A Comparison of Learning Styles, Teaching Styles, and Personality Styles of Preservice Montana and Ohio Agriculture Teachers

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Educational researchers have shown that not all students learn the same (Witkin, 1973; Gregorc, 1979; Jacobs, 1990). Students are unique in their own ways, including the way they learn. The characteristics of students teachers are just as diverse as those of the students. Researchers (Gregorc, 1979; Gregorc & Guild, 1984) suggest that the learning style, teaching style, and personality style of teachers have implications for student learning. Studies have investigated the selected teacher characteristics of learning style (Avery, 1985; Gregorc, 1979; Jacobs, 1990;Witkin, 1973; Zippert, 1985), teaching style (Avery, 1985; Dunn & Dunn, 1979; Witkin, 1973; Gregorc, 1979; Koppleman, 1980), and personality style (Lawrence, 1984; Myers & Myers, 1989; Hoffman & Betkouski, 1981; DeNovellis & Lawrence, 1983). Cano, Garton, and Raven (1991) concluded that despite the amount of related research regarding learning styles, teaching styles, and personality styles, agricultural teacher educators were unable to fully utilize the results because agriculture teachers were not included in the samples of previous research.

Individuals have the basic capability to learn and to teach; however, they are not able to learn and teach effectively in the same exact way (Gregorc, 1979). Dunn and Dunn (1979) cited that not only do students learn in considerably different ways, but certain students succeed only through selected teaching methods. Traditionally, agricultural education has relied on the problem-solving approach for classroom instruction. The question that arises is how does the use of problem-solving interact with learners' and teachers' characteristics?

Ronning, McCurdy, and Ballinger (1984) argued that problem-solving must consider at least three dimensions: knowledge domain, problem-solving methods, and characteristics of learners. Ronning et al. (1984) contended that the first two dimensions (knowledge domain and problem-solving methods) were widely accepted as essential for problem-solving, but there were no theories of problem-solving which took into account systematic individual differences. Ronning et al. (1984) concluded that modification of problem-solving instruction in ways consistent with students' learning styles seems an inevitable consequence.

One dimension not considered by Ronning et al. (1984) was the characteristics of the teachers. Could the learning, teaching, and/or personality style of the teacher impact on the effectiveness of problem-solving? Additionally, despite widespread support for problem-solving and the heavy emphasis placed on the approach by agricultural education preservice programs, recent studies have found that though teachers organize their lessons on a problem-solving basis, they do not generally follow through with actual problem-solving (Boone & Newcomb, 1990; Osborne & Hamzah, 1988).

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Before the relationship between problem-solving and teacher characteristics is investigated, it must be first determined if there are differences among agriculture teachers on the selected characteristics. Cano et al. (1991) found in a study of Ohio preservice agriculture teachers that there were differences in learning styles, teaching styles, and personality styles of preservice teachers of agriculture. However, the study was limited to one university and the authors recommended additional research be conducted concerning possible differences in the characteristics of preservice agriculture teachers.

Theoretical Framework

Learning Style

Garger and Guild (1984) described learning styles as "...stable and pervasive characteristics of an individual, expressed through the interaction of one's behavior and personality as one approaches a learning task (p. 11)." Learning style is an important factor in several areas including students' academic achievement, how students learn and teachers teach, and student-teacher interaction (Witkin, 1973). Cano et al. (1991) stated that not all students learn the same. Since not all students learn the same, it is essential that teachers recognize the learning style differences of their students and teach in a manner in which all learning styles are considered.

In considering learning styles, the influence the surrounding field has on a person's perception of items within the field as well as its impact on the person's intellectual domains and personality traits have been extensively studied. Witkin (1973) has shown that a person who's mode of perception is strongly dominated by the surrounding field is said to be leaning toward a field-dependent learning style. A person who perceives items as more or less separate from the surrounding field leans toward a field-independent learning style.

Individuals with a field-dependent learning style tend to perceive the world in a global fashion. Field-dependent learners are socially oriented and best learn material with a social content. Field-dependent learners require externally defined goals and must be provided with organization. Consequently, they may need more explicit instruction in problem-solving. As teachers, field-dependent learners tend to use student-centered activities. Teachers that are field-dependent are strong in establishing a warm and personal learning environment. Subsequently, field-dependent teachers are less likely to provide negative feedback and evaluation towards the student (Garger & Guild, 1984).

