THE RELATIONSHIP BETWEEN LEARNING STYLE AND SELECTED CHARACTERISTICS OF WEST VIRGINIA UNIVERSITY AGRICULTURAL AND NATURAL RESOURCES EXTENSION AGENTS

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ABSTRACT

The purpose of this study was to examine the learning style of West Virginia University County Extension agents within the program area of Agriculture and Natural Resources. Furthermore the study sought to relate learning styles to demographical data such as age, gender, highest degree earned, and length of employment with West Virginia University.

The data indicated that the age of West Virginia University Agricultural and Natural Resources Extension Agents' ranged from 24-61 years of age. The mean age for the agents was 42.79 years with a standard deviation of 9.23.

The data indicated that 89.7% (26) of the West Virginia University Agricultural and Natural Resources Extension Agents had their Masters of Science Degree, 3.4% (1) had a Masters of Art Degree, and 6.9% (2) had obtained a doctorate degree (Table 4.3). Furthermore, length of employment analysis indicated that West Virginia University Agricultural and Natural Resources Extension Agents' length of employment with West Virginia University Extension ranged from 1 to 31 years. The mean length of employment for the agents was 11.53 years, with a standard deviation of 8.59 years. Males were the largest group of West Virginia University Agricultural and Natural Resources Extension Agents.
The majority of West Virginia University Agricultural and Natural Resources Extension Agents were field dependent. The Group Embedded Figures Test (GEFT) mean score for the agents was 9.69 out of a possible eighteen (18). West Virginia University Agricultural and Natural Resources male Extension Agents were split evenly between field independent and field dependent. The majority of female West Virginia University Agricultural and Natural Resources Extension Agents were field dependent.

A low relationship (Davis, 1971) was found between West Virginia University Agricultural and Natural Resources Extension Agents learning style and gender. The data indicated a substantial relationship (Davis, 1971) between West Virginia University Agricultural and Natural Resources Extension Agents learning style and age. Furthermore, as West Virginia University Agricultural and Natural Resources Extension Agents’ age increased, GEFT mean scores tended to decrease. West Virginia University Agricultural and Natural Resources Extension Agents’ learning style and highest degree obtained indicated a moderate relationship (Davis, 1971). A very strong relationship (Davis, 1971) was found between West Virginia University Agricultural and Natural Resources Extension Agents’ learning style and length of employment.
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CHAPTER 1

INTRODUCTION

The history of extension education was developed by the passage of the Smith-Lever Act of 1914, which created the Cooperative Extension Service. The Smith Lever Act created a cooperative educational relationship between the federal government (United States Department of Agriculture (USDA)), state land-grant universities, and local governments at the county level. The cooperative arrangement provided for multiple funding sources, diverse program plans, and provided unique methods and opportunities for the diffusion of agricultural innovations.

The purpose of the act was to disseminate useful and practical information related to agriculture and home economics and promote the practical application of such information to the people of the United States. The information would be taught in many ways: practical demonstrations, publications, lectures, and home visits are some examples of these. Extension’s mission was and continues to be to transform the quality of people’s lives and contribute to their development as human beings through education. In a sense it was taking the universities to the people, and that continues to guide the Cooperative Extension Service today.
The passage of the Morrill Land Grant College Act of 1862, established the first land-grant colleges and the Hatch Experiment Station Act of 1887, provided federal monies to states for agricultural experimentation. The Morrill Act provided congressional affirmation that America depended upon agriculture and also instituted higher learning with distinct functions of teaching, researching, and service. The Hatch Act established funding between USDA and land-grant institutions. The experiment stations provided research findings to the farmers.

Extension began by offering diverse programs in the areas of agriculture, home economics, and youth development. In 1902, A.B. Graham formed the boys and girls’ clubs, which was the basis for 4-H. Graham’s goal was to educate parents through their children. However, boys and girls’ clubs focused on children being taught useful skills that pertained to agriculture.

Extension has moved from the aspect of teaching the youth to teaching the adults. Extension educators have to educate their clients in agricultural industries instead of relying on them to go back to the farm types of work. There have been and will continue to be many issues and challenges that affect extension education. The number of farmers and the number of farms has decreased. Farms have grown in size but decreased in number of owners as corporations have taken over the farming environment. The increase in farm production and efficiency has eliminated the need for the small farm operations.

Career opportunities and employment in agriculture are shrinking aspects of the American tradition. Extension educators have had to respond by changing their
education programs to include agriculturally related careers and disciplines. Horticulture, turf management, and greenhouse production are very important to extension education programs now, but in the past they were not even considered important.

There has been a shift in the number of persons from rural backgrounds that have experience with farming. Extension has had to redirect many of its resources in order to focus on urban related aspects of society. Nutrition programs, urban gardening, parenting skills, and after school programs are examples of shifting to provide service to society's needs.

Agricultural activities were not monitored or looked upon in the past, as much as they are today. People today are not worried about the production aspect of agriculture, but more about the practices used on land by agriculture. Extension has had to develop programs that respond to the Clean Water Act, Environmental Quality Incentive Programs, and Wildlife Habitat incentive Programs. The Extension service has been forced to stay up-to-date with all new and improved technologies of agriculture.

The Extension service has changed dramatically over the years within program focus and the role of the Agriculture Agent has changed enormously. However, with all of these changes that the Extension service and Agents have encountered, were there any changes being made pertaining to how Agents delivered their information to the public?

**Problem Statement**

West Virginia University serves a diverse clientele by providing people with help to improve their lives through educational progression using scientific knowledge and by
addressing issues and needs of their communities. However, despite the wealth of information that is distributed, WVU has lacked in making changes in program delivery methods in relation to audiences’ learning styles. WVU Extension does relatively well in collecting information about “what people know.” However, by combining “what people know,” with “the way people learn,” extension agents will have a greater opportunity to do a more effective job of working with individual learners (Keefe, 1988).

Researchers (Witkin, Moore, Goodenough & Cox, 1977; Cano, 1993; Garton, 1993) have studied how individuals learn and educators educate, and have shown that learning styles are an important variable in learning. The problem is that West Virginia Extension educators lack knowledge of learning styles and cognitive abilities of both themselves and their audiences. Educators of workshops, clinics, and training sessions need to know their own cognitive patterns and understand their audiences’ cognitive patterns and learn to adjust in order to effectively convey information.

**Purpose and Objectives**

The purpose of this study was to examine the learning style West Virginia University County Extension agents within the program area of Agriculture and Natural Resources. Furthermore the study sought to relate learning styles to demographical data such as age, gender, highest degree earned, and length of employment with West Virginia University.
The following research objectives were addressed:

1. Describe West Virginia University Extension Agricultural and Natural Resource Agents by selected demographical characteristics (age, gender, highest degree earned, length of employment with West Virginia University).

2. Determine the learning style of West Virginia University Agricultural and Natural Resource Extension Agents.

3. Describe the relationship between selected characteristics of West Virginia University Agricultural and Natural Resource Extension Agents and their learning style.

**Definition of Terms**

The following terms have been operationally defined for the purpose of this study:

- **County Extension Agent**: an employee of West Virginia University Extension who is responsible for a designated program area.

- **Agricultural and Natural Resource Agent**: An employee of the West Virginia University Extension service that assists owners and users of West Virginia's natural resources to gain competitive benefits from these resources. By using research and experience-based information, the agents are to empower the stewards and users of West Virginia landscapes to manage the agricultural, forests, water, soil, wildlife, and other natural resources in a sustainable manner that will fulfill the needs of the current and future generations.
Learning Style: The way a person received and processed information (Garton, 1993). Individuals are classified as Field Dependent or Field Independent (Oltman, Raskin, Karp, & Witkin, 1971).

