Assessment of teacher perceptions of teaching styles in grades K-8 : an instrumentation development
by Shirley Ann Handsaker

A thesis submitted in partial fulfillment of the requirements for the degree of Doctor of Education
Montana State University

Abstract:
Educators have recognized that students learn in uniquely individual ways. Research theory advocates the adaptation of instructional techniques to meet the requirements of individual learners, but there is lack of agreement with respect to how and to what extent this should be done. The reality of individual differences demands that teaching methods be diverse, since instructional approaches that are effective for some students may impede learning for others. Therefore, it is important to investigate teaching practice and its underlying theories. The goal of this study was to determine the degree to which a valid and reliable instrument could be developed to assess teacher perceptions of responsibilities, abilities, and effectiveness in teaching to the individual needs and learning styles of students, and to further measure the degree to which observations of classroom practices were predictive of demographic group membership. Equally important in this study was the development and pursual of a process for instrumentation development.

Questions from the literature were selected to measure instructional planning, teaching characteristics, teaching methods, student groupings and classroom environment. A panel of experts determined face validity of questions, and the questionnaire was piloted with one hundred nineteen kindergarten through grade eight teachers.

Test/retest correlation coefficients were generated, and the revised questionnaire was field-tested with eighty-two classroom teachers. Consenting respondents within a forty-mile radius were observed. Responses were grouped in accordance with factored scores, and were submitted to a discriminant analysis assessment, utilizing questionnaire and observed responses as predictors of demographic group membership.

The procedure established for instrument development was carefully followed. This procedure may have value for other researchers. The instrument developed in this study was shown to have content (face) validity and internal construct validity, but was determined to be of low reliability. Thus, no conclusive generalizations could be made based upon the instrument itself. A major recommendation was that the development of a long-term interview format might prove to be a productive method to assess teaching styles. Caution was given against utilizing untested instruments to gather data.

ASSESSMENT OF TEACHER PERCEPTIONS OF TEACHING STYLE IN GRADES K - 8: AN INSTRUMENTATION DEVELOPMENT

by

Shirley Ann Handsaker

A thesis submitted in partial fulfillment
of the requirements for the degree

of

Doctor of Education

MONTANA STATE UNIVERSITY
Bozeman, Montana

December, 1986

APPROVAL

of a thesis submitted by

Shirley Ann Handsaker

This thesis has been read by each member of the thesis committee and has been found to be satisfactory regarding content, English usage, format, citations, bibliographic style, and consistency, and is ready for submission to the College of Graduate Studies.

December 11, 1986
Date

Sherry Walton
Chairperson, Graduate Committee

Approved for the Major Department

December 11, 1986
Date

Duane Mellenbruch
Head, Major Department

Approved for the College of Graduate Studies

December 16, 1986
Date

Harry L Carson
Graduate Dean

STATEMENT OF PERMISSION TO USE

In presenting this thesis in partial fulfillment of the requirements for a doctoral degree at Montana State University, I agree that the Library shall make it available to borrowers under rules of the Library. I further agree that copying of this thesis is allowable only for scholarly purposes, consistent with "fair use" as prescribed in the U.S. Copyright Law. Requests for extensive copying or reproduction of this thesis should be referred to University Microfilms International, 300 North Zeeb Road, Ann Arbor, Michigan 48106, to whom I have granted "the exclusive right to reproduce and distribute copies of the dissertation in and from microfilm and the right to reproduce and distribute by abstract in any format."

Signature Shirley A. Handsaker

Date December 11, 1986

TABLE OF CONTENTS

TABLE OF CONTENTS (continued)

LIST OF TABLES

LIST OF TABLES (continued)

LIST OF TABLES (continued)

LIST OF TABLES (continued)

ABSTRACT

Educators have recognized that students learn in uniquely individual ways. Research theory advocates the adaptation of instructional techniques to meet the requirements of individual learners, but there is lack of agreement with respect to how and to what extent this should be done. The reality of individual differences demands that teaching methods be diverse, since instructional approaches that are effective for some students may impede learning for others. Therefore, it is important to investigate teaching practice and its underlying theories. The goal of this study was to determine the degree to which a valid and reliable instrument could be developed to assess teacher perceptions of responsibilities, abilities, and effectiveness in teaching to the individual needs and learning styles of students, and to further measure the degree to which observations of classroom practices were predictive of demographic group membership. Equally important in this study was the development and pursual of a process for instrumentation development.

Questions from the literature were selected to measure instructional planning, teaching characteristics, teaching methods, student groupings and classroom environment. A panel of experts determined face validity of questions, and the questionnaire was piloted with one hundred nineteen kindergarten through grade eight teachers. Test/retest correlation coefficients were generated, and the revised questionnaire was field-tested with eighty-two classroom teachers. Consenting respondents within a forty-mile radius were observed. Responses were grouped in accordance with factored scores, and were submitted to a discriminant analysis assessment, utilizing questionnaire and observed responses as predictors of demographic group membership.

The procedure established for instrument development was carefully followed. This procedure may have value for other researchers. The instrument developed in this study was shown to have content (face) validity and internal construct validity, but was determined to be of low reliability. Thus, no conclusive generalizations could be made based upon the instrument itself. A major recommendation was that the development of a long-term interview format might prove to be a productive method to assess teaching styles. Caution was given against utilizing untested instruments to gather data.

CHAPTER ONE

INTRODUCTION

It has long been recognized by educators that students learn in uniquely individual ways. Children bring certain attitudinal and content predilections to each learning situation which, when combined with individual perceptions and processing skills, constitute each child's particular learning style. Extensive data verified the existence of individual differences among children. According to Dunn, Dunn and Price (1979), these differences are so extreme that teaching methods, materials or grouping procedures that are successful for some students can prevent or impede learning for others. Since learners differ, the search for generally superior methods of teaching should be supplemented by a search for ways to fit the instruction to each kind of learner. The instructional method that is best "on the average" is not best for all persons (Cronbach and Snow, 1977:1).

Learning is a process of infinite complexity, observed and studied for centuries from a great many perspectives. Research theory, generated by psychologists and educational researchers, supports the concept of adaptation of instructional techniques to meet the requirements of individual learners. However, there is

lack of agreement with respect to how and to what extent this should be done.

Forty years ago, psychologist Nathaniel Cantor (1946:101 and 185) pointed out that a gap existed between theory and practice:

> The public elementary and high schools and colleges generally project what they consider to be the proper way of learning, which is uniform for all students . . . that there are individual differences in learning has been recognized in theory as often as it has been denied in practice.

In past and present practice, adaptation of instruction to meet individual needs has frequently been interpreted to mean little more than varying the pace at which students work through the prescribed curriculum.

Rennels (1976:10) has alleged:

> educational institutions founded on Euclidean linear throught processes, have systematically eliminated experiences that would assist young children's development of visualization, imagination and/or sensory-perceptual abilities.

The Dunns (1979) stated that 90 percent of all school instruction occurs through the lecture and/or the question and answer methods, while only two or three students in each group of ten will learn best by listening. Hughes (1959), Travers (1961), Flanders (1960), Parakh (1965) and others reported consistently that teachers talk between 65 and 75 percent of all class time, on the average, and that pupil talk is characterized primarily as response to teacher initiated communication.

Roger Sperry's (1964) investigations with human cerebral hemispheres suggested that educational institutions, rather than continuing to place emphasis only upon those functions identified to

reside in the left cerebral hemisphere (verbal communication such as reading, writing, and listening), should become concerned with developing equal qualities of left and right cerebral functioning in children by also emphasizing visual, spatial and sensory activities. Herman Epstein (1978) reinforced Sperry's thoughts by stating that schools cannot continue to ignore the holistic needs of students. These needs transcend programs with over-balanced cognitive predominance.

Albert Einstein (Sagan, 1979:21) wrote:

> I remember my student days; I the disorderly student and a daydreamer. It is a little short of a miracle that modern methods of instruction have not already completely strangled the curiosity of my inquiry, because what this delicate little plant needs most, apart from initial stimulation, is freedom. Without that it is surely destroyed.

Could it be that many potential Einsteins have been permanently discouraged through competitive examinations and the presentation of curricula through predominately left brain channels?

Since 1925, when Carleton Washburne pointed out that schools needed to adapt to the differing individuals who attend them, educators have searched for relationships between techniques of teaching and pupil growth. The word "individual" is generally interpreted to mean one-to-one instruction, or one child working alone. Anthony Gregorc (1977:20) stated:

> The secret to understanding this vital word as it applied to both learning and teaching lies in the two parts of which it is comprised: <u>indivi</u> (non-divisible) and <u>dual</u> (duality).

Gregorc referred to the dualities in people, the dualities that influence learning and teaching, and the duality in the use of

abstract and concrete reference points for thinking. Other dualities and their effect on the total learning process must also be considered in order that education might address the abilities, needs and concerns of the individual.

The reality of individual differences demands an approach founded on the fact of diversity. Learning is a multidimensional phenomenon. Authorities such as Chall (1967), Durkin (1969), Heilman (1969), and Karlin (1971) concluded that the classroom teacher is the single most important variable influencing how well a child learns. Medley (1977), after reviewing 289 studies which examined the relationship between teacher behavior and pupil learning, concluded that teachers may need to use different strategies depending on the context or situation. Flanders (1965) stated that students will learn more if they are allowed to work with flexible teachers, capable of utilizing diverse strategies.

It is important for educators to understand the relationship between the various processing skills and how they function with each other to enable a student to learn a given task (Mann, 1979). McCarthy (1981) posited that students need to make choices, manipulate, explore and experience in order for learning to take place. She stated (1981:108):

> These activities are often found in primary schools, but exploration, manipulation, experimentation in the higher grades is frequently limited to reading another book or writing another essay, activities that appeal to only 25 percent of our students.

McCarthy suggested that teaching be equally divided into four parts: reflective reason based upon experience; observation; experimentation;

and active application. This style of teaching is based upon Kolb's Model (Kolb, Rubin and McIntyre, 1974), a four stage model in which Kolb saw successful learning as a constant tension between activity and observation, and involvement and reflection. He perceived learning as requiring opposite abilities, and the learner must choose which set of learning abilities s/he will use in any specific situation. McCarthy (1981) suggested that 25 percent of teaching time be directed to each of the following: reflective reason, observation, experimentation, and active application. This would enable each learner to be instructed in the most comfortable, productive method for at least one-quarter of the time.

Several studies (Flanders, 1960; Hughes, 1963; Travers, 1961) indicated that many professional teachers possess a narrow range of teaching styles. A teacher who cannot readily vary his or her method or style is seriously limited. S/he needs to be able to select from a repertoire of tactics which will lead to different objectives and induce different students to learn (Hunt, 1965). Anthony Gregorc (1979) maintained that developing an awareness of teaching and learning styles shows teachers the need for switching styles in the classroom setting so that all learners can experience comfortable style matches as well as less comfortable mismatches. Style-flexing and stretching can help create the abilities for success under a wide variety of conditions (Gregorc, 1982). Ned Flanders (1965) stated that flexible teachers who shift from indirect to more direct approaches to students with the passage of time

enable students to learn more. The effectiveness of education depends upon the flexibility of the teacher.

Recently, public concern has focused on the right of the individual to expect results from education and on a demand for accountability from educational personnel. Benjamin Bloom (1976) reported that teachers in general expect one-third of all students to adequately learn; one-third to learn a good deal, but not to master all concepts presented; and one-third to fail or master only minimal amounts of content. However, he suggested that perhaps as many as 90 percent of all students can master instructional content, and that it is the task of educators to find the means of quality instruction which will enable students to do so. Devising and implementing specific educational techniques for quality instruction that are compatible with student learning styles and measuring the expected and actual achievement of students provide a system of educational accountability.

Abraham Shumsky (1968) posited that perhaps the most significant contribution of American education to the world is the commitment to the ideal of helping every child develop his or her individual characteristics and potential to the highest possible level: the uniqueness of the individual is guarded, conformity rejected, and the development of plurality of expression encouraged. Our concern over preserving the uniqueness of the individual is the basis for a variety of forms of educational practices, ranging from local control of the school to individualization of instruction within the classroom. This value underlies the teacher's continuous effort to tap

the level of ability of individual children, and to use a large variety of teaching techniques in order to reach the maximum number of individuals in the classroom. Children vary qualitatively in the way they approach learning, in their learning styles. By being aware of detailed patterns of individual learners, teachers can build on individual differences.

Considerable evidence indicates that American education has not met the needs of its consumers (Dunwell and Wendel, 1976). The educational community seems to have failed to intelligently consider the wide range of information on the nature of the learner, of knowledge and of instruction. The utilization of data gleaned from the behavioral sciences has not become a part of the educational process. Bruce Joyce (1981:2) stated:

> Because ideas that are not brought to fruition are less threatening than are those that are acted upon, we find a much greater diversity of ideas than we do of practice.

Educational practices are not necessarily reflective of educational theory.

The time has come for instructional practices to be reevaluated in terms of current knowledge. Teaching methods must be based on a learning model designed to reflect scientific knowledge of learning (Wallen and Travers, 1963). Recognized teaching methods used in the past have, to a great extent, been dictated by tradition and intuition. However, analytical research of the past decades provides various models and theories for instruction. An accumulation of research data offers a systematic design of behavior for teachers that would

maximize the achievement of pupils with respect to specific objectives.

Wallen and Travers (1963) stated that systematic teaching methods should be founded upon the educational objectives that the method is intended to achieve, and that the methods should be built in terms of a theory of behavior which reflect the conditions under which particular learning could be most effectively produced. Hunt (1981) recommended that studies of student learning styles begin with a more thorough understanding of teaching practice and the implicit theories that underlie it. Teachers' implicit ideas about student learning styles and their intuitive matching models are a rich source of information.

Advanced knowledge of the psychology of learning as related to student learning styles now exists. This body of knowledge has the potential for providing the solid foundation needed for the rational construction of teaching methods. It is necessary for educators to accept the challenge of individual differences and to address the need to help the teacher and the learner understand how and why human beings learn (Gregorc, 1979). Theoretical and practical knowledge regarding the diagnosis and application of teaching and learning styles is now available.

Need for the Study

Educators are criticized for failing to base instruction on the individual differences that exist among learners (Silberman, 1970; Glasser, 1969; Dunn and Dunn, 1979; Rennels, 1976; Sperry, 1964).

