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AN EXPLORATORY STUDY OF THE INTERRELATIONSHIPS OF PREFERRED TEACHING STYLES, PREFERRED LEARNING STYLES, PSYCHOLOGICAL TYPES, AND OTHER SELECTED CHARACTERISTICS OF PRACTICING TEACHERS

The Ohio State University

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Ph.D. 1983
AN EXPLORATORY STUDY OF THE INTERRELATIONSHIPS
OF PREFERRED TEACHING STYLES, PREFERRED
LEARNING STYLES, PSYCHOLOGICAL TYPES, AND
OTHER SELECTED CHARACTERISTICS OF PRACTICING TEACHERS

DISSERTATION

Presented in Partial Fulfillment of the Requirements for
the Degree Doctor of Philosophy in the Graduate
School of The Ohio State University

By

Jeanne Marie Huesman, B.A., M.A.

****

The Ohio State University
1983

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Robert R. Bargar
Joseph J. Quaranta
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Robert Bargar
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Psychological Types, and Other Selected Characteristics
of Practicing Teachers".

Dr. Alexis Lotas 6/16/83
Dr. Alexis Lotas date

Jeanne M. Huelsman 6/16/83
Jeanne M. Huelsman date
DEDICATION

WITH LOVE AND GRATITUDE TO MY PARENTS
GEORGE AND KATHLEEN HUELSMAN
ACKNOWLEDGEMENTS

I wish to extend my deep appreciation to
Dr. Robert Bargar for his sensitive guidance, insightful suggestions, enthusiastic encouragement, and support through all phases of this study;
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CHAPTER I

STATEMENT OF THE PROBLEM

Introduction

Recognizing and attending to the individual differences in students have been goals of teacher education and in-service training. Teachers and teacher educators generally have accepted the importance of these goals. However, in some ways, the goal of attending to the individual differences in children has been viewed more as a philosophic principle than a practical necessity. In practice, teacher education programs frequently have not been involved directly in the "how" of meeting the needs required by the individual differences of children. In many cases, teacher education programs have been concerned more with the external requirements of subject matter knowledge and the skills of planning, controlling, and execution by the teacher than with understandings of the teaching/learning process itself.

Implicit in traditional teacher education requirements was the need for learning about the utilization of strategies which could shape children's behavior to conform to the pre-established model of acceptability for the group or classroom setting in which most school learning occurred. Insofar as these efforts were focused more toward external control by the teachers than on the internalization of personal control in pupils, the focus or responsibility for learning was clearly teacher-centered. The strong suggestion that the teacher
should be proactive and the pupil generally reactive oversimplifies

the process. As Joyce (1981) suggests, teacher adaptation to

students' needs is the heart of the teaching/learning process; yet

this adaptation process is poorly understood. The Idea, "where there

is no learning, there is no teaching", expresses the reciprocal

nature of the teaching/learning process. It seems that the inter-

action process between teaching and learning is an area which needs

attention.

Until very recently, almost all theory and research in teaching

has been limited to the one-way effect of teachers on

students... any adequate account of the interaction between

teacher and student(s) must ultimately be reciprocal,

acknowledging that the unit is persons in relation and cannot be

understood in unidirectional terms (Joyce, 1981).

The processes of teaching and learning often were ignored as

researchable issues, at least partially, because of the implied com-

plexity of the interactive factors in the process. Even considering

learning as a discrete function is a tremendously complicated task.

According to Gregorc (1979), "Learning Is a process of such infinite

complexity that It can be observed and studied from a great many'

angles." In spite of the assumed complexity, efforts to understand

and to research these questions have continued. In more recent

years, the question of this interaction had been considered in the

light of the learner, learning and the teacher, teaching; and, this

research has taken many forms. Researchers have investigated the

learning or cognitive process for many years. Some recent attempts

have been made to decipher and dissect the process of cognition into

sequential steps, into modes, and also as simultaneously coordinated
multiple functions. In addition to learning behaviors, research topics have included teacher behavior, instructional behavior, questioning, time on task, alternative approaches to education, brain laterality, perception, information processing, decision-making, classroom management strategies, and remediation.

Studies of teaching have for the most part, concentrated on visible events in the classroom and other places where teaching takes place. Over one hundred systems have been developed to record and categorize teacher and student behaviors in a variety of ways (Joyce, 1979).

Most of these studies were designed to explore the interaction in a classroom.

In addition to these separate concerns for the learning and teaching processes, more recent developments have included questioning about the interaction process involved in teaching and learning. At one time, it was assumed that teachers tend to teach the way they were taught. Substantiating that assumption was the idea that teachers were, in fact, the products of the educational process itself and were likely to learn teaching skills from their own teacher-models. While preparing for their professional life, teachers in training were taught theoretical, historical, and philosophic issues of education. However, the actual educational interaction with children usually was included late in the teacher education program. At times, this field experience was not considered a high priority. The planning of the actual teaching field experience for so late in the teacher education program clearly suggests that prior knowledge about teaching is important to the actual teaching experience; but, perhaps more importantly, this programming suggests
that the process of teaching can be statically planned and controlled by the teacher without much regard for the many practical factors which involve pupils and the interaction between teacher and pupil. Certainly, current state standards for teacher education programs have attempted to alleviate some of these concerns through the requirement of the inclusion of carefully planned, supervised, and evaluated, early, continuing, and sequential field experiences in the professional preparation of teachers (Standards for Colleges and Universities Preparing Teachers, 1975).

As researchers theorized about the interactions between teaching and learning, the process of education was considered in new ways. Factors were found which definitely affected the learning process. Just as significantly, it was found that different factors affected different people in different ways. We understand that people do differ in the ways in which they perceive information, the ways in which they process their perceptions and make decisions or judgments about their perceptions. However, understandings that these differences exist have not been accompanied always by understandings of why they exist. These differences are aspects of personality and these differences clearly are related to the ways in which one most easily and naturally learns.

Significance of the Study

Research into both learning and teaching behaviors has resulted in models which attempt to explain some of the variables which account for the individual ways in which people function as learners.
and/or as teachers. Several researchers have implemented their models or theories with instruments which attempt to identify and/or measure specific traits or behaviors which have come to be known as "styles". In the course of this study, whether in reference to cognitive, learning, or teaching, the term "style" will be used to summarize the traits or factors associated with descriptions of these functions.

Teaching styles or behaviors demonstrated by teachers as they attempt to teach, have become topics of much interest, concern, and inquiry. Questions have arisen regarding the causes of teachers' classroom or teaching behaviors. If teaching styles may be defined as those preferences, strategies, behaviors, or techniques which a teacher utilizes with the greatest confidence, frequency, or ease, and across the widest assortment of pupils, then from where does this style derive? Is teaching style simply, or not so simply, an outgrowth of personality factors? Is it a collection of learned behaviors—learned from one's own schooling experiences or formal education courses; from other academic experiences or in-service education; from one's own observations or interactions with other teachers; from one's own trial and error; from one's pupils? Or, is teaching style, in fact, a dynamic collection of attitudes and behaviors which evolve from a variety of causes? Since teachers are learners also, one can raise the question: to what extent, if any, does teaching style evolve from a teacher's own learning style? These are complex questions which need to be explored in a controlled experimental situation. Each of these questions is important to an
understanding of the teaching/learning process.

The interrelationships among the teaching styles of instructors and the learning styles of students represent one focus of this complex question. Another focus is the consideration of one individual as both teacher and learner. Attempting to understand the possible interactive forces at work within the person who is both teacher and learner is an enormous challenge for the researcher. And, it has not been established clearly just what the relationship is between one's own personal cognitive style and one's teaching style (Kirby, 1979). However, the idea that one's preferred teaching style is reflective of one's preferred learning style has been expressed by many educators. Thomson (1982) in conversation, has indicated that this assumption is becoming quite common. And, according to Cross (1976), "Teachers, of course have cognitive styles and they tend to teach by the methods most comfortable for them unless they are consciously attempting to use a teaching strategy to accommodate student learning styles." Also, Dunn (1979) states that "teaching style tends to correspond to how each person learned." Dunn continues,

In our investigation into individual teaching styles, we found that instructors believe that the way they learn is the "easy" or "right" way, and that they therefore direct their students, offspring, and spouses toward mastering knowledge in much the same manner.

Insofar as test construction and evaluation are teaching functions, Kirby's (1979) comment is appropriate to this issue: "The problem of the style-biased test format becomes more serious when one considers that instructors who are unaware of their own style will probably tend to give tests in a format that favors that style."
While relatively little research has been done, compared to what is possible and needed, it is already clear that cognitive style is a potent variable in students' academic choices and vocational preferences; in students' academic development through their school career; in how students learn and teachers teach, and in how students and teachers interact in the classroom (Witkin, 1973).

Based on these comments, there is a strong suggestion that teaching style and learning style are closely related. However, no specific studies addressing the question of whether preferred teaching style reflects preferred learning style are apparent. One of the obvious reasons militating against this type of research is the difficulty of identifying and separating the multiple and complex characteristics which comprise that which we term teaching style and learning style. Another difficulty is concerned with the measurement of these characteristics when they are identified. Providing a consistency in considering the individual as teacher and learner is also problematical. If impartial observers are to ascertain the characteristics of an individual as teacher and learner, there are difficulties in establishing situations in which the same person could be logically observed in both teaching and learning roles. Allowing an individual to self-report about his/her learning and teaching style preferences suggests the following concerns:

1. The dependability of the information is limited by the degree of the subject's self understanding, which is required for accurate reporting of real preferences;

2. the possibility of misinformation being reported because learner "preference" or "interest" is not learning style
when the subject does not in fact do what he/she reports having done (Kirby, 1979);  
3. the reliability and validity of the instruments being used to measure these phenomena since many instruments are recently developed and have been used with small samples;  
4. the multidimensionality of teaching and learning cannot be reduced easily to a single dimension (Brown, 1968); and  
5. the recognition that the amount of variability one finds between teaching styles or learning styles depends greatly on the frame of reference from which the data are observed, recorded, and analyzed (Brown, 1968).

While these concerns may be considered as limitations to any study, an exploratory effort was made to see what relationships appear to exist among these variables of teaching style, learning style, psychological type, and selected personal characteristics. In a sense, a focus on cognitive style, learning style, and teaching style, could be a challenging avenue for considering how it is that children best cope with and gain meaning from their environment, how they best learn to interact productively with others, and how they learn the values and skills which can allow them the freedom to uniquely contribute to their own individual well-being as well as to societal well-being. Recognizing the importance of styles in children and in the adults around them has the potentiality to enhance in a very special way the intrinsic value of each person's uniqueness. Concepts of style may also provide a plan and schema for educational research which may lead to more reality-based teacher education
programs and In-service for teachers. It is hoped that as a result of greater sophistication among teachers about these issues, teachers may then provide for children significantly more realistic opportunities to learn to function productively.

Purpose of the Study

The purpose of this exploratory research is to determine whether or not practicing teachers do prefer to teach in styles similar to their own preferred styles of learning and whether their preferred teaching and/or learning styles are related to their psychological types and to other selected personal characteristics. Through the administration of several instruments and analyses of the results the following questions are addressed:

1. What is the relationship between the responses of practicing teachers to questionnaires assessing their preferred teaching and learning styles?

2. In what ways do other factors, such as sex, level of education, kinds of teaching experiences, age, number of years of teaching, and psychological types affect the relationship between the preferred teaching and learning styles of practicing teachers?

3. What is the relationship between teachers' responses to a teaching style preference questionnaire and their psychological types as measured by the Myers-Briggs Type Indicator?

4. What is the relationship between teachers' responses to a
learning style preference questionnaire and their psychological types as measured by the Myers-Briggs Type Indicator.

The researcher reviewed existing inventories and techniques which have been used in identifying teaching, cognitive, and learning styles and found much variability among the instruments which have been developed. Questionnaires, inventories, and tests have been developed by educators, researchers, and psychologists. These instruments have been based on various educational and psychological models. Many of the instruments or techniques which identify and measure style require a system of observations, recordings, and analyses: sometimes by the classroom instructors, or other times by outside, trained observers or evaluators. Other instruments require self assessment of information. The variability regarding information about the instruments is also significant. Some instruments have been normed; some have been validated statistically; and others have been used on the basis of face validity.

After reviewing various available instruments, this researcher decided on using the following instruments in this study:

1. Lotas Teaching Preference Questionnaire (LTPQ)
2. Learning Style Preference Questionnaire (LSPQ)
3. Myers-Briggs Type Indicator (MBTI)
4. Self Analysis Questionnaire (SAQ)

Lotas Teaching Preference Questionnaire (LTPQ)

The Lotas Teaching Preference Questionnaire is a self report preference instrument consisting of ten stems, with four choices for
completion. Cronbach's alpha reliability coefficients are reported in the .83-.89 range.

**Learning Style Preference Questionnaire (LSPQ)**

The Learning Style Preference Questionnaire is a self-report preference instrument consisting of twenty stems, with four choices for completion. Cronbach's alpha reliability coefficients are reported in the .59-.70 range. The choice of Lotas Learning and Teaching Style Preference Questionnaires was made because of their similar conceptual frameworks, similar formats, and similar reporting of results. While there are other learning style instruments which would be acceptable, the characteristics of the Lotas Instruments provide a distinct advantage to this study. The similarities between the Lotas Instruments eliminate the need for the researcher to risk possible errors in interpreting meanings of different questionnaire items while comparing responses. Also, since the Lotas Instruments are based on Jung's theory of psychological types as is the Myers-Briggs Type Indicator, the opportunity for validation of the Lotas Instruments with the Myers-Briggs Type Indicator is provided. In addition, the researcher is able to utilize the Myers-Briggs Type Indicator to better understand the data from the Lotas Instruments.

**Myers-Briggs Type Indicator (MBTI)**

The indicator was developed by Katharine C. Briggs and Isabel Briggs Myers and is a forced-choice preference questionnaire containing 166 items on a self-reporting description design. Split half reliability for internal consistency shows correlations in the .70 and .80 range for continuous scores (Myers, 1962).
Self Analysis Questionnaire (SAQ)

The Self Analysis Questionnaire is a ten item self-report questionnaire designed by the researcher for this study. Its purpose is to provide background and current information descriptive of the sample of teachers who participated in this study. This instrument provides information necessary in addressing the second question with which this study is concerned: In what ways do other factors affect the relationship between the preferred teaching and learning styles of practicing teachers?

Parameters of the Study

The parameters of the study involve the population studied, the instruments used, the procedures followed, and the analyses of data. More specifically the procedure followed in this study was as follows:

1. A sample of central Ohio practicing teachers was secured. For the purposes of this study a sample size of 90-100 was deemed adequate.

2. The researcher arranged to meet with the sample of teachers and explained that several instruments would be administered for the purpose of studying learning and teaching styles. There was no discussion of specific instruments at that time, other than directions for the administration of the first instrument.
3. The Lotas Teaching Preference Questionnaire was administered to the sample of teachers and the completed instruments were collected (1st session).

4. The Myers-Briggs Type Indicator was administered to the subjects and collected for hand scoring (2nd session).

5. The Learning Style Preference Questionnaire and the Self Analysis Questionnaire were administered; and completed instruments were collected (3rd session).

6. Results were returned and interpreted to the subjects after the last administration session. There was no discussion of any of the instruments prior to the administration of the last instrument in order to prevent possible contamination of results.

7. The data were analyzed using chi square, Mann-Whitney U-Wilcoxon Rank Sum W, Kruskal-Wallis 1-Way Anova and multiple regression techniques. More detailed information regarding the procedures is found in Chapter III.

**Definition of Terms**

The following list of terms represent operational definitions of terms used throughout this study.

1. **Bicognitive** refers to the ability to function well in either field independent or field sensitive modes.

2. **Cognitive Style** refers to characteristic ways of using the mind (Cross, 1976) and is frequently considered as one element among other elements comprising learning style.
3. Cognitive Style Mapping refers to a procedure developed by Hill which identifies and measures a person's learning preferences as major, minor, or negligible.

4. Extraversion is the transfer of interest from subject to object and refers to an attitude in which one's main points of reference are external or centered in the outer world of people and things.

5. Feeling refers to the judging function which is based on personal and subjective values.

6. Introversion refers to an attitude in which one's main points of reference are internal.

7. Intuition refers to the perception function which adds ideas or associations to sensations from outside.

8. Judging refers to perception processing or decision-making.

9. Learning Modalities refer to channels through which perceptions occur: vision, audition, kinesthesia.

10. Learning Style consists of distinctive behaviors which serve as indicators of how a person learns or seeks meaning from and adapts to his/her environment.

11. Perception refers to the process of gathering information about the outer world.

12. Personality refers to the dynamic organization within the individual of those psycho-physical systems that determine his/her unique adjustment to the world (Allport, 1937).

13. Sensing refers to direct perception through the five senses.
14. **Teaching Style** consists of a complex of personal attitudes, traits, and behaviors, and the media used to transmit to or receive data from the learners.

15. **Thinking** refers to the judging function primarily based on logic and facts.

**Organization of the Study**

In Chapter II the literature and research regarding teaching style, learning style, cognitive style, and psychological type are reviewed.

In Chapter III the methodology employed in the study is detailed. The setting, research design, the instruments used, the collection and analyses of data are discussed.

In Chapter IV the findings from the analyses of data are reported according to the four questions identified previously in Chapter I.

Chapter V is concerned with a summary of the study as well as a discussion of the conclusions reached. Recommendations and suggestions for future research and study are made.

**Summary**

In Chapter I, the background of the present study was discussed. The significance of past research and the importance of more recent research relative to teaching and learning were described. Questions to be answered in this investigation and the steps involved in the
research procedure were listed. A brief description of the organization of the remainder of the study was provided.
CHAPTER II
REVIEW OF THE LITERATURE AND RESEARCH

Introduction

During the last few decades, Individual differences have been researched, discussed, and built into curricular models. Generally, teachers attest to the importance in education of the Individual differences in children. And many teachers have incorporated individualized planning and materials into the curriculum. But Individual differences only recently have been articulated in terms of learning styles or cognitive styles. Research into learning and cognitive styles began over twenty-five years ago; and while the importance of Individual differences has been accepted, according to Cross (1976), only a limited number of counselors and/or teachers have any knowledge about cognitive style.

This chapter contains a review of the literature and research relevant to cognitive style, learning style, teaching style, and psychological type. Relationships found to exist among these personality characteristics and other selected variables are examined. While this literature review could be developed according to several possible organizational foci, the overlap among topics, models, theories, and their possible implementations create severe difficulties in the reporting of separate events. For the purposes of this study Chapter II is organized according to three theoretical models: Jung, Witkin, and Hill. Other models or instruments which are
theoretically parallel to Jung's, Witkin's, and Hill's are discussed in the appropriate sections.

The Jung model is conceived as a Multiple Bi-Polar Dimensions Model (MBDM) consisting of two or more dimensions with the important aspect of polar extremes being used as descriptors of each dimension. In this context, topics discussed with the Jung model are as follows:

1. Myers-Briggs Type Indicator (MBTI)
2. McKenney-Keen Model
3. Kolb's Learning Style Inventory
4. Gregorc's Learning Style Inventory
5. Lotas Model
6. McCarthy 4MAT Model

The Witkin model is seen as a Bi-Polar Model (BPM), consisting of one dimension with two polar extremes of the dimensions being used as descriptors. Other researchers discussed with the Witkin model include the following ones:

1. Ramirez and Castaneda
2. Messick

The Hill model is a Multiple Variables Model (MVM), consisting of many dimensions which are neither mutually exclusive nor conceptualized in terms of polar extremes. With the Hill model the following researchers are discussed:

1. Canfields', and Canfield and Lafferty
2. Dunn, Dunn, and Price
3. Fischer and Fischer
Because of the importance of the theoretical foundations for the development of knowledge about cognitive or learning style laid by Jung, the first model considered is the Jung model.

**Jung: Multiple Bi-Polar Dimension Model**

The introduction in the early 1920's of Jung's theory of psychological type provided a prototype and catalyst for many models of cognitive, learning, and teaching styles as well as personality theories (Kirby, 1979). Theories of personality have been developed by many researchers and clinicians. However, in this current study, Jung's theory of psychological type is utilized because it provides the theoretical base for three of the instruments which were administered to the subjects in this study. Jung's theory of psychological type attempts to explain that the apparently random behaviors of people really are not as random as they may appear, but are organized and can be understood by recognizing the orientation of the individual in reference to preferences among attitude, perception, and judgment (Myers, 1962). These preferences, while fairly consistent within an individual, can be developed and refined (Jung, 1977, 1921). Jung's theories and ideas evolved from his clinical work with patients. Interpretations of his theory are necessary for persons who wish to utilize his theory at a practical level with a "non-patient" or "normal" population.

Actually, Jung's model provides the theoretical base for several instruments developed by other researchers, including the Myers-Briggs Type Indicator, the Lotos Teaching Preference
According to Jung (1977, 1921), one's "psychological type" is derived from three major preferences relating to the following factors:

1. one's basic attitude or the direction toward which one prefers to expend one's psychic energy;
2. one's perceptual preferences which relate to the ways in which one derives information about the world; and
3. one's judging preference, which relates to the way one prefers to process information and make decisions.

Each of these factors has polar extremes which can be useful in identifying one's preferences. And, instruments have been developed to explore these factors. The polar extremes of the three preferences which determine one's psychological type are listed below:

1. Attitude: extraversion - introversion
2. Perception: sensing - intuition
3. Judgment: thinking - feeling

The polar extremes of attitude are extraversion and introversion. One can prefer to expend psychic energy outward toward the world of objective facts, places, things, and persons, which is called extraversion, or inward toward the world of ideas and thoughts, which is called introversion. People demonstrate both attitudes from time to time, but generally, according to Jung (1977, 1921) there is a
preference for one or the other "attitude". This preference is marked by a greater frequency of usage and corresponding behavior and, theoretically better development of the preference.

In Jung's theory there are two polar extremes of the perceiving function, namely, sensing and Intuition. Sensing refers to the perceptual preference of gathering information primarily through the five senses thus perceiving reality as it is in the immediate present condition. The person who prefers to use Intuition in perceiving will tend to perceive reality in a context beyond mere sensory information. While sensory information is clearly available, sensory impressions may be interpreted or expanded in an historical or future perspective. While people may perceive through both their senses and their intuition from time to time, a person generally prefers one mode over the other and as they use one mode more frequently, they tend to trust it more completely.

The polar extremes of the judging function are thinking and feeling. Persons who prefer to use thinking in decision making, usually make decisions impersonally and base their decisions on logic and facts. The person who prefers to make decisions based on the feeling preferences considers the values attached to the time, person, or place involved in the decision making. Feeling is a highly personal function and is directly related to the individual's personal and moral values. Each person uses both thinking and feeling at times, but generally demonstrates a preference for one or the other.

Summary. Jung's model consists of several combinations of bipolar variables or more specifically combining one preference for
each of the following: 1) attitude: either extraversion or introversion; 2) perception: either sensing or intuition; and 3) judging: either thinking or feeling, to arrive at the "psychological type" of an individual. It is important to know that Jung did not see these functions as completely separate idiosyncracies or as static characteristics, but rather as interrelated and dynamic characteristics expressed in personality as preferred ways of perceiving and responding (Jung, 1977, 1921).

While Jung's work may have stimulated the development of other measures of personality characteristics, one of the earliest implementations of the Jung model was the Myers-Briggs Type Indicator. **Myers-Briggs Type Indicator (MBTI)**

Interest in Jung's theory of psychological type led Katherine Briggs and Isabel Myers to spend twenty years in conceptualizing and technically refining the MBTI. The instrument was published in 1962 as a forced-choice, self-report preference inventory designed for use with normal subjects. Its purpose is to implement Jung's theory of psychological type and to provide a measure of four dichotomous preferences which (under Jung's theory) structure the individual personality (Myers, 1962). The four preferences measured in the MBTI are as follows:

1. attitude: as extraversion or introversion;
2. perception: as sensing or intuition;
3. judgment: as thinking or feeling; and
4. the function which is demonstrated outwardly as perception or judgment.
The MBTI has been used widely as a clinical and research tool. As of 1980, the Center for the Application of Psychological Type (CAPT) published a bibliography of 593 research studies that incorporated the MBTI (CAPT, 1980). According to McCaulley (1976) research using the MBTI with teachers has yielded the following results:

1. Generally, 60-80% of teachers tend to be feeling types.
2. The only teacher sample with equal numbers of feeling types and thinking types is a sample of math teachers.
3. A large number of elementary school teachers prefer a sensing-feeling combination.
4. Among high school teachers and even more so in college, intuitive-feeling types are in the majority.