Field Dependent/Field Independent: The extent to which a person is able to deal with a part of a field separately from the field as a whole, or the extent to which he or she is able to disembend items from organized context, or determines how analytical he or she is. Because one extreme of the performance range of perception is strongly dominated by the prevailing field, we speak of that mode as "field dependent." For the other extreme, where the person is able to deal with an item independently of the surrounding field, we use the designation "field independent" (Witkin, 1973 p. 5).

Assumptions

The researcher assumed that the population of this study, West Virginia University Agricultural and Natural Resource Extension Agents, was representative of all Agricultural and Natural Resource agents in West Virginia University’s Extension. It was also assumed that all participants in the study took the test seriously and to the best of their ability.

Limitations of the Study

The accessible population for this study consisted of all West Virginia University Agricultural and Natural Resource Extension Agents. The West Virginia University Agricultural and Natural Resource Extension Agents were chosen because the agents
were easily accessible by the author of this study. Since there was no research of this type to date within West Virginia University Extension, it was not relevant which agents were chosen for the study. However, generalizations will be limited to the West Virginia University Agricultural and Natural Resource Extension Agents who participated in the study.

Significance of the Problem

Extension educators are expected to deliver programs in an environment where learning must occur (Hudson, 1997). Planning, designing, and delivering educational programs would be beneficial for Extension agents and their audiences if they had a better understanding of learning styles. The more that is known and understood about the learner, the more effective and efficient the teaching and learning process will be (Starkey, 2000). It is known among educators that people think and act differently, somehow that concept becomes lost in the educational process (Reiff, 1992). Since Extension audiences are volunteer participants, it is a necessity that Extension educators teach more effectively to reach all learners (Hudson, 1997).

Limited research has been conducted measuring and explaining learning styles of Extension agents. Hudson (1997) conducted such a study with Northeast District Ohio State University Extension Agents. Given the aforementioned information, there was a need for research on learning styles among Extension agents not only in Ohio, but West Virginia as well.
CHAPTER 2

REVIEW OF LITERATURE

Learning Styles

Individuals who have varying learning styles are not new concepts to educators and behavioral scientists. When teachers take prior knowledge and level of cognitive development into account, the teaching is more effective (Messick, 1976). Even as early as 334 B.C., Aristotle stated that, “each child possessed specific talents and skills and discussed the concept of individual differences in young children” (Osborn, 1975, p.8).

Snow (1986) stated that individual student differences involved cognitive abilities, personality characteristics, and learning styles. Messick (1970) referred that learning must move beyond the content and level of learning to more understated differences in the process of cognition. Messick (1970) indicated that the process of cognition was learning styles.

All individuals have the basic ability to learn and teach, but individuals do not learn and teach in the same manner and effectiveness (Gregorc, 1979). Gregorc (1979) suggested that implications for students’ academic achievement, how students learned and teachers taught, and teacher-student interaction, depended on an individual’s learning style.
The information that has been learned concerning learning styles in the formal educational setting has distinctive implications for extension and extension audiences in the informal setting. All persons trying to create an environment that encourages learning should be aware that there are variables, which, as the educator, they can use to adapt their curriculum, behavior, and method to increase the possibility of effective learning.

The following review of literature focuses on the definition of learning style. Also, the review of literature looks at field dependent and field independent instruments, the determinants of learning styles, characteristics of field dependence and field independence, learning style factors, and previous research that has been conducted pertaining to learning styles.

**Learning Styles Defined**

There are many different descriptions/definitions of learning styles. Cano (1993) indicated that learning style was a consistent pattern of behavior and performance by which an individual approached an educational experience. Garton (1993) defined learning styles as the way a person received and processed information. Another definition by Kogan (1971) referred to learning styles as distinctive ways of storing, transferring, retaining, and utilizing information. Starkey (2000) stated that learning styles focused on the question of “how” learners processed information. Rita and Kenneth Dunn (1978) defined learning styles as the way individuals concentrated on, engaged, and retained new information. Also, Dunn and Dunn (1979) are known for their belief that teachers teach the way they were taught.
Claxton and Ralston (1978) indicated that learning style was a consistent way of responding to and using stimuli in the context of learning. DeBello (1990) and Keefe (1979) described learning styles as the cognitive, affective, and psychological behaviors that served as indicators of how learners perceived, interacted, and responded to the learning environment. Even (1978) expressed learning styles as a diverse way of consuming and processing information.

Gregorc (1979) stated that learning styles were a distinctive behavior that served as indicators of how a person adapted and learned from his or her environment. Witkin (1976) defined learning styles under the term cognitive style. Messick (1970) defined cognitive style as a person's way of perceiving, remembering, thinking, and problem solving. Vernon (1973) referred to learning styles as cognitive operations that accounted for an individual's difference in a variety of cognitive, personality, and perceptual variables. Researchers have defined learning styles differently; they also classified, categorized, and labeled learning styles variably (Starkey, 2000). There is a lack of agreement on how to define learning styles (Sims & Simms, 1995). According to Claxton & Murrell (1987), there needs to be a more developed theoretical base before agreement can be made on defining learning styles. However, learning style is the most important concept to demand attention in education (Guild & Garger, 1985).
Types of Learning Styles

Messick (1970) identified nine learning styles pertaining to individual preferences. Each one of these learning styles is different in that each one has a different outcome:

The nine learning styles incorporated:

1. **Conceptualizing styles**: the inclination to categorize perceived similarities and differences among stimuli in terms of many different concepts caused by individual differences.

2. **Level vs. sharpening**: Memory is the individual's reliability. Individuals at the leveling extreme tend to merge perceived events or objects with similar events from past experiences. However, sharpeners are less apt to confuse objects or events from the past with the present.

3. **Breadth of categorizing**: In establishing the acceptable range of goals, an individual is consistent with preference for broad inclusiveness, and divergent to narrow inclusiveness.

4. **Scanning**: Attention deployment is caused by the individual's variations in the vividness of experience and the span of awareness.

5. **Cognitive complexity vs. simplicity**: differences in an individual's tendency to interpret the world of social behavior, in a multi-dimensional way.
6. Tolerance for incongruous or unrealistic experiences: difference in willingness to accept experiences that are perceived compared to conventional experiences.

7. Reflectivity vs. impulsivity: The difference in response time and accuracy when posed a question. Reflective individuals ponder about the question and consider all possibilities before answering or deciding. Impulsive individuals tend to answer first, but are frequently incorrect.

8. Constricted vs. flexible control: Individual's differences in vulnerability to cognitive inferences and distractions.

9. Field independence vs. field dependence: the extent to which an individual can perceive items discrete from their background, which allows them to separate embedded figures from the surrounding field.

The most widely studied learning style dimension has been field dependence and field independence. Learning styles has been thought of as the most applicable to educational situations (Witkin, Moore, Goodenough, & Cox, 1977; Doeber & Eicke, 1979; Garton, 1993; Guild & Garger, 1985; Messick, 1976). Witkin (1973) referred to field dependence/independence learning style dimension as:

The extent to which a person is able to deal with a part of a field separately from the field as a whole, or the extent to which he or she is able to disembed items from organized context or, to put it in everyday language, determines how analytical he or she is. Because at one extreme of the performance range perception is strongly dominated by the prevailing field, we speak of that mode as "field dependent." For the other extreme, where the person is able to deal with an item independently of the surrounding field, we use the designation "field independent" (p. 5).
Guild and Garger (1985) stated that Witkin and his associates had done the most far-reaching and thorough research on learning styles in the last 50 years. With that, Witkin, Moore, Goodenough, Cox, Oltman, Friedman, Own, and Raskin (1971) can be noted for their studies with field-dependent and field independent cognitive styles in education. However, one individual, H.A. Witkin, has played the largest role in contribution to the research of learning styles.