Field-independent learners view the world more analytically. Field-independent learners rely on self-defined goals and self-structured situations. Teachers with a field-independent learning style tend to be more subject-centered in their instruction. Field-independent teachers serve more as a "guide" than a "teacher" for their students. Field-independent teachers place more emphasis on the cognitive aspect of instruction. Furthermore, teachers with a field-independent learning style are more likely to use an inquiry or problem-solving approach to learning due to their analytical perspective (Garger & Guild, 1984).

Regarding field-dependence, Witkin et al. (1971) repeatedly found consistent gender differences. Males tend to be more field-independent than females. Witkin et al. (1971) also found age-related changes in field-dependence over the life span. Witkin et al. (1971) noted that at some point between 24 years of age and old age the process of increasing field-dependence begins. Limited evidence suggests that this point occurs somewhere in the late 30s, after which the rate of change toward greater field-dependence accelerates.

Agricultural education is a male-dominated field. Only in the past 15 years have a number of females entered the profession. Do the women that enter agricultural education have similar learning styles to women in the general population? Results from Cano et al. (1991) suggested that they may differ. Additionally, universities have seen an increase in the number of older students. Montana State labels students that are 25 years or older as "non-traditional" age students. What are the learning styles of "non-traditional" age preservice agriculture teachers? Are there differences among states in terms of the age and gender of preservice teachers and their corresponding learning styles? For purposes of this study the Montana State definition for traditional and non-traditional age students was used.

Teaching Style

Are a teachers teaching styles consistent with their learning styles? Dunn and Dunn (1979) stated that "teachers teach the way they learned (p. 241)". Dunn and Dunn's (1979) conclusion is supported by other researchers (Witkin, 1973; Gregorc, 1979). However, Koppleman (1980) commented that there is a lack of research concerning the influence of a person's learning style on their teaching style.

Van Tilburg and Heimlich (Heimlich, 1990), in an attempt to describe an individual's teaching style, defined two domains, sensitivity and inclusion. The sensitivity domain is based on the ability of the teacher to sense the shared characteristics of the learners. The inclusion domain is based on the teacher's willingness and ability to utilize instructional strategies that take advantage of the group's characteristics. An individual can be classified into one of four teaching styles based on their sensitivity and inclusion scores.

The low inclusion and low sensitivity quadrant is labeled "expert". The "expert" teacher is subject oriented and tends to use the lecture method of instruction. Teachers scoring in the low inclusion and high sensitivity quadrant are termed "providers". "Providers" are learner-centered and seek to teach effectively. "Providers" tend to use group discussion, demonstrations, and guided activities. The quadrant defined by high inclusion and low sensitivity is labeled "facilitator". Teachers falling into the "facilitator" category are teacher-centered and the method of instruction is dictated by the subject matter. Teachers in the final quadrant with scores of high inclusion and high sensitivity are "enablers". "Enablers" are very learner-centered and the learners define both the activity and the process in the learning environment.

Personality Style

The Myers-Briggs Type Indicator (MBTI), a measurement of personality style, has also been used in learning style assessment (Lawrence, 1984; Sugarman, 1985) and teaching style prediction (Myers & Myers 1980; Hoffman & Betkouski, 1981). Once teachers know and understand their own personality characteristics, it thus becomes easier to understand and teach those who are of different personality styles than themselves (DeNovellis & Lawrence, 1983).

The MBTI reports an individual's preferences on four scales. Each scale represents two opposite preferences. The four scales are Extraversion-Introversion Scale (EI), Sensing-Intuition Scale (SN), Thinking-Feeling Scale (TF), and Judgment-Perception Scale (JP). The EI scale describes whether an individual likes to focus his/her attention on the outer or inner world. The SN scale describes how an individual perceives or acquires information; does he/she use his/her senses or does he/she rely on intuition? The TF scale describes how the individual makes decisions or judgments about something either through thinking or feeling. The JP scale describes how an individual orients himself/herself to the outer world by taking primarily a judging attitude or a perceptive attitude.