However, the concept of learning style promotes acceptance of individual differences as the norm rather than the exception, and the concept of teaching style implies necessity of flexibility in selection of tactics for different purposes and students. The public demand for accountability in education has led to increased research on teacher effectiveness and to the establishment of programs to improve teaching at all levels. The need to examine one's teaching style and behavior must be experienced before growth can take place (Ishler and Ishler, 1980).

People develop as total beings. Therefore, educators need to function by dealing interdependently with affective and cognitive aspects of learning (Barnes, 1980). Society is changing so rapidly that a great asset for future adults will be flexibility. Knowledge of teaching and learning styles will help both teachers and students to be consistently better at learning and adapting to future changes. Teaching style is more than a methodology: it places subjective demands upon the learner who may or may not have abilities to match such demands. According to Gregorc (1979), as we understand more about learning and teaching styles and how the mind operates, we will improve mental health and self-understanding as well as increase learning.

Dunn and Dunn (1977) recommended that teaching styles present in the classroom be identified in order to form groupings of complimentary student and teacher styles. Ronald Schmeck (1982:79) stated, "I believe we need more research that would provide an opportunity to observe interactions between instructional treatments and learning

style." Hunt (1981) recommended that studies of student learning styles begin with an investigation of teaching practice and its underlying theories. There is also a need to coordinate the current knowledge of learning and teaching style concepts. Available knowledge is diverse and not readily accessible to the practitioner.

Cornett (1983:8) stated:

> It is an exciting time to be an educator. Never before have we known so much about the central organ of learning--the brain in all its complexity. In the last decade we have witnessed an explosion of new information about the brain resulting in fascinating theories, some supporting and others refuting what we have long thought or intuited about how we learn.

The more teachers know about their own teaching and learning styles, the easier it will be for them to see specific ways their styles can be amplified or modified. Once teachers gain an appreciation of the variety of learning styles, they can respect learning style differences and adapt their teaching styles for different situations. They may also be alert to situations in which students' learning styles limit their success in academic areas (Cornett, 1983).

The practitioner (the teacher) is the key to educational excellence. Identifying teacher perceptions is one expedient way of providing the data necessary for educational evaluation. Arthur Combs (1982:3) stated:

> Everyone behaves in terms of his or her perceptions or beliefs, and teachers are no exception. . . Teacher beliefs are crucial. They determine how teachers behave and how successful they are likely to be in carrying out their professional tasks.

There is a need to determine teachers' perceptions of their particular roles in teaching to the individual needs and learning styles of students.

According to Horak (1980), measurement and categorization of beliefs and attitudes about educational practices have been successful in identifying beliefs and in predicting future teacher behaviors. However, research studies of teachers' patterns of belief related to attitudinal statements on teaching have shown that unidimensional continuums such as direct-indirect, integrative-dominative, or concrete-abstract do not accurately reflect the complex nature and interactions of teachers' belief systems. Under these continuums teachers appear to hold many conflicting beliefs.

> Classification schemes will not ever completely describe teachers. Yet they need to be developed to effectively support research on the interactions between teachers and students, and to better understand the precursors of teacher behavior [Horak, 1980:12].

It may be necessary for future research on teacher beliefs and behaviors to consider teacher actions in a more global sense (Horak, 1980).

Perceptions correlate with attitudes, and there is good evidence that attitudes are predictive of present behavior (Oppenheim, 1966). Procedures of indirectly assessing attitudes and actual behaviors are widely employed in science and the applications of science (Ryans, 1960). However, this researcher, after extensive review, was unable to find any instrument of adequate validity and reliability that was designed to measure teacher attitudes toward accommodation of student learning styles. Data regarding available

instruments (Dunn and Dunn, 1977; Canfield, 1975; Heikkinen, 1978; and Silver and Hanson, 1980) show either low validity and reliability figures, or no figures at all.

The focus of this study was to develop a valid, reliable instrument which could be used to ascertain teacher perceptions of actual and preferred roles in teaching to the individual learning styles of students. The need for a conveniently managed and easily interpreted instrument is vital to the accumulation of data necessary to guide practitioners in the application of learning theory. This instrument would be an essential contribution to the body of knowledge which bridges the span between the theory and practice of learning and teaching styles.

Statement of the Problem

The purpose of this study was to design an instrument which could be used to determine a teacher's perceptions of his or her responsibilities, abilities and effectiveness in teaching to the individual needs and learning styles of students. Regular public education kindergarten through grade eight classroom teachers were the focus of the study.

General Questions to be Answered

The central question asked in this study was: To what exent if any, can a valid and reliable instrument be developed to ascertain teacher perceptions of responsibilities, abilities and effectiveness in teaching to the individual needs and learning styles of students,

considering the pragmatic limitations of this educational research community? Also, to what extent is it possible to predict demographic group membership of teachers responding to the questionnaire by actual observation of classroom practice?

General Procedures

The procedures followed in this study were:

1. Documentary research. A thorough review of the literature as it pertains to teaching styles and student learning styles was conducted. The emphasis of this review was on understanding the underlying factors involved in teaching to the individual learning styles of students at the kindergarten through grade eight levels.

2. Definition. A working definition of learning style and teaching style for the purpose of this study was established.

3. Instrumentation. The literature pertaining to instrumentation development was reviewed, and procedural steps were outlined.

4. Question development

   a. Validity. Content (face) validity was determined by using a panel of experts and internal construct validity determined by a factor analysis of data on questions considered. A pilot study also determined ease of use.

   b. Reliability. Test/retest reliability and internal consistency were assessed to determine specific items for consideration of the questionnaire.

5. Panel review. A revised questionnaire developed from the above procedures was submitted to a panel of experts to reestablish content validity.

6. Field-testing. The questionnaire was initially field tested with one hundred nineteen Montana teachers, and was then utilized with eighty-two regular education kindergarten through grade eight classroom teachers in public elementary schools in Gallatin and Lewis and Clark Counties in Montana.

7. Observational data. All consenting respondents within a forty-mile radius of Bozeman were directly observed in order to assess the predictability of demographic groups responding to the questionnaire.

These procedures enabled the researcher to develop and field-test an instrument which was intended to be used to determine the regular education public kindergarten through grade eight classroom teachers' perceptions of their responsibilities, abilities and effectiveness in teaching to the individual needs and learning styles of students. This inventory was field-tested during the 1984-87 school years.

Limitations and Delimitations

The review of literature conducted for this study was confined to an ERIC search, the library at Montana State University, Inter-Library Loan services, and the investigator's personal library. The study was limited to the development of an instrument which was intended to be used to determine a teacher's perceptions of his or her responsibilities, abilities and effectiveness in teaching to the individual needs and learning styles of students. Regular public education kindergarten through grade eight classroom teachers from Montana participated in the field-testing of this instrument during

the 1984-87 school years. Direct observations were limited to one hour visitations of all consenting respondents within a forty-mile radius of Bozeman. It is recognized that longer observations of the entire population of teachers may have increased validity. However, it was pragmatically necessary to impose these limitations on the study. Although the instrument itself was designed to measure perceptions, perceptions are highly correlated with attitudes, and there is good evidence to draw the conclusion that attitudes are predictive of present behavior (Oppenheim, 1966). Procedures of indirectly assessing attitudes and actual behaviors are widely employed in science and the applications of science (Ryans, 1960).

Definitions of Terms

For the purposes of this study, certain key terms were considered in the following context:

1. Adaptive Education: Education in which the environment accommodates to the existing modes and processes of learners, and also influences these processes through instruction (Glasser, 1977).

2. Affective Behaviors: Motivational processes of the student that include liking and disliking (Keefe, 1979a).

3. Attitude: A state of readiness; a tendency to act or react in a certain manner when confronted with certain stimuli (Oppenheim, 1966).

4. Cognition: Cognitive processes; all the processes by which sensory input is transformed, reduced, elaborated, stored, recovered, and used (Scott, Osgood and Peterson, 1979).

5. Cognitive Style: A cognitive characteristic mode of functioning that individuals reveal throughout their perceptual and intellectual activities in a highly consistent way (Witkin, 1979).

6. Direct Teaching: Teacher verbal behavior classified as lecturing, giving directions or criticizing or justifying authority (Amidon and Flanders, 1961).

7. Indirect Teaching: Teacher verbal behavior classified as accepting and clarifying feelings, praising and encouraging, accepting or using student ideas, and asking questions (Amidon and Flanders, 1961).

8. Individuality: Distinctive and particular individual qualities (Wiles and Bondi, 1979).

9. Instruction: The provision of the environmental conditions which allow the learner to proceed from a present entering behavioral repertoire to the educational goals described as the desired outcome (Skinner, 1957).

10. Learning Style: Characteristic cognitive, affective and physiological behaviors that serve as relatively stable indicators of how learners perceive, interact with, and respond to the learning environment (Keefe, 1979a).

11. Multi-Grade Level Classroom: A classroom consisting of two or more grade levels.

12. Perception: Intuitive judgment; one's own frame of reference (Wiles and Bondi, 1979).

13. Physiological Behaviors: Biologically based response modes (Keefe, 1979a).

14. Provisioning: A teacher's act of providing a variety of techniques and materials to accommodate the different learning styles of students (Simon and Bryan, 1977).

15. Regular Education: Education designed for normal, non-exceptional students; does not include special education.

16. Style-Flex: The ability to shift to a style of teaching different from one's own primary style (Simon and Bryan, 1977).

17. Teaching: A system of actions intended to induce learning (Smith, 1960).

18. Teacher Ability: The quality or state of being able to teach; teaching skill.

19. Teacher Effectiveness: The teacher's effect on the realization of some value, usually some educational objective, defined in terms of desired pupil behaviors (Gage, 1963).

20. Teacher Responsibility: The charge, duty or obligation of the teacher.

21. Teaching Method: Patterns of teacher behavior that are recurrent, applicable to various subject matters, characteristics or more than one teacher, and relevant to learning (Gage, 1963).

22. Teaching Style: The teacher's personal behaviors and media technologies chosen to deliver and receive information (Gregorc, 1979).

The review of literature presented in Chapter Two will represent a means of becoming familiar with the data which was pertinent to

the investigator's study. The emphasis of this review was on (1) understanding the underlying factors involved in teaching to the individual needs and learning styles of kindergarten through grade eight students, and (2) pursuing approved methods of instrumentation development.

CHAPTER TWO

REVIEW OF LITERATURE

Educators have long been aware that students differ in how they learn. Some students learn better by listening, others by working independently, and so forth. Learning style describes a student in terms of those educational conditions under which s/he is most likely to learn, and suggests that certain educational approaches are more effective and efficient than others for the student (Hunt, 1979). Keefe (1979b:124) stated:

> An understanding of the way students learn is the door to educational improvement. And learning style diagnosis is the key to an understanding of student learning.

The concept of student learning styles revives the hope for authentic individualized education: it starts with the learner and then proceeds to a consideration of teaching and the learning environment.

In this section a critical review of relevant psychological and educational research regarding student learning styles and implications for classroom teachers is presented. Focus is placed on modern learning style theory, its historical context and background, in order to develop an understanding of the range of teaching styles needed to accommodate student learning styles. Theories of learning expounded by two major schools of psychology, behaviorism and cognitivism, are stated.

Historical Development of Student Learning Style Theory

One characteristic of education is exceptional: perhaps more than any other cultural process it carries almost all of its past with it into the present, even if this past rests in rather covert assumptions, practices, attitudes and beliefs (Burton, 1962). The history of learning theory is replete with movements that briefly influenced the course of the profession, and then passed on, leaving a legacy upon which researchers, philosophers and practitioners could build. According to Anderson and Bruce (1979), it is becoming apparent that the idea of learning styles may join the select group of concepts that have had a major and lasting impact on education.

Interest in learning, thinking and perceiving has a long history. At least since the time of the ancient Greeks, philosophers have speculated about these topics, and attempts to explain them make up a considerable part of the history of philosophy (Hill, 1963). It was not until the nineteenth century that attempts were made to study these topics experimentally.

The first psychological laboratory was founded by Wilhelm Wundt in Germany in 1879 (F. Allport, 1955). Wundt and his colleagues were largely interested in conscious experiences. They wanted to understand human sensations, thoughts and feelings (Hill, 1963).

This kind of introspective, mentalistic psychology, developed in Germany, became to a large extent the standard for the rest of Europe and for America. In the United States, however, there was a

considerable trend toward the study of objective behavior as well as conscious experience. Early in the twentieth century the features of American psychology came more and more into conflict with the German tradition.

In 1913 John B. Watson (1879-1958) was the vocal spokesman, espousing a psychology oriented toward objective behavior and practical usefulness (Hill, 1963). Watson's theory related to five trends in psychology: associationism, the analytic approach to science, a physiological orientation, the habit concept, and objectivity (Kimble, 1961). The convergence of these influences gave rise in America to Behaviorism.

Behaviorism

Hill (1963) stated that behaviorism is an objective association psychology, with an emphasis upon habit, biological in viewpoint and analytic in approach. Watson was interested only in behavior, not in conscious experience. Watson's great contribution to the development of psychology is his rejection of the distinction between body and mind and his emphasis on the study of objective behavior (Hill, 1963).

All behavioristic theories of learning are also associationistic; they include those of Thorndike, Skinner, Pavloc, Guthrie and Hull (Bower and Hilgard, 1981). Behaviorists study what people do as a result of how they think and feel. To the behaviorist, the aim of education is to teach thinking and mastery of information. Learning

is believed to be incremental, involving formation of new connections. Watson and Guthrie differed from other behaviorist theorists in that they made no use of the concept of reinforcement.

For nearly half a century, one learning theory dominated all others in America. The theory of Edward L. Thorndike (1874-1949), the "father of American psychology," based learning on association between sense impressions and impulses to action (responses). Thorndike's system, connectionism, was the original stimulus-response psychology of learning (Bower and Hilgard, 1981). Thorndike became the first reinforcement theorist.

B. F. Skinner (born 1904), like Thorndike, proposed a connectionist theory; both took a keen interest in problems of education and emphasized reinforcement as a basic factor in learning. Skinner recognized two different kinds of learning, respondent and operant. Respondent behavior is defined as automatic response to a specific stimuli. Operant behavior works on the environment in response to no particular stimuli (Hill, 1963). Skinner was largely concerned with positive reinforcers, and recognized the existence of negative reinforcers.

Ivan Pavlov (1849-1936) investigated conditioned reflexes relative to reinforcement. He had a major impact upon learning theory, particularly his systematic investigations, his theories of association, and his biases about what phenomena are worthy of investigation. According to Bower and Hilgard (1981), Pavlov ranks with Freud and Wundt as a major influence upon American psychology.