Instruments Used in Measuring Learning Styles

Witkin developed the Rod and Frame Test (RFT) to distinguish between field-dependence and field-independence (Witkin, Dyk, Faterson, Goodenough, & Karp, 1974). The Rod and Frame Test was administered with the subject seated in a darkened room and shown a luminous rod situated in a luminous frame. The subjects were asked to move the rod to the true vertical position as the frame was tilted. The subjects were allowed to do this since the rod and frame could be adjusted independently.

The field independent learner will adjust the rod to the vertical position of the frame. The field dependent learner, influenced by the frame, could not rotate the rod to true vertical position. Validity has been found for the RFT (Witkin, 1948; Witkin & Ashch, 1948). Reliability has been established (Witkin, 1948; Witkin & Ashch, 1948; Oltman, 1964) in testing for field dependence and field independence.

Witkin also developed the Body Adjustment Test (BAT), similar to the RFT, to differentiate field-dependence and field-independence (Witkin, Moore, Goodenough, & Cox, 1977). In the BAT, the body was seated in a chair within a special room, both of
which tilted independently. The subject aligned himself/herself so that he or she was upright. Subjects that adjusted his or her body to the tilted room and then reported that he or she was sitting in the upright position were classified as a field-dependent learner. While the subjects adjusting themselves to the upright position independently of the tilted angle of the room were classified as field-independent.

Later on, three researchers, Oltman, Raskin, and Witkin were noted for developing the Embedded Figures Test (EFT) for use with individuals, and the Group Embedded Figures Test (GEFT) to be used in groups (Oltman, Raskin, Karp, & Witkin, 1971). The Embedded Figures Test and The Group Embedded Figures Test required the subject to identify a simple figure that was embedded within a large complex figure. The subjects that were able to locate the simple figure within the complex figure pointed to a preference toward field independent learners, while the subjects who could not locate the simple figure within the complex figure were considered to be the field dependent learners. Both the EFT and GEFT have been tested for validity and reliability (Witkin, Oltman, Raskin, & Karp, 1971).

Field Independent and Field Dependent Learners

Witkin (1976) stated that mothers were influential in determining their children's learning style. Gender differences have been found to affect the learning styles of individuals. Males tend to learn more toward the Field-Independent style while females are more Field-Dependent (Witkin, 1976).
Claxton and Ralston (1978) indicated that learning styles were determined by early experiences that children had with their mothers. Researchers (Witkin, Dyk, Faterson, Goodenough, & Karp, 1974) have studied family experiences of children who became Field Dependent or Field Independent that did demonstrate relations with their mother, and indicated an influential part in determining their learning style.

However, not all learners who are classified as Field-Dependent or Field Independent experience the same characteristics (Garton, 1993). In addition, one learning style is not superior to another (Witkin et al., 1977). Furthermore, two distinct types of learners, Field Dependent and Field Independent are not the only types of learners (Claxton, & Murrel, 1987; Witkin, Moore, Goodenough, & Cox, 1977). Differences have been found between Field Dependent and Field Independent learning styles, however the two remain independent of intelligence (Garger & Guild, 1984). Garger and Guild (1984) stated that Field Dependence and Field Independence appeared to be related to the "how" rather than the "how much" of learning.

Characteristics of Field Dependent Learners

Field Dependent learners tend to socialize more than Field Independent learners. The need to be around people lets them express warmth and affection towards people (Witkin et al, 1977). Field dependent learners are socially oriented and learn material within social context best (Garger & Guild, 1984). Cano (1993) indicated that Field Dependent learners preferred to socialize with their peers than to become actively
involved in the learning process. Field Dependent individuals tend to choose careers that are more socially oriented such as teaching, nursing, or social work (Green, 1985; Kocsis, 1980).

Field Dependent people perceive objects as part of the global world (Reiff, 1992). Cano (1993) referred that Field Dependent learners’ experiences were obtained in a global fashion while remaining to the structure provided through their surroundings.

Field Dependent learners found it difficult with task-oriented subjects, becoming frustrated quickly. Field Dependent learners tend to give up easily and become uninterested when the task is too hard (Cano, 1993). Since Field Dependent learners were unable to break down complicated tasks, they were considered poor analytic problem solvers (Cano, 1993).

Field Dependent people would rather take the spectator approach when attaining concepts (Garger & Guild, 1984). Field Dependent individuals would rather be provided with the answer, rather than find it on their own (Cano, 1993). The Field Dependent individual needs a close working relationship with the instructor. The need for the working relationship with the instructor fills the social context needed by the learner (Estadt, 1997). Field Dependent learners value the guidance of instructors; they seek out instructor’s support in decision-making, and strive for that reward from the teacher (Cano, 1993). Field Dependent learners will become involved in the learning process when others become involved with them due to the extrinsic motivation factor (Estadt, 1997).
Cano (1993) stated that Field Dependent students tended not to be organized people, however organization is very important to them in the teaching and learning process. In fact, some field dependent learners will reorganize subject matter to an organizational structure to better understand it. Organization plays an important part in life to the Field Dependent individual.

Hruska and Grasha (1982) identified Field Dependent learners as students who showed little intellectual curiosity; learning only what was required. The teacher and peers were only a source of structure and support. Field Dependent individuals look at authority as a guide and want to be told what to do. Hruska and Grasha (1982) also found that teachers should put outlines or notes on the board so the Field Dependent learner can have a guide. Field Dependent learners need deadlines for assignments. The teacher used the teacher-centered teaching method.

Characteristics of Field Independent Learners

Field Independent learners tended to have characteristics that were exact opposites of Field Dependent learners (Cano, 1993). Field Independent individuals view the world more analytically because they are able to separate discrete parts from the total picture (Witkin, Moore, Goodenough, & Cox, 1977). Task oriented learning that encompasses several steps is accomplished more easily for Field Independent learners than Field Dependent learners (Garton, 1993). In addition to their analytical thinking ability, Field Independent individuals were more tailored to problem solving tasks than Field Dependent individuals.
Field Independent learners are insensitive and individualistic; they do not have the social characteristics of dependent learners (Cano, 1993). Field Independent learners’ unwillingness to socialize kept them from working in groups. However, Field Independent learners preferred independent studies for a learning situation (Cano, 1993). Tasks that lacked clear structure provided greater achievement for Field Independent learners.

Witkin, Moore, Goodenough, & Cox (1977) found that Field Independent learners preferred a hypothesis-testing approach when learning. Cano (1993) stated that Field Independent learners were intrinsically motivated. Along that line, Field Independent learners will learn more than Field Dependent learners under conditions that emphasize intrinsic motivation (Witkin, Moore, Goodenough, & Cox, 1977). Field Independent learners do not react to social reinforcement. However, Field Independent learners were motivated through competition, designing their own structure, and choice of activities (Cano, 1993). Criticism had less effect on Field Independent learners compared to Field Dependent learners (Guild & Garger, 1985). Guild & Garger (1985) also stated that Field Independent learners set their own reinforcements and goals.