Carlyn's (1976) study of prospective teachers revealed the following preferences:

1. Feeling type persons are more interested in teaching the lower grades than thinking type persons.
2. Intuitive type persons are more interested in working with small groups of students than sensing types.
3. Intuitive types have stronger need for independence and creativity than sensing types.
4. Intuitive types and extraverted types show more interest in planning school projects than do sensing types and introverted types.
5. Thinking and extraverted types are more interested in administration than feeling and intuitive types.
Lawrence (1980) reports that teachers tend to behave in the following ways according to their types:

1. Introverted type teachers tend to keep control centered in themselves; secure predictability through structuring activities with materials; and are less likely to give students choices regarding what or how to study.

2. Sensing type teachers also limit student choices.

3. Feeling type teachers direct students to focus on themselves and to work individually.

4. Introverted, sensing, judging type teachers are more likely to maintain a quiet and orderly classroom.

5. Extraverted, intuitive, perceiving type teachers are more likely to allow more movement, noise, and more student decisions about what to do.

6. Introverted, judging type teachers need most structure in the classroom.

7. Extraverted, judging type teachers need somewhat less classroom structure than introverted, intuitive types.

8. Introverted, perceiving type teachers need less structure than extraverted, judging types.

9. Extraverted, perceiving type teachers need least structure in the classroom.

Several studies concerned with the interaction factors between student teachers and cooperating teachers suggest the importance of a match in type. In one study, the results suggest that the greater the discrepancy between student teachers' and cooperating teachers'
scores on the Sensing-intuition scale, the Thinking-Feeling scale, and the Judging-Perceiving scale, the more negative were the student teachers' perceptions of the cooperating teachers' competencies (Davis, 1970). Another study also suggested the importance of matching student teachers' and cooperating teachers' types to insure low differences in their MBTI scores (Lucasse, 1975). In a study done with an Introductory philosophy class, Price (1982) found that the instructor communicated best to students with her own psychological type as measured by the MBTI. However, not supporting the theory that people of opposite Junglan types undervalue each other, are the findings of Taylor (1968), in his MBTI study of six instructors and their students who were college juniors, majoring in education.

**Summary.** The MBTI is a forced-choice, self-report preference inventory developed in 1962 by Katharine C. Briggs and Isabel Briggs Myers. It was designed to measure characteristics associated with Jung's theory of psychological type. The MBTI has been used extensively in research. Some of the research findings relative to the MBTI and teacher-learner characteristics have been discussed.

In addition to precipitating the development of the MBTI, the Jung model served as a prototype for other cognitive style dimensions and influenced the subsequent work of several learning and teaching style researchers (Kirby, 1979).

Several researchers have created models which appear parallel to the bi-polar elements of Jung's theoretical model. Some of these researchers have developed instruments which attempt to identify and measure these elements as they affect the way people learn.
McKenney and Keen Model

One model which appears similar to the Jung model of the bi-polar functions of perceiving modes and judging modes is that of McKenney and Keen. Figure 1 is a graphic representation of the McKenney and Keen Model. The McKenney and Keen model is a two dimensional model which addresses cognitive style from an Information-gathering dimension and an Information evaluation dimension. The Information-gathering dimension is the perceptual process by which the mind organizes and codes the wide variety of sensory stimuli to which it is exposed. At the extremes of the information-gathering dimension are: 1) preceptive individuals who use their precepts or prior experience as cues for gathering or coding the data they find; and 2) the receptive thinkers who are more sensitive to the stimuli itself and attempt to derive information more from direct examination of information than from fitting it to their precepts. The other dimension is concerned with the way individuals process or analyze the information which has been gathered. At the extremes of this dimension are: 1) systematic persons who approach the solution of problems by structuring them in terms of a specific method; and 2) intuitive thinkers who utilize trial and error strategies and are much more willing to move from one method of problem solving to another, to discard information and to use cues which defy verbal identification (McKenney and Keen, 1974; Martens, 1975).
Summary. While the terms used in the McKenney and Keen model are not identical to those of the Jung model, it appears that similarities do exist. A dimension analogous to Jung's perception is described by McKenney and Keen as the information gathering dimension. McKenney and Keen's information processing might be compared to Jung's judging function.

Kolb's Learning Style Inventory

Another learning style model which seems similar to Jung's model is Kolb's. From his model, Kolb developed his learning style inventory, which was published in 1977. The Inventory attempts to measure how people learn and what their strengths and weaknesses as learners
are. The Inventory Involves the measures of two dimensions: one related to how people perceive Information (from concrete to abstract) and the other dimension being related to how people process their perceptions, (from active to reflective). The inventory norms were based on 800 practicing managers and graduate students in management (Kolb, 1974b).

Kolb's Inventory initially identifies four learning modes for each subject:
1. feeling: concrete experience;
2. watching: reflective observation;
3. thinking: abstract conceptualization; and
4. doing: active experimentation.

Then, the subject's learning style is determined by combining the favored learning modes in the following way:
1. the preferred choice of the thinking and feeling modes
2. the preferred choice of the watching and doing modes

The four resultant combinations are termed learning styles (Kolb, 1974b). Table 1 is a visual representation of Kirby's (1979) description of the four Kolb learning styles as compared with their Jungian counterparts.
TABLE 1

COMPARISON OF KOLB'S LEARNING STYLES WITH JUNG'S FUNCTIONS

<table>
<thead>
<tr>
<th>Learning Styles</th>
<th>Learning Modes Combination</th>
<th>Jungian Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>converger</td>
<td>thinker-doer</td>
<td>senser</td>
</tr>
<tr>
<td>diverger</td>
<td>feeler-watcher</td>
<td>feeler</td>
</tr>
<tr>
<td>assimilator</td>
<td>thinker-watcher</td>
<td>logical thinker</td>
</tr>
<tr>
<td>accomodator</td>
<td>feeler-doer</td>
<td>Intulter</td>
</tr>
</tbody>
</table>

Kirby's (1979) descriptions of the Jungian counterparts are not specific in terms of including attitude, perception, and judging functions together. However, she does suggest an interesting comparison.

In addition to his own research, Kolb (1974b) used the work of Hudson (1966) in describing the converger and diverger learning styles.

1. Convergers: Hudson's research (1966) indicates that convergers are relatively unemotional, preferring to deal with things rather than people. They tend to have narrow interests and choose to specialize in physical sciences. Their greatest strength lies in the practical application of ideas. Kolb's research shows that many engineers demonstrate a converger style.

2. Divergers: Hudson's (1966) work suggests that diversers are interested in people and tend to be imaginative and emotional. Kolb's research suggests that diversers excel at viewing concrete situations from many perspectives. Diverger style is characteristic of managers from humanities and liberal arts backgrounds.
3. Assimilators: Assimilators' greatest strengths lie in their abilities to create theoretical models. They excel in assimilating disparate observations into integrated explanations. Being less interested in people and more interested in abstract concepts, assimilators tend toward the basic sciences rather than the applied sciences. In organizations, assimilators frequently are found in research and planning departments.

4. Accomodators: Accomodators' greatest strengths are in carrying out plans and experiments, and involving themselves in new experiences. Accomodators tend toward more risk-taking than persons demonstrating the other styles. Generally at ease with people, accomodators tend to be educated in practical fields. In organizations, they frequently have "action-oriented" jobs as in sales or marketing (Kolb, 1974b).

According to Kolb, no one learning style is theoretically preferable. What is important is the ability to use any of the four styles when it is most appropriate to a particular situation or setting.

Summary. Kolb's Learning Style Inventory is based on an intricate theoretical approach. The inventory has been widely used in business, management, and training concerns (Kirby, 1979). The inventory is completed by a respondent rank-ordering a series of words or phrases. Scores derived from this ordering, provide measures of two dimensions:

1. one related to how people perceive information
2. one related to how people process their perceptions

Jung's functions of perception and judging would appear analogous to Kolb's dimensions of perception and perception processing.
Gregorc's Learning Style Inventory

Another inventory which requires a respondent to rank order a series of words or phrases is Gregorc's Learning Style Inventory. It was developed as a method of investigating how people perceive information and how they process information. The Gregorc (1979) model consists of two interactive dimensions which describe perception and information processing. The bi-polar extremes of perception are measured from abstract to concrete; while the extremes of information processing are measured from random to sequential. In completing the inventory, a subject rank-orders a series of words or phrases. Raw scores obtained from this rank-ordering provide a measure of four different variables. These scores then are plotted to arrive at a combination of preferred perception and preferred information processing functions. Four possible learning style preferences may result:

1. Abstract random
2. Concrete random
3. Abstract sequential
4. Concrete sequential

Included in the following discussion are some descriptors of persons who prefer each of the four Gregorc (1977) learning style categories.

1. Abstract random
   a. Attentive to human behavior
   b. Senses atmospheric mood
   c. Ties a speaker's manner, delivery, and personality to the message
   d. Evaluates a learning experience as a whole
   e. Likes group discussions
   f. Is multi-sensory
g. Enjoys a busy environment and freedom from rules or guidelines
h. Gathers information informally and delays reaction
i. Learns well through short reading followed by class activity such as discussions, team work, audiovisual presentations, and assignments which permit reflection or "soaking" time

2. Concrete random:
   a. Demonstrates an experimental attitude and behavior
   b. Uses and relies on intuition and insights and unstructured problem solving skills
c. Makes and utilizes leaps to understanding
d. Sometimes jumps to conclusions
e. Finds one's own answers, frequently through trial and error
g. Likes games and simulations
h. Enjoys independent or small group projects, or problem solving activities

3. Abstract sequential
   a. Possesses excellent skills for decoding symbols
   b. Finds conceptual pictures important; uses reading, listening, and picture forms
c. Extracts main ideas well
d. Learns from authority
e. Prefers presentation which has substance, is rational, and sequential in nature
f. Has no problem listening to a dull lecturer as long as the content is interesting
g. Enjoys and profits from extensive reading and lectures
h. Dislikes distractions, and enjoys a quiet, well-controlled environment

4. Concrete Sequential:
   a. Likes direct, "hands on" experience and touchable models
   b. Responds well to step by step order and sequencing
c. Possesses well developed five senses
d. Looks for directions and follows them
e. Likes manuals, workbooks, and equipment
f. Does not tolerate distraction well
g. Learns well from a clearly ordered presentation and well-structured field trips

Summary. The Gregorc Model of learning style is based on the interaction between two bi-polar dimensions of perception and
Information processing. Parallels between Gregorc's and Jung's models can be drawn. Table 2 provides a comparison between the models of Gregorc and Jung.

### TABLE 2
**GREGORC/JUNG FUNCTIONS**

<table>
<thead>
<tr>
<th>FUNCTION</th>
<th>GREGORC</th>
<th>JUNG</th>
<th>FUNCTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perception</td>
<td>concrete</td>
<td>sensing</td>
<td>Perception</td>
</tr>
<tr>
<td></td>
<td>abstract</td>
<td>Intuition</td>
<td></td>
</tr>
<tr>
<td>Information</td>
<td>sequential</td>
<td>thinking</td>
<td>Judging</td>
</tr>
<tr>
<td>Processing</td>
<td>random</td>
<td>feeling</td>
<td></td>
</tr>
</tbody>
</table>

While the models in this section of the literature review have been organized around the Jung Multiple Bi-Polar Model (MBPM) it is important to recognize that undoubtedly there were many individual influences impinging upon each of the researchers who were previously discussed. As an example, the Lotas model to be discussed next is clearly based on Jung's theory of type; however, it is possible that the Lotas model was catalyzed by the Hill model which will be discussed later in this chapter.

**The Lotas Model**

The Lotas model provided the theoretical base for both his teaching style instrument and his and Brink's learning style instrument. In Jung's theory, each person possesses a preferred attitude: either introverted or extraverted; a preferred perceiving function: either sensing or intuitive; and a preferred judging function, either
thinking or feeling. Theoretically then, one's psychological type is a combination of one of each of these preferences. Lotas did not include a direct measure of the extraversion-introversion factors in his instruments, concentrating rather on the perceiving and judging functions. Using Jung's combination of a preferred perceiving and a preferred judging function, Lotas developed domains of teaching and learning styles, consisting of the four combinations possible. Lotas' teaching and learning style domains then were named Affective I for the sensing-feeling combination, Cognitive I for the sensing-thinking combination, Cognitive II for the intuitive-thinking combination, and Affective II for the intuitive-feeling combination. Each of the items in his teaching and learning styles inventory has four possible completions: each choice representing one of the four domains. The following are brief descriptions of the four domains:

Affective I or Sensing-feeling:

Affective I learners tend to be empathetic and people-oriented. They tend to make judgments based on feelings (and the consideration of feelings of others) rather than on logic or objective correctness. They enjoy learning through encounter, personal relationships, group process, and attention.

Cognitive I or Sensing-thinking:

Cognitive I learners tend to be realistic, practical, matter-of-fact, work and efficiency-oriented. They like action and doing things which are practical, and down to earth. They learn best when they can engage in concrete, real life activities. This type of learner tends to rely on an organized, step-by-step approach to problem solving. They tend to be adept at detailed planning and getting things done. Cognitive I learners prefer to deal with things rather than people. Cognitive I learners need to identify quickly the usefulness of what they are being asked to learn.
Cognitive II or Intuitive-thinking:

Cognitive II learners tend to be theoretical and intellectually oriented. They enjoy learning new things, especially abstract concepts or theories and approach these analytically. They are interested in looking at an issue from various angles and often through an interdisciplinary approach. (They) care more about the why of ideas rather than putting these ideas to use. (They) are stimulated by intellectual challenges. They require time and resources to develop different ways of expressing their ideas. This type of learner needs to have an occasional personal encounter with a teacher.

Affective II or Intuitive-feeling:

Affective II learners tend to be imaginative and creative in the arts. They enjoy situations that call for the generation of new and different ideas. They are inventive. They learn best through emulation, contemplation, brainstorming, creative artistic activity, fantasizing, pondering, and creative problem-solving by getting involved in personally relevant projects. (They) need to acquire aesthetic sensibility together with a sense of personal meaning that relates to ultimate values (Lotas, 1978).

Summary. The Lotas model is based on Jung's perception and judging functions. Instead of identifying and measuring these functions separately, Lotas designed a model combining each of Jung's perception functions: 1) sensing and 2) Intuition, with each of Jung's judging functions: 1) thinking, and 2) feeling. These combinations became the bases for Lotas' learning and teaching styles domains.

McCarthy's 4MAT Model

One of the most recently developed models of learning styles is that developed by Bernice McCarthy. McCarthy's 4MAT model has been included in the "Jung" section of Chapter II because the model incorporates Kolb's Experiential Learning model, which has been identified as a parallel model to Jung's model. McCarthy has attempted to
Integrate learning style research, especially Kolb's, and current research on brain hemispheric dominance.

There is a significant body of research which suggests that the right and left hemispheres of the human brain tend to function differentially. During the 1950's, Roger Sperry conducted a series of animal studies in which the corpus callosum, a thick cable of nerve fibers cross-connecting the two cerebral hemispheres, was severed. Sperry and his associates conducted further research on the separated hemispheres and discovered two separate minds. Additional research with split-brain patients revealed that the left brain uses linear, sequential processing of information and the right brain uses a global processing technique (McCarthy, 1982). Building on this research the McCarthy model suggests that each learning style be recognized as a part of a developmental strategy and implemented according to both right and left brain functioning preferences. To learn about one's own style, a subject completes two instruments: i.e., 1) a learning style assessment inventory, and 2) a brain dominance assessment inventory. Using the results of both instruments, a subject can determine his/her own style. McCarthy's learning styles are named: Type I, Type II, Type III, and Type IV. Descriptions of these styles are similar to descriptions of Kolb's learning styles with additional implications suggested by whether the individual is right or left brain dominant; and whether a person prefers to function generally in a global, holistic manner, or in a linear, sequential manner. McCarthy's integration of learning style and brain dominance is presented in Table 3.
### TABLE 3

**McCarthy's Learning Styles**

<table>
<thead>
<tr>
<th>McCarthy Styles</th>
<th>Kolb's Descriptors</th>
<th>Right or Left Brain Dominance</th>
<th>Major Interest or Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type I</td>
<td>sensing/feeling-watcher</td>
<td>global or sequential</td>
<td>personal meaning: the &quot;why&quot; of things</td>
</tr>
<tr>
<td>Type II</td>
<td>watcher-thinker</td>
<td>global or sequential</td>
<td>knowledge: the &quot;what&quot; of things</td>
</tr>
<tr>
<td>Type III</td>
<td>doer-thinker</td>
<td>global or sequential</td>
<td>application: the &quot;how&quot; of things</td>
</tr>
<tr>
<td>Type IV</td>
<td>sensing/feeling-doer</td>
<td>global or sequential</td>
<td>personal adaptation: the &quot;if&quot; of things</td>
</tr>
</tbody>
</table>

Additional descriptors of McCarthy's Types are as follows:

- **Type I**
  1. seeks meaning;
  2. needs personal involvement;
  3. learns by listening and sharing ideas;
  4. absorbs reality;
  5. perceives concretely and processes information reflectively;
  6. believes in own experiences;
  7. is interested in people and culture;
  8. functions through social interaction and discussion; and
  9. is similar to Kolb's "divergent".
Type II
1. seeks facts;
2. needs information from experts;
3. forms his/her own reality by thinking through ideas;
4. perceives abstractly and processes reflectively;
5. is less interested in people than in ideas and concepts;
6. enjoys traditional classroom;
7. functions by adapting to experts; and
8. is similar to Kolb's "assimilator".

Type III
1. seeks usability;
2. needs to know how things work;
3. learns by testing theories;
4. perceives abstractly and processes actively;
5. uses factual data in designing concepts;
6. functions inferentially from sensory experiences; and
7. is similar to Kolb's "converger".

Type IV
1. seeks hidden meanings;
2. needs to know what can be done with things;
3. learns by trial and error, self-discovery;
4. likes variety, relishes adapting to change;
5. is at ease with people;
6. tends to be a risk-taker;
7. may appear pushy;
8. often reaches accurate conclusions without logical justification;
9. functions by acting and testing experience; and
10. is similar to Kolb's "accommodators" (McCarthy, 1982).

Summary. McCarthy combined learning style research and brain dominance research to develop her integrated model. Through her model, McCarthy attempted to explain how people learn and how teachers can use knowledge about learning styles and right and left brain functioning differences to teach more effectively. A summary of the Multiple Bi-Polar Dimensions Models conceptualized by this researcher to describe learning, cognitive, and teaching styles is presented in Table 4.
### Table 4

**Summary of Multiple Bi-Polar Dimensions Models**

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>Jung</th>
<th>MBTI</th>
<th>McKENNEY-KEEN</th>
<th>KOLB</th>
<th>GREGORC</th>
<th>LOTAS</th>
<th>McCARTHY</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Attitude</strong></td>
<td>(E) extraversion</td>
<td>(E) extraversion</td>
<td>concrete experience (CE)</td>
<td>intuitive/feeling</td>
<td>right brain</td>
<td>left brain</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(I) introversion</td>
<td>(I) introversion</td>
<td>abstract conceptualization (AC)</td>
<td>intuitive/conceptualization(AC)</td>
<td>left brain</td>
<td>right brain</td>
<td></td>
</tr>
<tr>
<td><strong>Perception</strong></td>
<td>(S) sensing</td>
<td>(S) sensing</td>
<td>receptve</td>
<td>intuitive/feeling</td>
<td>right brain</td>
<td>left brain</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(N) intuition</td>
<td>(N) intuition</td>
<td>preceptive</td>
<td>intuitive/conceptualization(AC)</td>
<td>left brain</td>
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During the years that the Myers-Briggs Type Indicator was being conceptualized and refined, other important research related to cognitive style evolved from the field of psychology. One of the most prominent persons in the field of cognitive style was Herman Witkin. Witkin is often called the "father of cognitive style" (Kirby, 1979). Witkin conceived of cognitive style as the ways in which people perceive the world, and Witkin's question of interest clearly focused on perception (Kirby, 1979). Therefore, the Witkin model is described as basically consisting of one dimension with two polar extremes. Other bi-polar models discussed in this section are ones described by: 1) Ramirez and Castaneda; and 2) Messick.

Historically, Witkin's early research evolved out of the observations of the curious experiences of some of the World War II pilots. It had been observed that some pilots while flying through clouds, and, therefore, denied visual clues in positioning their airplanes, would fly out of the clouds and find themselves flying upside down. Other pilots did not seem to experience this disorientation (Kirby, 1979). With these events suggesting clear perceptual differences among pilots, the ramifications of this perceptual peculiarity became an interesting research issue. Since Witkin's early work focused on perception, it resulted in his coining the terms, "field independence" and "field dependence" to explain the differences in the perceptual functioning of individuals. More specifically, the terms "field independence" and "field dependence" were used to describe a dimension of cognitive style which refers to the degree to
which an individual's perception is embedded in the environment. The
less embedded within the environment a person's perception is, the
more "field independent" that person is termed to be. The more
embedded in the environment a person's perception is, the more "field
dependent" that person is termed to be (Witkin, 1973).

Witkin designed several test situations which attempt to measure
the degree of one's perceptual involvement or dependence upon the
environment. One test involves placing the subject in a
specially-designed chair within a specially-designed room. Both the
chair (with the person in it) and the room can be tilted at various
angles. Subjects are asked to identify a true vertical position
regardless of how angled or tilted the chair, room or both really
are. A more simplified test was developed in which a subject (in a
darkened room) is asked to adjust a luminous rod mounted inside a
luminous frame or square to a true vertical axis.

Later, the testing procedure was further simplified to the pro-
cedure of asking the subject to visually identify a simple figure
within a complex visual pattern. This test was eventually validated
and is called the Embedded Figures Test. In all the testing situa-
tions, the subject who is more able to distinguish the true vertical
position or locate the simple figure in the complex design is termed
"field independent". The person who is less capable of making this
distinction is termed "field dependent" (Witkin, 1973).

Insofar as the field independent person successfully or more
quickly accomplishes these tasks and the field dependent person is
unable to or more slowly accomplishes these same tasks, there is a
negative connotation to the application of the term "field dependence" to a subject.

In 1950, based on early research, Witkin described "field Independent" persons as active, aware, in control of impulses, and inclined toward self-esteem and self-acceptance, and "field dependent" persons as lacking clear identity, inclined to accept the environment and react to it passively, and inclined to agree with others. The early descriptors clearly suggest a negative connotation to "field dependence".

Witkin's research included discrete studies as well as longitudinal studies. Among the findings of his research are the following:

1. Women find it more difficult to resist the structure of the prevailing field in perceiving an item within it.
2. Men are found to be more attentive to sensations indicating body positions.
3. Women are more attentive to the relation between body and the surrounding field.
4. Women demonstrate more variable performances under different conditions.
5. Evidence indicates that individual differences in perception found in adults tend to appear early in life.
6. At all ages tested, people tend to be self-consistent in their perceptual preferences under different conditions.
7. Males and females appear to be most alike in perception at the 15 year old level (Witkin, 1954).
8. While there is an Embedded Figures Test for children, only at the adult level is there a picture of significant sex differences. (Numerous studies indicate that women are more "field-dependent" than men, although the differences are not great (Witkin, 1976).

In terms of the teaching/learning process, Witkin (1973) reported these results:

1. There does not seem to be any difference between field dependent/independent people in terms of their sheer learning ability or memory; but both types appear better at what seems relevant to them.

2. Among field independent/dependent, there are no differences between grade point ratios, although there are differences between courses selected by field independent/dependent people.

3. When there is no choice option, students are found to do better in a curriculum which favors their preference.

4. Field-dependence is more common among elementary school teachers, salespersons, counselors, and persons in the social sciences.

5. Field-Independence is more common among math and science teachers.


7. Field-dependent teachers prefer class discussion and the discovery method of teaching.
Additional studies reported by Witkin (1977) indicate that there is a positive relationship between field independence and verbal abilities, spatial abilities, and math skills. Field dependence seems to correlate more highly with sensitivity to one's social environment and adeptness at interpersonal communication.

Interest in Witkin's model led other researchers to explore other behavioral implications of field dependence/independence. Holley (1972) and Justice (1969) reported that field dependent people are drawn to persons with whom they are interacting. That field dependent persons pick up more social cues and look more at faces when interacting was reported by Ruble and Nakamura (1972). And when student and teacher are matched in cognitive style, they tend to view one another more positively (DiStefano, 1969).

Ramirez and Castaneda

Ramirez and Castaneda (1974) used Witkin's model of cognitive style; but their concern about the possible inference of "dependent personality" from the term, "field dependence" led Ramirez and Castaneda to substitute the term "field-sensitive" for "field-dependent". While Witkin's work suggested a developmental or differentiating progression from field-dependence to field-independence, Ramirez and Castaneda's research suggested that field-sensitivity is not a more elementary style; but may be, in fact, a more developed style depending on the context or situation in which the individual is behaving or acting.