Purpose and Objectives

The purpose of this study was to compare the learning style, teaching style, and personality style of preservice agriculture teachers at Montana State University (MSU) and The Ohio State University (OSU). The following research questions were used to guide this investigation:

What was the gender and age of preservice agriculture teachers at MSU and OSU?

What was the preferred learning style of preservice agriculture teachers at MSU and OSU as measured by the Group Embedded Figures Test (GEFT)?

What was the preferred teaching style of preservice agriculture teachers at MSU and OSU as measured by the Van Tilburg / Heimlich Teaching Style Preference Inventory (VHTSP)?

What was the preferred personality style of preservice agriculture teachers at MSU and OSU as measured by the Myers-Briggs Type Indicator (MBTI).

Procedure

Population and Sample

The populations for this descriptive study were preservice agriculture teachers in the Department of Agricultural and Technology Education at Montana State University and in the Department of Agricultural Education at The Ohio State University. The MSU sample (n=18) was junior and senior preservice agriculture

teachers enrolled in a methods of teaching agriculture and technology education course during the Fall Semester of 1991. The OSU sample (n=25) was junior and senior preservice agriculture teachers enrolled in a methods of teaching agriculture course during the Spring and Fall Quarters of 1990.

Instrumentation

The Group Embedded Figures Test (GEFT) was administered to determine the preferred learning style of the subjects as either field-dependent or field-independent. Subjects who score above the group mean are considered to be field-independent learners while subjects scoring below the group mean are considered to be field-dependent. The GEFT is considered a standardized instrument and has been tested for validity and reliability (Witkin, Oltman, Raskin, & Karp, 1971).

The Van Tilburg/Heimlich Teaching Style Preference Inventory (VHTSP) was used to ascertain the subjects' preferred teaching style. Although the VHTSP has not been standardized, the instrument has been tested for validity and reliability by its authors (Heimlich, 1990) and has been used extensively providing valid and reliable results.

The Myers-Briggs Type Indicator (MBTI) Form G was used to assess the personality type of the subjects. The MBTI is also considered a standardized instrument that has been tested for validity and reliability (Myers, 1962).

Data Collection and Analysis

All instruments were administered at the beginning of the respective methods courses. The instruments were administered by one of the researchers at each respective university during class sessions. All instruments were hand scored by the researchers and the data were analyzed using SAS. Since the samples were not random only descriptive statistics were used.

Results and Conclusions

The results indicated that there were 61% males (11) and 39% females (7) in the MSU sample while the OSU sample consisted of 72% males (18) and 18% females (7) (Table 1). Two-thirds of the MSU males were non-traditional age students (25 years or older) while over three-fourths of the MSU female students were traditional age (less than 25 years of age). Overall, approximately half the MSU subjects were traditional age students and half were non-traditional age. Conversely, just one-fifth of the OSU subjects were non-traditional age students. Nearly nine out of ten OSU males were traditional age students while the ratio between female traditional and non-traditional age students was two out of three. The MSU sample had a greater proportion of non-traditional age students as well as a greater percentage of female preservice teachers than OSU.

Table 1. Gender and Age of Preservice Teachers (N=43)

Gender	Age: Traditional age f	%	Nontraditional age f	%	Total f	%
Montana State (n=18)						
Males	4	36.4	7	63.6	11	61.1
Females	6	85.7	1	14.3	7	38.9
Total	10	55.6	81	44.4	18	100.0
Ohio State (n=25)						
Males	16	88.9	2	11.1	18	72.0
Females	4	57.1	3	42.9	7	28.0
Total	20	80.0	5	20.0	25	100.0