Teaching Styles of Field Dependent and Field Independent

Research has found that there was evidence between the way teachers taught and the way they learned (Dunn & Dunn, 1979). Cano (1993) stated that Field Dependent teachers aided their students in any way necessary to assure success. Field Dependent teachers preferred field trips, role-play, group projects, and “hands on” activities.
Cooperative efforts and class discussion were encouraged by Field Dependent teachers (Cano, 1993). Witkin, Moore, Goodenough and Cox (1977) indicated that Field Dependent teachers were student centered, and provided a learning environment that was warm.

Field Independent teaching style was constant with the field independent learning style (Hudson, 1997). Cano (1993) stated that Field Independent teachers were more focused on their subject matter compared to Field Dependent teachers who were student centered. Individual learning was encouraged without positive reinforcement (Hudson, 1997). Mahlios (1981) indicated that Field Independent teachers informed students with corrective feedback when they were wrong in order to enhance learning.

Witkin, Moore, Goodenough, and Cox (1977) referred to lecturing as a Field Independent teachers' preference as the method of delivery due to the authority figure portrayed. Problem solving approach to teaching was preferred by Field Independent teachers because it helped students to discover the answers themselves (Koppleman, 1980).

Research on Learning Styles

Learning style research has been applied at an alarming rate in education (Doebler & Eckle, 1979). With learning styles being a highly prioritized concept, an ample amount of research has been conducted developing many “gurus” within the subject.
Whittington and Raven (1995) studied learning and teaching styles of student teachers in the northwest. Whittington and Raven (1995) found that the female agricultural education student teachers in the study were more Field Independent than females in the general population. In addition, Montana State University and University of Idaho preservice agricultural education student teachers favored the Field Independent learning style (Whittington & Raven, 1995).

Cano and Metzger (1995) looked at the relationship between learning styles and levels of cognition of instruction of horticulture teachers. From the data it was found that the horticulture teachers in the study preferred the Field Independent learning style. Females who did not teach agricultural subjects did not prefer this style (Witkin, Otman, Raskin, & Karp, 1971).

McCutcheon (1997) researched the learning styles among selected Ohio 4-H adolescents. McCutcheon (1997) stated that learning styles were not related to age, gender, and length of tenure in the 4-H program. Furthermore, the relationship between enjoyment of activity and learning style preference was significant at the local level but there was no significance at the county, state, and national levels (McCutcheon, 1997).

Hudson (1997) studied the relationship between learning style and selected characteristics of Northeast District Ohio State University extension agents. Hudson (1997) found that the agents participating in the study leaned toward the Field Independent learning style. However, white participants were more Field-Independent, while the African-Americans and the Hispanic participants were more Field Dependent (Hudson, 1997). Hudson (1997) found that the mean age of Extension Agents was 42.88
with a standard deviation of 9.26. Furthermore, the mean length of employment was 11.22 years with a standard deviation of 8.28.

Estadt (1997) researched the relationship between learning styles and personality types of students enrolled in an agricultural teaching methods class at The Ohio State University. The data indicated that 70 percent of the students enrolled in the methods course were Field Independent learners. The male students were more apt to be Field Independent than were females, but the association was insignificant (Estadt, 1997).

Kitchel (1999) looked at the relationship between learning style and personality type of students majoring and minoring in agricultural education at The Ohio State University. The results indicated certain patterns in agricultural education majors and minors at The Ohio State University from 1990 to 1999. The students were Field Independent for the most part.

Hawk (1999) focused on the relationship between learning styles and 4-H participation. The data showed that there was a significant relationship between cognitive styles and level of enjoyment with 4-H project areas. However, Field Dependent 4-H members tended to enjoy participating in their projects more than Field Independent members.

The latest research in agricultural education was conducted by Starkey (2000) looking at learning styles and cognitive ability of Oak Harbor High School agricultural education students. Starkey (2000) found that cumulative grade point average was significantly related to the scores on the Group Embedded Figures Test.
McCutcheon (1997) stated that much of the research on learning styles has focused upon the formal educational setting. However, it must be recognized that informal settings also provide an ample amount of learning. In order for education to be successful, extension agents must be informed of the many aspects of learning style. It is necessary that the learning style in the informal setting be explored (McCutcheon, 1997).
CHAPTER 3

METHODOLOGY

Research Design

The design of this study was descriptive and correlational. The purpose of the study was to describe West Virginia University Agricultural and Natural Resources Extension agents in terms of their age, gender, highest degree earned and length of employment with West Virginia University. The information gathered determined the relationships between these characteristics and the learning style of the agents. The aim of the descriptive research was to describe and interpret what existed with relationships among desired characteristics (Ary, Jacobs, & Razavieh, 1985).

Population and Sample

The population for this study was West Virginia University Agricultural and Natural Resource Extension Agents (N = 34). Names of the subjects were obtained from the West Virginia University Extension Personnel Directory and they functioned as the frame for the study. Of the 34 (N = 34) West Virginia University Agricultural and Natural Resource Agents, a total of (n = 29) subjects participated in the study. The
accessible population (n = 29) was determined due to time and funding that the researcher had available. Therefore, the study was generalizable only to those subjects who participated in the data collection.

**Instrumentation**

One (1) standardized instrument and one (1) information sheet was used for data collection. The Group Embedded Figures Test (GEFT), a standardized measure of learning style, was utilized to evaluate agents’ learning styles. The GEFT was administered to West Virginia University Agricultural and Natural Resource Extension Agents. The GEFT was administered following the guidelines in the *Manual: Embedded Figures Test* (Witkin, Oltman, Raskin, & Karp, 1971). The GEFT is made up of three sections. The first section was not scored, just practice. Section I was made up of seven simple geometric figures. The agents were given two minutes to complete the first section. The second and third sections contained nine geometric figures each, which were more complex. The agents were given five minutes to complete each of the two sections. The subjects were scored on the eighteen items, which assessed the subjects’ learning styles. Scoring was achieved by adding the two sections together (Section II and III), with scores ranging from 0-18. Individuals with a score greater than the national mean of 11.4 were considered to be field independent while individuals with scores less than the national mean were labeled field dependent (Witkin, Oltman, Raskin, & Karp, 1971).
The validity of the Group Embedded Figures Test has been established through standardized studies by the author (Witkin, 1971). These studies have also established reliability. The reliability coefficient for the GEFT was .82. Validity of the Embedded Figures test was .82 for males and .63 for females (Witkin et al., 1971).

A brief information sheet was developed by the researcher to gather demographical data from the West Virginia University Agricultural and Natural Resource Extension Agents in the study. Data gathered by this instrument were age, gender, county of employment, highest educational degree obtained and length of employment with WVU Extension.

Data Collection Procedures

Data for the study were collected at the Annual Spring Meeting for West Virginia University Agricultural and Natural Resource Agents on April 6, 2001. The subjects were given a brief introduction, to be assured of the strict confidentiality of the results of the study. Following the brief introduction subjects were administered an informational sheet. Following the information sheet, the researcher and one assistant administered the Group Embedded Figures Test (GEFT) to 21 West Virginia University Agricultural and Natural Resource Agents. The researcher and assistant observed subjects during the administration of the instrument in order to address any unacceptable behaviors. No disruptive or unacceptable behaviors were observed.