In their book, Cultural Democracy, Bicognitive Development, and Education, Ramirez and Castaneda (1974) suggest strategies for
combining the features of field-sensitivity and field-independence for teachers to use with young learners. Separate surveys were developed to be used with direct observation of both learner and teacher. The observer notes and records the frequencies of behaviors which represent "field-sensitivity" and "field-independence". Information from this observation form can be used by the teacher to develop his/her own biconstancy, which refers to the ability to demonstrate both field-sensitive and field-independent behaviors. The observation form can be used also to assist learners in developing both field-sensitive and field-independent behaviors so that either kind of behavior can be comfortably and advantageously utilized in the appropriate situation. It should be noted that the observation form does not attempt to measure the ability to behave field-sensitively or field-independently; but it provides a way of measuring the frequency of such behaviors. One can infer that learning to recognize the behaviors and their appropriateness or inappropriateness in a given situation may assist a person in increasing his/her skill in utilizing either kind of behavior when desired.

Ramirez and Castaneda (1974) identified some indicators of field-sensitive and field-independent behaviors. Some of the indicators are listed below:

Indicators of field-independent behaviors:

1. maintaining formal relationship with students;
2. encouraging independent student achievement, task orientation, inter-student competition;
3. adopting a consultant role; and
4. focusing on curricular details, facts, and encouraging novel approaches to problem solving.

Indicators of field-sensitive behaviors:
1. displaying physical and verbal expressions of approval;
2. expressing confidence in children's ability to succeed;
3. giving guidance, encouraging learning through modeling, cooperating, and developing group feelings;
4. personalizing and humanizing the curriculum;
5. emphasizing global aspects of concepts; and
6. clearly explaining performance objectives.

In contrast to Witkin's findings which suggest that field dependence/independence is rather stable and not likely to change, Ramirez and Castaneda (1974) found that it is possible to intervene and affect one's style because style is not indelibly set at an early age.

The Witkin model seemed to stimulate the development of other bi-polar models of cognitive style. Many researchers have contributed their ideas and research to this growing body of knowledge. While the cognitive style dimension of field-dependence/independence developed by Witkin and associates is the most thoroughly researched and utilized, other researchers have developed cognitive style models similar in their bi-polarity and uni-dimensionality to the Witkin model. Some of the models are overlapping in theory and/or implications or interpretation. However, many of these other models simply extend the basic Witkin model or shift the emphasis somewhat.
One example of this extension is provided by Messick. Messick (1970) considers cognitive style as representing a person's fairly typical or consistent mode of perceiving, remembering, thinking, and problem-solving. Messick reviewed the many cognitive style dimensions that had been conceptualized by other researchers, listed and summarized them. Some of those he listed are the following:

1. Field dependence/Independence: This model developed by Witkin et al. refers to a global versus analytical mode of perceiving the environment.

2. Impulsivity versus reflectiveness: Based on the work of Block, Block, and Harrington, Kagan and others, and Yando and Kagan, this model relates to the speed and correctness with which a person forms hypotheses. Impulsivity refers to the tendency to react quickly and to experience more Incorrect responses while reflectivity refers to the tendency to respond more slowly with a higher level of correctness. This dimension can be expanded to allow for other possible combinations of speed and correctness: quick and correct; quick and Incorrect; slow and correct; slow and Incorrect.

3. Scanning versus focusing: Based on the work of Benfori; Gardner and Long; Holzman; Schlesinger; Silverman; and Wachtel, scanning relates to a high level of extensiveness and low level of Intensity of attention or awareness, while focusing refers to low extensiveness and high Intensity of attention or awareness.

4. Breadth versus narrowness of categorizing: Based on the work of Fillenbaum; Messick and Kogan; Pettigrew, Bruner, and Tajfel; Wallach and Caron, this dimension refers to a consistent preference for broad inclusiveness of many items or a narrow exclusiveness in establishing categories. (Individuals tend to be consistent across quantitative, verbal, and geometric domains.)

5. Leveling versus sharpening: Based on the work of Gardner and others; Holzman; Holzman and Gardner; Holzman and Klein; Israel; and Santostefano, Holzman and Rousey, this model refers to individual variations in assimilation in memory. Extreme levelers tend to blur similar memories together
while extreme sharpeners may see more differences between present events and past memories than may even be the case.

6. Constricted versus flexible control: Based on the work of Gardner and others; Jensen and Rohwer; Klein; and Santostefano and Paley, constricted control refers to individual differences which create greater susceptibility to distraction and cognitive interference. Flexible control allows for less susceptibility to distraction.

7. Cognitive complexity versus simplicity: Based on the work of Allard and Carlson; Bieri; Bieri and others; Kelly; Langley; Messick and Kogan; Scott; Harvey, Hunt, and Schroeder; Signell; Vonnoy; Wyer; and Zimring, this model is sometimes referred to as abstract versus concrete. Cognitive complexity refers to an individual tendency to construe the world and social behavior in a multidimensional, integrative manner; while cognitive simplicity refers to construing the world through consistent regularities in the environment.

8. Tolerance versus intolerance for unrealistic experience: Based on the work of Gardner and others; Klein and others, this model refers to high through low levels of the acceptability of perceptions at variance with conventional experience.

Other dimensions include:

9. Risk taking versus cautiousness: Based on the work of Kogan and Morgan; Slovic; Kogan and Wallach; this dimension suggests differences in individuals in the tendency for risk-taking which implies low probability and high payoff or cautiousness which implies high probability and low payoff.

10. Sensory modality preferences: Based on the work of Bruner, Olver, and Greenfield, this dimension refers to individual reliance on different sensory modes to understand experience, leading to: 1) kinesthetic or physical, inactive, or motoric thinking or 2) ikonic or figural, visual or spatial thinking; 3) auditory or symbolic or verbal thinking.

11. Converging versus diverging: Based on the work of Cronbach; Getzels and Jackson; Hudson; Kinsbourne; Wallach and Kogan, this model relates to the extremes of convergent thinking which is aimed toward logical conclusions or conventionally best outcomes and divergent thinking which is aimed toward variety and quantity of relevant output (Messick, 1976).
Summary

The Witkin model opened some new dimensions for educators and researchers to consider when dealing with different learners. Although other researchers have developed their own models since the first Witkin data appeared in the literature, their data seem to support the Witkin model, while offering some distinct and/or subtle extension possibilities. The models of both Jung and Witkin evolved from the psychological arena. Jung was a theoretician and practitioner of psychology and his model of personality became not only the basis of his own theory of psychological type but also a prototype of many of the cognitive, learning, and teaching style models to follow. Witkin's work has a strong psychological research orientation also; his model of a bi-polar dimension of cognitive style was the precursor of other cognitive and learning style models. His model of field dependence/independence has been researched heavily. While he allowed that the socialization process of the individual influenced his/her predisposition toward field dependence or independence, Witkin (1973) also has initiated research regarding the genetic implications for field dependence/independence.

Ramirez and Castaneda used the basic Witkin model; but altered the terminology of field dependence/independence to field sensitive/independent because of concern about the possible negative connotations ascribed to the term "field dependence". Ramirez and Castaneda's research suggested that cognitive style is not only refineable, but that it is important for teachers and students to
develop bicognitive characteristics.

Messick reviewed the literature regarding cognitive style and summarized much of the research done by others. He provided a comprehensive list of the various dimensions which investigators have named and researched in order to explain the ways in which people perceive and process information available to them, and make decisions.

Hill's Multiple Variables Model

There clearly were implications for educational practices in the personality model of Jung and the cognitive style model of Witkin and others. However, it was Hill who made an early effort to articulate the connections between psychological research and the educational setting. Hill considered learning style to be the manner by which one seeks meaning from one's environment (Smith, 1979). The term "learning style" has appeared in the literature more recently than the term "cognitive style". Learning style links some insights of cognitive style research and adds some other ideas. Cognitive style is usually considered as one element among other elements comprising learning style. Generally, cognitive style focuses on one style dimension with two polar extremes; while learning style may include several elements. These learning style elements usually are not either/or extremes; that is, the absence of one element does not imply the presence of the opposite element. Learning style may consist of varying levels of many elements (Kirby, 1979). Also, it is suggested that cognitive style remains more or less constant
within an individual while learning style may involve other more changeable elements (Cross, 1976). According to Hill, cognitive style can be adjusted or altered through training and education (Kirby, 1979). Ramirez and Castaneda (1974) also purport that one can develop or increase bicognitivily. Through the educational process of increasing one's self-awareness, a person can recognize that 1) one may have preferences; and 2) what those preferences are. Then, through conscious effort and supportive associates or teachers, a person can increase his/her repertoire through the recognition and practice of more appropriate choices of behaviors.

While other model builders searched for different single variables to explain cognitive style, Hill attempted to develop a conceptual framework to encompass a wide battery of learning variables. This is why the Hill model is described in this study as a Multiple Variables Model. This model appears common to the work of Canfield, Dunn, and Fischer; therefore, their learning style models are discussed in the Hill section of Chapter II.

To express this framework and the variables which purportedly determine educational cognitive style, Hill devised a hierarchical model called the Seven Educational Sciences. This model is hierarchical in the sense that each of the sciences in his model is presumably built on the earlier sciences. The Seven Educational Sciences are listed below.

1. Symbols and their meanings
2. Cultural determinants
3. Modalities of inference
4. Educational memory
5. Cognitive style
6. Teaching, administrative, student, and counseling style
7. Systematic analysis decision making

According to Smith (1979) Hill gives credit to the preliminary efforts of other researchers in Hill's development of the Seven Educational Sciences. The Sciences and the researchers as credited by Hill along with a brief explanation follow:

1. **Symbols and Their Meanings** (based on the research of John C. S. Pierce, N. L. Champlin, F. T. Villemanin, A. Korzybski, A. Rapaport, and others): There is a primary assumption that humans use two kinds of symbols, theoretical and qualitative. These symbols are basic to the acquisition of knowledge and meaning.

2. **Cultural Determinants of the Meaning of Symbols** (drawn from the research of E. C. Kelley, M. Sherif, E. C. Tolman, R. K. Merton, and others): This science centers on information about the world of human relationships and how these cultural influences affect what symbols mean to individuals. Some persons prefer to study alone, to make decisions alone, to describe situations in their own manner or words. Other persons prefer to depend on associates, peers, or family.

3. **Modalities of Inference** (concepts derived from statistics and logic, and research of J. Plaget, M. Werrtheimer, J. Bruner, and J. P. Guilford): This science looks at the methods of reasoning. Students may use categorical reasoning, comparing and contrasting, synthesizing various components into related unity, or using all these processes to appraise a situation and draw conclusions. Inductive or deductive reasoning may also be employed.

4. **Memory Concern: Biochemical and Electrophysiological Aspects of Memory Concern** (early work in this areas was done by D. O. Hebb, D. Kreck, and a research group at the University of California at Berkeley): This science emphasizes the neurological bases of memory. Short term memory and long term memory possess complicated relationships to energy and biochemical elements. Memory processes of recognition, retention, recall, and association are identified in the testing process by the "concern" components relating to persons, processes, and properties.
5. **Educational Cognitive Styles of Individuals** (based on the work of C. W. Allport, H. A. Witkin, R. W. Gardner, J. Kagan, H. Moss, and I. Sigel): This science is the product of the first four sciences. This concept is expressed as a cartesian set.

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Each set in this model contains elements which interact with elements in each other set to produce each individual's specific cognitive style. For each person, symbols, both theoretical (words and numbers) and qualitative (thought-related and personalized) are modified by the cultural determinants of meaning (personal or individual assessments of meaning, or meanings as impacted by family or associates). Each person draws tentative conclusions about symbols and their meanings based on one's individual thought processes or modalities of inference, which may be inductive or deductive. The fourth science, memory concerns, is considered by Hill as a fourth factor in the cartesian set which produces one's individual cognitive style.


7. **Systematic Analytic Decision Making** (based on the work of J. von Newman and O. Morgenstern, N. Wiener, D. Cook, and L. von Bertalanffy): An educational program may be defined as a social system composed of people, processes, properties and their interrelationships considered over a period of time. Basic to any system is a statement of goal or mission as well as specific performance criteria, inputs, and outputs to measure the level of success in meeting the goals of the system. To keep an educational system adjusted requires human feedback, communication, and modification or revision. Systematic analysis encourages decision-making which is best for all parts of the system (Smith, 1979).
One of the earliest measures of learning style evolved from the Seven Educational Sciences. Hill developed a comprehensive self-assessment instrument for identifying and measuring specific characteristics of learning or cognitive style. An individualized cognitive style map can be derived from this inventory for the respondent. This mapping analyzes how the respondent derives meaning from the environment. From this analysis an educational plan or strategy can be designed for the individual to help him/her understand his/her learning strengths and limitations. Prescriptions evolving from this map interpretation allow for the provision of educational experiences which are geared toward utilizing the respondent's identified strengths and augmenting the identified weaknesses. This may be accomplished by either a cognitive/learning style - teaching style match or mis-match.

At Oakland Community College in Michigan, this mapping was used by staff and students to identify student preferences in order to plan and organize optimal learning experiences. Mapping may also be developed as a composite of characteristics for an entire class or other learning group.

The instrument consists of statements of preferred ways of doing things. The respondent is asked to read each statement and then determine how often the statement would accurately describe himself/herself: rarely; sometimes; or usually. Each description is assigned a weighted value and the total numbers for each category indicate whether the category is of major, minor, or negligible strength. The
statements in the inventory are designed to measure the following learning characteristics.

1. The tendency to acquire meaning through symbols.
   a. theoretical symbol
      -- words: as seen and heard
      -- numbers: as seen and heard
   b. qualitative symbols
      -- sensory: as sounds, odors, taste, touch, and seeing
      -- programmatic: as in proprioceptive or the coordination of body movements from sensory information
   c. codes
      -- as in empathy, esthetics, ethics, histrionics, kinesics, kinesthetics, proxemics, synnoetics, and transactional

2. Cultural determinants: weighting or filtering of information independently or as influenced by family or associates

3. Modalities of inference: refering to how one reasons:
   a. Magnitude: as through rules and definitions
   b. Differences: as through seeing contrasts or comparisons
   c. Relationship: as through synthesizing dimensions into a unified meaning
   d. Appraisal: as through drawing conclusions from rules, differences, and relationships
   e. Deductive reasons or logical proof: as in deductive rather than inductive reasoning
Researchers were critical of the self-assessment, self-reporting design of the Hill Instruments. However, the criticism regarding the self-report nature of the Hill Instrument would be appropriate for any self-assessment instruments since the validity of the results depend upon the level of self-knowledge of the responder (Kirby, 1979).

Other criticism of Hill's cognitive style mapping involved the relative non-specificism of what constitutes "major categories", "minor categories", and "negligible categories". The percentile groupings used for the mapping were rather broadly inclusive and, therefore, the strength of the categories was not as specific as some of Hill's critics thought they should be (Kirby, 1979). Suggestions for changing percentile cutoffs for inclusion in "major, minor, or negligible categories" were very acceptable to Hill, who encouraged others in the field to use his work to meet their professional needs (Kirby, 1979).

As previously mentioned, Hill conceptualized the framework of teaching style as a cartesian product of demeanor, emphasis or concerns, and symbolic modes of presentation. However, Hill did not implement this sixth science through an identification and measurement instrument. The following is an outline of Hill's teaching style framework:

1. Demeanor
   A. Predominant or Fixed Style
   B. Adjustive or Switcher
C. Flexible
   1. authoritative
   2. permissive

II Concerns
   A. Persons
   B. Processes
   C. Properties

III Symbolic Mode of Presentation
   A. Theoretical predominance
   B. Reciprocity (mixture of theoretical and direct)
   C. Qualitative (direct experience)

(Kirby, 1979)

Following Hill's introduction of a multi-dimensional approach to identifying learning and teaching styles, both Dunn and Canfield developed similar models. Their models include the identification and measurement of external conditions as well as internal preferences. These models suggest that there are many aspects to consider as one identifies the ways in which an individual learns best. In this multi-dimensional model of learning style, low preference on one dimension does not always presuppose a high preference in some other category. Rather, the variables are identified and measures of each are more or less discrete. With any self-report instrument, one must recognize that the accuracy of results depend upon

1. the subject doing, in fact, what he/she reports doing; (Kirby, 1979) and
2. the subject knowing him/herself well enough to report reactions precisely.
The Canfield and Lafferty Learning Styles Inventory is a self-report instrument which is geared toward younger and older adults (Kirby, 1979). To complete the instrument, the respondent ranks four answer-choices for each stem in the Inventory. From the completed Inventory raw scores for each of the following categories can be obtained:

1. CONDITIONS: These eight scores reflect concerns for the dynamics of the situation in which learning occurs.
   a. Affiliation — peer — enjoying working relations with others
      — instructor — mutual understanding between student and instructor
   b. Structure — organization — needing clear and logical sequencing of tasks
      — detail — needing specific information
   c. Achievement — goal setting — establishing one’s own objectives
      — independence — planning and working alone
   d. Eminence — competition — needing comparison with others
      — authority — desiring classroom order

2. CONTENT: These four scores reflect major areas of interest.
   a. Numeric — working with numbers
   b. Qualitative — working with words and languages
   c. Inanimate — working with things
   d. People — working with people
3. MODE: These four scores reflect preferences for modalities of learning.
   a. listening - hearing information
   b. reading - examining written words
   c. iconics - viewing illustrated materials
   d. direct experiences - handling items or performing activities

4. EXPECTATION: These scores reflect the level of anticipated performance:
   a. outstanding
   b. above average
   c. average, and
   d. below average (Canfield, 1976; Kirby, 1979; Phillips, 1982).

The scores from these categories can be bar-graphed for percentile ranking among the norming sample. Because of noted differences, it is important that each person be profiled according to their appropriate sex and grade level group.

Canfield and Canfield's Instructional Styles Inventory. Canfield and Canfield's Instructional Styles Inventory parallels Canfield and Lafferty's Learning Styles Inventory in the following three categories: conditions, content, and mode. While the Learning Styles Inventory has a category for "Expectation of Level of Performance", which is not reflected in the Instructional Styles Inventory, the Instructional Styles Inventory includes a category of "Level of Responsibility" referring to responsibility assumed by the instructor for the learning of the student. As with the Learning Styles Inventory, percentile ranking of raw scores in each of the categories
differ with the sex of the Instructor. Therefore, separate profile sheets are indicated for male and female instructors. The samples cited in the *Instructional Styles Inventory* profile sheets include 373 females and 428 males.

**Dunn, Dunn, and Price**

In their book, *Teaching Students Through Their Individual Learning Style: A Professional Approach*, Dunn and Dunn incorporate many practical suggestions for teaching students with different learning styles as measured by the Dunn, Dunn, and Price *Learning Style Inventory*. This Inventory provides a profile which touches on 24 elements of learning style divided into four main categories. The Inventory consists of 100 questions to be answered "true" or "false". The subject's answers result in a profile indicating preferences in the following categories:

1. Environmental stimuli: sound, light, temperature, design;
2. Emotional stimuli: self-motivated, teacher-motivated, persistence, responsibility, and structure;
3. Sociological stimuli: learning alone, peer-oriented learning, learning with adults, learning through several ways;
4. Physical stimuli: perceptual, intake, time, or mobility;

Studies based on the learning style inventories of children up to grade 12 have provided the following information:
1. Both males and females become less tactile, less interested in learning with adults, and less interested in working in the morning, as the grade level advances.

2. Those with a lower self-concept need more mobility and wanted noise and adults around them (Kirby, 1979).

Also, findings of a study involving pupils in grades 3, 6, and 7 indicated that individuals with a high self-concept prefer

1. quiet setting;
2. warm temperature;
3. are adult and teacher motivated;
4. are persistent;
5. prefer to learn in several ways;
6. do not have auditory preferences; and
7. do not need mobility.

Individuals with low self-concept

1. prefer to study or learn with music;
2. prefer a cool atmosphere;
3. are not persistent;
4. are not able to learn in varied ways;
5. have auditory preferences; and
6. need mobility (Dunn, 1979).

Continuing research corroborates the belief that achievement, motivation, and discipline improve where learning style matches complementary teaching style (Dunn, 1981).

Fischer and Fischer

Another interesting approach to learning styles is that offered by Fischer and Fischer. Their ideas are based on their own direct observation and experience as well as discussion with sensitive and competent teachers (Fischer and Fischer, 1979). The term "style" in their usage refers to a pervasive quality in the behavior of an individual, a quality that persists though the content may change.
(Fischer and Fischer, 1979). Ten learning styles suggested by their research are the following:

1. Incremental learner: systematically adds bits of information together in order to understand the big picture.
2. Intuitive learner: arrives at generalizations from an unsystematic gathering of information and experience.
3. Sensory specialist learner: derives ideas primarily from one sense.
4. Sensory generalist learner: derives insights from the use of all or many of the senses.
5. Emotionally involved learner: functions best in a highly emotionally charged classroom.
7. Explicitly structured learner: functions optimally in a structured setting with clear goals and limits.
8. Open-ended structure learner: achieves optimally in a classroom in which opportunity for divergence and relevant exploration is provided.
9. Damaged learner: is physically normal but may demonstrate a damaged self-concept or other characteristic which encourages the development of a negative learning style.
10. Eclectic learner: can shift style depending on the requirements of the learning situation or classroom (Fischer and Fischer, 1979).
Fischer and Fischer (1979), discuss teaching style as separate from method of instruction. To distinguish style from instruction, Fischer and Fischer give several examples of teaching style.

1. Task-oriented teacher: prescribes specific materials and demands performance by the students.

2. Cooperative planner: is the teacher who together with the students determines the means and ends of instruction.

3. Child centered style: refers to the teacher who always provides a structure to allow students to pursue whatever interests them.

4. Subject centered style: refers to a focus on organized content prepared by the teacher.

5. Learning centered style: refers to teachers who clearly exhibit concern for both the students and the curriculum.

6. Emotionally exciting style and its counterpart: refers to the teacher who demonstrates emotional involvement in teaching and to the teacher who conducts classes in predominantly rational tones.

These Fischer and Fischer styles are not mutually exclusive. However, they do provide a somewhat different focus from the other previously discussed styles. Fischer and Fischer indicate that their ideas evolved from their own direct observations as well as through discussions with competent teachers.

Summary

Hill made a major effort toward applying the findings of psychological research relative to cognitive style to the field of
education. His concept of educational cognitive style was an effort at identifying the ways in which people seek meaning from their environment. He developed a model which considers learning style as being derived from a multiple of variables or dimensions. His model is different from the Jung or Witkin models in that Hill's variables are not articulated in terms of bi-polarity or mutual exclusiveness. Other researchers also considered the complex question of how people learn by analyzing the impact of many factors. The approaches of Canfield, Dunn, and Fischer were explored in this section of Chapter II.

Summary

In Chapter II, the literature and research relevant to cognitive style, learning style, teaching style, and psychological type were discussed. The chapter was organized around three basic models: (1) Jung; (2) Witkin; and (3) Hill.

The Jung model was described as a Multiple Bi-Polar Dimension Model. Topics discussed within the Jung Model were:

1. Myers-Briggs Type Indicator
2. McKenney-Keen Model
3. Kolb's Learning Style Inventory
4. Gregorc's Learning Style Inventory
5. Lotas Model
6. McCarthy's 4 MAT Model

The Witkin Model was described as a Bi-Polar Model, consisting of one dimension with the two polar extremes used as descriptors of the
dimension. Researchers addressed along with the Witkin Model included:

1. Ramirez and Castaneda
2. Messick

The Hill Model was described as a Multiple Variables Model, with dimensions which are neither mutually exclusive nor conceptually polar in extremes. With the Hill model, the following model developers were discussed.

1. Dunn, Dunn, and Price
2. Canfield and Lafferty
3. Fischer and Fischer

Currently many other models are being evolved. However, most models are similar to the basic models discussed in this chapter.
CHAPTER III

METHODOLOGY

Introduction

The purpose of this study was to identify relationships among the preferred teaching styles, preferred learning styles, psychological types, and selected personal characteristics of a sample of classroom teachers. In order to investigate these relationships, a sample of classroom teachers was asked to complete a series of self-report instruments. In Chapter III, the sample of teachers is described and discussed discretely as well as in comparison with the population of teachers in the State of Ohio. The research design along with a description of each of the instruments used in the study also are discussed. Limitations of the sample as well as the study are examined, after which a discussion of the data collection, coding, and analyses procedures follow.

Description of the Sample

A non-random sample of 98 classroom teachers participated in this study. Eighty-two of the participants were classroom teachers who were enrolled in courses or workshops arranged through the College of Education at The Ohio State University. Sixteen of the ninety-eight subjects participated in this study through in-service activities offered through the educational institution with which they were associated. The subjects in the study represented 19
different school districts or educational institutions. Of the 98 participants in the study, 84 or 86 percent were female and fourteen or 14 percent were male. Of the 91 respondents who reported their 1981-82 school year teaching assignments, 11 males reported the following assignments:

Elementary School---------2
Intermediate School-------2 Social Studies
                               3 Mathematics
                               2 Science
                               1 Foreign Languages
High School------------------2 Social Studies
                               1 Mathematics
                               1 Science
                               1 Business

Eighty females reported the following assignments:

Elementary School--------54 (Includes mixed assignments of elementary and other levels
Intermediate School-------2 Social Studies
                               4 Mathematics
                               2 Science
                               1 Health
                               1 Home Economics
                               1 Foreign Language
High School---------------4 English
                               4 Mathematics
                               1 Science
                               3 Home Economics
                               1 Journalism
                               3 Special Education (Including Intermediate)

Several of the teachers reported having assignments of more than one subject or grade level.