The system proposed by Edwin R. Guthrie (1886-1959) is an objective stimulus-response association psychology, and used the conditioned response terms from Pavlov while being practical and relevant as espoused by Thorndike (Bower and Hilgard, 1981). Guthrie's law of learning stated that a combination of stimulus which is accompanied by a movement will on its recurrence tend to be followed by that movement (Guthrie, 1935).

Clark Hull (1884-1952) was a behaviorist whose systematic theory emphasized habit as an explanation for the responses of organisms (Bower and Hilgard, 1981:95). He theorized that a response is always the result of a stimulus. His postulates were concerned largely with the systematic presentation of various other factors and their relationships (Hill, 1963). Proponents of his theory, who nurtured, extended, and applied his ideas in later years, are typified by Kenneth Spence, Neal Miller, O. H. Mowrer, Judson Brown, Grice, Amsel, Wagner, and F. A. Logan (Bower and Hilgard, 1981). These individuals were dominating figures in American psychology since 1940, and significantly altered learning theory.

Gestalt or Cognitivism

Gestalt or Cognitive Theory involves the study of the mental processes involved with thinking, planning, decision making, perception, aesthetics, and personality. To the cognitivist, learning is understanding or insight and the ability to transfer new insights to other situations.

One year before Watson published his first challenge to American psychology, Max Wertheimer (1880-1943) published a challenge to the established psychology of Germany (Hill, 1963). Both the American and the German versions were largely concerned with the structure of the mind. They tried to analyze conscious thought into fundamental units, such as sensations, ideas and images. In America there was a trend to study behavior for its own sake, but psychology was still considered primarily the study of conscious experience. Wertheimer (Hill, 1963) objected to the concern in psychology with analysis, that breaking consciousness into its parts destroyed what was most meaningful about it. Consciousness was his main concern; he wanted to study consciousness as it appears in wholes. This movement was primarily concerned with perception, but came to include learning and other topics as well. Wertheimer (Hill, 1963) applied the German word "Gestalt" to this emphasis on whole systems in which the parts are dynamically interrelated in such a way that the whole cannot be inferred from the parts taken separately.

Wolfgang Kohler and Kurt Koffka contributed to gestalt theory. Koehler's book, The Mentality of Apes (1925) and Koffka's The Growth of the Mind (1924) brought the gestalt doctrine vividly to the attention of American psychologists, and influenced American learning theories (Bower and Hilgard, 1981).

Gestalt psychologists were primarily interested in perception and in problem-solving processes. Gestalt psychology had a stimulating effect on the study of learning and memory. Its ideas about

human learning came to be appreciated and exploited in the early 1970s by scientists such as Allen Newell and Herbert Simon (Bower and Hilgard, 1981). The study of insight is the most important contribution of gestalt theory to our understanding of learning (Hill, 1963). Early German Gestalt Psychologists were the intellectual forefathers of much of what is today called cognitive psychology.

Among the gestalt psychologists who worked in Germany with Wertheimer, Kohler and Koffka was Kurt Lewin (1890-1947). Lewin outlined a system of description within which learning, personality, and social behavior could all be discussed. He introduced the concept of life space, which is defined as the totality of facts which determine the behavior of a given individual at a given time (Hill, 1963). Lewin's work provides a system for describing and predicting behavior, but does not espouse a definite theory of learning (Hill, 1963).

Edward Tolman (1886-1959) published Purposive Behavior in Animals and Men in 1932. Tolman created what has been called a purposive behaviorism, because it involves the study of behavior as it is organized around purposes. He attempted to combine behaviorism's objectivity with an appreciation of the cognitive aspects of bahavior (Hill, 1963). Tolman emphasized the relation of behavior to goals. Tolman combined the best of behaviorism and cognitive theory, although he did not do experiments to make these cognitive formulations precise enough to be really useful for prediction (Hill, 1963). His emphasis upon physical objectivity was a symptom of the readiness of psychology to receive a method in which the mind was

reduced to a reflex of the brain (Kimble, 1961). Tolman influenced the psychology of learning in basic, methodological ways. He was responsible for the first clear statement of the learning-performance distinction; he was one of the first to contend that conditioning is a limited form of learning; and he brought the concept of intervening variables to American psychology (Kimble, 1961).

William K. Estes (born 1919) contributed to the development of statistical learning theory (Hill, 1963). He was interested in building a mathematical model of learning. Estes constructed an abstract formal model of learning, emphasizing stimulus factors and de-emphasizing reinforcement (Hill, 1963).

Jean Piaget (1896-1983) studied the development of intelligence and concepts in children (Piaget, 1952). Piaget espoused the concept of mental development depending upon the idea that the world is made up of objects having substance and permanence. This "object concept" made possible the development of ideas of space and causality, and enabled the fundamental distinction between self and external world (White, 1968). In Piaget's system, the child comes at birth with certain sensory-motor coordinations which he termed schemata. Variations in stimulus situations calls for adaptive accommodations or changes in these schemata, of which these changes are assimilated or stored as residues. Piaget found incongruities between central schemata and receptor inputs to be facilitative of growth. In Piaget's theory the child's gestalt-like conceptions of reality are schemata which develop through a continuous process of accommodations and assimilations and become fixed or static only when the child's

schemata come to correspond so well with reality that no further accommodations are required (J. McV. Hunt, 1968). Piaget held that the development stages have a fixed order, and that each person passes through these stages in this order.

According to Hill (1963), cognitive psychology is now a dominant viewpoint in American experimental psychology. Cognitive theories suggest that perceptions determine what is learned; that learning involves reorganization and transfer to new situations; and that since humans are innately curious, learning by insight has its own rewards. Problem solving, creative thinking, discovery learning, divergent thinking, decision making, aesthetics, perceiving and questioning strategies may be attributed to the cognitive theory of learning. Further, cognitive theory results in the awareness of learning strategies in human beings that can apply as circumstances, motives and materials require (Bower and Hilgard, 1981). Differences in learning abilities among people, depending on the particular strategies or specific skills and knowledge acquired, is also recognized. Rudolf Arnheim, Soloman Asch, Kurt Goldstein, and Wolfgang Metzger are among those identified as strongly influenced by the cognitive theory.

Recent Developments in Learning Theory

Contemporary psychology witnessed an increasing convergence of the historically distinct theories of learning. Behaviorism now incorporates some of the phenomena associated with cognitivism:

sensory imagery, sensory conditioning, hypothesis learning, observational learning, decision making and biases in processing of information for learning (Bower and Hilgard, 1981).

Cognitive psychology is concerned with how organisms gain knowledge about the world and how they use that knowledge to guide decisions and perform effective actions. Cognitive psychologists try to understand the mind and its abilities in perception, learning, thinking and language use. Most cognitive psychologists follow an information-processing approach and view the human brain as a kind of computer, having distinct levels of organization, treatable as a symbol-manipulating system (Bower and Hilgard, 1981).

Learning is a fascinating interactive process, the product of teacher and student activity within a given learning environment. The process of learning is, in turn, subject to wide variation in sequence, style and quality. Experienced educators know that the quality of instruction is greatly influenced by the particular mix of student characteristics, teacher approach, and classroom organization (Keefe, 1979b).

According to Glenn Hass, there are at this time four major families of learning theory (1980): S-R conditioning, Freudian theory, social learning theory, and the field theories.

Stimulus-Response conditioning includes all the reinforcement and conditioning theories of learning. Experience is important, and thinking is a part of an S-R sequence that begins and ends outside the learner. Learning is a conditioning process by which a person

acquires a new response; motivation is the urge to act, resulting from a stimulus; and behavior is directed by stimuli from the environment.

Freudian learning theories include awareness, which is freedom or self-understanding; identification; and imitation. The importance of self-knowledge is a basic premise of Freudian psychology. Freudian learning theories are utilized freely and compatibly by the exponents of the S-R associationist, the perceptual-field, and cognitive-field learning positionists.

Social learning is emphasized by sociologists, anthropologists and social psychologists. According to this theory, human beings have unlimited capacity to learn, but this capacity is confined by social expectations and by limitations in behavior patterns that the immediate social environment considers appropriate. The learning environment is primarily social, and learning occurs through socialization. The dyadic relationship between two people is the basic unit of learning. In describing how learning occurs, social learning theorists make use of rewarded responses, transfer, self-concept, personal meaning, meaningfulness of the whole, the importance of generalizations and organization, self-understanding, imitation and identification.

Field theory includes the Gestalt-field, perceptual-field and cognitive-field group of learning theories. In these theories, wholeness is primary, starting with the total aspects of a learning situation and proceeding to the particulars in light of the whole.

The nature of the whole determines the meaning of the components; individual perceptions determine meaning.

Gestalt-field theory emphasizes wholeness, and means that field theories reject elemental analysis in terms of stimuli and responses as the most significant factors in learning (Hass, 1980). The meaning of learning can only be derived from the whole, not from its parts.

Perceptual-field psychology is "a humanistic, phenomenological, personalistic, existential view of behavior which sees man engaged in a continuous process of being and becoming (Combs, 1980:157)." The primary principle of perceptual psychology is that all behavior is a function of the behaver's perceptual field at the instant of behaving (Combs, 1980). Arthur Combs and Donald Snygg published the first outline for perceptual or experiential psychology in 1949 (Combs, 1982). Abraham Maslow called this movement "Third Force" psychology. Combs (1982) stated that people's belief systems determine behavior, and guide individual selection of appropriate behaviors for particular situations.

Cognitive-field learning theory emphasizes personal meaning, generalizations, principles, advance organizers, discovery learning, coding and superordinate categories. The self-concept is central, and behavior and learning are functions of perception. Meanings existing for the individual as a result of one's unique perceptions most affect learning, and the whole is greater than the sum of its parts.

Cognitive theorists (Bruner, 1959; Gagne, 1978; Ausubel, 1963) not only agree that the learner's acquisition of clear, stable and organized bodies of knowledge is the major, long-term objective of education, but also insist that these bodies of knowledge, once acquired, constitute the most significant independent variables in influencing the meaningful learning and retention of new subject-matter material (Ausubel, 1965).

Control over meaningful learning can be exercised effectively by identifying and manipulating significant cognitive structure variables. This can be done substantively, being concerned with the structure of a discipline, and programmatically, by employing principles of ordering the sequence of subject matter and its internal logic and organization (Ausubel, 1965).

Proponents of the cognitive viewpoint, including Gagne, Ausubel and Bruner, use perception as their model. They regard differentiated conscious experience as providing the most significant data for a science of psychology (Ausubel, 1965). Instead of focusing mechanistically on stimulus-response connections, they endeavor to discover psychological principles of organization and functioning governing these differentiated states of consciousness and the underlying cognitive processes from which they arise.

According to David Ausubel (1965), meaning is not an implicit response but a clearly articulated and precisely differentiated conscious experience that emerges when potentially meaningful signs, symbols, concepts or propositions are related to and incorporated within a given individual's cognitive structure on a nonarbitrary and

substantive basis. The acquisition of new meanings is held to be coextensive with meaningful learning. Ausbel's advance organizer helps the learner categorize and interrelate specific topics, and is based on the belief that an array of information is best learned by understanding how it fits together, what parts depend upon or support others, and how it is organized. New material in this sequence should never be introduced until all previous steps are thoroughly mastered (Ausubel, 1965).

Gagne and Bruner differed from Ausubel in their conception of the role of cognitive structure in transfer (Ausubel, 1965). This difference stems in part from their conception of the nature of knowledge as consisting of the capability of performing different classes of problem-solving tasks. In fostering transfer, Gagne focused on the learner's possession of the problem-solving capability. Bruner concentrated more on the deductive aspects of transfer, and emphasized generic learning because it can facilitate derivative problem solving, or the solution of problems that exemplify a more general proposition (Ausubel, 1965). Ausubel, on the other hand, viewed knowledge as a substantive phenomenon rather than as a problem-solving capability, and regarded the transfer functions of cognitive structure as applying more significantly to reception learning than to problem solving in the typical classroom situation.

Robert Gagne is an associationist trained in the verbal learning tradition (Bower and Hilgard, 1981). Gagne proposed hierarchies of

skills and rules in academic tasks, which include sequencing the training of some skills before others. A number of distinct types of learning are identified by Gagne, in order of increasing complexity. Gagne has found the hierarchical principle a useful one for moving from learning principles to the sequencing of instruction. Gagne and White (1978) posited that the effects of instruction are derived from the three-term relationship between instruction, memory structure and learning outcome. The processing of various forms of instruction by the learner initially results in the acquisition of new memory structures. These memory structures enable the learner to retain and transfer in terms of new performances.

Jerome Bruner is a cognitive psychologist, with primary interests in the development of mental abilities (Bower and Hilbard, 1981). Bruner believed that a theory of instruction is prescriptive and proposed rules for achieving knowledge or skill and provided techniques for measuring or evaluating outcomes. It is also normative, in that it sets goals to be achieved and deals with conditions for meeting them. He specified that a theory of instruction must encompass four features: predisposition to learn, structure and knowledge, sequence, and reinforcement. Bruner took the position that, with sufficient understanding of the structure of a field of knowledge, something anticipating the later, more advanced concepts can be taught appropriately at much earlier ages. He (1960:33) stated:

> Any subject can be taught effectively in some intellectually honest form to any child at any state of development.

Bruner was interested in cognitive development, originally stimulated by Piaget. He emphasized three modes of representation in a developmental sequence: the enactive, or learning through action; the iconic, based on representation through perceptual means; and the symbolic, enabling the translation of experience into words (Bower and Hilgard, 1981).

J. P. Guilford's studies in the area of human intelligence have influenced modern day learning theory. Guilford proposed that cognition means discovery, rediscovery or recognition, and memory means retention of what is cognized (1965). Guilford classified intellectual factors according to the basic kind of process or operation performed, including factors of cognition, memory, convergent thinking, divergent thinking, and evaluating; according to the kind of material or content involved, including figural, symbolic or semantic material; and according to product, including units, classes, relations, systems, transformations and implications. His model, called "structure of intellect," represents the modes of variation of the factors. Structure of intellect has implications for testing intellectual abilities in an effort to understand the intellectual resources of individuals.