The data was also collected on April 13, 2001, in the Jackson County Extension Office from two West Virginia University Agricultural and Natural Resource Agents. On
April 16, 2001, data was collected from four West Virginia University Agricultural and Natural Resource Agents in their county offices. Furthermore, on April 23, 2001, data was collected from two West Virginia University Agricultural and Natural Resource Agents in their county offices. The subjects were given a brief introduction, to be assured of the strict confidentiality of the results of the study. Following the brief introduction, subjects were administered an informational sheet. Following the informational sheet, the researcher administered the Group Embedded Figures Test (GEFT) to all the West Virginia University Agricultural and Natural Resources Extension Agents at their respective locations. The researcher observed subjects during the administration of the instrument in order to address any unacceptable behaviors. No disruptive or unacceptable behaviors were observed.

**Data Analysis**

To organize and summarize the data, descriptive and correlational statistics were used. Each individual was to respond to eighteen scorables items in the GEFT. The GEFT was hand scored by the researcher. The number correct was determined and entered as a raw score. The raw scores were coded and entered into the Statistical Package for the Social Science (SPSS).

A brief information sheet was developed by the researcher to gather information pertaining to age, gender, highest degree earned, and length of employment. The various characteristics were coded and entered into SPSS. An alpha level of .05 was set a priori.
Davis' (1971) conventions were used to describe the strength of the relationships reported in the study between the information gathered and learning styles:

<table>
<thead>
<tr>
<th>COEFFICIENT</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>.70 or greater</td>
<td>Very Strong Relationship</td>
</tr>
<tr>
<td>.50 to .69</td>
<td>Substantial Relationship</td>
</tr>
<tr>
<td>.30 to .49</td>
<td>Moderate Relationship</td>
</tr>
<tr>
<td>.10 to .29</td>
<td>Low Relationship</td>
</tr>
<tr>
<td>.01 to .09</td>
<td>Negligible Relationship</td>
</tr>
</tbody>
</table>

Table 3.1  Davis' Correlation Descriptions (Davis, 1971)
CHAPTER 4
FINDINGS

The purpose of this study was to examine the learning style of West Virginia University County Extension agents within the program area of Agriculture and Natural Resources. Furthermore, the study sought to correlate learning style to demographical data such as age, gender, highest degree earned, and length of employment with West Virginia University.

Chapter 4 contains the findings of the study. The findings of the study are presented in order of the objectives of the study. The content of the chapter includes: 1) Agents' Demographical Characteristics; 2) Agents' Learning Style; 3) Comparisons of Demographical Characteristics and Learning Style; 4) Correlations of Agent’s Learning Style and Demographical Characteristics.
Demographical Characteristics

Demographical data were collected on 29 West Virginia University Agricultural and Natural Resources Extension Agents during Spring Quarter, 2001. The demographical data included age, gender, highest educational degree obtained, and length of employment with West Virginia University Extension. The ensuing results indicated the findings of the demographical data.

The data indicated that the age of West Virginia University Agricultural and Natural Resources Extension Agents ranged from 24-61 years of age. The mean age for the agents was 42.79 years with a standard deviation of 9.23. Further analysis of data indicated that 17.2% (5) of West Virginia University Agricultural and Natural Resources Extension Agents were between the ages of 24 and 33, 31% (9) were between the ages of 34 and 43, 37.9% (11) were between 44 and 53, and 13.8% (4) were between 54-63 years of age (Table 4.1). Furthermore, a gender analysis revealed that of the 29 West Virginia University Agricultural and Natural Resources Extension Agents who were involved in the study, 17.2% (5) were female, and 82.8% (24) were male (Table 4.2).

<table>
<thead>
<tr>
<th>Age</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>24-33</td>
<td>5</td>
<td>17.2</td>
</tr>
<tr>
<td>34-43</td>
<td>9</td>
<td>31</td>
</tr>
<tr>
<td>44-53</td>
<td>11</td>
<td>37.9</td>
</tr>
<tr>
<td>54-63</td>
<td>4</td>
<td>13.8</td>
</tr>
<tr>
<td>Total</td>
<td>29</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Mean = 42.79  
Standard Deviation = 9.23

Table 4.1: Age in Years of West Virginia University Agricultural and Natural Resources Extension Agents (n = 29)
<table>
<thead>
<tr>
<th>Gender</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>5</td>
<td>17.2</td>
</tr>
<tr>
<td>Male</td>
<td>24</td>
<td>82.8</td>
</tr>
<tr>
<td>Total</td>
<td>29</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Table 4.2: Gender of West Virginia University Agricultural and Natural Resources Extension Agents (n = 29)

The data indicated that 89.7% (26) of the West Virginia University Agricultural and Natural Resources Extension Agents had their Masters of Science Degree, 3.4% (1) had a Masters of Art Degree, and 6.9% (2) had obtained a doctorate degree (Table 4.3). Furthermore, length of employment analysis indicated that West Virginia University Agricultural and Natural Resources Extension Agents length of employment with West Virginia University Extension ranged from 1 to 31 years. The mean length of employment for the agents was 11.53 years, with a standard deviation of 8.59 years. Further analysis of the data indicated that 17.2% (5) West Virginia University Agricultural and Natural Resources Extension agents had been employed by West Virginia University Extension between 0 and 4 years, 34.5% (10) had been employed 5 to 9 years, 24.1% (7) had been employed 10 to 14 years, 13.8% (4) had been employed 20 to 24 years, and 3.4% (1) had been employed 30 to 34 years (Table 4.4).
<table>
<thead>
<tr>
<th>Highest Educational Degree</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Master’s of Science</td>
<td>26</td>
<td>89.7</td>
</tr>
<tr>
<td>Master’s of Art</td>
<td>1</td>
<td>3.4</td>
</tr>
<tr>
<td>Doctorate Degree</td>
<td>2</td>
<td>6.9</td>
</tr>
<tr>
<td>Total</td>
<td>29</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Table 4.3: Highest Educational Degree Obtained by West Virginia University Agricultural and Natural Resources Extension Agents (n = 29)

<table>
<thead>
<tr>
<th>Length of Employment with WVU Extension</th>
<th>Frequency</th>
<th>Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-4 years</td>
<td>5</td>
<td>17.2</td>
<td>17.2</td>
</tr>
<tr>
<td>5-9 years</td>
<td>10</td>
<td>34.5</td>
<td>51.7</td>
</tr>
<tr>
<td>10-14 years</td>
<td>7</td>
<td>24.2</td>
<td>75.9</td>
</tr>
<tr>
<td>20-24 years</td>
<td>4</td>
<td>13.8</td>
<td>89.7</td>
</tr>
<tr>
<td>25-29 years</td>
<td>2</td>
<td>6.9</td>
<td>96.6</td>
</tr>
<tr>
<td>30-34 years</td>
<td>1</td>
<td>3.4</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>29</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

Mean = 11.53  
Standard Deviation = 8.59

Table 4.4: West Virginia University Agricultural and Natural Resources Extension Agents Length of Employment with West Virginia University (n = 29)

Agents’ Learning Style

The Group Embedded Figures Test (GEFT) was administered to 29 West Virginia University Agricultural and Natural Resources Extension Agents in order to measure learning style. An individual’s score on the GEFT determined that individual’s learning style. Learning style was labeled as either field dependent or field independent. Possible
scores were between 0 and 18. If the individual's score on the GEFT was less than the national mean of 11.4, the individual was determined to have a field dependent learning style (Witkin, Oltman, Raskin, & Karp, 1971). Furthermore, if an individual scored greater than the national mean of 11.4, the individual was considered to have a field independent learning style (Witkin et al., 1971).