Data showed that 67% (12) of the MSU subjects were field-independent learners and 33% (6) were field-dependent learners while 56% (14) of the OSU subjects were field-independent and 44% (11) were field-dependent (Table 2). In the MSU sample, just over half (6) of the males were field-dependent, while all of the females were field-independent. The majority of females (71%) in the OSU sample were also field-independent while the OSU males were evenly split among field-dependence/independence. The mean GEFT score for all MSU subjects was 12.4 which is higher than the national norm of 11.3 and the OSU sample mean of 11.5. The difference between the MSU and OSU mean GEFT scores is due to the MSU females mean score of 15.3 which is higher than the national norm for females of 10.8. The tendency for both MSU and OSU females to be more independent than their male counterparts is opposite to what the literature would suggest (Witkin, et al., 1971). MSU scores ranged from 2 to the maximum of 18 while the OSU scores ranged from the minimum of 0 to the maximum. A greater proportion of MSU preservice agriculture teachers tended to be field-independent than OSU preservice teachers. However, the ratio of field-dependent female learners to field-independent female learners as well as field-dependent males and field-independent males were similar for both samples. The GEFT findings suggest that female preservice agriculture teachers tend to be more field-independent than females in the general population.

Table 2. Preferred Learning Styles of Preservice Teachers by Gender (N-43)

Gender	Learning style: Field-dependent f	%	Field-independent f	%
Montana State (n=18)				
Males	6	54.5	5	45.5
Females	0	0.0	7	100.0
Total	6	33.3	12	66.7
Ohio State (n=25)				
Males	9	50.0	9	50.0
Females	2	28.6	5	71.4
Total	11	44.0	14	56.0

Examination of the GEFT scores by the age of MSU students revealed that non-traditional age students tend to be more field-dependent than traditional age students (Table 3). Half (4) of the MSU students 25 years or older were field-dependent while only a fifth (2) of the students younger than 25 years were field-dependent. Similarly, non-traditional age OSU students also tended to be field-dependent (60%) while a greater proportion of traditional age students were field-independent (60%). These results tend to concur with previous results of Witkin et al. (1971) concerning age and field-dependence.

Table 3. Preferred Learning Styles of Preservice Teachers by Age (N=43)

Age	Learning style			
	Field-dependent		Field-independent	
	f	%	f	%
Montana State (n=18)				
Traditional age <25	2	20.0	8	80.0
Nontraditional age >25	4	50.0	4	50.0
Total	6	33.3	12	66.7
Ohio State (n=25)				
Traditional age <25	8	40.0	12	60.0
Nontraditional age >25	3	60.0	2	40.0
Total	11	44.0	14	56.0

Teaching style results indicated that MSU subjects preferred a learner-centered approach to teaching (Table 4). The data showed that 91% (17) of the MSU preservice teachers preferred the "enabler" teaching style. One (9%) of the MSU subjects preferred the "provider" teaching style while no subjects preferred the "expert" style or the "facilitator" style. The one MSU student who did prefer the "provider" teaching style was male. The majority of Ohio preservice teachers also preferred a learner-centered teaching style. However, there were greater percentages of OSU students preferring the "provider", "facilitator", and "expert" teaching styles. The results of the study indicate that the MSU preservice teachers prefer a more learner-centered approach to teaching than the OSU preservice teachers. However, the majority of OSU preservice teachers wished to involve learners in defining both the activity and the process in the learning environment.

The majority of OSU subjects were field-independent; however, the field-independent characteristic of being subject-centered was not evident. There was a greater percentage of field-independent MSU learners and even less evidence in the teaching style data of the field-independent characteristic of being subject-centered. Cano et al. (1991) wanted to know why students, specifically the field-independent learners, place a high value on being learner-centered. One plausible explanation may be that preservice teachers who are field-independent place a high value on being learner-centered as students, but when they start to teach the field-independent characteristic of being subject-centered will become more evident. Further investigation is needed to determine why field-independent learners place such a high value on student-centered instruction.

Table 4. Teaching Style Dimensions of Preservice Teachers (N=43)

Gender	Teaching style							
	Expert		Provider		Facilitator		Enabler	
	f	%	f	%	f	%	f	%
Montana (n=18)								
Males	0	0.0	1	9.1	0	0.0	10	90.9
Females	0	0.0	0	0.0	0	0.0	7	100.0
Total	0	0.0	1	5.6	0	0.0	17	94.4
Ohio (n=25)								
Males	1	5.6	4	22.2	4	22.2	9	50.0
Females	0	0.0	1	14.3	1	14.3	5	71.4
Total	1	4.0	5	20.0	5	20.0	14	56.0

The MBTI results indicated that the majority of the MSU subjects were either ISTJ, ISTP, or ENTP (Table 5). Half (9) of the MSU students were E and the other half (9) were I on the Extraversion-Introverstion (EI) dimension. On the Sensing-Intuition (SN) dimension 67% (12) of the MSU subjects were S and 33% (6) were N. Overall, 72% (13) of the MSU subjects were T. On the final dimension 56% (10) of the MSU subjects were P while the remaining 44% (8) were J.