The school settings as reported by 91 of the 98 teachers in the sample are compared with the school settings of the teachers in the
State of Ohio in Table 5. On all tables in which descriptive information regarding teachers in the State of Ohio is provided, the source of that state information is the Ohio Department of Education: Division of Computer Reports and Statistical Reports (1981-82).

**TABLE 5**

SCHOOL SETTINGS REPORTED BY SUBJECTS (1981-1982)

<table>
<thead>
<tr>
<th>TEACHERS</th>
<th>% OF THE STUDY SAMPLE</th>
<th>% OF OHIO TEACHERS</th>
</tr>
</thead>
<tbody>
<tr>
<td>52</td>
<td>57% Elementary</td>
<td>47,101</td>
</tr>
<tr>
<td>17</td>
<td>19% Intermediate</td>
<td>Included in state figures for elementary</td>
</tr>
<tr>
<td>19</td>
<td>21% High School</td>
<td>34,901</td>
</tr>
<tr>
<td>3</td>
<td>3% Mixed</td>
<td>15,470</td>
</tr>
</tbody>
</table>

91 of 98 Respondents Reporting State of Ohio Records

Table 6 illustrates age categories and frequencies. The range of ages reported by 86 of the 98 subjects was from 25 to 59 years. The mean of the reported ages is 37.9 years. Since age was not reported by the Ohio Department of Education statistical reports, no comparison can be drawn.

In Table 7 the teaching experience prior to the 1981-82 school year which was reported by 87 of the 98 teachers in the study sample is summarized.
TABLE 6

AGE REPORTED BY SUBJECTS (1982-1982)

<table>
<thead>
<tr>
<th>AGE</th>
<th>TEACHERS</th>
<th>% OF THE SAMPLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 35 years</td>
<td>33</td>
<td>38%</td>
</tr>
<tr>
<td>35-45 years</td>
<td>32</td>
<td>37%</td>
</tr>
<tr>
<td>46 and over</td>
<td>21</td>
<td>25%</td>
</tr>
</tbody>
</table>

86 of 98 Respondents Reporting

TABLE 7

KINDS OF PAST TEACHING EXPERIENCE REPORTED BY SUBJECTS
PRIOR TO 1981-82 SCHOOL YEAR

<table>
<thead>
<tr>
<th>EXPERIENCE</th>
<th>TEACHERS</th>
<th>% OF THE SAMPLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>High School only</td>
<td>13</td>
<td>15%</td>
</tr>
<tr>
<td>Intermediate School only</td>
<td>6</td>
<td>6%</td>
</tr>
<tr>
<td>Elementary School only</td>
<td>45</td>
<td>51%</td>
</tr>
<tr>
<td>High School &amp; Elementary School</td>
<td>2</td>
<td>2%</td>
</tr>
<tr>
<td>Intermediate School &amp; Elementary School</td>
<td>9</td>
<td>10%</td>
</tr>
<tr>
<td>High School &amp; Intermediate School</td>
<td>6</td>
<td>6%</td>
</tr>
<tr>
<td>High School, Intermediate School &amp; Elementary School</td>
<td>6</td>
<td>6%</td>
</tr>
</tbody>
</table>

87 OF 98 Respondents Reporting
In Table 8 characteristics of the sample are compared with characteristics of the teaching population of the State of Ohio. (Ohio Department of Education, 1981-82). Table 8 indicates that there is a much higher percentage of females in the study sample than in the general population of teachers.

**TABLE 8**

**SEX OF SUBJECTS IN STUDY**

<table>
<thead>
<tr>
<th>SEX</th>
<th>% OF THE STUDY SAMPLE</th>
<th>% OF OHIO TEACHERS</th>
</tr>
</thead>
<tbody>
<tr>
<td>MALE</td>
<td>14%</td>
<td>35%</td>
</tr>
<tr>
<td>FEMALE</td>
<td>86%</td>
<td>65%</td>
</tr>
<tr>
<td>TOTAL</td>
<td>96%</td>
<td>96,472 TOTAL</td>
</tr>
</tbody>
</table>

Table 9 shows that the characteristics of the study sample relative to the numbers of years of experience are not dramatically dissimilar from the State of Ohio population of teachers, except in the category of teachers who have taught 24 years or more, where the percentage of teachers in Ohio is more than twice the percentage of teachers in the study sample.
### TABLE 9
YEARS OF TEACHING EXPERIENCE REPORTED BY SUBJECTS (1981-82)

<table>
<thead>
<tr>
<th>% OF THE TEACHERS OF THE STUDY SAMPLE</th>
<th>YEARS</th>
<th>% OF THE TEACHERS OF OHIO TEACHERS</th>
</tr>
</thead>
<tbody>
<tr>
<td>16</td>
<td>less than 5</td>
<td>18,230</td>
</tr>
<tr>
<td>54</td>
<td>5 - 13</td>
<td>44,328</td>
</tr>
<tr>
<td>20</td>
<td>14 - 23</td>
<td>25,986</td>
</tr>
<tr>
<td>4</td>
<td>24 - 24+</td>
<td>8,929</td>
</tr>
</tbody>
</table>

94 of 98 Respondents Reporting 97,473 Teachers in Ohio

Table 10 illustrates that the study sample does not differ dramatically from the population of teachers in the state of Ohio in the category of "Level of Education."

### TABLE 10
LEVEL OF EDUCATION REPORTED BY TEACHERS (1981-82)

<table>
<thead>
<tr>
<th>% OF THE TEACHERS OF THE STUDY SAMPLE</th>
<th>EDUCATION LEVEL</th>
<th>% OF THE TEACHERS OF OHIO TEACHERS</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>No degree</td>
<td>2,259</td>
</tr>
<tr>
<td>64</td>
<td>Bachelor's</td>
<td>39,437</td>
</tr>
<tr>
<td></td>
<td>Bachelors + 35 hours</td>
<td>22,793</td>
</tr>
<tr>
<td>9) = 24</td>
<td>Master's/</td>
<td>32,984</td>
</tr>
<tr>
<td>15)</td>
<td>Master's +</td>
<td></td>
</tr>
</tbody>
</table>

88 of 98 Respondents Reporting 97,473 Teachers in Ohio
Description of the Instruments

The Instruments which were used in this Investigation are the following:

1. Myers-Briggs Type Indicator (MBTI)
2. Lotas Teaching Preference Questionnaire (LTPQ)
3. Learning Style Preference Questionnaire (LSPQ)
4. Self-Analysis Questionnaire (SAQ)

Each of these Instruments is discussed in this section of the study.

Myers-Briggs Type Indicator (MBTI)

The MBTI is an inventory containing 166 items in a self-report design. The purpose of the MBTI is to implement Jung's theory of psychological type. Jung's theory suggests that much apparently random variation in human behavior is actually quite orderly and consistent, being due to basic differences in the ways people choose and prefer to use perception and judgment (Myers, 1962). The MBTI inventory provides discrete measures of four scales: 1) judging and perceiving, 2) thinking and feeling, 3) sensation and intuition, and 4) extraversion and introversion. Each scale attempts to assess the subject's preference for one mode of behavior over the other. According to Saunders (1958) the four scales can be considered in the following way. The most basic premise of the theoretical formulation underlying the MBTI is that each time a person uses his/her mind, that person performs either an act of Perception (P) or an act of Judgment (J). Generally, people derive more pleasure from one: either Perception or Judgment.
Two forms of judgment are Thinking (T) and Feeling (F). Thinking—judgment is a logical formalizable process aimed at impersonal findings of fact. Feeling—judgment is a more complicated process, since it bestows personal and subjective values on elements of situations too complex for logical analysis. People use both forms of judgment but generally trust one more and, therefore, use it more frequently. Frequency of use may develop the function so that it grows more trustworthy.

Sensation (S) and Intuition (N) are two forms of perception. Sense-perception is the direct awareness of something by way of one or more of the senses: sight, hearing, touch, taste, or smell. Intuitive-perception is indirect in that the unconscious may add on ideas or associations to the sensations from outside the organism. While a person uses both sensing and intuition from time to time, people generally find one more interesting than the other and the more interesting function gains in priority.

Extraversion (E) and Introversion (I) are the two basic attitudes which provide patterns of organization (in the Jungian sense). Extraversion is the attitude in which a person's main points of reference are external. Introversion is the attitude in which one's main points of reference are internal (Saunders, 1958).

Validity. There is some controversy regarding the validity of the MBTI (Lotas, 1978; Stricker and Ross, 1964a,b). However, there is also substantial support for its validity. Empirical data have been gathered on MBTI scores as related to creativity, academic
achievement, vocational preference, aesthetic preference, values, needs, aptitudes, and work habits. Group differences and correlations are broadly supportive of the construct validity of the MBTI scales (Buros, 1978). Carlyn (1977) examined the MBTI for content, predictive, and construct validity, and reported the MBTI to be a reasonably valid instrument in that it does measure dimensions of personality similar to those postulated by Jung. Other support for the validity of the MBTI is provided by Steele and Kelly (1976) and Carskadon and Knudson (1978).

Reliability. Split-half reliability for internal consistency of the MBTI has been reported in the .70-.80 range for continuous scores (Myers, 1962). Carlyn (1977) considered the MBTI to be an adequately reliable self-report inventory based on her review of the reliability reports. Internal consistency for continuous scores was cited as:

- .76-.82 Extraversion-Introversion Scale
- .75-.87 Sensing-Intuition Scale
- .69-.86 Thinking-Feeling Scale
- .80-.84 Judging-Perceiving Scale

Lotas

Two of the Instruments used in this study were developed by Alexis Lotas. Before discussing either of these instruments, a preliminary explanation of the Lotas model of teaching and learning is given. After this brief introduction, the LTPQ and the LSPQ are discussed. As with the MBTI, the Lotas Instruments are related to Jung's theory of psychological type. However, while the MBTI is
concerned with a more generalized implementation of type theory, the
Lotas Instruments have been designed to focus on Jung's theory as it
applies to the more specific areas of teaching and learning.

The Lotas model is based on Jung's theory of psychological type.
According to Jung's theory, psychological type can be explained in
terms of a person's basic attitudinal preference for either the
internal world of ideas (Introversion) or the external world of per­
sons, places, and things (extraversion), in combination with the
orderly and consistent ways in which a person prefers to use
perception and judgment. The Lotas model concentrates on that part
of Jung's theory which is related to the functions of perception and
judgment. Instead of viewing the extremes of perception: as in
sensing and intuiting and the extremes of judging: as in thinking
and feeling, discretely, Lotas combined each of the perception func­
tions with each of the judging functions. The four resulting combi­
nations became the four domains named by Lotas as:

1. Affective I: sensing-feeling domain
2. Cognitive I: sensing-thinking domain
3. Cognitive II: Intuitive-thinking domain
4. Affective II: Intuitive-feeling domain

These domains have been applied by Lotas to the concept of teaching
styles and by Lotas and Brink to the concept of learning styles.
Figure 2 illustrates the Lotas Model as compared with the Jung func­
tions of perception and judgment.
Figure 2 is a diagram of the perception and judging functions of Jung's model of psychological type as represented by two intersecting dimensions of Thinking-Feeling and Sensing-Intuition as compared with the Lotas model illustrating the domains created by the combinations of perception and judging. The Lotas model evolved from a 45° rotation of the Jung diagram. This rotation combines perception and judgment functions into learning and teaching domains. From Jung there is support for the Lotas model of combining functions:

For all the types met in practice, the rule holds good that besides the conscious, primary function, there is a relatively unconscious auxiliary function which is in every respect different from the nature of the primary function. The resulting combinations present the familiar picture of, for instance, practical thinking allied with sensation, speculative thinking forging ahead with intuition, artistic intuition selecting and presenting its images with the help of feeling values ... (Jung, 1977, 1921).
LOTAS TEACHING PREFERENCE QUESTIONNAIRE (LTPQ)

The LTPQ was published in 1978. The LTPQ is a self-report, forced-choice instrument consisting of ten statements of issues in teaching. Each of the ten statements is followed by four possible choices for completion. Subjects are asked to select their two most preferred choices from among the four possible choices. In every statement, each of the four choices labeled as "a", "b", "c", or "d" represents one of the teaching style domains. The "a" scores reflect Affective I; the "b" scores reflect Cognitive I; the "c" scores reflect Cognitive II; and the "d" scores reflect Affective II. When the subject has completed all ten statements, scores for each domain are totaled. For purposes of this study, the largest total score designates the strongest teaching style preference; the second largest score, the second most preferred style; the third largest score, the third most preferred style; and the smallest score, the least preferred style. A copy of the LTPQ is included as Appendix A. The copy of the instrument provides information regarding scoring.

In cases of tied scores, the investigator and LTPQ author together considered the relative strengths of individual scores awarded to the tied and other domains. In the few cases where this consultation could not result in a break of the tie, the data were not included in the reported results. For purposes of this study, the first and second choices of the subjects were used in the analysis of data and the resolution of the questions involved in this research.
Teaching Style Domains. Lotas has indicated that three of the teaching style domains can be analogous to Broudy’s (1972) concepts of philetics, didactics, and heuristics (Lotas, 1977). The following discussion provides a short description of the teaching domains.

Affective I: Philetics (Broudy, 1972)
The teacher concentrates on the emotional adjustment of the pupil, tending to parent, support, and nurture (Social Interaction).

Cognitive I: Didactics
The teacher concentrates on instruction in which the contents are made explicit and in which the criteria for successful learning are objective; tending to be a trainer or task master (Behavior Modification).

Affective II: Logos (Lotas, 1977)
In this style, the teacher has a message which enlightens, liberates, and enables growth (Personal Quest).

Validity. The LTPQ serves to distinguish among tracts suggested by a theoretical model which contains a limited number of constructs in well-defined relationships to each other. The natural emphasis is on construct validation rather than content or criterion validation. To begin work on construct validation, a principal component factor analysis was performed on the LTPQ data provided by 228 teachers from Southfield, Saline, and East Detroit. The factor analysis supported the predictions of the model: 1) the strongest domain distinction among teachers would be between the information processing modes of thinking and feeling; 2) that a second factor would make a distinction between information-production modes of sensing and intuiting;
and 3) that a somewhat weaker, but significant factor would dis­tin­guish between a "relative" and an "absolute" dimension (Lotas and Brink, 1980).

Reliability. Reliability of the LTPQ was measured using the SPSS Reliability subprogram. Cronbach's alpha coefficients, reported in Table 11 provide measures of internal consistency of scales and subscales (Lotas and Brink, 1979-80). The Table includes the coefficients from the Lotas study as well as the study reported herein.

<table>
<thead>
<tr>
<th>RELIABILITY COEFFICIENTS REPORTED FOR THE LTPQ</th>
</tr>
</thead>
<tbody>
<tr>
<td>ALPHA COEFFICIENTS</td>
</tr>
<tr>
<td>Spring, 1979 (n=183)</td>
</tr>
<tr>
<td>Spring, 1980 (n=228)</td>
</tr>
<tr>
<td>Fall, 1982 (n=97)</td>
</tr>
</tbody>
</table>

LEARNING STYLE PREFERENCE QUESTIONNAIRE (LSPQ)

The LSPQ was developed by Alexis Lotas and James Brink as the principal tool developed by Project Campus (1979-80) for assessing students' preferred learning styles. The LSPQ is similar to the LTPQ in format, scoring and interpretation. However, it contains 20 stems
rather than the 10 stems of the LTPQ. A multiple of stems were generated representing many aspects of the high school student's learning environment as well as more general aspects of learning. Each stem has four possible choices for completion. Each choice represents one of the four learning style domains. As with the LTPQ, the order of answers from "a" to "d" remain constant throughout the questionnaire:

- "a" choice reflecting Affective I
- "b" choice reflecting Cognitive I
- "c" choice reflecting Cognitive II
- "d" choice reflecting Affective II

A copy of the LSPQ draft which was used with students can be found as Appendix B.

The final revision was based largely on the correlations of items to total scales. Also, teachers involved in the pilot administration of the LSPQ along with the LSPQ authors revised items on the basis of readability, simplicity, and content.

**Validity.** Face validity of the LSPQ was established by a committee of trained judges who examined the instrument and judged its face validity to be acceptable for the purposes of this investigation.

**Reliability.** Prior to the final revision by Lotas and Brink, reliability was based on a sample of 60 high school students enrolled
In three science classes. Using an SPSS Reliability subprogram, Cronbach's alpha coefficients were reported as:

<table>
<thead>
<tr>
<th>AFF. I</th>
<th>COG. I</th>
<th>COG. II</th>
<th>AFF. II</th>
</tr>
</thead>
<tbody>
<tr>
<td>.70</td>
<td>.69</td>
<td>.59</td>
<td>.60</td>
</tr>
</tbody>
</table>

(n=60) (Lotas and Brink, 1979-80)

The scoring procedures used with these high school students differed slightly from the scoring used by the teachers who completed the LSPQ in this current study. The earlier administration to students utilized a scoring procedure of assigning 10 points to the most preferred answer and 5 points to the second preference—with the two non-choice answers given "0's." One of the authors of the LSPQ explained in personal discussion (1982) that the 10 and 5 points scoring was deemed advisable with the younger target group of students because the "10-5" scoring seemed less complicated than the "4-1" or "3-2" scoring possibilities used by adults taking the LTPQ.

At the same time, the researcher inquired as to whether or not the author had any technical concern about an adult sample scoring the LSPQ as they scored the LTPQ, i.e., with a "4 and 1" or "3 and 2" point allocation. The author indicated that this would be acceptable. A copy of the scoring directions used in this current study is found as Appendix C. The researcher measured the Internal consistency of the LSPQ according to both scoring formats. Therefore, Table 12 reflects comparison of the reliability coefficients reported from the student sample and adult data scored similarly to the student sample. In addition, reliability coefficients are reported based on data which were secured from the
adult sample that was scored in the same manner as the LTPQ was scored.

Table 12 suggests that the reliability of the LSPQ improved with the last revision. Some of the differences may be accounted for by the difference in populations used. The slight differences in reliabilities reported using the two different scoring formats suggests that the change in scoring of the LSPQ with the adult sample was not a major concern.

**TABLE 12**

**RELIABILITY COEFFICIENTS REPORTED FOR THE LSPQ**

<table>
<thead>
<tr>
<th>INSTRUMENT</th>
<th>SAMPLE</th>
<th>LSPQ REVISIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td><strong>Aff. I</strong></td>
</tr>
<tr>
<td>LSPQ - prior to final revision</td>
<td>n=60 high school science</td>
<td>.70</td>
</tr>
<tr>
<td>(10 + 3 scoring format)</td>
<td>students</td>
<td></td>
</tr>
<tr>
<td>LSPQ - final revision</td>
<td>n=90 classroom teachers</td>
<td>.83</td>
</tr>
<tr>
<td>(10 + 3 scoring format)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LSPQ - final revision</td>
<td>n=90 classroom teachers</td>
<td>.82</td>
</tr>
<tr>
<td>(4 + 1 or 3 + 2 scoring format; similar to LTPQ scoring format)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

With both of the Lotas' Instruments, reliabilities may appear slightly inflated due to the scoring arrangement which requires that two "0" scores be allocated to the third and fourth preference choices in each question.
SELF-ANALYSIS QUESTIONNAIRE (SAQ)

The SAQ was designed by the researcher to secure data descriptive of the sample of teachers participating in the study. Through the questionnaire, the researcher also sought to determine the subjects' views of possible influences on their learning and teaching styles separately, as well as the subjects' views of the relationships between teaching and learning styles. No reliability or validity information is necessary for the Self Analysis Questionnaire for the purpose of this study. A copy of the SAQ is included as Appendix D.

ADMINISTRATION OF THE INSTRUMENTS

Data were collected from the completion of four instruments by teachers participating in this study. When the instruments were administered a brief explanation of the study was made to the participants. Also the researcher secured the permission of the participants to code and use their data in the research study. The four instruments were administered in the following order:

1. Lotas Teaching Preference Questionnaire (LTPQ)
2. Myers-Briggs Type Indicator
3. Learning Style Preference Questionnaire (LSPQ)
4. Self Analysis Questionnaire (SAQ)

Data were collected in a variety of settings during the time period from Spring, 1982 through Fall, 1982. The data collection was integrated into the curriculum of various courses or workshops. Classes which provided the settings for the collection of data were
selected because of the interest of the instructor and the relatedness to the class, of the discussions and activities resulting from the administration of the instruments. In most situations, the instruments were administered by the researcher and the subjects responded during the class time. However, in eight of the ninety-eight cases, subjects were given one or more of the instruments to self-administer outside of the educational setting. In these instances, the instruments were accompanied by detailed written instructions.

While the timeline was altered among the various administration sessions, the ordering of the instrument completion was maintained. Particularly important was the requirement of a significant time separation between the completion of the LTPQ and the LSPQ. The completed data collection was followed by an interpretation and discussion of results with the participants.

LIMITATIONS OF THE SAMPLE AND THE STUDY

The sample of teachers in this study is predominantly female and predominantly elementary school teachers. Also, the fact that teachers who participated were enrolled in related courses may suggest a topical common interest constituting a potential sample bias. While these facts suggest limited generalization of the results of the study, it should be noted that in the area of several other characteristics the sample in this study was not appreciably different from the population of teachers in the State of Ohio (See Tables 5, 9, 10).
All the Instruments used in this study are of a self-report design and are, therefore, subject to limitations common to such a design:

1. The dependability of the information is limited by the degree of the subjects' self understanding, which is required for accurate reporting of real preferences.

2. There is a possibility of misinformation being reported because learner "preference" or "interest" is not learning style when the subject does not in fact do what he/she reports having done (Kirby, 1979).

However, preference Instruments are considered a reliable way to determine style.

Three of the Instruments, the LTPQ, the LSPQ, and the SAQ are relatively new; and the validity of them has not been thoroughly established and at this time, no norms have been established. As Brown (1968) indicated, one should recognize that the amount of variability that one finds between teaching and learning styles depends greatly on the frame of reference from which the data are observed, recorded, and analyzed.

The LSPQ has been used previously only with high school science students. And for the purpose of this study, involving an adult sample, directions for administration and scoring were adjusted slightly. While the reliabilities reported for the LTPQ and the LSPQ are acceptable for this study, the reliability measures may be slightly inflated because of the scoring arrangements, allowing for two "0" scores out of the four possible choices following each stem.
DATA ANALYSES

After the data were collected, the data were coded to afford anonymity to the subjects. The coded data were key punched on cards to be used in the data analyses. Coded categories used to summarize the collected data are the following:

1. Identification number
2. School district or other educational institution
3. Sex
4. Age
5. Level of education
6. Current school assignment
7. Summary of kinds of past school experiences
8. Number of years of teaching
9. Raw scores for MBTI - extraversion, introversion, sensing, intuition, thinking, feeling, judging, perceiving
10. Raw scores of all 20 questions in the LSPQ
11. Raw scores of all 10 questions in the LSPQ
12. Total scores for LTPQ Domains
13. Total scores for LSPQ Domains
14. First preferences of the LTPQ and LSPQ (domains)
15. MBTI categories: INT, ENT, IST, EST, INF, ENF, ISF, ESF

The Statistical Package for the Social Science (SPSS) subprograms were utilized in the data analyses.

SPSS is an integrated system of computer programs designed for the analysis of social science data. The system provides a unified and comprehensive package that enables the user to perform many different types of data analysis in a simple and convenient manner... In addition to the usual descriptive statistics, simple frequency distributions and cross tabulations, SPSS contains procedures for simple correlation (for both ordinal and interval data), partial correlation, means and variances for stratified subpopulations, one-way, and n-way analysis of variance (including multiple classification analysis tables), multiple regression, discriminant analysis, scatter diagrams, factor analysis, canonical correlations, and Guttman Scaling (Nie, Hull, Jenkins, Steinbrenner, and Bent, 1975).

The specific statistical tests employed in the data analyses are discussed separately with each of the research questions.
As described in Chapter I, this study is concerned with four questions:

1. What is the relationship between the responses of practicing teachers to questionnaires assessing their preferred teaching and learning styles?

2. In what ways are other factors, i.e., sex, level of education, kinds of teaching experience, age, number of years of teaching, and MBTI types significantly related to the preferred teaching and learning styles of practicing teachers?