The data indicated that the West Virginia University Agricultural and Natural Resources Extension Agents, who participated in the study, had a mean score on the GEFT of 9.69, with a standard deviation of 5.31 (Table 4.5). Furthermore, the majorities, 55.2% (16), were field dependent in their learning style, whereas 44.8% (13) were field independent in their learning style (Table 4.6).
<table>
<thead>
<tr>
<th>Learning Style Score</th>
<th>Frequency</th>
<th>Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1</td>
<td>3.4</td>
<td>3.4</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>3.4</td>
<td>6.9</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>6.9</td>
<td>13.8</td>
</tr>
<tr>
<td>3</td>
<td>1</td>
<td>3.4</td>
<td>17.2</td>
</tr>
<tr>
<td>4</td>
<td>2</td>
<td>6.9</td>
<td>24.1</td>
</tr>
<tr>
<td>5</td>
<td>1</td>
<td>3.4</td>
<td>27.6</td>
</tr>
<tr>
<td>6</td>
<td>0</td>
<td>0.0</td>
<td>27.6</td>
</tr>
<tr>
<td>7</td>
<td>2</td>
<td>6.9</td>
<td>34.5</td>
</tr>
<tr>
<td>8</td>
<td>2</td>
<td>6.9</td>
<td>41.4</td>
</tr>
<tr>
<td>9</td>
<td>1</td>
<td>3.4</td>
<td>44.8</td>
</tr>
<tr>
<td>10</td>
<td>2</td>
<td>6.9</td>
<td>51.7</td>
</tr>
<tr>
<td>11</td>
<td>1</td>
<td>3.4</td>
<td>55.2</td>
</tr>
<tr>
<td>12</td>
<td>2</td>
<td>6.9</td>
<td>62.1</td>
</tr>
<tr>
<td>13</td>
<td>1</td>
<td>3.4</td>
<td>65.5</td>
</tr>
<tr>
<td>14</td>
<td>3</td>
<td>10.5</td>
<td>75.9</td>
</tr>
<tr>
<td>15</td>
<td>3</td>
<td>10.5</td>
<td>86.2</td>
</tr>
<tr>
<td>16</td>
<td>2</td>
<td>6.9</td>
<td>93.1</td>
</tr>
<tr>
<td>17</td>
<td>2</td>
<td>6.9</td>
<td>100.0</td>
</tr>
<tr>
<td>18</td>
<td>0</td>
<td>0.0</td>
<td>100.0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>29</strong></td>
<td><strong>100.0</strong></td>
<td></td>
</tr>
</tbody>
</table>

Mean = 9.69  
Standard Deviation = 5.31

Table 4.5  Group Embedded Figures Test (GEFT) Scores of West Virginia University Agricultural and Natural Resources Extension Agents (n = 29)
<table>
<thead>
<tr>
<th>Learning Style</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Field Dependent</td>
<td>16</td>
<td>55.2</td>
</tr>
<tr>
<td>Field Independent</td>
<td>13</td>
<td>44.8</td>
</tr>
<tr>
<td>Total</td>
<td>29</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Table 4.6 West Virginia University Agricultural and Natural Resources Extension Agents Learning Style (n = 29)

Comparison of Demographical Characteristics and Learning Styles

An analysis of gender indicated that the West Virginia University Agricultural and Natural Resources Extension male agents were split evenly between field independent (50%) and field dependent (50%) (Table 4.7). The analysis indicated that 80% (4) of the female West Virginia University Agricultural and Natural Resources Extension agents were field dependent in their learning style, while 20% (1) were field independent in their learning style (Table 4.7).

<table>
<thead>
<tr>
<th>Males Learning Style</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Field Dependent</td>
<td>12</td>
<td>50.0</td>
</tr>
<tr>
<td>Field Independent</td>
<td>12</td>
<td>50.0</td>
</tr>
<tr>
<td>Total</td>
<td>24</td>
<td>100.0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Females Learning Style</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Field dependent</td>
<td>4</td>
<td>80.0</td>
</tr>
<tr>
<td>Field independent</td>
<td>1</td>
<td>20.0</td>
</tr>
<tr>
<td>Total</td>
<td>5</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Table 4.7 West Virginia University Male and Female Agricultural and Natural Resources Extension Agent’s Learning Style (24)
The West Virginia University Agricultural and Natural Resources Extension

Agents were grouped into four age categories: 1) 24-33; 2) 34-43; 3) 44-53; and, 4) 54-63 years of age. An analysis of the agents’ scores on the GEFT indicated a GEFT mean score for the agents between the age of 24 and 33 to be 14.40, with a standard deviation of 1.52. GEFT scores for the age group of 34 to 43 yielded a mean score of 11.00, with a standard deviation of 4.58. The 44 to 53 age group had a mean score was 7.45, with a standard deviation of 5.63. For the 54 to 63 age group, the mean score was 7.00, with a standard deviation of 5.35 (Table 4.8).

<table>
<thead>
<tr>
<th>Age</th>
<th>Frequency</th>
<th>Mean</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>24-33</td>
<td>5</td>
<td>14.40</td>
<td>1.5</td>
</tr>
<tr>
<td>34-43</td>
<td>9</td>
<td>11.00</td>
<td>4.6</td>
</tr>
<tr>
<td>44-53</td>
<td>11</td>
<td>7.50</td>
<td>5.6</td>
</tr>
<tr>
<td>54-63</td>
<td>4</td>
<td>7.00</td>
<td>5.4</td>
</tr>
<tr>
<td>Total</td>
<td>29</td>
<td>9.70</td>
<td>5.3</td>
</tr>
</tbody>
</table>

Table 4.8   West Virginia University Agricultural and Natural Resources Extension
Agent’s Mean GEFT Score and Standard Deviation by Age (n = 29)

<table>
<thead>
<tr>
<th>Age</th>
<th>Field Dependent Frequency</th>
<th>Field Dependent Percent</th>
<th>Field Independent Frequency</th>
<th>Field Independent Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>24-33</td>
<td>0</td>
<td>0.0</td>
<td>5</td>
<td>100</td>
</tr>
<tr>
<td>34-43</td>
<td>5</td>
<td>55.6</td>
<td>4</td>
<td>44.4</td>
</tr>
<tr>
<td>44-53</td>
<td>8</td>
<td>72.7</td>
<td>3</td>
<td>27.3</td>
</tr>
<tr>
<td>54-63</td>
<td>3</td>
<td>75.0</td>
<td>1</td>
<td>25.0</td>
</tr>
</tbody>
</table>

Table 4.9   West Virginia University Agricultural and Natural Resources Extension
Agent’s Learning Style by Age (n = 29)
An analysis of the West Virginia University Agricultural and Natural Resources Extension Agents’ learning style by highest degree obtained indicated that 26 individuals had obtained a Master’s of Science. Of those twenty-six, 53.8% (14) were field dependent in their learning style, and 46.2% (12) were field independent in their learning style (Table 4.10). One individual whose highest degree obtained was a Master’s of Art Degree yielded a field independent learning style score (Table 4.10). The two individuals whose highest degree obtained was a Doctorate Degree, indicated a field dependent learning style (Table 4.10).