Lawrence Kohlberg has developed the cognitive developmental approach proposed by John Dewey and Piaget. He utilized this approach as a foundation from which to teach moral education (Kohlberg, 1980). The approach is called cognitive because of the active thinking involved in moral issues and decisions. It is called developmental because the aims of moral education are viewed as movement through

moral stages. The moral stages identified by Kohlberg are: preconventional level; conventional level; and postconventional, autonomous or principled level. These moral stages are considered to be structured wholes, or organized systems of thought, forming an invariant sequence forward, and are hierarchical integrations. The stages are defined as responses to a set of verbal moral dilemmas classified according to an elaborate scoring scheme. Since moral reasoning clearly is reasoning, a person's logical stage puts a certain ceiling on the moral stage he can attain (Kohlberg, 1980). Kohlberg's approach makes possible democratic experience in moral and intellectual development.

The high visibility and readability of cognitive theorists like Bruner and Gagne, and the increased believability of the information-processing model accompanying the rise of computer technology, has added credence and importance to cognitive psychology. The intuitive psychology of scholars in other disciplines who have been involved in curriculum reform, especially mathematics and the sciences, is invariably cognitive. It is time to reexamine educational structures in light of what is appropriate for our time.

New Directions for Instruction

During recent years the importance of principles of learning in the design of instruction for the schools has been increasingly recognized. Continually deepened knowledge of human behavior and of the factors governing it have led to the need for the design of novel procedures for instruction. According to Gagne (1980), investigators

of learning have shifted from a connectionist view of learning, which held that learning is a matter of establishing connections between stimuli and responses, to an information-processing view, recognizing that stimuli are processed in a variety of ways by the central nervous system.

Gagne (1980) stated that the most desirable condition for new learning is the prior learning of prerequisite capabilities; this is dependent upon instruction, memory structure and learning outcome. He believed that diagnostic tests should be designed and used to measure prerequisite skills of learners; prerequisites not mastered must be taught; and additional practice should be in the form of periodic and spaced review. As new memory structures are acquired, the learner is enabled to retain and transfer in terms of new performances (Gagne and White, 1978). Gagne (1980) defined instruction as a matter of stimulating the use of capabilities the learner already has at his/her disposal, and making sure s/he has the requisite capabilities for the present learning task as well as for other tasks to come.

Robert Glasser (1977) stated that recent works in learning theory, developmental psychology, and psychometrics strongly suggest new directions for educational research and practice. He recommended that the deadening effects of uniformity need to be recognized, and that educational environments must be adapted to individual differences. Carleton Washburne made a similar statement in 1925:

> Throughout the educational world, there has . . . awakened the desire to find some way of adapting schools to the differing individuals who attend them.

Glasser (1977) recommended an adaptive mode of education, in which a wide range and variety of instructional methods and opportunities for success are provided. In an adaptive educational setting, alternative means of learning are adapted to and in some way matched to knowledge about each individual; an individual's styles and abilities are assessed and are related to subsequent learning experiences; and student learning experiences are matched with abilities and interests. Measures of individual differences are valid to the extent that they help to define alternate paths that result in optimizing immediate learning, as well as long term success. Glasser (1977:312) stated:

> In principle, and in contrast to traditional practice, there seems to be no reason why educational environments cannot be designed to accommodate more readily to variations in the backgrounds, cognitive processes, interests, styles, and other requirements of learners.

Current research indicates that a fruitful approach to education is the consideration of individual differences in terms of the process constructs of contemporary theories of learning, development and human performance.

Cognitive Processes Involved in Learning

An awareness of learning theory is important in order to understand the range of teaching styles needed to accommodate student learning styles that can be found in classrooms. There is ample evidence to demonstrate that cognitive processes involved in learning can be identified and influenced, and the analysis of individual differences in performance can be carried out in terms of such processes (Melton, 1967). Studies designed to experimentally

identify and influence cognitive processes have been conducted by innumerable researchers. William Rohwer (1970) studied the developmental and individual difference aspects of mental elaboration, in reference to the fact that individuals recode or transform materials presented to them by elaborating the content. Rohwer's work suggested that individual differences, related to students' backgrounds, influence the way in which they carry out cognitive processes of this kind. Rohwer (1970) suggested that children should be trained in elaboration of content in order to facilitate learning in general.

In another study related to individualization of instruction, Jerome Rosner (1972) studied perceptual processes related to basic academic tasks in elementary school. Rosner's work indicated that competence in visual and auditory perceptual processes, concerned with organizing and extracting patterns of information in geometric patterns and in sound combinations; is differentially related to academic achievement in math and reading. He has also demonstrated that these processes can be taught to children.

Studies such as these support the potential for research of individual differences in terms of cognitive processes. Kagan and Kogan (1970) systematically studied the effects of cultural background on the dominance of visual, auditory or tactile sense modalities; the ability to hold changing images in memory, or "leveling and sharpening;" and the degree to which an individual pauses to evaluate the quality of cognitive products in the course of problem solving, referred to as differences in reflection and impulsivity. They concluded that some people consistently reflect before responding,

while others make impulsive responses; this creates dramatic differences in quality of problem solving among individuals, with impulsive respondents making more errors than reflective individuals. Kagan and Kogan (1970) claimed that these traits are stable over time and applicable to various situations.

Other studies designed to identify and modify cognitive style were conducted by Yando and Kagan (1968) and Meichenbaum and Goodman (1969). Yando and Kagan found that when first grade students are placed with experienced teachers who have a reflective style, the children become more reflective during the school year than children who are placed with impulsive teachers. This study implied that tailoring the tempo of the teacher to the child can influence the child's behavior. Meichenbaum and Goodman (1969) investigated the controlling function of covert speech as a self-guidance procedure. In this system, impulsive children are taught to talk to themsleves in order to modify their problem-solving styles.

Educational systems need to present adaptive educational environments that enhance the abilities of individuals for self-regulation in different possible situations for learning. Glasser (1977:320) stated that "intelligence is specific to the particular ways in which school subjects can be learned." The kinds of educational systems that are most effective will be extracted from the fullest understanding of human behavior and from sustained, carefully studied educational innovations with the flexibility for successive incremental improvement. If we value individual performance, we must design

effective conditions under which individuals are provided with the opportunities and rewards to perform at their best and in their own learning styles.

Learning Styles

Individualization, based upon recognition and support of each student's own way of learning, is not adequately provided for in many classrooms. Current research by cognitive psychologists and educators produced information for teachers relative to individualization in classrooms. Many definitions of learning style exist, and much of the research has not been integrated or related. Continuous, in-depth development of understanding of the learning process should be a priority for educators. Information should be easily accessible to teachers. According to Adaia Shumsky (1968), having insight into the qualitative difference of the academic capabilities of children enables the teacher to provide individual children with an opportunity to use and develop their strongest avenues for learning.

The exact beginning of interest in learning styles cannot be pinpointed. Coop and Sigel (1971) reported that German psychologists discussed cognitive style at the turn of the century. A variety of work on personal learner characteristics was explored throughout the 1930s and during the 1950s in America. Gordon Allport used the term in 1937 to define aspects of a student's personality. Allport viewed learning style as a variable to be considered in an understanding of the learning process. According to Robinson (1974), Gardner was the first to use the term cognitive style in his studies in 1959.

In the 1960s Herman Witkin (1962) studied perception and defined two polarities: field-dependence and field-independence. He has since studied and applied perceptual characteristics to learning.

Educators during the 1960s and 1970s began to specifically speak of learning style. Studies and applications of learning style appeared: cognitive style mapping in Junior College; diagnosis and application to gifted students; patterns in learning of the learning disabled; career counseling based on analysis of style; and diagnosing style in relation to vocational education.

Bruce Joyce and Marsha Weil (1972) were, at this time, exploring teaching style. They identified several distinctive teaching styles and related them to student learning.

The literature refers to cognitive style and learning style and indicates that style may be equally as predictive of success as motivation or conceptual skills. Cognitive style is most frequently used by psychologists to define the various ways people perceive, think, process and learn. Learning style is most frequently used by educators to describe the various ways by which people learn.

Kinds of Learning Styles

According to Dunn and Dunn (1979), a body of knowledge accumulated over an eighty year period repeatedly verifies that students acquire information and skills in many different ways. What is unique is that the research on the information processing habits of learners has produced instrumentation that is useful in identifying specific learning styles, and has resulted in a new look at classroom

activities in the context of students' learning characteristics. Cognitive style and learning style may be classified as follows: cognitive processes, learner behaviors, combination of cognitive processes and learner behaviors, sensory modality styles, and other examples.

Cognitive Processes

The cognitive processes are inferred through specific behaviors exhibited by individuals, and include cognition and conceptualization. Herman Witkin (1976) defined cognitive styles as characteristic modes of functioning revealed throughout our perceptual and intellectual activities in a consistent and pervasive way. Witkin and his associates (Witkin, Oltman, Raskin, and Karp, 1971) explored perceptual characteristics among people in the late 1940s. Witkin's experiments led to the definition of two polarized indicators of the extent to which the surrounding field influence an individual's perception of an object within it. They concluded that an individual with a field-dependent mode of perception is dominated by the prevailing field; a person with a field-independent mode of perception experiences objects as more or less separate from the surrounding field. Field-independent people can separate and analyze parts from a whole; field-dependent people can work with the whole. The terms analytic and global are sometimes used to describe field-independent and field-dependent people. Witkin (1971) stated that most people are not extremely field-independent or field-dependent, but tend to be relatively one or the other.

Witkin, Goodenough and Oltman (1979) posited that these dimensions of orientation include the perceptual and intellectual domains, as well as domains of personality. Witkin (1971) defined cognitive styles as processes concerned with form rather than content of cognitive activity. They referred to individual differences in how people perceive, think, solvè problems, learn, relate to others, and so forth. Witkin (1971) developed the Embedded Figures Test to assess field-independence and field-dependence. He claimed that his nonverbal assessment instrument is free of cultural bias (1977). Witkin implied that people can be taught to compensate for their cognitive style weaknesses.

A great deal of research has been done to affirm and clarify field-independence and field-dependence characteristics in people. Rameriz and Castenada (Cortes, 1978) studied Chicano populations and use the term field-independence and field-sensitivity. They found that most Chicanos studied are predominantly field-sensitive because of their cultural environment, and suggested that the educational system must better accommodate this learning style.

Learner Behaviors

Learner behaviors include operational definitions of learning style, and include teacher-student interaction. Rita and Kenneth Dunn (1979) defined specific elements of the learning situation as the learner's style. They stated that learning style is an individual's preference for each of the eighteen different elements that they have identified as factors in learning. These elements are

grouped according to environment, and one's emotional, social and physical learning patterns (Dunn, Dunn and Price, 1975). The Dunns have identified various elements of the learning situation which affect the learner's success in order to better individualize education to benefit all students, especially the disadvantaged student. They have developed the "Learning Style Inventory" to assess a student's preference for the various elements (Dunn, Dunn and Price, 1975). Once the learning styles of students are identified, the Dunns suggested accommodation by matching styles to teachers, methods, curriculum and activities. They have also developed the "Teaching Style Inventory" to identify the way in which teachers actually function in order to form groupings on the basis of complementary student and teacher styles (Dunn and Dunn, 1977).

Renzulli and Smith (1978) defined learning style as the learner's preferred mode of instruction. They categorized learning styles into nine instructional strategies: projects, drill and recitation, peer teaching, discussion, teaching games, independent study, programmed instruction, lecture, and simulation. Renzulli and Smith developed a Learning Style Inventory, specifically designed to meet the special needs of gifted and talented children. The inventory is designed to measure the preferred instructional strategies of students. A parallel Teaching Styles Inventory is available to measure the teacher's preference and use of the nine instructional modes. The purpose of both the student and teacher inventories is to achieve an appropriate match between student preference and classroom instruction. Renzulli

and Smith (1978) added that, in addition to matching learning preferences to instruction, the inventory profile will provide the teacher with a more complete characterization of the learning, stimulate teachers to make better use of instructional approaches available, and demonstrate that a variety of methods can and should be provided to reach common goals. This definition is task-specific, and as such has limited usefulness. Renzulli and Smith (1978) noted that preferences for different teaching techniques will vary with age and subject matter.

Cognitive Processes and Learner Behaviors

Beth Atwood (1975:72) stated:

> The thinking processes involved in conceptualization, internalization or transformation are so complex . . . every person utilizes them in his or her own unique way. No two people perceive and modify experiences or information in the same manner. The thinking tools that may work well for one person may not work for another, depending on the situation. Some people learn to skip steps in the process of restructuring data; some need to think one step at a time. Some learn best in visual terms; some in verbal.

The terms "cognitive style" and "learning style" are used in overlapping ways within this context, although psychologists see learning as a part of cognition.

Cognitive style is the psychological construct concerning the ways in which individuals differ from one another in intellectual functioning (Saracho and Spodek, 1984). Researchers in the area have amassed evidence suggesting that cognitive style affects the way students learn, the way teachers teach, and the way students and teachers interact.

Joseph Hill (Griffin, 1974) developed a system for identifying a student's cognitive style as part of a system for education called the Educational Science. Five assumptions were described in developing a cognitive style mapping program: each individual searches for meaning, or learns in his or her own way; it is possible to determine the elements of an individual's educational cognitive style which produced success in the past; 90 percent of all people can and have achieved 90 percent success in formal and informal learning settings of their choice; it is possible to match methods and learning styles for 90 percent success; and an educated person develops the skills needed for success (Nunney, 1977). The educational cognitive style is produced by symbolic orientation, cultural determinants, modalities of inference, and educational memory (Nunney, 1977). Cognitive style mapping is comprehensive and its current application and use in elementary through graduate schools constitute an important assessment tool of learning styles. Both Nunney (1977) and Griffin (1974) pointed out that cognitive style mapping should produce a prescription that is changeable and must be regularly reevaluated. Cognitive style mapping represents one method of identifying a student's cognitive style.

A second method of identification of student learning style is the method designed by David Kolb (1974). Kolb, working from an organizational and management perspective, found that it is the combination of how we perceive and how we process that forms the uniqueness of our own learning style, which is our most comfortable way to learn. He developed a model for experiential learning, which

includes four kinds of abilities needed by students for success: concrete experience, reflective observation, abstract conceptualization, and active experimentation (Kolb, 1974). In this four stage model Kolb saw successful learning as a constant tension between action and observation, and involvement and reflection; he perceived learning as requiring opposite abilities, and the learner must choose which set of learning abilities s/he will use in any specific learning situation. Kolb felt that individual learning style is a result of heredity, life experience, and the demands of environment; individuals have both strengths and weaknesses in learning. Kolb's word association test was designed to determine an individual's learning style, but it was designed and tested only with managers in business and may have limited use for educators. However, concrete experience, reflective observation, abstract conceptualization, and active experimentation describe behavior and processes that are helpful to educators in understanding the complexity of the learner and the learning process.