3. What is the relationship between teachers' responses to a teaching style preference questionnaire and their psychological types as measured by the MBTI?

4. What is the relationship between teachers' responses to a learning style preference questionnaire and their psychological types as measured by the MBTI?

The first question, stated as a null hypothesis, is: There is no significant relationship between the preferred teaching and learning styles of practicing teachers. Cross tabulations were performed and the chi square statistic used to test the significance of differences between expected and observed frequencies of preferred teaching and learning styles.

The second question, stated as a null hypothesis, is: There is no significant relationship between other selected personal characteristics and preferred teaching and learning styles of practicing teachers. Cross tabulations were performed and tables constructed
from the crosstabs. Chi square, Mann-Whitney U-Wilcoxon Rank Sum W, and Kruskal-Wallis 1-Way Anova were conducted to test for statistical significance.

The third question, stated as a null hypothesis, is: There is no significant relationship between teachers' responses to a teaching style preference questionnaire and their psychological types as measured by the MBTI. To answer this question, stepwise regression analysis was used to test to what extent, if any, the eight raw scores of the MBTI: extraversion, introversion, sensing, intuition, thinking, feeling, judging, and perceiving, account for the subjects' choices of preferred teaching styles.

The fourth question, stated as a null hypothesis, is: There is no significant relationship between teachers' responses to a learning style preference questionnaire and their psychological types as measured by the MBTI. To answer this question, stepwise regression analysis was used to test to what extent, if any, the eight raw scores of the MBTI: extraversion, introversion, sensing, intuition, thinking, feeling, judging, and perceiving, account for the variance among the subjects' choices of preferred learning styles.

**SUMMARY**

This study was designed to examine possible relationships among the preferred teaching styles, preferred learning styles, psychological types, and selected personal characteristics of a sample of 98 practicing classroom teachers. The sample was predominately women and elementary school teachers. However, a broad
spectrum of other characteristics suggested that in many ways the sample was not appreciably different from the population of teachers in the State of Ohio. Limitations of the sample and the study were discussed. The research design was explained as consisting of the following steps:

1. Administering to the sample of teachers a series of self-report instruments in the following order: LTPQ, MBTI, LSPQ, and SAQ;
2. Collecting, coding, and key punching the data on cards;
3. Analyzing the data using chi square, Mann-Whitney U-Wilcoxon Rank Sum W, Kruskal-Wallis 1-Way Anova, and multiple regression techniques;
4. Testing the four null hypotheses with which this research was concerned:
   a. There is no significant difference between the responses of practicing teachers to questionnaires assessing their preferred teaching and learning styles.
   b. There is no significant relationship between other selected personal factors and the relationship between preferred teaching and learning styles of practicing teachers.
   c. There is no significant relationship between teachers' responses to a teaching style preference questionnaire and their psychological type as measured by the MBTI.
   d. There is no significant relationship between teachers' responses to a learning style preference questionnaire and their psychological type as measured by the MBTI.
CHAPTER IV
PRESENTATION OF RESEARCH FINDINGS

Introduction

It was the purpose of this study to identify relationships among the preferred teaching styles, preferred learning styles, psychological types, and other personal characteristics of practicing teachers. Results of the data analyses conducted to answer the research questions are reported in this chapter. Descriptive statistics for each of the four instruments used in this study are presented in the first section of Chapter IV. In the next section, findings related to the four major research questions are presented. Discussion of the findings related to the descriptive statistics as well as the research questions follow immediately the presentation of data. A chapter summary constitutes the last section of the chapter.

Descriptive Data

Myers-Briggs Type Indicator

The Indicator was completed by 97 of the 98 participants in this study. Preferences measured by the MBTI result in a "type" designation consisting of one letter of each of the following four dichotomous scales: (E) extraversion or (I) introversion, (S) sensing or (N) intuition, (T) thinking or (F) feeling, and (J) judging or (P) perceiving. Table 13 is a complete MBTI Type Table, which is a summary of the data resulting from the hand scoring of the instruments.
completed by the subjects. Frequencies and percentages of male and female subjects as well as total number of subjects in each of the 16 "Type" categories are shown. Other breakdowns of data relative to preferences of subjects on discrete scales as well as combinations of various scales are also reported in Table 13.

In Table 14, "types" reported in the Type Table are listed with the current teaching assignments of the subjects in each type category. In Table 15, the first preferences for learning styles (LSPQ-HI) and teaching styles (LTPQ-HI) of subjects in each of eight "type" categories are indicated. The "type" categories in Table 15 express subjects' preferences on three discrete scales E-I, S-N, T-F. Subjects' learning and teaching style preferences are expressed as percentages.

Discussion. The descriptive statistics presented thus far suggest a similarity of findings relative to results cited by two other researchers. McCaulley (1976) reported that 60-80% of teachers tend to prefer "feeling" judgment over "thinking" judgment. Results from this current study indicate that 62 of 97 or 64% of the subjects report a judging preference of "feeling" (See Table 14). Carlyn's (1976) study of prospective teachers indicates that "feeling" type persons are more interested in teaching the lower grades than are "thinking" type persons. Results from the current study indicate that among the 59 teachers who identify themselves as elementary teachers, 42 or 71% indicate that their judging preference is "feeling". Seventeen or 29% of the elementary teachers report a judging preference for "thinking" (See Table 14).
<table>
<thead>
<tr>
<th>SENSING TYPES</th>
<th>INTUITION TYPES</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>with FEELING</td>
</tr>
<tr>
<td>ISTJ</td>
<td>ISFJ</td>
</tr>
<tr>
<td>N = 10</td>
<td>N = 15</td>
</tr>
<tr>
<td>% = 10</td>
<td>% = 16</td>
</tr>
<tr>
<td>M = 2</td>
<td>M = 2</td>
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<td>F = 8</td>
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<td>M = 0</td>
<td>M = 0</td>
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<tr>
<td>F = 0</td>
<td>F = 4</td>
</tr>
<tr>
<td>ESTJ</td>
<td>ESFJ</td>
</tr>
<tr>
<td>N = 11</td>
<td>N = 13</td>
</tr>
<tr>
<td>% = 11</td>
<td>% = 14</td>
</tr>
<tr>
<td>M = 4</td>
<td>M = 0</td>
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<tr>
<td>F = 7</td>
<td>F = 13</td>
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<tr>
<td>NOTES:</td>
<td>Total number</td>
</tr>
<tr>
<td></td>
<td>Males</td>
</tr>
<tr>
<td></td>
<td>Females</td>
</tr>
</tbody>
</table>

NOTES: Total number - 97
Males - 14
Females - 83
TABLE 14
MBTI (16) TYPES AND 1981-82 TEACHING ASSIGNMENTS

<table>
<thead>
<tr>
<th>MBTI TYPE</th>
<th>ENGLISH</th>
<th>SOCIAL STUDIES</th>
<th>MATH</th>
<th>SCIENCE</th>
<th>OTHER</th>
<th>ELEMENTARY</th>
<th>TOTALS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>m</td>
<td>f</td>
<td>m</td>
<td>f</td>
<td>m</td>
<td>f</td>
<td>m</td>
</tr>
<tr>
<td>ISTJ</td>
<td>-1</td>
<td>-</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>7</td>
</tr>
<tr>
<td>ISFJ</td>
<td>-1</td>
<td>-</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>7</td>
</tr>
<tr>
<td>ISTP</td>
<td>-1</td>
<td>-</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>7</td>
</tr>
<tr>
<td>ISFP</td>
<td>-1</td>
<td>-</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>7</td>
</tr>
<tr>
<td>INFJ</td>
<td>-1</td>
<td>-</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>7</td>
</tr>
<tr>
<td>INTJ</td>
<td>-1</td>
<td>-</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>7</td>
</tr>
<tr>
<td>INFP</td>
<td>-1</td>
<td>-</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>7</td>
</tr>
<tr>
<td>INTP</td>
<td>-1</td>
<td>-</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>7</td>
</tr>
</tbody>
</table>

COLUMN TOTALS
0 1 3 0 3 3 3 2 1 4 1 2 8 11 38

NOTE: School assignments were reported by 91 of the 98 subjects.
Five subjects reported multiple assignments accounting for the total number of 97 assignments.
Results from the current study are inconsistent with McCaulley's (1976) reporting of the tendency of high school teachers to prefer "Intuitive-feeling" functions. Only eight of the thirty-eight secondary (intermediate and high school) teachers prefer "Intuitive-feeling" functioning as measured by the MBTI (See Table 14).

From Table 15, there are several interesting results which bear mentioning. A smaller percentage of the ISF than the ESF types prefer the Affective I (sensing-feeling) learning style domain, while a larger percentage of the ISF than ESF types prefer Affective I teaching. The learning style preference identified by the largest percentage of ISF persons is the Cognitive I (sensing-thinking) learning domain.

The IST type persons seem to prefer both teaching and learning in the Cognitive I (sensing-thinking) domain. The largest percentage of EST persons seems to prefer learning in the Cognitive II (Intuitive-thinking) domain. None of the IST or EST persons prefers to teach in the Affective II (Intuitive-feeling) domain.

Half of the INT persons prefer to teach in the Affective I (sensing-feeling) domain and learn in the Cognitive II (Intuitive-thinking) domain. None of the INT persons prefers to teach in the Affective II (Intuitive-feeling) domain. There are only four persons in the ENT category, and their preferences are clustered in two learning style domains and two teaching style domains.

Of the INF type persons, 50% prefer to learn and none prefers to teach in the Affective II (Intuitive-feeling) domain. The largest
### Table 15

MBTI (8) Types with Learning and Teaching Style Preferences

<table>
<thead>
<tr>
<th>MBTI Type</th>
<th>N</th>
<th>% Subjects Preferring Each LTPQ* Domain</th>
<th>% Subjects Preferring Each LSPQ** Domain</th>
<th>Preferred Domain</th>
<th>% Subjects Preferring Each LTPQ* Domain</th>
<th>% Subjects Preferring Each LSPQ** Domain</th>
<th>N</th>
<th>MBTI Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>ISF</td>
<td>18</td>
<td>55.6% (10) 33.3% (6) AFFECTIVE I</td>
<td>50.0% (4) 25.0% (2)</td>
<td>8 INT</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>11.1% (2) 44.4% (8) COGNITIVE I</td>
<td>12.5% (1) 12.5% (1)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>27.8% (5) 16.7% (3) COGNITIVE II</td>
<td>37.5% (3) 50.0% (4)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>5.6% (1) 5.6% (1) AFFECTIVE II</td>
<td>0 (0) 12.5% (3)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ESF</td>
<td>16</td>
<td>50.0% (8) 43.8% (7) AFFECTIVE I</td>
<td>0 (0) 0 (0)</td>
<td>4 ENT</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>18.8% (5) 18.8% (3) COGNITIVE I</td>
<td>25.0% (1) 50.0% (2)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>25.0% (4) 25.0% (4) COGNITIVE II</td>
<td>75.0% (3) 0 (0)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>6.3% (1) 12.5% (2) AFFECTIVE II</td>
<td>0 (0) 50.0% (2)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IST</td>
<td>12</td>
<td>8.3% (1) 8.3% (1) AFFECTIVE I</td>
<td>70.0% (7) 20.0% (2)</td>
<td>10 INF</td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td></td>
<td></td>
<td>66.7% (8) 58.3% (7) COGNITIVE I</td>
<td>20.0% (2) 0 (0)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>25.0% (3) 16.7% (2) COGNITIVE II</td>
<td>10.0% (1) 30.0% (3)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0 (0) 16.7% (2) AFFECTIVE II</td>
<td>0 (0) 50.0% (5)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EST</td>
<td>10</td>
<td>70.0% (7) 0 (0) AFFECTIVE I</td>
<td>64.3% (9) 42.9% (6)</td>
<td>14 ENF</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>20.0% (2) 40.0% (4) COGNITIVE I</td>
<td>0 (0) 0 (0)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>10.0% (1) 50.0% (5) COGNITIVE II</td>
<td>21.4% (3) 14.3% (2)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0 (0) 10.0% (1) AFFECTIVE II</td>
<td>14.3% (2) 42.9% (6)</td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

* LTPQ* Teaching Preference Questionnaire

** LSPQ** Learning Style Preference Questionnaire
percentage of INF persons appears to prefer teaching in the Affective I (sensing-feeling) domain. 64% of the ENF persons indicate a preference for teaching in the Affective I (sensing-feeling) domain. Of particular interest is the result that ENF persons represent the largest percentage of all the types that prefer teaching in the Affective II (intuitive-feeling) domain.

**Lotas Teaching Preference Questionnaire (LTPQ)**

The LTPQ was completed by 98 subjects. Highest preferences of teaching styles among the subjects are presented in frequencies and percentages in Table 16.

**Learning Styles Preference Questionnaire (LSPQ)**

The LSPQ was completed by 92 of 98 subjects. Highest preferences of learning styles are presented in frequencies and percentages in Table 16.

**TABLE 16**

<table>
<thead>
<tr>
<th></th>
<th>LTPQ (HIGHEST)</th>
<th>LSPQ (HIGHEST)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>DOMAINS</strong></td>
<td><strong>MALE</strong></td>
<td><strong>FEMALE</strong></td>
</tr>
<tr>
<td>AFFECTIVE I</td>
<td>5</td>
<td>43</td>
</tr>
<tr>
<td>COGNITIVE I</td>
<td>5</td>
<td>14</td>
</tr>
<tr>
<td>COGNITIVE II</td>
<td>3</td>
<td>23</td>
</tr>
<tr>
<td>AFFECTIVE II</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td>TOTALS</td>
<td>13</td>
<td>85</td>
</tr>
</tbody>
</table>


Discussion. Of the 98 subjects who completed the LTPQ, 49% of the subjects report a first preference for the teaching style domain of Affective I (sensing-feeling); 19% prefer Cognitive I (sensing-thinking); 27% prefer Cognitive II (intuitive-thinking); and 5% prefer Affective II (intuitive-feeling). The first preference for learning styles among the 92 subjects who completed the LSPQ are fairly evenly distributed among the four domains: 26% of subjects report preferring Affective I (sensing-feeling); 27% report preferring Cognitive I (sensing-thinking); 25% report preferring Cognitive II (intuitive-thinking); and 22% report preferring Affective II (intuitive-feeling).

Self Analysis Questionnaire (SAQ)

The SAQ was completed by 84 of 98 study participants. Nine questions were asked of subjects completing the SAQ. In many cases, subjects answered some but not all of the questions. A copy of the SAQ is found as Appendix D. Information derived from the SAQ is presented as follows.

Answers to the first four questions provide information regarding characteristics of the sample of teachers involved in the study. Information regarding sex, age, level of education, and previous professional experience was reported in Chapter III in the section titled Description of the Sample. Answers to question numbers 5 through 9 on the SAQ are discussed in Chapter IV.

SAQ Question 5a. Subjects are asked to identify other work or professional experience that subjects believe to have influenced their teaching styles. The 51 responses to this question vary
considerably. However, over 50% of the female respondents identify "other teaching experience" and "courses and workshops" as influencing their teaching styles; while 66% of the male respondents indicate that "coaching" influenced their teaching styles.

**SAQ Question 5b.** Subjects are asked to identify other work or professional experience that subjects believe to have influenced their learning styles. Since only one male subject responded to this question, results for males and females are totaled. Seventeen responses are spread over ten activities. Over 50% of the respondents indicate that "courses", "office work", and "respondents' own teachers" influenced their learning styles.

**SAQ Question 6.** Subjects are asked to indicate if they now teach as they were taught when they were students. Of the eighty-seven responses to this question, six responses (one male and five females) or 7% indicate that they "never" teach as they were taught; seventy (nine males and sixty-one females) or 80% indicate that they "sometimes" do; eleven (one male and ten females) or 13% indicate "often"; and none indicates "always" as an answer.

**SAQ Question 7.** In this question, subjects are asked if they believe that they now teach as they were taught to teach. Responses of eighty-six of the ninety-eight subjects are as follows: Eight subjects (three males and five females) or 9% indicate that they "never" teach as they were taught to teach; sixty-two subjects (seven males and fifty-five females) or 72% report that they "sometimes" do; sixteen subjects (one male and fifteen females) or 19% report that they "often do"; and none reports "always" as an answer.
**SAO Question 8.** In this question subjects are asked if they believe that they teach as they prefer to learn. Eighty-six of the responses to this question are summarized as follows: none of the subjects report that they "never" teach as they prefer to learn; fifteen subjects (three males and twelve females) or 18% indicate that they "sometimes" do; sixty-three subjects (six males and fifty-seven females) or 73% report that they "often" do; and eight respondents (two males and six females) or 9% report that they "always" teach as they prefer to learn.

**Discussion.** Of the 85 subjects reporting their highest and second highest teaching style preferences and highest and second highest learning style preferences, 71 or 82% indicate that they tend to teach as they prefer to learn either "often" or "always". Of the 85 participants, 77 or 89% report highest or second highest teaching style preferences either of which match their highest or second highest learning style preferences. However, of the 77 subjects whose first or second learning and teaching style preferences match, only 64 indicate that they believe that they tend to teach as they prefer to learn. Thirteen of the seventy-seven respondents report that they believe that they tend to teach as they prefer to learn "sometimes" or "never". Of the eight subjects; neither of whose highest or second highest learning style preferences match either of their highest or second highest teaching style preferences, seven indicate that they believe that their teaching styles "often" reflect the way they learn. The eighth person reports "sometimes" as an
Figure 3 is a bar graph which summarizes in percentages subjects' responses to the Self Analysis Questionnaire items numbered 6, 7, and 8.

SAQ Question 9. Subjects are asked whether or not they have changed their predominant teaching styles since they began teaching. Of the eighty-seven respondents to the question, sixty-seven (nine males and fifty-eight females) or 77% indicate, "yes", that they had changed their predominant teaching styles and twenty (two males and eighteen females) or 23% indicate, "no". Those who answered "yes" were asked to identify what precipitated the change they experienced. Of the 62 responses to this question, more than 66% of both males and females indicate that, "experience", "courses and workshops", and the "perceived differences in student needs", account for the changes in their predominant teaching styles.

Summary

In the first section of Chapter IV, descriptive data were provided regarding subjects' responses to the four instruments administered in this study. Topical discussions followed the presentation of data.

The next section of Chapter IV is concerned with the four major research questions. The questions are stated as null hypotheses.

Question I

There is no significant relationship between the responses of practicing teachers to questionnaires assessing their preferred teaching and preferred learning styles.
FIGURE 3

SUBJECTS' BELIEFS ABOUT THEIR TEACHING STYLES

NOTE: ALK = always  M = male
      OFT = often  F = female
      SOM = sometimes
      NEV = never
To answer Question I, crosstabulations were performed and chi square used to test the significance of the relationship between preferred teaching and learning styles. Of the 98 participants in this study, 92 subjects completed both the LTPQ and the LSPQ.

Chi square = 19.81337 with 9 degrees of freedom. This result is significant at the .01 level. The .01 significance is noteworthy and may suggest that a statistically significant relationship exists between first preferences of learning and teaching styles. However, interpretation of results are made with caution; insofar as eight of the sixteen cells have expected cell frequencies of less than 5.0. Consequently, most remarks concerning these results are descriptive in nature and any interpretations are highly tentative.

In order to investigate possible implications of this statistical test, expected frequencies were calculated for each of the 16 cells. Table 17 provides information regarding the observed and expected frequencies as well as percentages for each cell in the four by four matrix.

Discussion

Of the 24 teachers who prefer to learn in the Affective I domain, 63% prefer to teach in Affective I; 8% prefer Cognitive I; 21% prefer Cognitive II; and 8% prefer to teach in the Affective II domain. The 25 teachers who prefer to learn in the Cognitive I domain prefer to teach in the following domains: 24% in Affective I; 48% in Cognitive I; 28% in Cognitive II; and none in Affective II. Of the 23 teachers who prefer to learn in the Cognitive II domain,
TABLE 17
CROSSTABULATIONS OF HIGHEST PREFERENCES OF LSPQ BY LTPQ

<table>
<thead>
<tr>
<th>LTPQ HIGHEST</th>
<th>LSPQ HIGHEST</th>
<th>AFFECTIVE I</th>
<th>COGNITIVE I</th>
<th>COGNITIVE II</th>
<th>AFFECTIVE II</th>
<th>ROW TOTALS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>( f_o = 15 )</td>
<td>( f_o = 2 )</td>
<td>( f_o = 5 )</td>
<td>( f_o = 2 )</td>
<td>24</td>
</tr>
<tr>
<td></td>
<td></td>
<td>( f_e = 12.26 )</td>
<td>( f_e = 4.95 )</td>
<td>( f_e = 5.74 )</td>
<td>( f_e = 1.04 )</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>( % = 63 )</td>
<td>( % = 8 )</td>
<td>( % = 21 )</td>
<td>( % = 8 )</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>( f_o = 6 )</td>
<td>( f_o = 12 )</td>
<td>( f_o = 7 )</td>
<td>( f_o = 0 )</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td></td>
<td>( f_e = 12.77 )</td>
<td>( f_e = 5.16 )</td>
<td>( f_e = 5.98 )</td>
<td>( f_e = 1.08 )</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>( % = 24 )</td>
<td>( % = 48 )</td>
<td>( % = 28 )</td>
<td>( % = 0 )</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>( f_o = 14 )</td>
<td>( f_o = 3 )</td>
<td>( f_o = 5 )</td>
<td>( f_o = 1 )</td>
<td>23</td>
</tr>
<tr>
<td></td>
<td></td>
<td>( f_e = 11.75 )</td>
<td>( f_e = 4.75 )</td>
<td>( f_e = 5.50 )</td>
<td>( f_e = 1 )</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>( % = 61 )</td>
<td>( % = 13 )</td>
<td>( % = 22 )</td>
<td>( % = 4 )</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>( f_o = 12 )</td>
<td>( f_o = 2 )</td>
<td>( f_o = 5 )</td>
<td>( f_o = 1 )</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td></td>
<td>( f_e = 10.22 )</td>
<td>( f_e = 4.13 )</td>
<td>( f_e = 4.78 )</td>
<td>( f_e = .86 )</td>
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</tr>
<tr>
<td></td>
<td></td>
<td>( % = 60 )</td>
<td>( % = 10 )</td>
<td>( % = 25 )</td>
<td>( % = 5 )</td>
<td></td>
</tr>
<tr>
<td>COLUMN TOTALS</td>
<td></td>
<td>47</td>
<td>19</td>
<td>22</td>
<td>4</td>
<td>92</td>
</tr>
</tbody>
</table>

\( f_o \) = observed frequencies  
\( f_e \) = expected frequencies  
\% = \% of row
61% prefer to teach in Affective I; 13% in Cognitive I; 22% in Cognitive II; and 4% prefer to teach in Affective II. The 20 teachers who prefer to learn in the Affective II domain prefer to teach in the following domains: 60% in Affective I; 10% in Cognitive I; 25% in Cognitive II; and 5% in Affective II.

In viewing the most preferred teaching and learning styles designated by subjects, results indicate that while learning style preferences appear fairly evenly distributed among the four learning style domains measured by the LSPQ, teaching style preferences are not evenly distributed among the four domains measured by the LTPQ.

Most of the matches of the same domains for teaching and learning styles occur in the Affective I and Cognitive I domains; with these domains accounting for 27 of the 33 total matches between first preferences. It appears that differences between observed and expected cell frequencies tend to occur in the LSPQ cells under the Affective I and Cognitive I Teaching Domains. The LSPQ cells under the Cognitive II and Affective II teaching domains reflect similar observed and expected cell frequencies.

Summary

The chi square test indicates that there may be a statistically significant relationship between preferences of learning and teaching styles when these variables are viewed in terms of most preferred styles as measured by the LTPQ and the LSPQ. However, these relationships require further exploration and results of this current analysis must be interpreted cautiously. Perhaps more important than the chi-square itself are the trends and frequency patterns.
suggested by Table 17 which was constructed from the cross tabulations.

Question 11

There is no significant relationship between personal factors (i.e., sex, level of education, kinds of teaching experience, age, years of teaching experience, and MBTI types) and the relationships between most preferred teaching and learning styles of practicing teachers.

To answer this major research question, six secondary research questions were raised regarding preferred teaching and learning styles and the following factors: 1) sex, 2) level of formal education, 3) kinds of previous teaching experience, 4) age, 5) years of teaching experience, and 6) MBTI types. The procedure followed in testing the significance of the relationships identified in each of these six questions was that cross tabulations were performed with the highest learning style preferences by the highest teaching style preferences, while controlling separately for the following:

1) sex--male/ female,
2) level of education--batchelor's/ master's/ beyond master's,
3) kinds of previous teaching experiences--high school only/ Intermediate school only/ elementary school only/ high and intermediate schools/ elementary and intermediate schools/ high and elementary schools/ high, intermediate, and elementary schools,
4) age--under 34 years/ between 35 and 45 years/ 46 years and over,
5) number of years of teaching experience--one to four years/
five to thirteen years/ fourteen to twenty-three years/
twenty-four years and over,

6) MBTI types—ISF/ ESF/ IST/ EST/ INT/ ENT/ INF/ ENF.