The majority of OSU subjects were either ESFJ, ESTJ, or ISTJ. In analyzing the (EI) dimension for the OSU sample, 60% (15) were E and 40% (10) were I. On the (SN) dimension, 76% (19) were S and 24% (6) were N. Analysis of the (TF) dimension, 56% (14) were T and 44% (11) were F. Results of the (JP) dimension showed that 60% (15) of the OSU subjects were J and 40% (10) were P.

Field-independent learners tend to be intrinsic, but this was not supported by the personality data for the MSU and OSU females. The majority of females from both samples were E as well as being field-independent based on their GEFT. The overall OSU EI scores were consistent with the teaching style preference data. However, the overall MSU teaching style data was not consistent with scores on the EI dimension. With 50% of the MSU subjects being I, one would not expect the teaching style data to show such a preference towards learner-centered instruction.

OSU scores on the Thinking-Feeling (TF) dimension also tended to be consistent with GEFT scores. Field-independent learners tended to be a T on the MBTI. Being a "thinker" rather than a "feeler" is characteristic of a field-independent learner. However, MSU females who tended to be field-independent also tended to be feelers rather than thinkers.

Table 5. Personality Types on the Myers-Briggs Type Indicator (N=43)

Personality type	Gender					
	Male		Female		Total	
	f	%	f	%	f	%
Montana State (n=18)						
Extraversion	3	27.3	6	85.7	9	50.0
Introversion	8	72.7	1	14.3	9	50.0
Sensing	8	72.7	4	57.1	12	66.7
INtuition	3	27.3	3	42.9	6	33.3
Thinking	10	90.9	3	42.9	13	72.2
Feeling	1	9.1	4	57.1	5	27.8
Judgment	5	45.5	3	42.9	8	44.4
Perception	6	54.5	4	57.1	10	55.6
Ohio State (n=25)						
Extraversion	11	61.1	4	57.0	15	60.0
Introversion	7	38.9	3	43.0	10	40.0
Sensing	14	77.8	5	71.4	19	76.0
INtuition	4	22.2	2	28.6	6	24.0
Thinking	11	61.1	3	43.0	14	56.0
Feeling	7	38.9	4	57.0	11	44.0
Judgment	11	61.1	4	57.0	15	60.0
Perception	7	38.9	3	43.0	10	40.0

Implications

Cano et al. (1991) found the results from Ohio perplexing. Overall, comparing the MSU results to the OSU results adds some clarity to what we know about the learning styles, personality styles, and teaching styles of preservice teachers in agricultural education. The addition of the MSU data to the OSU data does support the statement by Cano et al. (1991) that preservice agriculture teachers do differ in learning styles, personality styles, and their preferred way of teaching. In both the MSU and OSU studies subjects tended to be field-independent. Additionally, in both studies females tended to more field-independent than the national norm. Furthermore, in each investigation preservice agriculture teachers tended to prefer learner-centered instruction. This is the opposite from what one would expect from a field-independent learner. Why were females in these studies more field-independent than the national norm? More importantly, why do the field-independent women have so many field-dependent traits? Additionally, the two samples differ in

personality types. The majority of OSU subjects to be E, while MSU students were evenly split among I and E.

What are the causes of the differences in personality and teaching styles? Could the greater proportion of non-traditional students in the MSU sample be a source of the differences? The learning style, teaching style, and personality style of preservice teachers in agricultural education in more states needs to be determined in order to help answer some of these questions. Additionally, more research is needed in order to investigate the relationship between learning style, teaching style, and personality style and teachers' ability to use problem-solving in their instruction. The current study raises more questions than it answers underscoring the need for more research about the characteristics of our preservice teachers as well as the teacher educators who educate teachers of agriculture.

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