A third method of identification of student learning style, and similar to Kolb's, is the word association test designed by Anthony Gregorc (1979). Gregorc defined learning style as consisting of distinctive behaviors which serve as indicators of how a person learns from and adapts to the environment, and gives clues to how a person's mind operates. Gregorc's word assocation test is structured to determine the information acquisition preference profile of individuals. Gregorc (1979) described four dualities of the mind:

concrete versus abstract perception; sequential versus random ordering; deductive versus inductive processing; and separative versus associative relationships. Gregorc and Ward identified four distinct learning preference patterns associated with the dualities of the mind: Abstract Sequential, Abstract Random, Concrete Sequential, and Concrete Random (1977). Gregorc believed that people exhibit qualities of each mode, but show strong preference for one or more areas.

Characteristic traits of learners with strengths in each preferred mode have been identified (Gregorc and Ward, 1977): Abstract Sequential learners have excellent decoding abilities in written, verbal and image symbols; conceptual pictures in mind; good use of reading, listening, and visual skills; prefer content with substance, rationally and sequentially presented; defer to authority; and low tolerance for distractions. Abstract Random learners are actually attentive to human behavior and have extraordinary ability to sense and interpret vibrations of mood; evaluate learning experiences as a whole; prefer unstructured instruction; like busy environments; and reflect on gathered information. Concrete Sequential learners prefer direct, hands-on experiences; have acute development of the senses; appreciate order and logical sequence; prefer step-by-step directions; defer to authority; and have no tolerance for distractions. Concrete Random learners have an experimental attitude; make intuitive leaps; utilize trial-and-error approach; and like stimulus-rich environments. Gregorc and Ward stressed that their studies concern information acquisition only. Other dualities and their effect on the total learning process must also be considered (1977).

Sensory Modality Styles

Additional factors affecting student learning is preference for particular sensory modality. Gilley (1975) investigated six sensory input modalities: visual, aural, haptic, interactive, print, and kinesthetic. Bernstein (1974) cited several studies involving visual and non-visual learners. Jeanne Pizzo (1981) investigated the matching of learning style preferences for sound. Salmon (1975) studied visual and auditory learners.

Other Examples of Learning Styles

Many other examples of learning styles are found in the literature. Spaulding (1978) defined learning styles as categories of student behavior. Reissman (1976) was involved with inner city students and discussed learning styles in that particular environment. Oen (1973) studied differences among vocational/technical students in their preferences for structure and their concrete and symbolic skills. Also, David Hunt (1970) devised a thorough system for identifying the conceptual level of the learner.

The field of learning style study is diverse. Definitions vary, and applicability of research to practice is also varied. Herman Witkin (1962:80) stated:

> A number of cognitive dimensions, identified by different investigators, may tap the same core of individual functioning. . . In a period of extensive research on cognitive styles, it is not surprising that there should be overlap or even identity among the cognitive styles established by different investigators. There is clearly a need for studies aimed at codifying these cognitive styles.

Assessment Techniques

Many assessment techniques and instruments have been developed to measure learning styles. These techniques and instruments are as varied as the definitions of learning style, since they were developed to diagnose specific learning style characteristics identified by particular researchers. There is little agreement in general on the methods of assessment. Some researchers advocate self-assessment, while others believe that people are not aware of their own learning style. The Dunns (1978) and Renzulli and Smith (1978) assessed learning styles according to the student's stated preferences. Reissman (1976), Gregorc and Ward (1977), and Witkin (1962) implied in their work that students are unaware of their strengths and weaknesses in learning styles, and therefore they discounted the use of self-assessment instruments.

To make the issue of assessment of learning styles even more complex, Satterly and Brimer (1971) stated that the learning style instrument itself may favor one learning style over others. They advocated the following criteria for learning style assessments (1971:296):

> Allow freedom to the subject to determine what is for him a significant result in a situation capable of organization in a number of different ways; avoid highly formalized or diagrammatic material since these demand too specific an orientation which frequently presents the kind of set known to exert strong influence on the modes of solution; and be analyzed by a technique which does not seek to impose a limited number of preconceived categories in which to classify the styles elicited by the task.

No instrument could be found by this researcher that would meet these three criteria; all formal instruments available are designed and

analyzed according to preconceived categories, some are highly diagrammatic, and some impose limitations through the choices of answers given. Objective observation of the student could, however, meet all three criteria.

Renzulli and Smith (1978) cautioned against labeling students from an initial assessment. Dunn, Dunn and Price (1975), Oen (1973) and Kolb (1974) stated that learning style must be continually reassessed. Gregorc (1979) and Nunney (1977) expressed the importance of informal observation and analysis of student work by classroom teachers as a tool in assessing learning styles.

Stability of Learning Styles

Satterly and Brimer (1971:294), in an analysis of various definitions of learning style, stated:

> All suggest that people behave in a typical way across a variety of tasks and that such personal consistencies remain comparatively stable over time.

In agreement with this statement, Barbara and Louis Fischer (1979: 245) defined learning style as "a pervasive quality in the behavior of an individual, a quality that persists though the content may change." They stated that distinctive qualities of behavior, consistent through time and present in all situations, can be identified in individuals in all fields of endeavor (1979). Other authors implying agreement with stability of learning style are Witkin (1977), Kagan (1966), and Thorsland and Novak (1972).

Definitions of learning style involving student preferences, including the Dunn's eighteen elements (1975) and Renzulli and Smith's

preferred instructional modes (1978) suggest less consistency. Smith (1978:2) stated:

> Students' preferences may vary with the nature of the subject matter being studied and the personal dynamics of a particular teacher.

Studies in changing individual learning styles have been conducted by many researchers. Witkin and his associates (1962), upon investigating the maleability of field-dependency and field-independency, concluded that people can be taught to compensate for their cognitive style weaknesses, but perception itself is not altered. Kagan (1965), in his studies involving the training of impulsive children to be more reflective, found that although the children involved did become more reflective in their response tempo, they did not increase their accuracy on tasks.

The Fischers (1979) and Bernice McCarthy (1981) have begun to explore the possibility of a connection between right/left hemisphere brain dominance and learning style. Reissman (undated:4) stated that "style is laid down early in life and is not subject to fundamental change, although it is possible to bend it and develop it."

Coop and Siegel (1971) stated that learning style influences the younger learner more than the adult learner, since they have less experience with developing compensatory techniques. Kagan (1966) found that people become slightly more reflective with age, and Witkin (1962) noted a slight increase in field-independency as people become older. Stylistic variance, however, is present at all ages and in both sexes.

Implied Success of Particular Learning Styles

Grieve and Davis (1971) implied that some learning styles produce more success in school learning because of the nature of the tasks valued by instructors. They cited studies in which students have achieved better than would have been predicted, when learning styles are matched with instructional methods. Kolb and his associates (1974) stated that the best learning style is the ability to adapt to the situation. Witkin (1977) believes that there are both positive and negative traits in each learning style, depending on the circumstances, since each style is bipolar. Gilley (1975) found that of sensory input styles, haptic was the most efficient for school learning.

Some school situations demand particular learning styles. Kagan (1966) stated that some subsets of standardized intelligence tests favor certain learning styles; he cited the Bender and some non-visual portions of the WISC which require particular visual and spatial skills. These findings imply that the success of a particular learning style is related to the task, and raises the question of what kinds of learning styles are needed to succeed in school learning in a typical classroom.

Instructional Styles

Daines (1977) stated that instructional style affects learning outcomes. The classroom teacher is responsible for determining the proper method and learning materials that will enable students to learn to their maximum potentials. The decisions of the teacher,

guided by knowledge of the learning process, knowledge of the learner, and knowledge of the context to be learned, are very important. The complex nature of the learning process demands responsible, defensible choices of methods.

Understanding the differences in how people think and being aware of one's own personal style and of its strengths and weaknesses is particularly important for teachers. Without that awareness, it is all too easy to assume that the way one approaches tasks or problems is the correct way, and to discourage and even penalize other approaches (Williams, 1983). The result for students whose learning styles differ from the teacher's is to deprive them of their primary and most efficient way of learning. This can be an insurmountable obstacle for many potential learners. According to Butler, students who are not encouraged to explore, develop and use their learning styles in a meaningful way for the majority of the time spent in school pay "a psychological toll -- often diminished mental health, lack of psychological freedom, and ultimately an inability to recognize and actualize individual purpose [1983:42]."

Williams stated (1983:189-90):

> Children come to school as integrated people with thoughts and feelings, words and pictures, ideas and fantasies. They are intensely curious about the world . . . The challenge we face as teachers is to use the wealth they bring us. They come with a two-sided mind. We must encourage them to use it, to develop types of thinking so that they have access to the fullest possible range of mental abilities.

Teachers can help students greatly by making them aware of their learning styles, including how to use their strengths and how to

request the kinds of help they need. Teachers can also help strengthen the capabilities which are underdeveloped in each student, and can help and encourage them to transfer from one medium to another.

Glassman (1980) stated that the most effective teachers are those who have the flexibility to use the appropriate styles and behaviors called for in given situations. Teachers need to choose those behaviors that are appropriate to achieving their goals.

Bennet (1976) recommended that basic skills be stressed in an environment which allows for self-expression and cooperation. Bruner (1964) stated that the more formal the teaching, the more time pupils spend working on the subject matter at hand, and therefore the more they improve at it.

Mager (1984) stated that learning is for the future; the object of instruction is to facilitate some form of behavior at a point after the instruction has been completed. The likelihood of students putting their knowledge to use is influenced by their attitudes for or against the subject.

Hart (1983), in his synthesis of the research findings of many fields, presents a modern, brain-based, comprehensive theory of human learning. He stated that learners are active information processors who decode and recode in the process of learning. However, to the extent that the cerebrum is inhibited by threat, school learning tends to stop. Therefore, it is important that the learning environment be rich in materials, with access to many learning activites, and with an atmosphere of trust, acceptance and respect.

According to Brandwein and Ornstein (1977), many so-called learning disabilities do not exist at all. What exists instead is the failure of educators to recognize and stimulate both hemispheres of the brain. Some students with learning problems may be simply demonstrating a preference for one mode of thought. It is the task of educators to seek and promote integration of intuitive approaches to knowledge, developed by traditional cultures, and intellectual modes, promoted by modern science. These modes can function concurrently and in support of each other (Brandwein and Ornstein, 1977).

Granrose (1980:29) stated:

> To blend form and content into a successful style of teaching is fundamentally a question of developing a certain wholeness of character from which the details of one's teaching will flow.

Successful teaching consists of this personal wholeness, rather than simply the possession of certain skills, beliefs or attitudes.

"A learning style match happens in the mind of the learner, not in the presence of matched learning style materials [Butler, 1983: 38]." This is the guiding premise in diversifying the curriculum according to the principles of learning style. The needs and individual learning style preferences of students are the focusing factors in planning a style-based curriculum. Differentiated programming should be not only different in content, but also different in its ability to address and receive various learning styles as well (Butler, 1984). The potential of a style-based approach to curriculum comes from the mind of the teacher.

While teachers generally have an overall style, this does not mean that they cannot add to or modify that style as circumstances warrant (Cornett, 1983). Bruce Joyce (1981) reported success in helping teachers with various teaching styles to learn new models of teaching behavior that contribute to student learning.

Joyce and Weil (1972) identified a variety of models of teaching, and classify them into four families: social interaction, information processing, personal development, and behavior modification. These families are based on "different orientations toward man and the universe (1972:8)," or what educational outcomes are expected. Social interaction represents the family of teaching styles in which "the relationships of a person to his society or his direct relationships with other people (1972:8)" are emphasized. Priority is given to social relations and to the creation of a better society. Information processing refers to the family of teaching styles concerned with how students improve their information processing abilities.

> By information processing, we mean the ways in which people handle stimuli from the environment, organize data, sense problems, generate concepts and solutions to problems, and employ verbal and nonverbal symbols [1972:9].

Personal development represents the family of teaching styles emphasizing "personal development as a source of educational ideas (1972:10)." The models in this category emphasize individual oriented constructs such as personal psychology, emotional life, self concept, self image, and creativity. Behavior modification represents the family of teaching styles in which emphasis is placed upon "changing the external behavior of the student" and describes the

student in terms of visible behavior rather than underlying and unobservable behavior (1972:10-11).

Expanding teaching styles may be easier if teachers find colleagues to help and share teaching duties, such as team teaching provide. Teachers trained in learning disabilities or special education are excellent resources; they are generally familiar with hemispheric research, and are astute observers of the learning process (Williams, 1983). These specialists can offer insights into the learning problems of specific students, and they possess a rich repertoire of teaching strategies directed to both hemispheres.

Assessment of Teaching Styles

Classroom teachers are the single most important element in the interactive process of teaching (Munroe, 1983). What teachers do and how they do it relates to teaching style.

> Teaching is full of intangibles--factors like trust, expectations and motivation that can't be measured but that play a crucial role in the process [Williams, 1983:185].

Guidelines for analyzing teaching styles are general indicators. Teachers are people, all different and deserving of respect due to all individuals (Butler, 1983).

Renzulli and Smith (1978) and Papalia (1978) have developed instruments for assessing teaching style in relation to specific learning styles of students. Virtually all of the researchers involved with learning styles imply that accommodation of learning styles affects learning outcomes.

Dunn and Dunn (1977) developed the "Teaching Style Inventory" in order to identify the way in which teachers actually function. This instrument is intended to be used as a first step in expanding teachers' teaching styles to respond to varied students' learning styles, in order to form groupings on the basis of complementary student and teacher styles. According to Dunn and Dunn (1977), identifying potential areas of improvement and long-range motivators should begin with an appraisal of each individual faculty member's teaching style.