(In an effort to increase cell sizes, the sixteen MBTI types
listed in Table 13 were reduced to the eight types listed
above by eliminating the Judging-Perceiving factor).

Chi squares were attempted; but due to the small sample sizes and the
high number of cells with expected frequencies of less than five, all
chi squares are invalid.

To further explore for any possibly significant relationships
between personal factors and teaching/learning styles, two
non-parametric tests, the Mann-Whitney U-Wilcoxon Rank Sum W and the
Kruskal-Wallis 1-Way Anova were utilized. Where significance was
established in an analysis involving differences among more than two
groups, a post hoc analysis, Dunn's Procedure for Multiple Comparison
of Pairs, was performed to identify between which of the groups in
the category the significant differences are found. Table 18
provides data indicating where significant differences occur between
teaching and learning style preferences and selected personal
characteristics of the subjects. Clearly, differences in teaching
and learning style preferences are identified on the bases of sex and
current school assignments.

Level of formal education appears to be related to differences
in teaching style preferences. However, the number of years of
teaching which subjects have taught appears to be unrelated to either
teaching or learning style preferences.
### TABLE 18

LTPQ AND LSPQ DOMAIN SCORE DIFFERENCES BETWEEN GROUPS ON BASES OF SEX, CURRENT SCHOOL ASSIGNMENT, LEVEL OF FORMAL EDUCATION, AND NUMBER OF YEARS OF TEACHING

<table>
<thead>
<tr>
<th>VARIABLE</th>
<th>LTPQ DOMAIN</th>
<th>LSPQ DOMAIN</th>
<th>MEAN</th>
<th>RANK</th>
<th>N</th>
<th>Z</th>
<th>2-TAILED P</th>
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<tr>
<td><strong>SEX</strong></td>
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<tr>
<td>MALE</td>
<td>AFF I</td>
<td>32.19</td>
<td>13</td>
<td>-2.1350</td>
<td>0.0328*</td>
<td>80</td>
<td></td>
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<tr>
<td>FEMALE</td>
<td>AFF I</td>
<td>49.41</td>
<td>80</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>COG I</td>
<td>64.77</td>
<td>13</td>
<td>-2.5648</td>
<td>0.0103**</td>
<td>80</td>
<td></td>
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<tr>
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<td>COG I</td>
<td>44.11</td>
<td>80</td>
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<td></td>
</tr>
<tr>
<td>FEMALE</td>
<td>COG II</td>
<td>43.50</td>
<td>13</td>
<td>-0.5049</td>
<td>0.6136 n.s.</td>
<td>80</td>
<td></td>
</tr>
<tr>
<td>MALE</td>
<td>COG II</td>
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<td>80</td>
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<td>13</td>
<td>-0.5993</td>
<td>0.5490 n.s.</td>
<td>80</td>
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<tr>
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<td>80</td>
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<td>0.0057**</td>
<td>78</td>
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<td>AFF I</td>
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<td>78</td>
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<tr>
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<td>0.0382*</td>
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<td>78</td>
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<td>0.0162**</td>
<td>78</td>
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<td>78</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FEMALE</td>
<td>AFF II</td>
<td>41.04</td>
<td>12</td>
<td>-0.6354</td>
<td>0.5252 n.s.</td>
<td>78</td>
<td></td>
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<td>0.0015***</td>
<td>31</td>
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<tr>
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<td>31</td>
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</tr>
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<td>0.1177 n.s.</td>
<td>31</td>
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<td>31</td>
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<td>COG I</td>
<td>39.02</td>
<td>58</td>
<td>-2.6041</td>
<td>0.0092**</td>
<td>29</td>
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### TABLE 18 (continued)

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<tr>
<th>VARIABLE</th>
<th>LTPQ DOMAIN</th>
<th>LSPQ DOMAIN</th>
<th>MEAN RANK</th>
<th>N</th>
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<tr>
<td><strong>LEVEL OF FORMAL EDUCATION</strong></td>
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<td><strong>NUMBER OF YEARS OF TEACHING</strong></td>
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<td></td>
<td></td>
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<tr>
<td>1-13</td>
<td>AFF I</td>
<td>48.93</td>
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<td>n.s.</td>
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</tr>
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<td>COG I</td>
<td>44.98</td>
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<tr>
<td>1-13</td>
<td>COG II</td>
<td>46.66</td>
<td>75</td>
<td>-1.7881</td>
<td>0.0738</td>
<td>n.s.</td>
</tr>
<tr>
<td>14 +</td>
<td>COG II</td>
<td>58.76</td>
<td>23</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-13</td>
<td>AFF II</td>
<td>52.22</td>
<td>75</td>
<td>-1.7127</td>
<td>0.0868</td>
<td>n.s.</td>
</tr>
<tr>
<td>14 +</td>
<td>AFF II</td>
<td>40.63</td>
<td>23</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-13</td>
<td>AFF I</td>
<td>44.98</td>
<td>67</td>
<td>-0.3240</td>
<td>0.7459</td>
<td>n.s.</td>
</tr>
<tr>
<td>14 +</td>
<td>AFF I</td>
<td>47.02</td>
<td>23</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-13</td>
<td>COG I</td>
<td>47.92</td>
<td>67</td>
<td>-1.4997</td>
<td>0.1337</td>
<td>n.s.</td>
</tr>
<tr>
<td>14 +</td>
<td>COG I</td>
<td>38.46</td>
<td>23</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-13</td>
<td>COG II</td>
<td>43.64</td>
<td>67</td>
<td>-1.1526</td>
<td>0.2491</td>
<td>n.s.</td>
</tr>
<tr>
<td>14 +</td>
<td>COG II</td>
<td>50.91</td>
<td>23</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-13</td>
<td>AFF II</td>
<td>44.58</td>
<td>67</td>
<td>-0.5693</td>
<td>0.5692</td>
<td>n.s.</td>
</tr>
<tr>
<td>14 +</td>
<td>AFF II</td>
<td>48.17</td>
<td>23</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Significant at the .05 level
**Significant at the .01 level
***Significant at the .001 level

Mann-Whitney U-Wilcoxon Rank Sum N Test
Table 19 provides data regarding differences in learning and teaching style preferences on the bases of age and kinds of previous teaching experiences.

Age appears to be significantly related to the preference of Cognitive II teaching style; whereas, kinds of previous teaching experiences appear to be related somewhat to both preferred teaching and learning styles.

Descriptive information regarding MBTI types and teaching and learning style preferences were summarized earlier in Table 15 (See page 95). Learning and teaching styles and MBTI factors are explored further in Major Research Questions III and IV.

Summary

There appears to be statistically significant differences between teaching and learning style preferences of subjects on the bases of selected personal characteristics. Differences in sex, level of formal education, kinds of teaching experiences, and age of subjects appear to be significantly related to some learning and teaching style preferences. The number of years that subjects have taught does not appear to be significantly related to style preferences; however, the categories of one to thirteen years, and, fourteen years and over, may be too broad to discriminate accurately.

Question III

There is no significant relationship between teachers' responses to a teaching style preference questionnaire and their psychological types as measured by the MBTI.
<table>
<thead>
<tr>
<th>AGE IN YEARS</th>
<th>LTPQ DOMAIN</th>
<th>LSPQ DOMAIN</th>
<th>MEAN RANKS</th>
<th>N</th>
<th>CHI SQUARE</th>
<th>SIGNIFICANCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-34 AFF I</td>
<td>49.50</td>
<td>32</td>
<td>45</td>
<td>0.043</td>
<td>0.979 n.s.</td>
<td></td>
</tr>
<tr>
<td>35-45 AFF I</td>
<td>50.16</td>
<td></td>
<td>32</td>
<td>0.162</td>
<td>0.922 n.s.</td>
<td></td>
</tr>
<tr>
<td>46 + AFF I</td>
<td>48.50</td>
<td></td>
<td>21</td>
<td>0.162</td>
<td>0.922 n.s.</td>
<td></td>
</tr>
<tr>
<td>1-34 COG I</td>
<td>52.70</td>
<td></td>
<td>45</td>
<td>3.610</td>
<td>0.164 n.s.</td>
<td></td>
</tr>
<tr>
<td>35-45 COG I</td>
<td>51.70</td>
<td></td>
<td>32</td>
<td>0.162</td>
<td>0.922 n.s.</td>
<td></td>
</tr>
<tr>
<td>46 + COG I</td>
<td>39.12</td>
<td></td>
<td>21</td>
<td>0.162</td>
<td>0.922 n.s.</td>
<td></td>
</tr>
<tr>
<td>1-34 COG II</td>
<td>43.62</td>
<td></td>
<td>45</td>
<td>6.317</td>
<td>0.042</td>
<td></td>
</tr>
<tr>
<td>35-45 COG II</td>
<td>49.25</td>
<td></td>
<td>32</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>46 + COG II</td>
<td>62.48</td>
<td></td>
<td>21</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-34 AFF II</td>
<td>50.74</td>
<td></td>
<td>45</td>
<td>0.162</td>
<td>0.922 n.s.</td>
<td></td>
</tr>
<tr>
<td>35-45 AFF II</td>
<td>48.31</td>
<td></td>
<td>32</td>
<td>0.162</td>
<td>0.922 n.s.</td>
<td></td>
</tr>
<tr>
<td>46 + AFF II</td>
<td>48.64</td>
<td></td>
<td>21</td>
<td>0.162</td>
<td>0.922 n.s.</td>
<td></td>
</tr>
<tr>
<td>1-34 AFF I</td>
<td>44.68</td>
<td></td>
<td>38</td>
<td>2.394</td>
<td>0.302 n.s.</td>
<td></td>
</tr>
<tr>
<td>35-45 AFF I</td>
<td>41.55</td>
<td></td>
<td>31</td>
<td>0.162</td>
<td>0.922 n.s.</td>
<td></td>
</tr>
<tr>
<td>46 + AFF I</td>
<td>52.81</td>
<td></td>
<td>21</td>
<td>0.162</td>
<td>0.922 n.s.</td>
<td></td>
</tr>
<tr>
<td>1-34 COG I</td>
<td>47.84</td>
<td></td>
<td>38</td>
<td>4.142</td>
<td>0.126 n.s.</td>
<td></td>
</tr>
<tr>
<td>35-45 COG I</td>
<td>49.45</td>
<td></td>
<td>31</td>
<td>0.162</td>
<td>0.922 n.s.</td>
<td></td>
</tr>
<tr>
<td>46 + COG I</td>
<td>35.43</td>
<td></td>
<td>21</td>
<td>0.162</td>
<td>0.922 n.s.</td>
<td></td>
</tr>
<tr>
<td>1-34 COG II</td>
<td>41.88</td>
<td></td>
<td>38</td>
<td>1.318</td>
<td>0.517 n.s.</td>
<td></td>
</tr>
<tr>
<td>35-45 COG II</td>
<td>48.84</td>
<td></td>
<td>31</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>46 + COG II</td>
<td>47.12</td>
<td></td>
<td>21</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-34 AFF II</td>
<td>48.84</td>
<td></td>
<td>38</td>
<td>1.511</td>
<td>0.470 n.s.</td>
<td></td>
</tr>
<tr>
<td>35-45 AFF II</td>
<td>41.10</td>
<td></td>
<td>31</td>
<td>0.162</td>
<td>0.922 n.s.</td>
<td></td>
</tr>
<tr>
<td>46 + AFF II</td>
<td>45.95</td>
<td></td>
<td>21</td>
<td>0.162</td>
<td>0.922 n.s.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>KINDS OF PREVIOUS TEACHING EXPERIENCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>ELEMENTARY AFF I</td>
</tr>
<tr>
<td>SECONDARY AFF I</td>
</tr>
<tr>
<td>MIXED AFF I</td>
</tr>
<tr>
<td>ELEMENTARY COG I</td>
</tr>
<tr>
<td>SECONDARY COG I</td>
</tr>
<tr>
<td>MIXED COG I</td>
</tr>
<tr>
<td>ELEMENTARY COG II</td>
</tr>
<tr>
<td>SECONDARY COG II</td>
</tr>
<tr>
<td>MIXED COG II</td>
</tr>
<tr>
<td>ELEMENTARY AFF II</td>
</tr>
<tr>
<td>SECONDARY AFF II</td>
</tr>
<tr>
<td>MIXED AFF II</td>
</tr>
</tbody>
</table>
In order to examine the hypothesis of no significant relationship between preferred teaching styles and psychological types, multiple regression analysis was employed. This technique was used to predict the criterion variable (i.e., specific teaching style preference as measured by the LTPQ) from the MBTI variables: extraversion (ERS), introversion (IRS), sensing (SRS), intuition (NRS), thinking (TRS), feeling (FRS), judging (JRS), and perceiving (PRS). Specifically, the raw scores (RS) for the MBTI variables were used in a stepwise selection procedure. In this selection procedure, variables are added one at a time to the regression equation provided the addition produces a statistically significant increase in the multiple R (Tatsuoka, 1969). The results of the examination of the relationships between LTPQ domain scores and MBTI variables indicate the best predictors of teaching styles by MBTI scores.
LTPQ Affect 1. LTPQ Affective 1 is predicted best by thinking, introversion, perceiving, feeling, and sensing.

Table 20 summarizes the analysis of variance for the last independent variable (ERS) to be entered in the regression equation.

**TABLE 20**

**ANALYSIS OF LTPQ AFFECTIVE 1 ERS - ANALYSIS OF VARIANCE**

<table>
<thead>
<tr>
<th>Analysis of Variance</th>
<th>df</th>
<th>Sum of Squares</th>
<th>Mean Square</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regression</td>
<td>6</td>
<td>690.44296</td>
<td>115.07383</td>
<td>1.92985</td>
</tr>
<tr>
<td>Residual</td>
<td>83</td>
<td>4949.15704</td>
<td>59.62840</td>
<td></td>
</tr>
</tbody>
</table>

The F value of 1.92985 indicates no statistically significant increase in the multiple R as a result of the addition of ERS.

Table 21 presents the order in which the independent variables which significantly increase the multiple R are entered in the regression equation.
**TABLE 21**

SUMMARY OF LTPQ AFFECTIVE I REGRESSION ANALYSIS

<table>
<thead>
<tr>
<th>VARIABLE</th>
<th>F</th>
<th>df</th>
<th>SIGNIFICANCE</th>
<th>MULTIPLE R</th>
<th>R SQUARE</th>
<th>SIMPLE R</th>
<th>BETA</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRS</td>
<td>9.82</td>
<td>1</td>
<td>.01</td>
<td>0.3169</td>
<td>0.1004</td>
<td>-0.3169</td>
<td>-0.17379</td>
</tr>
<tr>
<td>IRS</td>
<td>5.72</td>
<td>2</td>
<td>.01</td>
<td>0.3410</td>
<td>0.1163</td>
<td>-0.2154</td>
<td>-0.08246</td>
</tr>
<tr>
<td>PRS</td>
<td>3.89</td>
<td>3</td>
<td>.05</td>
<td>0.3458</td>
<td>0.1196</td>
<td>0.1635</td>
<td>0.04343</td>
</tr>
<tr>
<td>FRS</td>
<td>2.95</td>
<td>4</td>
<td>.05</td>
<td>0.3492</td>
<td>0.1219</td>
<td>0.2965</td>
<td>0.10074</td>
</tr>
<tr>
<td>SRS</td>
<td>2.34</td>
<td>5</td>
<td>.05</td>
<td>0.3496</td>
<td>0.1222</td>
<td>-0.1179</td>
<td>-0.02376</td>
</tr>
<tr>
<td>ERS</td>
<td>1.93</td>
<td>6</td>
<td>n.s.</td>
<td>0.3499</td>
<td>0.1224</td>
<td>0.2092</td>
<td>0.04690</td>
</tr>
<tr>
<td>(CONSTANT)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>18.58889</td>
</tr>
</tbody>
</table>

**Discussion**

The Affective I teaching domain involves a combination of sensing and feeling behaviors. Of the eight MBTI variables entered in the multiple regression equation, the best predictor, although negative, is thinking. Another negative predictor, introversion is the second best predictor of Affective I teaching. Perceiving and feeling, both positive, are the third and fourth best predictors. The fifth and last significant predictor is sensing, and a negative indicator. Results show that the other variables, extraversion, intuition, and judging are not significant predictors of the Affective I teaching domain.
LTPQ Cognitive I. LTPQ Cognitive I appears to be best predicted by the following variables in order of the strength of their predictive abilities:

- sensing,
- thinking,
- extraversion,
- perceiving,
- intuition,
- feeling,
- judging,
- and introversion.

Tables 22 and 23 provide details regarding the regression analysis.

### TABLE 22

**LTPQ COGNITIVE I - IRS ANALYSIS OF VARIANCE**

<table>
<thead>
<tr>
<th></th>
<th>df</th>
<th>Sum of Squares</th>
<th>Mean Square</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regression</td>
<td>8</td>
<td>2484.51399</td>
<td>310.56425</td>
<td>5.81247</td>
</tr>
<tr>
<td>Residual</td>
<td>53</td>
<td>4327.88601</td>
<td>53.43069</td>
<td></td>
</tr>
</tbody>
</table>

**Discussion**

Cognitive I teaching is based on a combination of sensing and thinking functions. The two best predictors are positive: sensing and thinking. The next four best predictors are all negative: extraversion, perceiving, intuition, and feeling. The last two predictors, judging and introversion are positive predictors of Cognitive I.
LTPQ Cognitive II. There is no significant predictive relationship between LTPQ Cognitive II and the MBTI variables. Only 5% of the variance among teaching styles is accounted for by the entire eight MBTI variables. Tables 24 and 25 provide substantiating data.

TABLE 23

<table>
<thead>
<tr>
<th>VARIABLE</th>
<th>F</th>
<th>df</th>
<th>SIGNIFICANCE</th>
<th>SIMPLE R</th>
<th>MULTIPLE R</th>
<th>R SQUARE</th>
<th>BETA</th>
</tr>
</thead>
<tbody>
<tr>
<td>SRS</td>
<td>25.59324</td>
<td>1.88</td>
<td>.01</td>
<td>0.47466</td>
<td>0.22531</td>
<td>0.47466</td>
<td>0.017653</td>
</tr>
<tr>
<td>TRS</td>
<td>19.52502</td>
<td>2.87</td>
<td>.01</td>
<td>0.55659</td>
<td>0.30980</td>
<td>0.38201</td>
<td>0.29356</td>
</tr>
<tr>
<td>ERS</td>
<td>14.75522</td>
<td>3.86</td>
<td>.01</td>
<td>0.58293</td>
<td>0.33981</td>
<td>-0.30031</td>
<td>-0.25564</td>
</tr>
<tr>
<td>PRS</td>
<td>11.88719</td>
<td>4.95</td>
<td>.01</td>
<td>0.59894</td>
<td>0.35873</td>
<td>-0.43761</td>
<td>-0.32353</td>
</tr>
<tr>
<td>NRS</td>
<td>9.49956</td>
<td>5.84</td>
<td>.01</td>
<td>0.60100</td>
<td>0.36121</td>
<td>-0.46796</td>
<td>-0.14525</td>
</tr>
<tr>
<td>FRS</td>
<td>7.89107</td>
<td>6.83</td>
<td>.01</td>
<td>0.60269</td>
<td>0.36324</td>
<td>-0.29971</td>
<td>0.09750</td>
</tr>
<tr>
<td>JRS</td>
<td>6.71114</td>
<td>7.82</td>
<td>.01</td>
<td>0.60352</td>
<td>0.36423</td>
<td>-0.41783</td>
<td>-0.14586</td>
</tr>
<tr>
<td>IRS</td>
<td>5.81247</td>
<td>8.81</td>
<td>.01</td>
<td>0.60391</td>
<td>0.36470</td>
<td>0.31943</td>
<td>-0.08573</td>
</tr>
<tr>
<td>(CONSTANT)</td>
<td>16.53251</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

TABLE 24

LTPQ COGNITIVE II - SRS ANALYSIS OF VARIANCE
(LAST INDEPENDENT VARIABLE ENTERED IN EQUATION)

<table>
<thead>
<tr>
<th>Analysis of Variance</th>
<th>df</th>
<th>Sum of Squares</th>
<th>Mean Square</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regression</td>
<td>8</td>
<td>223.26050</td>
<td>29.15756</td>
<td>0.60325</td>
</tr>
<tr>
<td>Residual</td>
<td>81</td>
<td>3915.06172</td>
<td>48.33410</td>
<td></td>
</tr>
</tbody>
</table>
TABLE 25
SUMMARY OF LTPQ COGNITIVE II REGRESSION ANALYSIS

<table>
<thead>
<tr>
<th>VARIABLE</th>
<th>F</th>
<th>df</th>
<th>SIGNIFICANCE</th>
<th>MULTIPLE R</th>
<th>R SQUARE</th>
<th>SIMPLE R</th>
<th>BETA</th>
</tr>
</thead>
<tbody>
<tr>
<td>FRS</td>
<td>1.54474</td>
<td>1.88</td>
<td>n.s.</td>
<td>0.13134</td>
<td>0.01725</td>
<td>-0.13134</td>
<td>-0.30246</td>
</tr>
<tr>
<td>PRS</td>
<td>1.67298</td>
<td>2.87</td>
<td>n.s.</td>
<td>0.19244</td>
<td>0.03704</td>
<td>0.09122</td>
<td>0.62078</td>
</tr>
<tr>
<td>JRS</td>
<td>1.45904</td>
<td>3.86</td>
<td>n.s.</td>
<td>0.22007</td>
<td>0.04843</td>
<td>-0.07154</td>
<td>0.48756</td>
</tr>
<tr>
<td>TRS</td>
<td>1.17613</td>
<td>4.85</td>
<td>n.s.</td>
<td>0.22901</td>
<td>0.05244</td>
<td>0.07871</td>
<td>-0.11813</td>
</tr>
<tr>
<td>IRS</td>
<td>0.95588</td>
<td>5.84</td>
<td>n.s.</td>
<td>0.23202</td>
<td>0.05383</td>
<td>-0.03443</td>
<td>-0.09251</td>
</tr>
<tr>
<td>ERS</td>
<td>0.79097</td>
<td>6.83</td>
<td>n.s.</td>
<td>0.23256</td>
<td>0.05409</td>
<td>0.02301</td>
<td>-0.05655</td>
</tr>
<tr>
<td>NRS</td>
<td>0.67149</td>
<td>7.82</td>
<td>n.s.</td>
<td>0.23284</td>
<td>0.05421</td>
<td>0.07792</td>
<td>0.13284</td>
</tr>
<tr>
<td>SRS</td>
<td>0.60325</td>
<td>8.81</td>
<td>n.s.</td>
<td>0.23713</td>
<td>0.05623</td>
<td>-0.06135</td>
<td>0.13335</td>
</tr>
<tr>
<td>(CONSTANT)</td>
<td>5.680423</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

LTPQ Affective II. LTPQ Affective II appears to be best predicted by the following MBTI variables:

sensing,
thinking,
extraversion,
introversion,
Judging,
Intuition,
perceiving, and
feeling.

Tables 26 and 27 summarize the regression analysis.