<table>
<thead>
<tr>
<th>Highest Degree Obtained</th>
<th>Field Dependent Frequency</th>
<th>Field Dependent Percent</th>
<th>Field Independent Frequency</th>
<th>Field Independent Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Master’s of Science</td>
<td>14</td>
<td>53.8</td>
<td>12</td>
<td>46.2</td>
</tr>
<tr>
<td>Master’s of Art</td>
<td>0</td>
<td>0.0</td>
<td>1</td>
<td>100.0</td>
</tr>
<tr>
<td>Doctoral Degree</td>
<td>2</td>
<td>100.0</td>
<td>0</td>
<td>0.0</td>
</tr>
</tbody>
</table>

Table 4.10 West Virginia University Agricultural and Natural Resources Extension Agents Learning Style by Highest Degree Obtained (n = 29)

Correlations of Agents’ Learning Style and Demographical Characteristics

A Phi coefficient was calculated to describe the relationship between West Virginia University Agricultural and Natural Resources Extension Agents’ learning style and the nominal dichotomous variable gender. The Learning Style was grouped according to the scores that the West Virginia University Agricultural and Natural Resources Extension Agents’ scored on the GEFT. Agents who scored between 0 and 11
were labeled 1 (field dependent) and those who scored between 12 and 18 were labeled 2 (field independent). The relationship's magnitude was interpreted using Davis' (1971) conventions. The correlations were based on the sample of 29 West Virginia University Agricultural and Natural Resources Extension Agents. The relationship between the West Virginia University Agricultural and Natural Resources Extension Agents' gender and GEFT score had a low relationship (.20) (Table 4.11).

<table>
<thead>
<tr>
<th>Learning Style</th>
<th>Gender</th>
<th>Age</th>
<th>Highest Degree Earned</th>
<th>Length of Employment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>20</td>
<td>.50</td>
<td>.30</td>
<td>.70</td>
</tr>
</tbody>
</table>

Table 4.11  West Virginia University Agricultural and Natural Resources Extension Agent's Correlations Between GEFT Score and Gender, Age, Highest Degree Earned and Length of Employment.

The relationship between learning style and age was calculated using the Cramer's V statistic (Hays, 1988). Learning style was grouped pertaining to the West Virginia University Agricultural and Natural Resources Extension Agents' scores on the GEFT. Agents who scored between 0 and 11 were labeled 1 (field dependent) and those who scored between 12 and 18 were labeled 2 (field independent). Age in years of the West Virginia University Agricultural and Natural Resources Extension Agents was grouped into 4 age categories: 1) 24-33; 2) 34-43; 3) 44-53; and, 4) 54-63 years of age. The Cramer's V statistic indicated a coefficient of .50, which showed a substantial relationship between learning style and age (Table 4.11).
To describe the relationship between learning style and highest degree obtained by West Virginia University Agricultural and Natural Resources Extension Agents, the Cramer’s V statistic was utilized (Hays, 1988). Learning style score was grouped into two categories: field dependent (1) and field independent (2). The highest degree obtained had three levels: Master’s of Science (1), Master’s of Art (2), and Doctorate (3). The correlation between learning style and highest degree obtained was moderate (.30) (Table 4.11).

The learning style of West Virginia University Agricultural and Natural Resources Extension Agents was grouped into two categories: agents who scored between 0 and 11 were labeled as field dependent (1), and agents who scored between 12 and 18 were labeled as field independent (2). Length of employment was categorized into (6) groups: 0-4 years (1); 5-9 years (2); 10-14 years (3); 20-24 years (4); 25-29 years (5); and, 30-34 years (6). The relationship between the dichotomous nominal variable learning style of West Virginia University Agricultural and Natural Resources Extension Agents, and the multichotomous ordinal variable, length of employment by West Virginia University, was calculated using Cramers V statistic. The correlation coefficient between learning style and length of employment was very strong (.70) (Table 4.11).
CHAPTER 5

SUMMARY, CONCLUSIONS, IMPLICATIONS, AND RECOMMENDATIONS

The purpose of the study was to describe West Virginia University Agricultural and Natural Resources Extension agents in terms of their age, gender, highest degree earned and length of employment with West Virginia University. The information gathered determined the relationships between these characteristics and the learning style of the agents. The aim of the descriptive research was to describe and interpret what existed with relationships among desired characteristics (Ary, Jacobs, & Razavieh, 1985).

The following research objectives were addressed:

1. Describe West Virginia University Extension Agricultural and Natural Resource Agents by selected demographical characteristics (age, gender, highest degree earned, length of employment with West Virginia University).

2. Determine the learning style of West Virginia University Agricultural and Natural Resource Extension Agents.

3. Describe the relationship between selected characteristics of West Virginia University Agricultural and Natural Resource Extension Agents and their learning style.
Summary of Findings

Demographical data were collected on 29 West Virginia University Agricultural and Natural Resources Extension Agents during Spring Quarter, 2001. The demographical data that was collected included age, gender, highest educational degree obtained, and length of employment with West Virginia University Extension. The ensuing results indicated the findings of the demographical data.

Demographical Data

The data indicated that the age of West Virginia University Agricultural and Natural Resources Extension Agents' ranged from 24-61 years of age. The mean age for the agents was 42.79 years with a standard deviation of 9.23. Further analysis of data indicated that 17.2% (5) of West Virginia University Agricultural and Natural Resources Extension Agents were between the ages of 24 and 33, 31% (9) were between the ages of 34 and 43, 37.9% (11) were between 44 and 53, and 13.8% (4) were between 54-63 years of age (Table 4.1). Furthermore, a gender analysis revealed that of the 29 West Virginia University Agricultural and Natural Resources Extension Agents who were involved in the study 17.2%, (5) were female, and 82.8% (24) were male.

The data indicated that 89.7% (26) of the West Virginia University Agricultural and Natural Resources Extension Agents had their Masters of Science Degree, 3.4% (1) had a Masters of Art Degree, and 6.9% (2) had obtained a doctorate degree (Table 4.3). Furthermore, length of employment analysis indicated that West Virginia University Agricultural and Natural Resources Extension Agents' length of employment with West Virginia University Extension ranged from 1 to 31 years. The mean length of
employment for the agents was 11.53 years, with a standard deviation of 8.59 years. Further analysis of the data indicated that 17.2% (5) West Virginia University Agricultural and Natural Resources Extension agents had been employed by West Virginia University Extension between 0 and 4 years, 34.5% (10) had been employed 5 to 9 years, 24.1% (7) had been employed 10 to 14 years, 13.8% (4) had been employed 20 to 24 years, and 3.4% (1) had been employed 30 to 34 years.

Agents' Learning Style

The Group Embedded Figures Test (GEFT) was administered to 29 West Virginia University Agricultural and Natural Resources Extension Agents in order to measure learning style. An individual's score on the GEFT determined that individual's learning style. Learning style was labeled as either field dependent or field independent. Possible scores were between 0 and 18. If the individual's score on the GEFT was below the national mean of 11.4, the individual was determined to have a field dependent learning style (Witkin, Oltman, Raskin, & Karp, 1971). Furthermore, if an individual scored above the national mean of 11.4, the individual was considered to have a field independent learning style (Witkin et al., 1971).

The data indicated that the West Virginia University Agricultural and Natural Resources Extension Agents, who participated in the study, had a mean score on the GEFT of 9.69, with a standard deviation of 5.31. Furthermore, the majorities, 55.2% (16), were field dependent in their learning style, whereas 44.8% (15) were field independent in their learning style.
Correlations of Agents' Learning Style and Demographical Characteristics

A Phi coefficient was calculated to describe the relationship between West Virginia University Agricultural and Natural Resources Extension Agents' learning style and the nominal dichotomous variable gender. Learning style was grouped according to the scores that the West Virginia University Agricultural and Natural Resources Extension Agents' scored on the GEFT. Agents who scored between 0 and 11 were labeled 1 (field dependent) and those who scored between 12 and 18 were labeled 2 (field independent). The relationship's magnitude was interpreted using Davis' (1971) conventions. The correlations were based on the sample of 29 West Virginia University Agricultural and Natural Resources Extension Agents. The relationship between the West Virginia University Agricultural and Natural Resources Extension Agents' gender and GEFT score had a low relationship (.20).