There are nine major elements that comprise a person's teaching style as measured by the Dunns' instrument: instructional planning; teaching methods; student groupings; room design; teaching environment; evaluation techniques; educational philosophy; teaching characteristics; and student preference. Instructional planning includes the diagnosis, learning prescriptions, and evaluations completed for each student or group of students. Essential to the diagnosis is knowledge of each student's ability, learning style, interests, skill development, ability to retain information, and concept formation. The prescription includes the design and/or use of objectives, materials, techniques, and multisensory learning activities at various levels (Dunn and Dunn, 1977). Teaching methods refer to the instructor's behavior in the learning environment, including the way the teacher groups students for learning, designs and assigns resources, uses interaction techniques with students, and employs basic approaches to the teaching and learning of each student (Dunn and Dunn, 1977). Student groupings are defined as the way a teacher assigns or permits learning to occur through small groups, pairs, individuals, large

groups, varied groupings, or through one-to-one tutoring (Dunn and Dunn, 1977). Room design reflects the ways in which the teacher divides, decorates, and designs learning spaces or areas to match the learning needs of the students (Dunn and Dunn, 1977). Teaching environment includes time schedules, different types of instructional stations, optional learning activities that are available, and provisions made for mobility, multilevel resources, and nutritional intake (Dunn and Dunn, 1977). Evaluation techniques include the methods used by the teacher to assess the progress of individual students (Dunn and Dunn, 1977). Educational philosophy refers to the attitudes a teacher holds toward key program descriptions, such as open education, student-centered curriculum, basic skills approach, and so forth (Dunn and Dunn, 1977). Teaching characteristics are defined as the values and standards a teacher holds and the operational approaches used to transmit those values and standards. This includes the degree of flexibility (Dunn and Dunn, 1977). Student preference describes the types of students whom the teacher prefers to have in the classroom, including students' learning rate, level of motivation, emotional stability, learning potential, verbal communication ability and independence level (Dunn and Dunn, 1977).

The Dunns' "Teaching Style Inventory" culminates in a teaching style profile score as follows: highly individualized; somewhat individualized; transitional; somewhat traditional; and traditional. It is assumed that individual classrooms contain students with a wide variety of learning styles. No validity or reliability information was available for this instrument.

Munroe (1983) identified five elements of teaching style which are directly related to effective learning patterns. These elements are: warmth, cognitive organization, orderliness, indirectness, and problem solving ability.

Silver and Hanson (1980) identified the following components of teaching style: classroom atmosphere; teaching techniques; planning; preferred qualities of students; teacher/student interaction; classroom management; appropriate student behaviors; teacher behavior; evaluation; and goals. There was no reliability or validity information included with this instrument.

According to Mager (1984), classroom observations should focus on instructional procedures and policies in relation to their effects on students. He recommended that areas to explore are physical environment, instructional materials and devices, instructor behaviors, and instructional procedures and policies.

Implications for the Classroom Teacher

Witkin and Moore (1974) have shown that students' cognitive styles interact with teachers' cognitive styles, affecting how teachers instruct and how students learn. Research suggests that when individuals involved in the learning process are stylistically similar, learning is facilitated (Paradise and Block, 1984).

Pat Guild (1980) stated that learners have differences in the ways they perceive, gain knowledge, process knowledge, behave, and feel in a learning situation. It is important for teachers to be aware of different ways by which people learn, become sensitive to

cognitive strengths and weaknesses of students, and accommodate the way students learn in the classroom.

Renzulli and Smith (1978) indicated that the learning process is an interconnection among three elements; the teacher, the learner, and the curriculum. Oen (1973:38) stated: "Learners with certain cognitive styles are either facilitated or hampered by the particular teaching method to which they are exposed." Harmony between instructional style and individual learning style enables more learning energy to go directly into the task at hand. Leinhardt and Greeno (1986) found that expert teachers employ the use of routines and activity segments; this reduces the cognitive load for students and gives them more time to concentrate on the lesson.

The classroom teacher is responsible for determining the proper method and learning material that will enable students to learn to their maximum potentials. The decisions of the teacher, guided by knowledge of the learning process, knowledge of the learner, and knowledge of the content to be learned, are very important; the complex nature of the learning process demands responsible, defensible choices of methods.

The teacher creates and carries out instructional strategies; in the interactions with students s/he must organize them for learning and bring the strategy to life in the classroom. S/he must change and adapt his/her strategies as s/he teaches. Instructional strategies are decisions about organizing people, materials, and ideas to produce learning (Joyce, 1972). Teaching strategies encompass both

decisions about instructional goals and decisions about the means of achieving those goals with particular students.

The teacher must possess a range of teaching strategies because different styles of teaching behavior are useful for different educational purposes and for differences in students (Joyce, 1972). David Hunt (1965) stated that a teacher who cannot readily vary his/her method or style is seriously limited; s/he needs to be able to select from a repertoire tactics that will lead to different objectives and induce different students to learn. Ned Flanders (1965) stated that flexible teachers who shift from indirect to more direct approaches to students with the passage of time enable students to learn more. The effectiveness of education depends upon the flexibility of the teacher. Flanders (1965) posited that effective teachers should be able to control their own spontaneous behavior in order to provide one role or another at will. Several studies indicate that, unfortunately, many professional teachers possess a narrow range of styles (Flanders, 1960; Hughes, 1963; Travers, 1961).

Accommodation of learning style differences is a recognition of strengths and weaknesses and an effort to maximize the strengths, in order to facilitate the learning process. Awareness of learning styles is a first step in an attempt to understand differences in learners, and awareness of teaching styles represents the initial step toward the eventual accommodation of learners. Provisioning, style-flex, and matching are identified methods of accommodating student learning styles.

Provisioning, defined by Bruner (1964) as many tracks leading to the same general goal, requires the teacher to provide a variety of techniques and materials to enable student mastery of content. This method of instruction provides a variety of activities, and offers students compatable learning situations much of the time.

Style-flex, a term used by Gregorc (1979), requires the teacher to be conscious of learning style characteristics inherent in a method, and calls upon the teacher to help students expand and adapt their learning styles to the chosen method. This method of instruction is accompanied by the assumption that knowledge of one's own learning style will help students develop compensatory techniques for weaknesses, maximize strengths, and enable students to become more flexible in style.

Matching, a third method of accommodating the learner's style, requires diagnosis of learning styles and planning specific instruction to meet the needs of each student. This method of instruction has limitations as a satisfactory approach to accommodate learning styles because: many definitions and labels exist to define learning style characteristics; it is premature to successfully diagnose learning styles without error; and studies of formal matching have failed to confirm its success (Tallmadge and Shearer; 1971).

Teaching style is both a set of attitudes and actions that open a formal and informal world of learning to students. According to Butler (1983), style-match, style-flex or style-stretch are viable approaches that teachers can use.

Recent scientific studies suggest that labeling children "right brained" or "left brained" could be dangerous (Shelby, 1985). Thinking, particularly higher-level conceptualizing, involves the integration of both hemispheres of the brain. The current trend is to teach more holistically.

Hunter (1976) stated that individuals may be born with a predisposition to use their right or left brains. However, as with handedness, practice has a great deal to do with skill. Without practice, skills and processes can become stagnant, so the comfort of using the dominant hand (or brain) often results in minimal use of the subordinate. The ineptitude that results from lack of practice is often interpreted as lack of inherent ability (Hunter, 1976).

According to Hunter (1976:46), "The assumption that practice would be as important as native ability is supported by current research which indicates that measured I.Q. can change with prescribed changes in experience." In conducting day-to-day schooling, these findings suggest that: 1) It is vital to present information in a way that students can practice integrating it from both of their hemispheres. 2) Whenever a student has problems with learning, teachers should augment the stimulus they are using with one to the other hemisphere. 3) Teachers should adopt practices that could increase students' facility in the use of each hemisphere singly and in concert (Hunter, 1976). It is not necessary that teachers diagnose brain dominance, but it is important that dual methods of teaching be utilized so that both brain hemispheres are stimulated.

Merely matching teaching style with student learning style is not sufficient. According to Gregorc (1982), periods of mismatch develop and strengthen the weaker learning capabilities. Style flexing and stretching can help create the abilities for success under a wide variety of conditions.

A teacher may not be able to meet the needs of all students at all times, but adjustments can be made for individual differences. A classroom can have areas that are quiet and free from visual distractions; seating can be arranged to fit individual needs. The teacher can help students become aware of their individual styles so that they can select their best learning environment and can articulate their needs clearly to other teachers (Williams, 1983).

It is also important for students to become aware of modes and strategies that they avoid or seldom use. The more thinking and learning tools students are able to use skillfully, the more successful they will be at a variety of tasks (Williams, 1983). The processes of thinking and learning should be made a part of classroom activities.

Classroom structure, atmosphere, routines, and individual teachers place demands upon student learning styles. The first step in accommodating student learning styles is to examine the demands that the school situation is placing on individuals. Educators who are aware of learning style concepts and who also understand their existant school learning environment, specifically their own teaching style, can begin to make specific efforts to accommodate the stylistic diversity of the students whom they serve. The researcher was able

to find no instrument of adequate validity and reliability that could be used to assess teacher perceptions of responsiblities, abilities and effectiveness in teaching to the individual needs and learning styles of students.

Instrument Design

Teaching to the individual needs and learning styles of students is a vital component of quality education. This implied harmony between instructional style and individual learning style enables more learning energy to go directly into the task at hand. According to Munby (1984), teachers' beliefs and attitudes are contextually significant to the implementation of innovations. He stated (1984:28), "If we are to understand how a teacher might deal with an innovation, then we must first understand his or her beliefs and principles." Munby (1983:157) remarked further that "the field of measuring attitudes [is] replete with instruments, but . . . these instruments are used in a rather cavalier fashion, without heed to their reliability and validity." Zeidler (1984) recommended that attitudinal instruments should be developed in a manner consistent with the formal criteria and theoretical guidelines of social pyschology in the validation process.

It is difficult to holistically measure the multitude of interactions occurring in the classrooms. Research into teaching styles must not allow itself to be severed from dimensions of style not easily observed or explained. Kenneth Ebel (1980:4) stated:

> Indeed, almost all research into teaching suffers by comparison with the vibrancy of the act itself, and suffers badly from isolating in order to analyze, from systematizing in order to simplify, from embracing terminology, charts, printouts.

Any device used to measure teaching style is unlikely to accurately reflect the total dynamics of instruction. Researchers usually examine teaching style by exploring the teacher's and student's perceptions of each other (Saracho and Spodek, 1984).

In developing an instrument designed to assess attitudes, it is important to remember that

> . . .people are much better able to tell you what they have done compared with what they might do . . . If there is a conflict of attitudes, the respondent favors one over the other by what he actually does [Labaw, 1982:33].

Behavior is a function of the interaction between a person's inner determinants, such as attitudes, and environmental factors as perceived by the individual (Oppenheim, 1966). Sudman (1982) stated that the term "attitude" is in principle unverifiable except by the report of the individual. We may make inferences about the validity of self-reports from the relationship between people's behavior and what they say. However, it is important to note that other factors may intervene between the attitude and the action (Sudman, 1982).

Prior to construction of the instrument, the following points should be considered (Oppenheim, 1966): sample size, knowledge of respondents; decisions concerning the main and auxiliary methods of data collection; method of approach to the respondents; build-up of question sequences and order of questions; and the use of precoded versus free-response questions.

Pilot work is vital in developing question wording, and also in handling procedural matters such as the ordering of questions and the

reduction of nonresponse rates. The questionnaire should be constructed on the basis of certain hypotheses regarding the following considerations (Labaw, 1982): 1) the nature of the respondent; 2) the relationship between the expressed attitudes and behavior of the respondent; 3) the goals and needs of the client; 4) sociological structures and their influence on the respondent; 5) the meaning of words and the respondent's grasp of language; and 6) the relationship among knowledge, attitudes and behavior. It is crucial to be aware of what is to be accomplished with the questionnaire.

Question development should include the following major points (Sudman, 1982:121):

> 1) Make certain that attitude objects are clearly specified. 2) Decide on the critical aspects of the attitude to be measured--affective, cognitive, and action. These must not necessarily be consistent. 3) Measure the strength of the attitude by building a strength dimension into the question itself, by asking a separate question about strength, or by asking a series of questions which reflect the general attitude. 4) Avoid double-barreled questions that introduce multiple concepts. 5) Consider the use of separate unipolar items if there is a possibility that a bipolar item might miss independent dimensions. 6) Recognize that the presence or absence of an explicitly stated alternative can have dramatic effects on response. 7) Pretest new attitude questions to determine how they are being interpreted by respondents. The use of split ballots in pretests is highly desirable. 8) If general and specific attitude questions are related, ask the general question first. 9) When asking questions of differing degrees of popularity involving the same underlying value, ask the least popular item first. 10) In attempting to measure changes in attitude over time, ask exactly the same questions in all time periods, if possible.

Format is an important consideration in questionnaire design. It is important to consider the individuals who will be asked to respond, since completing a questionnaire is an imposition. The

following considerations are basic to a good finished product (Berdie and Anderson, 1974:34-36):

> 1) Make the questionnaire as appealing to the eye and easy to complete as possible. 2) Number the questionnaire items and pages so the respondent will not become confused while completing the form. 3) Put an identifying mark on each page of the form so that if one page should get separated from the rest, it can be reattached. 4) Put the name and address of the person to whom the form should be returned at the beginning and end of the questionnaire even if you include a self-addressed return envelope since questionnaires are often separated from the cover letter and envelope. 5) Put the study title in bold type on the first page of the questionnaire. 6) Include brief but clear instructions for completing the form and additional clarification and examples before selections that might be confusing. However, try to construct questions so their intent is self-evident and so they will not require instructions supplementary to those at the beginning of the form. 7) Group items into logically coherent sections. 8) Begin with a few interesting non-threatening questions because introductory questions that are threatening or dull may reduce the likelihood of the subject's completing the questionnaire. 9) Avoid putting important items at the end of a long questionnaire. 10) If questions appear on both sides of a page, put the word "over" on the bottom of the front side of that page. 11) Try to make smooth transitions between sections so the respondent does not get the feeling he is answering a series of unrelated questions. 12) Avoid constructing sections of the form to be answered by only a subset of respondents, since such sections may lead respondents to believe the form is not appropriate for them or it may cause frustrations and result in fewer completed forms. 13) If you have sections which consist of long checklists, skip a line after every third item to help the respondent place his answers in the appropriate spaces. 14) Avoid using the words "questionnaire" or "checklist" on the form itself since some people may be prejudiced against these words after receiving many forms not designed with the care of yours.

Common sense dictates certain practices about the design of the mail questionnaire. The questionnaire should be attractive, easy to fill out, have adequate space for response, and be legible. A neat, well-organized, attractive questionnaire should increase the response

rate (Berdie and Anderson, 1974). People associate appearance with quality and are more willing to complete well-designed forms.