TABLE 26
LTPQ AFFECTIVE II - FRS ANALYSIS OF VARIANCE
(LAST INDEPENDENT VARIABLE ENTERED IN EQUATION)

<table>
<thead>
<tr>
<th>Analysis of Variance</th>
<th>df</th>
<th>Sum of Squares</th>
<th>Mean Square</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regression</td>
<td>8</td>
<td>878.92470</td>
<td>109.86559</td>
<td>3.03354</td>
</tr>
<tr>
<td>Residual</td>
<td>81</td>
<td>2933.57530</td>
<td>36.21698</td>
<td></td>
</tr>
</tbody>
</table>
TABLE 27  
SUMMARY OF LTPQ AFFECTIVE II REGRESSION ANALYSIS

<table>
<thead>
<tr>
<th>VARIABLE</th>
<th>F</th>
<th>df</th>
<th>SIGNIFICANCE</th>
<th>MULTIPLE R</th>
<th>R SQUARE</th>
<th>SIMPLE R</th>
<th>BETA</th>
</tr>
</thead>
<tbody>
<tr>
<td>SRS</td>
<td>21.75296</td>
<td>1,88</td>
<td>.01</td>
<td>0.44520</td>
<td>0.19820</td>
<td>-0.44520</td>
<td>-0.28080</td>
</tr>
<tr>
<td>TRS</td>
<td>11.96962</td>
<td>2,87</td>
<td>.01</td>
<td>0.46453</td>
<td>0.21579</td>
<td>-0.22127</td>
<td>-0.07564</td>
</tr>
<tr>
<td>ERS</td>
<td>8.06803</td>
<td>3,86</td>
<td>.01</td>
<td>0.46865</td>
<td>0.21963</td>
<td>0.14687</td>
<td>0.33767</td>
</tr>
<tr>
<td>IRS</td>
<td>6.12811</td>
<td>4,85</td>
<td>.01</td>
<td>0.47311</td>
<td>0.22383</td>
<td>-0.15549</td>
<td>0.28524</td>
</tr>
<tr>
<td>JRS</td>
<td>4.92911</td>
<td>5,84</td>
<td>.01</td>
<td>0.47628</td>
<td>0.22684</td>
<td>-0.31306</td>
<td>-0.24947</td>
</tr>
<tr>
<td>MRS</td>
<td>4.10003</td>
<td>6,83</td>
<td>.01</td>
<td>0.47815</td>
<td>0.22863</td>
<td>0.43187</td>
<td>0.13449</td>
</tr>
<tr>
<td>PHS</td>
<td>3.50002</td>
<td>7,82</td>
<td>.01</td>
<td>0.47963</td>
<td>0.23005</td>
<td>0.30991</td>
<td>-0.19646</td>
</tr>
<tr>
<td>PHS</td>
<td>3.03354</td>
<td>8,81</td>
<td>.01</td>
<td>0.48014</td>
<td>0.23054</td>
<td>0.18574</td>
<td>0.04442</td>
</tr>
<tr>
<td>(CONSTANT)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Discussion

LTPQ Affective II is a domain characterized by an intuitive and feeling combination. The two best MBTI predictors of this domain are sensing and thinking; both being negative predictors. Extraversion and introversion are the next two best predictors: extraversion, positively and introversion, negatively. Judging is the next best, although a negative, predictor. Intuition, perceiving, and feeling are the next best predictors and all are positively predictive of Affective II teaching.

Summary

There appears to be a statistically significant relationship among three of the LTPQ domains and the MBTI variables. Affective I, Cognitive I, and Affective II are all predicted to some extent by the
eight MBTI variables of extraversion, introversion, sensing, intuition, thinking, feeling, judging, and perceiving. The only domain not predicted significantly by these variables is Cognitive II teaching domain.

Question IV

There is no significant relationship between teachers' responses to a learning style preference questionnaire and their psychological types as measured by the MBTI.

To test this hypothesis, a multiple regression was conducted. This technique was used to predict the criterion variable (i.e., specific learning style preferences as measured by the LSPQ) from the MBTI variables: extraversion, introversion, sensing, intuition, thinking, feeling, judging, and perceiving. A stepwise selection procedure was utilized. Results of the analysis indicate the predictors of each of the learning styles (as measured by the LSPQ) in the order of the strength of their predictive capabilities.

LSPQ Affective I. The best predictors among the eight MBTI variables for Affective I learning are the following:

feeling, introversion, intuition, extraversion, judging, perceiving, thinking, and sensing.

Tables 28 and 29 summarize the multiple regression analysis.
TABLE 28
LSPQ AFFECTIVE I - SRS ANALYSIS OF VARIANCE
(LAST INDEPENDENT VARIABLE ENTERED IN EQUATION)

<table>
<thead>
<tr>
<th>Analysis of Variance</th>
<th>df</th>
<th>Sum of Squares</th>
<th>Mean Square</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regression</td>
<td>8</td>
<td>5272.62804</td>
<td>659.07851</td>
<td>5.04048</td>
</tr>
<tr>
<td>Residual</td>
<td>81</td>
<td>10591.32751</td>
<td>130.75713</td>
<td></td>
</tr>
</tbody>
</table>

TABLE 29
SUMMARY OF LSPQ AFFECTIVE I REGRESSION ANALYSIS

<table>
<thead>
<tr>
<th>VARIABLE</th>
<th>F</th>
<th>df</th>
<th>SIGNIFICANCE</th>
<th>MULTIPLE R</th>
<th>R SQUARE</th>
<th>SIMPLE R</th>
<th>BETA</th>
</tr>
</thead>
<tbody>
<tr>
<td>FRS</td>
<td>31.66445</td>
<td>1.88</td>
<td>.01</td>
<td>0.51440</td>
<td>0.26461</td>
<td>0.51440</td>
<td>0.56590</td>
</tr>
<tr>
<td>IRS</td>
<td>18.49013</td>
<td>2.87</td>
<td>.01</td>
<td>0.54615</td>
<td>0.29828</td>
<td>-0.29707</td>
<td>-0.54988</td>
</tr>
<tr>
<td>NRS</td>
<td>13.00145</td>
<td>3.86</td>
<td>.01</td>
<td>0.55859</td>
<td>0.31202</td>
<td>-0.01251</td>
<td>-0.28784</td>
</tr>
<tr>
<td>ERS</td>
<td>10.06947</td>
<td>4.85</td>
<td>.01</td>
<td>0.56702</td>
<td>0.32151</td>
<td>0.27142</td>
<td>-0.34407</td>
</tr>
<tr>
<td>JRS</td>
<td>8.10636</td>
<td>5.84</td>
<td>.01</td>
<td>0.57050</td>
<td>0.32547</td>
<td>-0.16654</td>
<td>-0.30875</td>
</tr>
<tr>
<td>PRS</td>
<td>6.76682</td>
<td>6.83</td>
<td>.01</td>
<td>0.57314</td>
<td>0.32849</td>
<td>0.16985</td>
<td>-0.25806</td>
</tr>
<tr>
<td>TRS</td>
<td>5.77602</td>
<td>7.82</td>
<td>.01</td>
<td>0.57467</td>
<td>0.33024</td>
<td>-0.43291</td>
<td>0.09574</td>
</tr>
<tr>
<td>SRS</td>
<td>5.04048</td>
<td>8.81</td>
<td>.01</td>
<td>0.57651</td>
<td>0.33237</td>
<td>-0.01141</td>
<td>-0.13690</td>
</tr>
<tr>
<td>(CONSTANT)</td>
<td>52.99055</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Discussion

The Affective I learning domain is best predicted, positively, by feeling. The next two best predictors, Introversion and Intuition are negative predictors. Extraversion is a positive next best predictor. Judging is the next, although negative, predictor. Perceiving is a positive predictor; and the last two predictors, thinking and sensing are negative.
LSPQ Cognitive I. The LSPQ Cognitive I domain is based on a sensing and thinking combination of functions. Cognitive I learning domain is predicted by the following MBTI variables in the order of their predictive importance:

- Intuition,
- thinking,
- extraversion,
- judging,
- sensing,
- feeling, and
- introversion.

Tables 30 and 31 summarize the regression analysis.

### TABLE 30

**LSPQ COGNITIVE I - IRS ANALYSIS OF VARIANCE**  
(LAST INDEPENDENT VARIABLE ENTERED IN EQUATION)

<table>
<thead>
<tr>
<th>Analysis of Variance</th>
<th>df</th>
<th>Sum of Squares</th>
<th>Mean Square</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regression</td>
<td>7</td>
<td>7184.89716</td>
<td>1026.41388</td>
<td>8.56288</td>
</tr>
<tr>
<td>Residual</td>
<td>82</td>
<td>9829.15840</td>
<td>119.96779</td>
<td></td>
</tr>
</tbody>
</table>

**Discussion**

Cognitive I learning is predicted best, although negatively, by intuition. Thinking is a positive second predictor; while extraversion is third and negative. Judging and sensing are positive and next best in predictive importance. Of the next two predictors, feeling is a negative and introversion, a positive indicator.
TABLE 31

SUMMARY OF LSPQ COGNITIVE II REGRESSION ANALYSIS

<table>
<thead>
<tr>
<th>VARIABLE</th>
<th>F</th>
<th>df</th>
<th>SIGNIFICANCE</th>
<th>MULTIPLE R</th>
<th>R SQUARE</th>
<th>SIMPLE R</th>
<th>BETA</th>
</tr>
</thead>
<tbody>
<tr>
<td>NRS</td>
<td>47.26877</td>
<td>1,88</td>
<td>.01</td>
<td>0.59114</td>
<td>0.34944</td>
<td>-0.59114</td>
<td>-0.30775</td>
</tr>
<tr>
<td>TRS</td>
<td>27.06191</td>
<td>2,87</td>
<td>.01</td>
<td>0.61929</td>
<td>0.38352</td>
<td>0.29539</td>
<td>0.21160</td>
</tr>
<tr>
<td>ERS</td>
<td>19.18484</td>
<td>3,86</td>
<td>.01</td>
<td>0.63319</td>
<td>0.40092</td>
<td>-0.24682</td>
<td>-0.26741</td>
</tr>
<tr>
<td>JRS</td>
<td>14.95939</td>
<td>4,85</td>
<td>.01</td>
<td>0.64276</td>
<td>0.41314</td>
<td>0.44328</td>
<td>0.13139</td>
</tr>
<tr>
<td>SRS</td>
<td>12.08436</td>
<td>5,84</td>
<td>.01</td>
<td>0.64682</td>
<td>0.41837</td>
<td>0.59021</td>
<td>0.19263</td>
</tr>
<tr>
<td>FRS</td>
<td>10.06097</td>
<td>6,83</td>
<td>.01</td>
<td>0.64889</td>
<td>0.42106</td>
<td>-0.21366</td>
<td>0.10425</td>
</tr>
<tr>
<td>IRS</td>
<td>8.56288</td>
<td>7,82</td>
<td>.01</td>
<td>0.64984</td>
<td>0.42229</td>
<td>0.27309</td>
<td>-0.13840</td>
</tr>
<tr>
<td>(CONSTANT)</td>
<td>24.32733</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

LSPQ Cognitive II. The LSPQ Cognitive II domain involves an intuitive and thinking combination of functions. Cognitive II learning is predicted from the following MBTI variables in the order of their predictive strength:

- feeling,
- intuition,
- judging,
- introversion,
- extraversion,
- thinking, and
- sensing.

Tables 32 and 33 summarize the regression analysis.
TABLE 32

LSPQ COGNITIVE II - SRS ANALYSIS OF VARIANCE
(LAST INDEPENDENT VARIABLE ENTERED IN EQUATION)

<table>
<thead>
<tr>
<th>Analysis of Variance</th>
<th>df</th>
<th>Sum of Squares</th>
<th>Mean Square</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regression</td>
<td>7</td>
<td>2294.29840</td>
<td>327.75691</td>
<td>3.74963</td>
</tr>
<tr>
<td>Residual</td>
<td>82</td>
<td>7167.65716</td>
<td>87.41045</td>
<td></td>
</tr>
</tbody>
</table>

TABLE 33

SUMMARY OF LSPQ COGNITIVE II REGRESSION ANALYSIS

<table>
<thead>
<tr>
<th>VARIABLE</th>
<th>F</th>
<th>df</th>
<th>SIGNIFICANCE</th>
<th>MULTIPLE R</th>
<th>R SQUARE</th>
<th>SIMPLE R</th>
<th>BETA</th>
</tr>
</thead>
<tbody>
<tr>
<td>FRS</td>
<td>14.92756</td>
<td>1.88</td>
<td>.01</td>
<td>0.38083</td>
<td>0.14503</td>
<td>-0.38083</td>
<td>-0.41194</td>
</tr>
<tr>
<td>NRS</td>
<td>9.84299</td>
<td>2.87</td>
<td>.01</td>
<td>0.42956</td>
<td>0.18452</td>
<td>0.14222</td>
<td>0.30271</td>
</tr>
<tr>
<td>JRS</td>
<td>7.46393</td>
<td>3.86</td>
<td>.01</td>
<td>0.45451</td>
<td>0.20658</td>
<td>0.12909</td>
<td>0.16398</td>
</tr>
<tr>
<td>IRS</td>
<td>6.10556</td>
<td>4.85</td>
<td>.01</td>
<td>0.47243</td>
<td>0.22319</td>
<td>0.18681</td>
<td>0.64494</td>
</tr>
<tr>
<td>ERS</td>
<td>5.33429</td>
<td>5.84</td>
<td>.01</td>
<td>0.49091</td>
<td>0.24100</td>
<td>-0.15827</td>
<td>0.51696</td>
</tr>
<tr>
<td>TRS</td>
<td>4.42491</td>
<td>6.83</td>
<td>.01</td>
<td>0.49229</td>
<td>0.24235</td>
<td>0.30391</td>
<td>-0.07061</td>
</tr>
<tr>
<td>SRS</td>
<td>3.74963</td>
<td>7.82</td>
<td>.01</td>
<td>0.49242</td>
<td>0.24248</td>
<td>-0.12636</td>
<td>-0.03305</td>
</tr>
<tr>
<td>(CONSTANT)</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>5.333168</td>
</tr>
</tbody>
</table>

Discussion

Cognitive II learning is predicted negatively and best by feeling. Positive predictors in order of strength are intuition, judging, and introversion. The next best predictor is negative: extraversion. Thinking is a positive next predictor, followed by a negative predictor: sensing.
LSPQ Affective II. The LSPQ Affective II domain draws from the combination of Intuition and feeling functions. Affective II learning is predicted from MBTI variables in the following order:

Intuition, judging, feeling, thinking perceiving, extraversion, introversion, and sensing.

Tables 34 and 35 summarize the regression analysis.

**TABLE 34**

LSPQ AFFECTIVE II - SRS ANALYSIS OF VARIANCE
(LAST INDEPENDENT VARIABLE ENTERED IN EQUATION)

<table>
<thead>
<tr>
<th>Analysis of Variance</th>
<th>df</th>
<th>Sum of Squares</th>
<th>Mean Square</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regression</td>
<td>8</td>
<td>5074.71255</td>
<td>634.33907</td>
<td>6.69645</td>
</tr>
<tr>
<td>Residual</td>
<td>81</td>
<td>7672.94300</td>
<td>94.72769</td>
<td></td>
</tr>
</tbody>
</table>

Discussion

Affective II learning style is best predicted positively by Intuition. The next predictor, judging, is negative. The third best predictor, feeling, is positive; and the fourth, thinking is negative. The next two predictors are positive: perceiving and extraversion. The last two predictors are negative: introversion and sensing.
Summary of Table 35:

SUMMARY OF LSPQ-AFFECTIVE II REGRESSION ANALYSIS.

<table>
<thead>
<tr>
<th>VARIABLE</th>
<th>F</th>
<th>df</th>
<th>SIGNIFICANCE</th>
<th>MULTIPLE R</th>
<th>R SQUARE</th>
<th>SIMPLE R</th>
<th>BETA</th>
</tr>
</thead>
<tbody>
<tr>
<td>NRS</td>
<td>43.321</td>
<td>1,88</td>
<td>.01</td>
<td>0.57436</td>
<td>0.32989</td>
<td>0.57436</td>
<td>0.42300</td>
</tr>
<tr>
<td>JRS</td>
<td>23.735</td>
<td>2,87</td>
<td>.01</td>
<td>0.59415</td>
<td>0.35302</td>
<td>-0.43755</td>
<td>-0.02851</td>
</tr>
<tr>
<td>FRS</td>
<td>16.708</td>
<td>3,86</td>
<td>.01</td>
<td>0.60682</td>
<td>0.36823</td>
<td>0.00109</td>
<td>-0.39143</td>
</tr>
<tr>
<td>TRS</td>
<td>13.674</td>
<td>4,85</td>
<td>.01</td>
<td>0.62573</td>
<td>0.39154</td>
<td>-0.12016</td>
<td>-0.28855</td>
</tr>
<tr>
<td>FRS</td>
<td>10.896</td>
<td>5,84</td>
<td>.01</td>
<td>0.62724</td>
<td>0.39343</td>
<td>0.44126</td>
<td>0.20358</td>
</tr>
<tr>
<td>ERS</td>
<td>9.027</td>
<td>6,83</td>
<td>.01</td>
<td>0.62839</td>
<td>0.39488</td>
<td>0.11872</td>
<td>0.24895</td>
</tr>
<tr>
<td>IRS</td>
<td>7.742</td>
<td>7,82</td>
<td>.01</td>
<td>0.63082</td>
<td>0.39793</td>
<td>-0.14505</td>
<td>0.21869</td>
</tr>
<tr>
<td>IRS</td>
<td>6.696</td>
<td>8,81</td>
<td>.01</td>
<td>0.63094</td>
<td>0.39809</td>
<td>-0.56028</td>
<td>-0.03703</td>
</tr>
</tbody>
</table>

(CONSTANT) 20.41687

Summary

Relationships between all of the LSPQ domains and the MBTI variables appear to be statistically significant. All eight of the MBTI variables are significant (either positive or negative) predictors of LSPQ Affective I and Affective II domains. Seven of the eight MBTI variables are significant predictors of LSPQ Cognitive I and Cognitive II domains.

Summary

In Chapter IV, relationships among preferred teaching styles, preferred learning styles, psychological types, and other personal characteristics of practicing teachers were identified. Results of the data analyses conducted to answer the research questions were reported. The following findings were identified and discussed.
1. Of the subjects in this study, 64% indicated a judging, feeling preference as measured by the MBTI.

2. Of the elementary teachers in the sample, 71% indicated a judging, feeling preference as measured by the MBTI.

3. A larger percentage of introverted, sensing, thinking persons than extraverted, sensing, thinking persons prefer both teaching and learning in the Cognitive I (sensing-thinking) domain.

4. Of the introverted, intuitive, feeling type persons, 50% prefer to learn in the Affective II (intuitive-feeling) domain, but none prefers to teach in the Affective II domain.

5. Of the eight MBTI categories, the extraverted, intuitive, feeling category contains the largest percentage of subjects who most prefer teaching in the Affective II domain.

6. Among the 98 persons who completed the LTPQ, there appears to be a strong preference for Affective I (sensing-feeling) teaching and a very low preference for teaching in the Affective II (intuitive-feeling) domain.

7. Among the 92 subjects who completed the LSPQ, learning style preferences appear fairly evenly distributed among the four domains.

8. Significantly more females than males most prefer teaching and learning in the Affective I domain.
9. Significantly more males than females prefer
   1) teaching and learning in the Cognitive I domain, and
   2) learning in Cognitive II domain.

10. Significantly more elementary than secondary teachers prefer
teaching and learning in the Affective I domain.

11. More secondary teachers prefer
   1) learning in Cognitive I domain, and
   2) teaching in Cognitive II domain

12. There appears to be no significant difference in preferred
teaching styles between teachers with bachelor’s and
master’s degrees.

13. More teachers with bachelor’s degrees prefer learning in the
Affective I domain; and more teachers with master’s degrees
prefer learning in the Cognitive II domain.

14. There is no significant difference in learning or teaching
style preferences between teachers who have taught one to
thirteen years and fourteen years and over.

15. More teachers, 46 years and older, than teachers under 34
years of age, prefer to teach in the Cognitive II domain.

16. Regarding previous teaching experiences, more teachers with
only elementary teaching experiences than with secondary
only or mixed (elementary and secondary) teaching back-
grounds prefer teaching in the Affective I domain.

17. More teachers with only secondary school experience prefer
Cognitive II teaching than teachers with only elementary
school backgrounds.
18. More teachers with mixed (elementary and secondary) teaching backgrounds prefer learning in the Cognitive II domain than teachers with only elementary teaching experience.

19. Multiple regression analyses revealed that the ability of the MBTI variables to predict all LSPQ domains was significant.

20. Regression analyses revealed that the ability of the MBTI variables to predict LTPQ Affective I, Cognitive I, and Affective II domains was significant.
CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Introduction

For many years, the uniqueness of people as defined by their "individual differences" has been an important issue in the field of education. Educational literature as well as school goal statements have addressed the professional objective of meeting the individual needs of students. However, actually attending to the uniqueness of each person in an educational setting has provided an enormous challenge to professional educators. At times the importance of individual differences was ignored in lieu of stressing absolute criteria for educational performance and achievement. However, a balance between maintaining standards and allowing for individual growth, processing, and expression is what is clearly needed. Establishing and maintaining a balance between these important goals requires creative effort, patience, and perhaps more importantly the practical recognition of the actual importance of both goals. This issue is faced today as universities identify admission requirements and state boards of education consider the essentials of diploma-granting. Standards are important—yet, a too tunneled view can result in destroying or at least discouraging the cutting edge, as it were, of educational change and growth.

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If teachers consider education in the sense of "leading out", it appears significant that efficient and effective education may depend upon the ability of teachers to identify where both teachers and students are in respect to learning needs and style preferences. Implicit in this issue is the importance of teachers understanding themselves as they interact with students, particularly in the educational setting. Essential, too, is the willingness of teachers to explore the sources and educational ramifications of individual differences in people—be those people, students, co-workers, or parents of students.

Much importance has been attached to the role of the teacher and concomitantly to the importance of teacher education programs. Often, especially in times of national emergencies, monetary and other resources have been appropriated to implement the goals of education, particularly as those goals apply to student literacy, employability, preparation for adult responsibilities or advanced study, and the ability of individuals to contribute significantly to the "brain trust" of the country.

Occasionally, after major influences have been felt and changes effected, educators have reconsidered overall goals in the hope of ascertaining whether, in fact, noted changes occurred in a direction to meet actual needs. Special projects have been funded, legislation passed, and studies promoted in the effort to maximize the efficiency and effectiveness of providing educational opportunities for all children in the United States. Providing such opportunities for all children strongly suggests that individual needs and differences be
recognized and addressed: whether the needs are physical, intellectual, environmental, psychological, modal, perceptual, or emotional. In a sense, meeting these needs requires an extremely holistic attitude in teachers. It may also require the exposure of students to a multiplicity of opportunities for growth: opportunities frequently created by teachers who understand the multifaceted requirements of effective teaching. Teachers do not simply teach a "subject"; they teach children (an over used phrase, perhaps, but essentially a truism).

One of the avenues that appears to hold promise in terms of assisting teachers in meeting the individual needs of students is the concept of "style"—cognitive, learning, and teaching. After years of psychological exploration of cognitive style, the concept of learning style evolved. Learning style provides a reference point for considering, in a value-free way, how people create meaning of their worlds. Once it was accepted that learners tend to learn in certain preferred ways, it was hypothesized that teachers may tend to teach in certain preferred ways. This concept of style provides a way of considering differences in teachers and in learners that does not reflect negative or positive values. "Style" suggests that there are many acceptable, however diverse, means of accomplishing a goal. Understanding and implementing this idea has the potential of encouraging greater growth and expansion of human capacities.
Summary of the Study

In light of these issues, this study was undertaken to investigate possible interactive influences which may impinge upon the teaching behavior of the professional educator. The purpose of this study was to investigate the interrelationships of teaching styles, learning styles, psychological types, and selected personal characteristics among practicing teachers in the greater Columbus area.

The following null hypotheses were investigated in this study:

I. There is no significant relationship between the responses of practicing teachers to questionnaires assessing their preferred teaching and learning styles.

II. There is no significant relationship between other factors (i.e., sex, level of formal education, kinds of teaching experiences, age, number of years of teaching, and MBTI types) and the relationship between preferred teaching and learning styles of practicing teachers.

III. There is no significant relationship between teachers' responses to a teaching style preference questionnaire and their psychological types as measured by the MBTI.

IV. There is no significant relationship between teachers' responses to a learning style preference questionnaire and their psychological types as measured by the MBTI.

A non-random sample of 98 teachers, predominantly female, was involved in the study. Elementary, Intermediate, and high school teachers were represented by the sample, in which more than half were
elementary school teachers. With regard to some characteristics, this sample is not greatly dissimilar from the population of teachers in the State of Ohio (See Tables 5, 9, 10).

For the purpose of this investigation the subjects completed the following self report instruments:

1) Lotas Teaching Preference Questionnaire (LTPQ)
2) Myers-Briggs Type Inventory (MBTI)
3) Learning Styles Preference Questionnaire (LSPQ)
4) Self Analysis Questionnaire (SAQ)

Completed instruments were coded, key punched, and analyzed using chi square, Mann-Whitney U-Wilcoxon Rank Sum W, Kruskal-Wallis and multiple regression techniques. Relationships between teaching and learning styles and between selected personal characteristics and teaching and learning styles were statistically tested for significance by chi square, Mann-Whitney U-Wilcoxon Rank Sum W and Kruskal-Wallis tests. Relationships between teachers' responses to the MBTI and the LTPQ as well as the MBTI and the LSPQ were analyzed using a stepwise multiple regression. SPSS subprograms were used to conduct each of these analyses.

Conclusions

Analyses were made based on the four null hypotheses, and the following conclusions are drawn. Discussion and possible implications of the conclusions follow each one.
Conclusions Related to Research Questions I and II

Research questions I and II concern the relationship between the preferred teaching and preferred learning styles of practicing teachers. Other factors which may be significantly related to the relationship between teaching and learning styles also were explored.

1. While preferred teaching style appears to reflect preferred learning style to some degree, the relationship between preferred teaching and learning styles does not fully explain the teaching style preferences of practicing teachers.

