on-one  
   f. Websites
PART 3

Demographics

Choose the answer which best explains your preference and circle the letter(s) next to it. Please select only one answer.

23. Do you work within the agricultural industry?
   a. Yes
   b. No

24. Do you work in the agricultural industry in Yuma County?
   a. Yes
   b. No

25. Gender
   a. Male
   b. Female

For questions 26-27 (Please provide a numerical value for the questions below.) Example 34

26. Respondents Age ________.

27. How many years have you worked in the agricultural industry? ________.

28. Education of Respondent (please mark the highest education obtained).
   a. Attended or graduated from high school.
   b. Attended or graduated from a post-secondary vocational/technical program.
   c. Attended and graduated from a 2 year college.
   d. Attended and graduated from a four-year college or university with a major in agriculture.
   e. Attended and graduated from a four-year college or university, but did not major in agriculture.
   f. Attended Graduate School and obtained a Master’s Degree.
   g. PhD

29. If you answered “Yes” to question number 23, then what type of position do you hold?
   a. Grower/Farmer
   b. Pest Control Advisor
   c. Industry Personnel