The method of recording responses is dependent upon the form of question used. Major points to consider in choosing a recording technique are (Sudman, 1982:148-149):

> 1) Use open questions sparingly. 2) Avoid interviewer field coding, if possible. It is better to have field coding done by the respondent. 3) Start with the end of a scale that is least socially desirable. 4) Do not use rating scales with more than four or five verbal points. 5) Consider the use of analogies such as thermometers, ladders and clocks for numerical scales with many points. 6) Ranking of preferences for alternatives can be done only when respondents can see or remember all alternatives. If many alternatives are present, respondents can rank the three most desirable and the three least desirable. 7) Rankings can be obtained by series of paired-comparison questions. 8) When lists are used, complete information can be obtained only if each item is responded to with a "yes/no, applies/does not apply," and the like rather than with the instruction "Circle as many as apply." 9) Complex ratings can be accomplished by means of card-sorting procedures.

It is important to guard against error in all research efforts. Possible sources of error in questionnaire design are (Oppenheim, 1966:20-21):

> . . .faults in the design of the survey, sampling error; errors due to nonresponse; bias due to questionnaire design and question wording; unreliability or lack of validity of various techniques used; varieties of interviewer bias; respondent unreliability, ignorance, misunderstanding, reticence, or bias; bias in recording and coding the responses; errors in processing and statistical analysis; and faulty interpretation of the results.

It is vital to consider validity and reliablity in questionnaire design if error is to be minimized. Reliability refers to obtaining the same results again; validity refers to measuring what an item is

supposed to measure. To ascertain reliability of an attitudinal questionnaire, sets of questions or attitude scales may be used effectively. The reliability of a scale can be assessed by a split-half coefficient (Oppenheim, 1966) without having to ask the same questions twice. By using sets of questions, provided they all relate to the same attitude, it is possible to maximize the more stable components while reducing the instability due to particular items, emphasis, mood changes, and so on. For studies done with similar populations and in similar contexts, and where there is no reason to expect changes, using identical questions allows estimation of response reliability (Sudman, 1982).

Since questionnaires are designed to elicit information from respondents, one of the criteria for the quality of a question is the degree to which it elicits the information that the researcher desires. Construct validity, as opposed to pragmatic validity, is appropriate for attitude measurements because what is being measured is beneath the surface; we are trying to say what sub-variables it pulls together, and how it is related to other attitudinal or perceptual variables and to some aspects of behavior (Oppenheim, 1966). Such constructs would be expected to enter into relationships with other variables in predictable ways. Validity is inferred from such a predicted network of relationships; this validates both the measure and the theory behind it. Sometimes it is possible to correlate a new scale with an older, well-established one. Also, it may be appropriate to use criterion groups between which the scale can distinguish.

Steps in instrument design may be summarized as follows (Sudman, 1982:281-282):

> 1) Decide what information is needed; 2) Conduct a search in data archives for existing questions and scales on the topics of interest; 3) Draft new questions and/or revise existing questions; 4) Put the questions in sequential order; 5) Format the questionnaire; 6) Precolumn and precode; 7) Get peer evaluation of draft questionnaire in group sessions and/or individually; 8) Revise the draft and test the revised questionnaire on yourself, friends, relatives, or co-workers; 9) Prepare simple interviewer instructions for pilot test, and revise questionnaire if the instruction writing or interviewer training uncover any problems; 10) Pilot-test on small sample of respondents (twenty to fifty) similar to the universe from which you are sampling; 11) Obtain comments of interviewers and respondents in writing and/or at interviewer debriefings; 12) Eliminate questions that do not discriminate between respondents or that do not appear to provide the kind of information required; 13) Revise questions that cause difficulty; 14) Pilot-test again; 15) Prepare final interviewer instructions, and revise questionnaire if the instruction writing uncovers any problems; 16) During interviewer training and initial interviewing, be alert for possible new problems; 17) After interviewing is completed, analyze interviewer report forms and debrief interviewers and coders to determine whether there were any problems that would affect analysis; and 18) Use the experience gained on one questionnaire for future planning.

If all of these steps are carefully followed, the resultant instrument should obtain the data needed.

The results of the literature survey enabled the researcher to design and field-test an instrument which was intended to determine a teacher's perceptions of his or her responsibilities, abilities and effectiveness in teaching to the individual needs and learning styles of students. Chapter Three details the questionnaire development which was formulated as a result of this literature review.

CHAPTER THREE

PROCEDURES

The focus of this study was to design an instrument which could be used to determine a teacher's perceptions of his or her responsibilities, abilities and effectiveness in teaching to the individual needs and learning styles of students. Regular education kindergarten through grade eight classroom teachers from the public schools of Gallatin and Lewis and Clark Counties in Montana were the sample population for the study. This study was designed to determine the theoretical underpinnings for investigation of perceptions through a review of pertinent literature, and to develop and field-test an instrument to determine teacher perceptions of teaching to the individual learning styles of students.

The following information is provided in this chapter: 1) a description of the setting of the study; 2) a description of the population; 3) sampling procedures; 4) control of variables; 5) development of instrumentation; 6) method of data collection and organization; 7) statement of research questions; 8) explanation of how the data were analyzed; 9) identification of the precautions taken to insure accuracy; and 10) a summary of the procedural chapter.

The Setting

The Montana Public School System is organized into secondary and elementary school districts. There are 385 elementary school districts (Office of Public Instruction, 1986) in the state. Twenty-six elementary school districts are within Gallatin and Lewis and Clark Counties, Montana (Office of Public Instruction, 1986).

Population Description

The instrument developed in this study was field-tested with one hundred nineteen kindergarten through grade eight Montana classroom teachers during the 1984-87 school years. It was then utilized with the regular education kindergarten through grade eight classroom teachers in public elementary schools in Gallatin and Lewis and Clark Counties in Montana. There were 491 single-grade classroom teachers and 32 multi-grade classroom teachers (County Superintendents of Gallatin and Lewis and Clark Counties, 1986) in this population having a homeroom during the 1986-87 school year.

Sampling Procedures

A proportional stratified sample (Leedy, 1980) of 50 single-grade classroom teachers was selected from the population. A demonstrated sample size of 10 percent of the population per proportional group is shown by Jaeger (1984) as being adequate for statistical analysis. Junior high school teachers of mathematics, language arts, social studies, foreign language, science and health were included in the study. The entire population of multi-grade level classroom

teachers (32) was selected because of the small numbers involved. The strata are identified as grade level taught and single or multi-grade level classrooms. Grade levels were clustered into three groups for the purpose of this study: 1) primary which included kindergarten through grade two; 2) intermediate which included grade three through grade five; and 3) upper-intermediate which included grade six through grade eight. The sampling utilized 10 percent of single-grade level classroom teachers (see Table 1) and 100 percent of multi-grade level classroom teachers (see Table 2).

Table 1

Single-Grade Level Classroom Teachers

	Actual Number	Number Used in Study
Primary	175	18
Intermediate	148	15
Upper-Intermediate	168	17
Total	491	50

Table 2

Multi-Grade Level Classroom Teachers

	Actual Number	Number Used in Study
Primary	6	6
Intermediate	8	8
Upper-Intermediate	9	9
Kindergarten through grade 8	9	9
Total	32	32

Control of Variables

The predicted variables of this study were identified as differences in: primary, intermediate or upper-intermediate grade level of pupil taught; single or multi-graded setting; years of teaching experience; educational level of teacher; teacher age; teacher gender; number of students in class; attitude toward teaching; vocational commitment; and prior knowledge of learning styles. These variables were identified in order to provide characteristics which could be used to determine consistency in response to the developed questionnaire.

Development of Instrumentation

The researcher reviewed literature which pertained to the philosophies and strategies of teaching to the individual needs and learning styles of students. A working definition of learning style and teaching style was established for the purpose of this study. A review of the literature pertaining to instrumentation development was also completed. According to precedent set within the literature, the researcher developed and field-tested a questionnaire which was intended to be used to determine a teacher's perceptions of his or her responsibilities, abilities and effectiveness in teaching to the individual needs and learning styles of students. Regular public education kindergarten through grade eight classroom teachers were the focus of the study.

Part of this study was to develop and refine questions through a thorough developmental process. Questions were selected to

measure the following areas of teaching styles: instructional planning; teaching characteristics; teaching methods; student groupings; and classroom environment. The content (face) validity of the questions was established by asking items similar to those asked by experts in the field of teaching and learning styles, and also by submitting questions to a panel of six experts (Appendix C). Experts were defined as individuals who have studied and worked with teaching styles of kindergarten through grade eight classroom teachers. The panel was asked to judge questions in terms of their appropriateness as a measure of teaching styles relative to accommodating the needs and individual learning styles of learners. Teaching style is defined as follows: the teacher's personal behaviors and media technologies chosen to deliver and receive information (Gregorc, 1979:26).

Internal construct validity was ascertained by initially including sets of questions intended to elicit similar responses, and through the use of factor analysis (SPSS^{x}, 1986) and correlation of questions with factors generated. The correlation coefficients generated were defined using the Spearman's rho procedure (Williams, 1979). The instrument as initially constructed was given to fifteen teachers in order to get their reactions as to format, length, clarity of questions, clarity of directions and general appearance of the survey. Teachers were encouraged to be open and candid about the instrument and the process of administration.

In order to ascertain test/retest reliability, the instrument was field-tested with one hundred nineteen experienced teachers. The

test and retest were given within two weeks of each other. Each teacher was asked to comment on an open-response questionnaire after taking the second test. The commentary invited response for a second time as to clarity of questions, length of exam and motivation for completing the task. The results of the testing were submitted to measures for test/retest reliability and internal consistency using Spearman's rho, a rank-difference correlation procedure (Williams, 1979).

It was planned that items having less that a .85 correlation coefficient would be omitted; an instrument using items reaching the .85 correlation coefficient would be generated. The revised instrument using items at .85 or greater test/retest correlation coefficient was to be submitted to another group of teachers for test/retest verification. Only items above the .85 level were to be used after this testing. However, the dissertation proposal committee agreed that if a .85 correlation coefficient for a sufficient set of questions could not be achieved after three revisions of the questionnaire, a lower level of correlation would be set. After three revisions of the questionnaire it was necessary to set the correlation coefficient at .37 in order to continue the study. This standard was approved by two members of the dissertation reading committee. These data were submitted to a factor analysis assessment (SPSS^{x}, 1986) to determine whether items fell into consistent categories. The factors derived were used to verify the construct validity of the questionnaire. A revised questionnaire developed from these data was again submitted to a panel of experts to reestablish content validity.

The questionnaire was then utilized with the regular education kindergarten through grade eight classroom teachers in public elementary schools in Gallatin and Lewis and Clark Counties in Montana. There were 491 single-grade and 32 multi-grade classroom teachers in this population. Questionnaire forms were number-coded in order that nonrespondents could be contacted. However, complete confidentiality was enforced in the analysis of data.

Non-respondents were contacted by mail two weeks after the original questionnaire forms were sent. Consenting respondents within a forty-mile radius of Bozeman were directly observed in order to assess the predictability of the demographic groups responding to the questionnaire. An observation form reflecting the questions of the study was developed (Van Dalen and Meyer, 1966). The observer was trained to use the observation form to make assessments of actual behaviors occurring in classrooms. Observational data was coded on a 1 through 4 scale as follows: 1 = Directly Observed Negative or No Opportunity to Observe; 2 = Evidence Suggests Negative; 3 = Evidence Suggests Positive; and 4 = Directly Observed Positive (see Appendix M). Appendices include training-session objectives, dates met and forms used. Demographic data were used as predicted variables, analyzed in terms of questionnaire and observed responses. The discriminant analysis technique for ordinal and nominal data (Klecka, 1975) was used to obtain a statistically reliable assessment of the predictability of demographic data as related to questionnaire and observed responses.

This information, in conjunction with the review of pertinent literature as a foundation, enabled the researcher to develop and field-test an instrument which was intended to determine the regular education public kindergarten through grade eight classroom teachers' perceptions of their responsibilities, abilities and effectiveness in teaching to the individual needs and learning styles of students. This inventory was field-tested during the 1984-87 school years.

Method of Data Collection and Organization

A statement of all items, test/retest data, validity statements, and open-questionnaire response data were accumulated in chart form to indicate items usable in the questionnaire. The refined questionnaire responses were recorded. The number of primary, intermediate and upper-intermediate single and multi-grade level classroom teachers responding were noted. Nonrespondents were contacted by mail two weeks after the first questionnaire forms were sent in order to maximize return.

The data was organized and summarized in tables and charts in Chapter Four. Tables included data on expert content validity per item, test/retest correlations per item, factor analysis of items, and discriminant analysis of data using demographic items as predicted variables and questionnaire and observed items as predictors.

Research Questions

This study investigated two research questions. These questions were non-directional and were tested in two ways: 1) the demographic

data were used as predicted variables, analyzed in terms of questionnaire response; and 2) the discriminant analysis technique for ordinal and nominal data was used to obtain a statistically reliable assessment of the predictability of demographic data as related to questionnaire and observed responses.

The research questions were as follows:

Research question number 1: To what degree is it possible to develop a valid and reliable instrument that ascertains teacher perceptions of responsibilities, abilities and effectiveness in teaching to the individual needs and learning styles of students?

Research question number 2: To what degree is it possible to predict demographic group membership of teachers responding to the questionnaire by actual observation of classroom practice?

Analysis of Data

The responses to the questionnaire developed in this study were tabulated according to frequency of response and categorized in frequency distributions according to primary, intermediate or upper-intermediate grade level taught; single or multi-grade level groupings; years of teaching experience; educational level of teacher; teacher age; teacher gender; number of students in class; attitude toward teaching; vocational commitment; and prior knowledge of learning styles. Contingency tables were constructed for factor loading. The demographic data were used as predicted variables, analyzed in terms of questionnaire and observed responses. The discriminant analysis technique (Klecka, 1975), a non-parametric statistical tool, was used

to obtain a statistically reliable assessment of the predictability of demographic data as related to questionnaire and observed responses.

This information, in conjunction with the review of pertinent literature as a foundation, enabled the researcher to assess if the degree to which it were possible to develop an instrument which could be used to determine the regular education public kindergarten through grade eight classroom teachers' perceptions of their responsibilities, abilities and effectiveness in teaching to the individual needs and learning styles of students. The researcher also intended to assess the degree to which demographic groups were predicted by observation. However, conclusive assessments were unable to be made because the instrument developed in the study was of low reliability (.37).

Precautions Taken for Accuracy

All raw data was computer analyzed and verified prior to insertion. The Statistical Package for the Social Studies (SPSS^{X}, 1986) was used to compute Spearman's rho, factor analysis, and discriminant analysis. This was implemented on Montana State University's Honeywell level 66 mainframe computer.