If, as much of the literature suggests, teaching style reflects learning style, then, what is implied when the number of matches between teaching and learning style preferences is not conclusively large? It may be that the sample of teachers who participated in this particular study were more sophisticated about learning and teaching style issues and, therefore, were less likely to report teaching behaviors which simply reflect their own preferred learning styles. The understanding of how one best learns may or may not translate into a concern for how others learn or into accepting responsibility for teaching with awareness of the learning preferences of students. However, this awareness might create fewer matches and greater diversity between teachers' preferred learning and teaching styles.

It may be that the grade levels and subjects taught by participants in this study affected the results in such a way that matches were not likely to occur. Results also suggest that teaching
style is a complicated concept, not easily or simply explained on the basis of any one variable.

2. The incidence of matches between preferred teaching and learning styles appears to be related to a preference for the sensing function.

If one assumes that learning style is a relatively more natural or basic style than teaching style which may be influenced by professional training, then, the fairly even distribution of learning style preferences among the LSPQ domains is interesting in itself. However, when this observation is coupled with the recognition of the high number of teachers who indicate a teaching style preference involving the sensing function rather than the intuitive function, the issue becomes more significant. Of the 23 persons who prefer Cognitive II (Intuitive-thinking) learning, 17 indicate a preference for teaching in a domain involving sensing; of the 20 persons who prefer Affective II (Intuitive-feeling) learning, 14 prefer teaching domains involving sensing. Obviously, under these conditions the likelihood of matches occurring in the intuitive domains is not great.

That the intuitive learners in this study generally indicate a preference to teach in sensing domains, raises a question of the degree to which professional training may or may not assist intuitive learners in using their intuitive strengths or preferences in their teaching activities. If for professional, practical, or other reasons, teachers are encouraged to teach in non-preferred styles, it seems that support services should be available to assist them. This
assistance may be needed as teachers develop their skills and evaluate their own development, and might prevent or reduce teacher stress or burnout. Insofar as burnout may be attributed to the expectations placed on teachers to teach in non-preferred styles.

Because there are intuitive learners in classrooms, the issue of teaching not only from the teacher's strength—but also to the learner's strength—becomes important. Perhaps the difficulties met in attempting to teach by creating a setting which encourages students to utilize and develop their intuitive-functioning skills are too great. And perhaps teachers simply are not encouraged by training or professional motivations to attempt to teach in this manner.

Of the persons who indicate an intuitive teaching style preference, far more prefer the intuitive-thinking domain than the intuitive-feeling domain. The "thinking" component of the intuitive-thinking domain may be more congruent with the traditional teaching role. The fact that so few persons express a teaching style preference for the Affective II (intuitive-feeling) domain deserves some comment and raises some questions. One may question why so few teachers indicate a preference for the intuitive-feeling teaching style when Affective II learners (based on the data from the study) clearly are present in the teaching profession. This could be due to the uniqueness of this particular sample of teachers. It is possible also that many school settings are not conducive to the Affective II teaching style, since the teaching of universal, holistic values can be a very sensitive and complicated challenge. With large class
enrollments, opportunities for one to one interaction, which is an important aspect of Affective II style, may not be plentiful. Also, pressures for accountability in teaching may militate for more tangible or easily documentable objectives, activities, and evaluations.

The issue of teachers being encouraged to teach in styles which are incongruous with their own preferences or strengths is significant. How does this phenomenon affect classroom communication and the overall school atmosphere? What values are communicated about the sensing and intuitive modes of perception by the predominant preference for sensing-teaching styles? Teacher clarity has been identified as a characteristic important to effective teaching. Is it that sensing is regarded by many as a more clear or trustworthy means of perceiving?

In the light of these concerns, how can teachers, regardless of demonstrated or preferred styles, reaffirm to themselves and their students the acceptability of styles different from their preferred style? Answers to these questions are not available immediately; but perhaps the questions will stimulate the development of other hypotheses, inquiry, and eventually some answers.

3. There appears to be a trend away from sensing-feeling learning and teaching preferences as formal education level is increased.

The statistical significance of the differences between level of formal education and the Affective I (sensing-feeling) learning style preferences was discussed in Chapter IV. However, other trends
suggested by the data are interesting. It appears that preferences for sensing-feeling teaching and learning styles decrease with increased formal education; and the preference for intuitive-thinking learning tends to increase with an increase in level of formal education. This trend is consistent with McCaulley's (1977) reporting of the incidence of more intuitive type persons pursuing higher education.

Whether this is a self-selecting situation in which intuitive persons simply indicate a preference for their own additional educational development or whether the higher-education setting—housing as is does, many intuitive types among the professors—simply attracts other intuitive persons as students, is an interesting and, at this time, unanswered question.

Conclusions Related to Research Questions III and IV

Research questions III and IV are concerned with the relationships between preferred teaching styles and psychological types and preferred learning styles and psychological types. The MBTI, the LTPQ, and the LSPQ were developed from Jung's theory of psychological type. The MBTI purports to discretely measure four dichotomous scales: extraversion-introversion, sensing-intuition, thinking-feeling, and judging-perceiving. The LTPQ and the LSPQ attempt to identify preferred teaching and learning styles, respectively, based on domains created from combinations of Jung's functions: Affective I (sensing-feeling), Cognitive I (sensing-thinking), Cognitive II (intuitive-thinking), and Affective II (intuitive-feeling). Since all of the instruments attempt to measure Jung's functions—the MBTI
(as discrete variables) and the Lotas Instruments (as combined measures)—an effort was made to determine to what extent, if any, the instruments measure similar traits and to what extent, psychological type is related to teaching and/or learning style.

4. LTPQ Affective I, Cognitive I, and Affective II domains and LSPQ Affective I, Cognitive I, Cognitive II and Affective II domains generally are predicted by MBTI variables in ways consistent with the theory of psychological type.

These predictive patterns strongly suggest that the Lotas instruments and the MBTI are measuring, similarly, the characteristics associated with the theory of psychological type as described by Jung. With only two exceptions, the pattern of MBTI predictors were appropriately positive or negative in accordance with the theoretical expectations based on Jung's work.

5. The predictive pattern of the MBTI variables supports the idea of polarity in attitude and function measurement.

The data indicate that, in all except one instance, Extraversion-Introversion, Sensing-Intuition, Thinking-Feeling, and Judging-Perceiving are consistently opposite each other in their positive or negative prediction of learning and teaching styles.

6. In the instances of high, negative MBTI predictors of learning and teaching styles, it appears that the Lotas instruments may be tapping into the less preferred functions as measured by the MBTI (i.e., the second auxiliary and/or the inferior functions as defined by Jung's theory) rather
than into the more preferred (i.e., the dominant or auxiliary functions as defined by Jung's theory).

This conclusion is consistent with the theory of psychological type insofar as these instruments are capable of addressing Jung's theory.

7. The Lotas Instruments appear to measure characteristics in addition to those represented by the combinations suggested by the domain descriptions.

Significant predictive contributions are made by the following MBTI variables: extraversion, introversion, judging, and perceiving. Perhaps the attempt to create items which measure combined functions has resulted in items which tap into characteristics (as measured by the MBTI) which are distinct from those specifically being measured. For example,

1) extraversion (E) appears to be a consistently positive predictor of Affective I (sensing-feeling) and Affective II (intuitive-feeling) learning domains;

2) introversion (I) appears to be negatively predictive of Affective I (sensing-feeling) and Affective II (intuitive-feeling);

3) perceiving (P) appears to positively predict Affective I (sensing-feeling) and Affective II (intuitive-feeling);

4) judging (J) appears to negatively predict Affective I (sensing-feeling) and Affective II (intuitive-feeling); and

5) judging (J) appears to positively predict Cognitive I (sensing-thinking) and Cognitive II (intuitive-thinking).
Recommendations for Further Study

This study was exploratory in nature. The conclusions reached are tentative; and they tend to raise questions which might be pursued through additional research. Since any study is necessarily limited by its specific parameters (e.g., sample, setting, instruments, research design, and data analyses) the following suggestions for further study are made.

1) It is recommended that this study be replicated using other learning and teaching style instruments.

2) It is recommended that in using the Lotas instruments for research purposes the ordering of the answers within each question be altered in an attempt to prevent automatic patterning of responses.

3) It is recommended that in replications of this study, the instrument administration schedule be altered to identify possible inter-instrument contamination effects.

4) It is recommended that in other research, group categories of personal characteristics be re-identified in order to test for other relationships which were not explored in this study.

5) It is recommended that this study be replicated with a larger and more diverse or random sample to permit analyses not possible with this sample.

6) It is recommended that studies be conducted to investigate whether or not the small number of teachers who prefer
Affective II teaching style is unique to this sample. If not, this issue should be explored further.

7) It is recommended that longitudinal research involving learning and teaching style preferences be conducted with teachers in training to see how both learning and teaching style preferences are affected by the teacher education experience.

8) It is recommended that studies be conducted to investigate how teachers' preferences of learning or teaching styles may be related to school discipline.

9) It is recommended that data accruing from this study and additional research be used to provide a base for further investigation into the construct validity of the instruments used in this study. Implicit is the need for exploring the underlying theory of psychological type as it relates to the instruments used in this study.

10) It is recommended that research be conducted to explore the effects of teachers, teaching in a non-preferred mode, upon the communication patterns between teachers and students.

11) It is recommended that effort be expended to determine whether or not teacher stress or burnout is related to the phenomenon of teachers teaching or being expected to teach in styles incongruent with their personal and/or professional preferences.
12) It is recommended that additional studies be planned to explore the variance between LTPQ and LSPQ domains and MBTI variables.

General Recommendations

1. It is recommended that school administrators, supervisors, and personnel staff members be encouraged to increase their knowledge of learning and teaching styles and that these persons take style into account as they perform the following functions:
   a. creating master schedules,
   b. developing student schedules,
   c. making teaching assignments
   d. assigning rooms to teachers,
   e. planning In-service for staff, and
   f. evaluating teachers.

2. It is recommended that teachers be encouraged to explore their own learning and teaching styles to deepen their understanding of style, and to expand their repertoire of styles.

3. It is recommended that supervisory help, support groups, counseling, and other assistance be available to teachers as they confront the possible incongruities between their own style preferences and the demands of the educational setting and specifically, the needs of students.

4. It is recommended that the multitudinous and diverse information regarding teaching and learning styles be examined critically,
organized, and systematically introduced into the teacher education curriculum.

5. It is recommended that information about learning styles and teaching styles be introduced systematically into the K-12 curriculum.

Summary

In Chapter V, this exploratory study of the interrelationships among teaching styles, learning styles, psychological types, and other personal characteristics was summarized. Findings and conclusions from the study were discussed. Questions for further study were explored and specific recommendations were made.
LOTAS TEACHING PREFERENCE QUESTIONNAIRE (LTPQ)*

The LTPQ is intended to assist you in describing your preferences among the major teaching styles. These preferences are grouped into 10 somewhat overlapping issues in teaching. As you read the four alternative statements (a) to (d) under each issue, please note that:

1. no single statement by itself would comprise an adequate philosophy or attitude toward teaching, but that

2. each statement is a reasonable or plausible point of view in some circumstances.

Please try to avoid any artificial or forced consistency. It is alright not to think/feel the same way from issue to issue. Respond as an expression of your actual thoughts, feelings, and actions as if teaching one of your better classes or groups of students.

Our intent is to make choices clear and obvious, hence all a's represent the same teaching-style; all b's, c's, and d's do the same.

Directions:

Under each issue, choose (2) statements from the (4).

In some cases, you will prefer the (2) choices relatively equally; then give 3 pts. to the first choice and 2 pts. to the second choice; i.e., assign a total of 5 points to the (2) choices.

When you have a stronger preference for the first choice, give it 4 pts., and then 1 pt. to the second choice.

In summary, rate as follows:

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<td>About Equal</td>
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<td>Strong Preference</td>
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There is no time limit, so take your time and consider each choice carefully.

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1. A classroom atmosphere in which I am most comfortable when working with students emphasizes the following:

a. A warm, friendly supportive atmosphere in which students are encouraged to share their personal thoughts, feelings and experiences, and to interact with one another.

b. An organized, systematic, teacher-directed atmosphere in which students are actively engaged in purposeful work.

c. An intellectually stimulating atmosphere designed to develop student's critical thinking skills, and where the student is expected to reach for his/her limits of performance.

d. The creation of a flexible, innovative, but demanding work atmosphere in which values, methods of accomplishing goals, and the relationships between immediate and long-range goals are open to discussion.

2. My teaching techniques often provide for activities which:

a. Involve a student as a whole person, and through empathy, nurture the maturation process. Instructional strategies may include: group dynamics, role playing, slow and tell, sharing feelings and experiences, peer tutoring, contracts, and small/large group projects.

b. Require students to master skills and draw upon memory. Instructional strategies may include: drill, lecture, reading assignments, programmed instruction, workbooks, seat work, laboratory, and question-answer sessions.

c. Ask students to be analytical and strive for understanding. Instructional strategies may include: brainstorming, lecture, laboratory, reading, simulations, inquiry approach, and independent projects.

d. Enable students to explore and find ways for mastery through self-expression, to gain inspiration and act on their personal values. Instructional strategies may include: discussions, contracts, getting involved in the real world through projects, creative and artistic activities, dramatizations, and values clarification.

3. In considering the evaluation of student work (grading), I am inclined to emphasize the following factors:

a. Each student's strengths and individuality; the fact that objective tests are only the beginning of evaluation which involves helping each person to accept himself, and to achieve his/her potential (e.g., self-reports, rating scales, ranking questionnaires).

b. Giving students opportunities to demonstrate what they have learned through frequent quizzes, tests, homework, task performance exams.

c. The importance of evaluating conceptual understandings and intellectual power, through essay exams, problem-solving, critiques, experiments.

d. The necessity of including self-evaluation, clear standards for creative work, encouragement of self-reliance; for example, through the use of a journal; as well as other types of exams.
4. I am most comfortable and do my best teaching when my lesson plans:

a. Account for the student's human needs and the needed survival skills, rather than always following a curriculum guide. I also tend to respond to the here-and-now class needs in order to capitalize on spontaneous events for instruction.

b. Follow prescribed curriculum guides or textbook chapters, which are translated into specific weekly or daily lesson plans. I usually know ahead of time how each skill or concept will be presented and developed.

c. Follow an outline identifying main concepts/ideas/themes. The plans often focus on conceptual objectives. I may organize a unit around a topic/concept with details left to emerge during instruction.

d. Identify a larger purpose for the lesson. Plans may depend on student suggestions of materials and experiences to make them more attractive and contribute toward student growth. Instruction may center around an individual interest in relation to the learning goals.

5. I especially like young persons who:

a. Care about feelings, are sensitive to the rights of others, and place a high value on relationships with significant adults, friends, and getting along with people.

b. Have a definite idea of what they would like to do, are task-oriented and appreciate specific and confident instruction from mature adults.

c. Are interested in academic pursuits, are excited by ideas and strive to clearly express their thoughts.

d. Are enthusiastic and concerned with larger issues, sometimes question the way things are done, and may have artistic interests or abilities.

6. I am at my best when teaching students who:

a. Like to work cooperatively with another student or in small groups, usually learn best in person-to-person interactions, and relate to me as a person.

b. Pay attention to neatness and organization; prefer to complete many smaller tasks with clear answers/products which tell them then-and-there how well they are doing; and learn best from step-by-step procedures.

c. Are interested in ideas and theories behind the facts, are often impatient with repetitive drill, and may use the teacher as an expert who provides helpful suggestions and critique.

d. Have variety of interests which often reach beyond the standard curriculum, and tend to work best when following contracted goals which are related to personal interests and commitments.
7. I get great satisfaction when during a lesson I:
   a. Enable students to participate sincerely in group discussions and share
      their personal thoughts and feelings.
   b. Spend my time communicating information to students and get them organized
      to succeed at tasks.
   c. Stimulate student's to better understand, and provoke them to think for
      themselves.
   d. Inspire students to explore and to consider possibilities, to stay with an
      issue until an insight is achieved, or even to attempt a new solution to a
      human predicament.

8. I manage my classes by:
   a. Building on my awareness of student's needs and feelings, and designing
      lessons and activities which take these into account.
   b. Establishing well-defined classroom rules and procedures, and covering
      content in an orderly, prescribed manner, by sticking to a good lesson
      plan.
   c. Working towards a consensus or even negotiating rules and work expectations,
      with procedures designed to encourage and reward maximum individual effort.
   d. Arranging structure to provide flexibility for selecting activities which
      challenge the student to become involved with classical human issues. The
      work environment at times may include projects which are offered for the
      stimulation of ideas and richness of experience.

9. In working with students to achieve appropriate behavior, I prefer to:
   a. Arrange a person-to-person conference, or bring up the issue with the whole
      class in order to help the student to behave in a socially acceptable
      manner.
   b. Establish clear standards and expectations for correct behavior, preferably
      in a written form, such as a policy. Punitive consequences for infractions
      of rules are consistent and predictable — "firm, but fair."
   c. Discuss rules with the class in order to understand them clearly. I prefer
      to see students use self-discipline and behave in the obviously sensible and
      prudent way.
   d. Assist students to think/feel through the consequences and the significance
      of their behavior in order to enable them to acquire an internal sense of
      discipline and morality.

10. In summary, my educational goals generally center around:
    a. Providing Support for the development of a positive self-concept, the acqui-
       sition of survival skills, and skills which enable one to communicate and
       interact better with others.
    b. The Mastery of a specific content and skills by being able to read, doing
       basic arithmetic, finding and collecting information, presenting data, and
       organizing facts.
    c. The Understanding of ideas, gaining mastery of concepts, expressing ideas
       powerfully and accurately.
    d. The Development of a student's personal potential and competencies, creative
       abilities, and clarity of personal beliefs in relation to self and the human
       community.
### LTPQ Tally Sheet

#### Statements

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#### My Profile

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**Current Teaching Assignment:**

- Elementary (circle grade(s))
- Intermediate (circle 1 or more)
- High School (circle 1 or more)

**Name:**

**Number of Years Teaching:**

- K
- 1
- 2
- 3
- 4
- 5
- 6

**Subject Areas:**

- Social Studies
- Math
- Science
- P.E.
- Art
- Special Ed.
- Other

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Appendix B
LEARNING STYLE PREFERENCE QUESTIONNAIRE (LSPQ)*

Directions: The following twenty statements have to do with the ways we work and learn, particularly in school. Each statement has four choices. Please select the two that best describe your feelings or preferences. There are no right or wrong choices.

EXAMPLE. My favorite ice cream is: a. lovable licorice 
        b. factual fudge 
        c. conceptual cocoa 
        d. chocolate divinity

For each statement, give your first choice 10 points, and your second choice 5 points. Place your points on the tally sheet as follows:

\[
\begin{array}{cccc}
\text{a} & \text{b} & \text{c} & \text{d} \\
10 & 5 & & \\
\end{array}
\]

1. I prefer teachers who: 
   a. are kind and caring.
   b. teach me how to do things.
   c. challenge me to think.
   d. encourage me to be creative.

2. I like questions that ask me to:
   a. give my feelings about a topic.
   b. select the right answer.
   c. explain things.
   d. express myself.

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In social studies, for extra credit, I might choose to:

a. be in a study group where we talk about what's on our minds.
b. do extra work-sheets on the topic.
c. read and report additional information.
d. do a project showing what I've learned.

4. I like teachers who are:

a. friendly with their students.
b. firm but fair with their students.
c. know their subject matter.
d. challenge students to think for themselves.

5. I prefer games in which:

a. everyone participates and has fun.
b. there is a lot of action.
c. winning is based on strategy.
d. winning is not as important as the game itself.

6. As far as teachers are concerned, I especially like those who:

a. take time to listen.
b. are well organized.
c. recognize my ability.
d. have wide-ranging interests.

7. I do my best work when:

a. my teacher is friendly.
b. I know what's required.
c. I am learning important ideas.
d. I am feeling good about life.

8. To me, a good teacher is one who:

a. cares about me as a person.
b. explains one thing at a time.
c. knows the subject "inside out," and cares about ideas.
d. encourages me to develop new interests.
9. I like an assignment when it:
   a. has a human interest.
   b. describes in detail what I have to do.
   c. involves understanding new concepts.
   d. requires me to choose how to go about it.

10. I try to be a person who:
    a. cares about my feelings and those of others.
    b. gets things done and is dependable.
    c. thinks clearly and knows a lot.
    d. is imaginative and expressive.

11. I like it when teachers:
    a. show an interest in me.
    b. realize that I am here to learn, and work hard at teaching.
    c. encourage me to think for myself.
    d. seem to be still involved in learning.

12. I prefer assignments which:
    a. are about people.
    b. are about how things work.
    c. make me work with ideas.
    d. make me use my imagination.

13. Working on a project is more enjoyable when I can:
    a. have someone to do it with me.
    b. follow the directions, one step at a time.
    c. use what I have already learned.
    d. find a new way of doing it.

14. When I am listening to someone, I usually try to:
    a. notice the person's feelings.
    b. figure out exactly what the person is saying.
    c. relate what is being said to what I know.
    d. understand the larger meaning.
15. I learn a great deal by:
   a. working with people.
   b. practicing skills.
   c. reading about things.
   d. exploring.

16. I am most likely to get a good grade in a course when:
   a. class participation and effort are counted with written work.
   b. tests are fair, and cover what was assigned.
   c. tests let me demonstrate my understanding.
   d. I concentrate on learning and do not worry about the grade.

17. In school, what's important to me is:
   a. being with my friends.
   b. learning useful information.
   c. learning how to think for myself.
   d. learning to become like a person I respect.

18. As an adult, I think it will be important for me to:
   a. have someone who loves me.
   b. get a good job.
   c. know what's happening in the world.
   d. contribute toward improving the world.

19. Sooner or later, I hope everyone will realize that deep down I am:
   a. warm and lovable.
   b. capable and practical.
   c. intelligent and knowledgeable.
   d. wise and sensitive.

20. As far as future plans are concerned, I most often wonder about:
   a. my happiness.
   b. succeeding in a job.
   c. doing something important in the world.
   d. what kind of person I will become.
# Score Tally Sheet

**NAME**

**DATE**

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*CAMPUS/Southfield H.S.*
Appendix C
Learning Style Preference Questionnaire

Scoring directions used with adults in this current study

DIRECTIONS: The following twenty statements have to do with the ways we work and learn, particularly in school. Each statement has four choices. Please select the two that best describe your feelings or preferences. There are no right or wrong answers.

EXAMPLE: My favorite ice cream is

| a. lovable licorice |
| b. factual fudge |
| c. conceptual cocoa |
| d. chocolate divinity |

Under each issue, choose the two answers which you most prefer.

In some cases, you will prefer the (2) choices relatively equally; then give 3 points to the first choice and 2 points to the second choice; i.e., assign a total of 5 points to the (2) choices.

When you have a stronger preference for the first choice, give it 4 points, and then 1 point to the second choice.

In summary, rate as follows:

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<th>ABOUT EQUAL</th>
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Appendix D
SELF ANALYSIS QUESTIONNAIRE

NAME ____________________________ SCHOOL ____________________________
DISTRICT __________________________

1. LEVEL OF FORMAL EDUCATION
   (circle one)
   less than bachelor's bachelor's
   master's beyond master's doctorate

2. MALE _____ FEMALE _____ (check one)

3. AGE ______________

4. PROFESSIONAL EXPERIENCE IN EDUCATION IF DIFFERENT FROM YOUR
   CURRENT ASSIGNMENT:
   ELEMENTARY (circle grade(s)) K 1 2 3 4 5 6
   INTERMEDIATE (circle one or more)
   Soc. Studies Math Science P.E.
   Sp. Ed. OTHER __________________
   HIGH SCHOOL (circle one or more)
   Soc. Studies Math Science P.E.
   Sp. Ed. OTHER __________________

5. OTHER WORK OR PROFESSIONAL EXPERIENCE WHICH YOU BELIEVE MAY HAVE INFLUENCED
   a. THE WAY YOU TEACH ________________________________
   b. THE WAY YOU LEARN ________________________________

6. DO YOU BELIEVE THAT YOU NOW TEACH AS YOU WERE TAUGHT WHEN YOU WERE
   A STUDENT? (circle one)
   always often sometime never

7. DO YOU BELIEVE THAT YOU NOW TEACH AS YOU WERE TAUGHT TO TEACH IN YOUR
   TEACHER EDUCATION COURSES - BEFORE CERTIFICATION? (circle one)
   always often sometime never

8. DO YOU BELIEVE THAT YOU NOW TEACH IN WAYS SIMILAR TO THE WAYS IN WHICH
   YOU PREFER TO LEARN? (circle one)
   always often sometime never

9. HAS THE PREDOMINANT WAY IN WHICH YOU TEACH CHANGED SINCE YOU BEGAN
   TEACHING? YES _____ NO _____ (check one)
   If you, please explain what you believe precipitated the change.
   ________________________________________________________
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