The relationship between learning style and age was calculated using the Cramer's V statistic (Hays, 1988). The learning styles were grouped pertaining to scores that the West Virginia University Agricultural and Natural Resources Extension Agents' scored on the GEFT. Agents who scored between 0 and 11 were labeled 1 (field dependent) and those who scored between 12 and 18 were labeled 2 (field independent). Age in years of the West Virginia University Agricultural and Natural Resources Extension Agents were grouped into 4 age categories: 1) 24-33; 2) 34-43; 3) 44-53; and, 4) 54-63 years of age. The Cramer's V statistic indicated a coefficient of .50, which showed a substantial relationship between learning style and age.
To describe the relationship between learning style and highest degree obtained by West Virginia University Agricultural and Natural Resources Extension Agents, the Cramer’s V statistic was utilized (Hays, 1988). Learning style scores were grouped in two categories: field dependent and field independent. The highest degree obtained had three levels: Master’s of Science, Master’s of Art, and Doctorate. The correlation between learning style and highest degree obtained was moderate (.30).

The learning style of West Virginia University Agricultural and Natural Resources Extension Agents was grouped into two categories those agents who scored between 0 and 11 were labeled as field dependent and those agents who scored between 12 and 18 as field independent. Length of employment was categorized into (6) groups: 0-4 years; 5-9 years; 10-14 years; 20-24 years; 25-29 years; and, 30-34 years. The relationship between the dichotomous nominal variable learning style of West Virginia University Agricultural and Natural Resources Extension Agents, and the multichotomous ordinal variable, length of employment by West Virginia University, was calculated using Cramer’s V statistic. The correlation coefficient between learning style and length of employment was very strong (.70).
Conclusions

The following conclusions were drawn from the findings of the study.

1. The majority of West Virginia University Agricultural and Natural Resources Extension Agents were between 24-61 years of age. The mean age for the agents was 42.79. Furthermore, males were the largest group of West Virginia University Agricultural and Natural Resources Extension Agents. The majority of West Virginia University Agricultural and Natural Resources Extension Agents had obtained a Masters of Science Degree. West Virginia University Agricultural and Natural Resources Extension Agents ranged from 1 to 31 years of employment with West Virginia University Extension. Furthermore, West Virginia University Agricultural and Natural Resources Extension Agents had a mean of 11.53 years of employment with West Virginia University Extension.

2. The majority of West Virginia University Agricultural and Natural Resources Extension Agents were field dependent. The Group Embedded Figures Test (GEFT) mean score for the agents was 9.69 out of a possible eighteen (18). West Virginia University Agricultural and Natural Resources male Extension Agents were split evenly between field independent and field dependent. The majority of female West Virginia University Agricultural and Natural Resources Extension Agents were field dependent. The Field Dependent individual needs a close working relationship with the instructor. The need for the working relationship with the instructor fills the social context needed by the learner (Estadt, 1997). Field Dependent learners value the guidance of instructors; they seek out
instructor’s support in decision-making, and strive for that reward from the teacher (Cano, 1993). Field Dependent learners will become involved in the learning process when others become involved with them due to the extrinsic motivation factor (Estadt, 1997)

3. A low relationship (Davis, 1971) was found between West Virginia University Agricultural and Natural Resources Extension Agents learning style and gender. The data indicated a substantial relationship (Davis, 1971) between West Virginia University Agricultural and Natural Resources Extension Agents learning style and age. Furthermore, as West Virginia University Agricultural and Natural Resources Extension Agents’ age increased, GEFT mean scores tended to decrease. However, the 24-33 age group are all field independent. West Virginia University Agricultural and Natural Resources Extension Agents’ learning style and highest degree obtained indicated a moderate relationship (Davis, 1971). A very strong relationship (Davis, 1971) was found between West Virginia University Agricultural and Natural Resources Extension Agents’ learning style and length of employment.

**Implications**

Individuals with a score greater than the national mean of 11.4 were considered to be field independent, while individuals with scores below the national mean were labeled field dependent (Witkin, Oltman, Raskin, & Karp, 1971). A mean score of 9.69 implied that West Virginia University Agricultural and Natural Resources Extension Agents had
a field dependent learning style. The range of scores varied from 0 to 17, indicating that West Virginia University Agricultural and Natural Resources Extension Agents ranged from a dominant field dependent learning style to a dominant field independent learning styles. Furthermore, since the majority of West Virginia University Agricultural and Natural Resources Extension Agents were field dependent, they perceive objects as part of the global world (Reiff, 1992). Cano (1993) referred that Field Dependent learners’ experiences were obtained in a global fashion while remaining to the structure provided through their surroundings. In addition, Field Dependent learners found it difficult with task-oriented subjects, becoming frustrated quickly. Field Dependent learners tend to give up easily and become uninterested when the task is too hard (Cano, 1993). Since Field Dependent learners were unable to break down complicated tasks, they were considered poor analytic problem solvers (Cano, 1993).

Witkin (1948) indicated that females were more field dependent. Hudson (1997) found that female extension agents in Ohio leaned more toward field dependent. Furthermore, since the majority of female West Virginia University Agricultural and Natural Resources Extension Agents were field dependent it could be implied that gender does play a role determining learning styles.

The data indicated a substantial relationship (Davis, 1971) between West Virginia University Agricultural and Natural Resources Extension Agents learning style and age. Furthermore, as West Virginia University Agricultural and Natural Resources Extension Agents age increased, GEFT mean scores tended to decrease. Furthermore, it can be implied as age increases so does field dependency. This is supported with previous
research (Crosson, 1984) that found field independence declines with age. The older generation indicates field dependence for the need of socialization, which may indicate that job satisfaction, is greater allowing for a longer length of employment. Whereas, a West Virginia University Agricultural and Natural Resources Extension Agent job does not look appealing to the younger field independent generation. The data indicated a very strong relationship (Davis, 1971) between West Virginia University Agricultural and Natural Resources Extension Agents learning style and length of employment. Furthermore, as West Virginia University Agricultural and Natural Resources Extension Agents length of employment increases field independence declines.

Recommendations

1. West Virginia University Extension Agents statewide should take the Group Embedded Figures Test to establish their learning style. Furthermore, all agents should receive training regarding learning styles.

2. West Virginia University Agricultural and Natural Resources Extension Agents should consider learning style preference when planning instruction.

3. West Virginia University Agricultural and Natural Resources Extension Agents should have knowledge about their audiences’ different learning styles.
4. West Virginia University Agricultural and Natural Resources 
   Extension Agents should develop programs (context vs. delivery) that 
   will interest diverse learning styles.

5. West Virginia University Extension should recruit future employees for 
   characteristics of a field dependent learner if advisable.

6. Inform West Virginia University Extension Advisory committees of 
   learning style research.

**Recommendations for Further Research**

1. The current study should be replicated with other West Virginia University 
   Extension Agents.

2. The current study should be replicated with audiences that West Virginia 
   University Extension Agents teach.

3. The current study should be replicated in other states besides West Virginia and 
   Ohio to see if culture plays a role in learning styles.

4. The current study should be replicated with more information being assessed, 
   such as level of job satisfaction.

5. The current study should be replicated with other Agricultural and Natural 
   Resource agencies.

6. The five field independent 24-33 year old agents should be studied in 10 years.
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