The results of this study are presented in Chapter Four. Conclusions and recommendations are stated in Chapter Five.

CHAPTER FOUR

ANALYSIS OF DATA

The following general questions were investigated in this study: 1) To what extent, if any, can a valid and reliable instrument be developed to ascertain teacher perceptions of responsibilities, abilities and effectiveness in teaching to the individual needs and learning styles of students? and, 2) to what extent are demographic groups predicted by actual observation of classroom practice? In addressing these questions the researcher determined the theoretical underpinnings for investigation of perceptions through a review of pertinent literature, established a working definition of learning style and teaching style for the purpose of the study, and reviewed the literature pertaining to instrumentation development. Because the instrument developed in an attempt to answer Question 1 was of low reliability (.37), it was not possible to conclusively answer Question 2. The researcher continued with this study for the purpose of exploring the process of instrument design and validation. However, the reader should note that the discussions relative to Question 2 are strictly theoretical.

Pertinent items for the research instrument were gleaned from the literature and were similar to those asked by experts in the field of learning and teaching styles. Content (face) validity was established by using a panel of experts and construct validity determined through a factor analysis of data on questions considered. A

pilot study was used to determine ease of administration. Test/retest reliability and internal consistency were established to determine specific items for inclusion on the questionnaire. A revised questionnaire developed from these procedures was then submitted to a panel of experts (Appendix C) to reestablish content validity. The questionnaire was then utilized with the regular education kindergarten through grade eight classroom teachers in public elementary schools in Gallatin and Lewis and Clark Counties in Montana. All consenting respondents within a forty-mile radius of Bozeman were directly observed in order to assess the predictability of demographic groups responding to the questionnaire. An observation form reflecting the questions of the study was developed. Demographic data were used as predicted variables, and analyzed in terms of questionnaire response. The discriminant analysis technique for ordinal and nominal data (SPSS^{x}, 1986) was used to obtain a statistically reliable assessment of the predictability of demographic data as related to questionnaire and observed responses. Only two of the thirty-one teachers contacted declined the observation. It was felt that the group who declined observation was too small to significantly bias the results of the study.

This procedure, in conjunction with the review of pertinent literature as a foundation, enabled the researcher to develop and field-test an instrument which was intended to be used to determine the regular education public kindergarten through grade eight classroom teachers' perceptions of their responsibilities, abilities and

effectiveness in teaching to the individual needs and learning styles of students. This chapter details analyses of data generated for each procedural step.

Analysis of Initial Questions

A search of existing questions and scales pertinent to the topic of the study was conducted, and sets of like questions were generated for consideration (see Appendix A). These questions were submitted to a panel of six individuals who have studied and worked with teaching styles of kindergarten through grade eight classroom teachers (Appendix C). These experts were asked to judge questions in terms of their relevance to measuring individual teaching styles of teachers, defined as teachers' personal behaviors and media technologies chosen to deliver and receive information. The experts were also asked to indicate whether both statements in each set said the same thing, or whether they felt that one statement was clearer than the other. This questionnaire and cover letter may be found in Appendix B.

Five of the six experts (see Appendix C) responded to the questionnaire. The criteria established for decision to retain or reject a question set were as follows: questions receiving two or more inappropriate or very inappropriate responses were rejected; questions receiving two or more appropriate or very appropriate marks and no more than one inappropriate or very inappropriate mark were retained; questions receiving three or more marks indicating that one was superior to the other and no qualifying statements were rejected; and questions receiving two or more marks indicating that neither was

superior and both asked the same thing were retained. A summary of the expert critique of the questionnaire may be found in Table 3.

Table 3 shows that 35 of the initial 52 sets of questions were retained and 17 sets of questions were rejected. Content (face) validity of the group of 35 sets of questions were therefore established by the panel of experts. The 35 sets of questions were then utilized to construct the initial questionnaire for the study.

Analysis of Initial Questionnaire

The 35 sets of questions approved by the panel of experts were separated into 70 questions; each set was intended to elicit similar responses in order to ascertain internal construct validity. These questions were put in order, and the questionnaire was formatted, precolumned and precoded with the assistance of one professor of Elementary Education and the Director of Testing Services at Montana State University. A cover letter and a form for response to the questionnaire were also drafted. This questionnaire, cover letter and response form are found in Appendix D.

This instrument as initially constructed was given to fifteen teachers in order to get their reactions as to format, length, clarity of questions and general appearance of the survey. Teachers were encouraged to be open and candid about the instrument and the process of administration.

All fifteen teachers surveyed responded to the questionnaire. The criteria established for decision to retain or alter the questionnaire were as follows: questions receiving two-thirds of the

Table 3

Expert Critique of Questions
(n=5)

Question Set		Degree of Appropriateness					Preferred Statement			Decision
		VA	A	U	I	VI	A	B	None	To Use
Set 1:	A	3	1							
	B	3					1	2	2	Retain
Set 2:	A	1	1	1		1				
	B				2	1	2	1	2	Reject
Set 3:	A	1	1		1					
	B	1	2		1		2	1	1	Reject
Set 4:	A	4								
	B	2	1				4		1	Reject
Set 5:	A	3	1							
	B		1				4	1		Reject
Set 6:	A	1	2							
	B	1	3				1	2	2	Retain
Set 7:	A	2	1							
	B	2			2		2	2	1	Reject
Set 8:	A	1	1		1					
	B	2	2				1	2	1	Retain
Set 9:	A	1	2							
	B	2	2				1	2	2	Retain
Set 10:	A	2	1							
	B	3					1	2	2	Retain
Set 11:	A	3			1					
	B	3					1	2	2	Retain
Set 12:	A	2	1							
	B	3	1				1	2	2	Retain
Set 13:	A	3								
	B	2	1		1		2	2	1	Reject
Set 14:	A	3	1							
	B	3					1	2	2	Retain
Set 15:	A	2	2							
	B	3					3	1	1	Reject
Set 16:	A	2	1							
	B	4					1	2	2	Retain
Set 17:	A	2	1							
	B	4					1	2	2	Retain
Set 18:	A	2	1							
	B	4					1	2	2	Retain
Set 19:	A	2	1							
	B	4					1	2	2	Retain
Set 20:	A	2	2							
	B	1	2		1		4		1	Reject
Set 21:	A	2	2							
	B		1	1	1		3	1	1	Reject

Table 3 (continued)

Question Set		Degree of Appropriateness VA	A	U	I	VI	Preferred Statement A	B	None	Decision To Use
Set 22:	A	3								
	B	3	1				1	2	2	Retain
Set 23:	A	3	1							
	B	2	1	1			3		1	Reject
Set 24:	A	3	1							
	B	3					2	1	2	Retain
Set 25:	A	2	1							
	B	1	3				1	2	2	Retain
Set 26:	A		3		1					
	B	2	1				1	3	1	Reject
Set 27:	A	1	1		1					
	B	3	1				1	3	1	Reject
Set 28:	A	2	2							
	B	3	1				1	1	2	Retain
Set 29:	A	3	1							
	B	3					2	1	2	Retain
Set 30:	A	2	1							
	B	3	1				1	2	2	Retain
Set 31:	A	1	3							
	B	1	2				3		1	Reject
Set 32:	A	2	1							
	B	3	1				1	2	2	Retain
Set 33:	A	1	1		1					
	B	2	2				1	2	2	Retain
Set 34:	A	3	1							
	B	3					2	1	2	Retain
Set 35:	A	2	2							
	B	3					1	2	2	Retain
Set 36:	A	2	1	1						
	B	2			1		2	1	2	Retain
Set 37:	A	2	2							
	B	1	2				2	1	2	Retain
Set 38:	A	2	1							
	B	1	3				1	2	2	Retain
Set 39:	A	4								
	B	2	1				4		1	Reject
Set 40:	A	3	1							
	B	3					2	1	2	Retain
Set 41:	A	3								
	B	3	1				1	2	2	Retain
Set 42:	A	2	2							
	B	1	2				2	1	2	Retain

Table 3 (continued)

Question Set		Degree of Appropriateness VA	A	U	I	VI	Preferred Statement A	B	None	Decision To Use
Set 43:	A	2	2							
	B	1	2				2	1	2	Retain
Set 44:	A	3								
	B	2	2				1	2	2	Retain
Set 45:	A	4								
	B	2	1				2	1	2	Retain
Set 46:	A	3			1					
	B	1	1		1		3		1	Reject
Set 47:	A	2	1							
	B	1	1				2	1	2	Retain
Set 48:	A	3			1					
	B	1			2		3		1	Reject
Set 49:	A	2	1							
	B	3	1				3	1	1	Reject
Set 50:	A	3	1							
	B	2	2				2	1	2	Retain
Set 51:	A	1	2		1					
	B	2	1				1	2	2	Retain
Set 52:	A	2	1	1						
	B	3					1	2	2	Retain

respondents' support were retained; questions receiving only one-third of the respondents' support were altered; and suggestions for improvement were utilized when comments clearly increased the efficiency and ease of use of the questionnaire. A summary of the teachers' responses to the initial questionnaire is shown in Table 4.

Table 4 indicates that format, appearance, clarity, directions and administration of the questionnaire were acceptable to the teachers surveyed; the length of the instrument was not acceptable.

Table 4

Teacher Responses to Initial Questionnaire
(n = 15)

Question	Acceptable	Not Acceptable	Comments
1. Format	12	2	Too many lines Too many statement choices
2. Length	2	13	Too long Group common questions Too bulky
3. Appearance	13	2	Motivate Columns congested
4. Clarity	11	2	Some questions similar Some questions too basic Eliminate "should/ can"; use "successful when"
5. Directions	14	2	"The teacher can" is not clear
6. Administration	6	0	

Although clarity was acceptable to the group, the comments indicated that the column headings were unclear.

The following changes in the instrument were made as a result of this survey: The column headings were reworded to read "Ideally, a teacher should" and "Realistically, a teacher can," rather than as originally stated. A statement of explanation of necessary survey length was added to the cover letter, since sets of questions were essential at this stage of questionnaire development, and the finished instrument would contain only one question from each set. The revised questionnaire and cover letter are found in Appendix E.

Analysis of First Field Test of Questionnaire

The revised questionnaire and cover letter were field tested with fifty experienced kindergarten through grade eight classroom teachers from West Elementary School and Riverview Elementary School in Great Falls, Montana. The test and retest were given within two weeks of each other. Each teacher was also asked to comment on an open-response form after taking the second test. This form is included with the questionnaire (Appendix E). The open-response form invited commentary regarding clarity of questions, length of exam and motivation for completing the task.

Forty-one of the fifty teachers surveyed responded to the first test, and twenty-eight of these teachers also completed the retest. Spearman's rho correlation coefficients (SPSS^{x}, 1986) were generated to measure test/retest reliability and internal consistency of question sets. The criterion established for decision to consider the

test/retest items reliable and question sets internally consistent was orginally planned to be set at a level of .85 or greater. However, moderately low correlations within the large number of tests made this pass extremely difficult to interpret. From a pragmatic vantage point, it was decided to set the correlation coefficient level at .35 for continuation of the study. If any three of the six test/retest groups (see Table 5) fell below .35, that group set was discarded. This lower level correlation coefficient allowed more questions to be retained and enabled the researcher to utilize the comments of respondents to further refine the questionnaire. A summary of the correlation coefficients generated for the combined teacher responses to the first field test/retest of the questionnaire may be found in Table 5. Teacher comments derived from the open-response form are summarized and displayed in Table 6.

From Table 5 it can be seen that only four items had a .85 or greater correlation coefficient (items 2, 23, 50 and 58). Teacher commentary indicated that the length of the instrument significantly affected response to the questionnaire. This table shows that 24 of the initial 35 sets of questions were retained and 11 sets of questions were rejected, using the criterion level of .35 or greater correlation on three or more out of the six coefficients computed for each question set. Therefore, a relatively low level of test/retest reliability and internal consistency was established for 24 of the original 35 question sets. It was determined that a shorter and simpler questionnaire would be developed, and would be piloted with a second group of

Table 5

Teacher Responses to First Field Test/Retest
(n = 41)

Question Sets		Test/Retest						Question Sets			Decision
		Ideal		Realistic		Tried		Ideal	Realistic	Tried	
A	B	A	B	A	B	A	B	A&B	A&B	A&B	
1	36	.36	.29	.79	.20	.54	.34	.31	.39	.62	Reject
2	37	.58	.73	.70	.54	.85	.55	.51	.35	.35	Retain
3	38	.60	.69	.80	.75	.57	.52	.41	.18	.29	Retain
4	39	.61	.48	.54	.46	.42	.23	.29	.29	.46	Reject
5	40	.54	.60	.52	.46	.44	.10	.35	.26	.55	Retain
6	41	.01	.25	.68	.28	.46	.45	.46	.28	.47	Reject
7	42	.22	.15	.78	.40	.31	.58	.66	.58	.37	Reject
8	43	-.10	.57	.66	.79	.51	.70	.43	.12	.16	Reject
9	44	.41	.62	.41	.46	.59	.56	.49	.23	.65	Retain
10	45	.46	.44	.57	.49	.49	.57	.65	.54	.43	Retain
11	46	.61	.30	.68	.51	.50	.62	.57	.27	.54	Retain
12	47	.39	.42	.71	.56	.42	.22	.56	.30	.42	Retain
13	48	.42	.43	.09	.15	.34	.45	.48	.04	.35	Reject
14	49	.41	.42	.56	.72	.62	.48	.56	.48	.40	Retain
15	50	.47	.57	.73	.89	.55	.78	.80	.63	.62	Retain
16	51	.65	.45	-.07	.31	.25	.49	.70	.11	.44	Reject
17	52	.34	.29	.60	.59	.32	.28	.43	.32	.39	Reject
18	53	.44	.73	.09	.47	.73	.46	.56	.04	.24	Reject
19	54	.44	.43	.29	.49	.73	.46	.60	.32	.41	Retain
20	55	.36	.52	.36	.67	.56	.45	.74	.55	.38	Retain
21	56	.44	.49	.26	.42	.65	.53	.67	.42	.71	Retain
22	57	.39	.76	.29	.14	.57	.72	.57	.57	.63	Retain
23	58	.88	.85	.95	.77	.92	.71	.91	.59	.65	Retain
24	59	.38	.13	.49	.63	.61	.33	.64	.55	.61	Retain
25	60	.45	.54	.49	.69	.31	.50	.27	.20	.45	Reject
26	61	.31	.52	.51	.72	.57	.61	.72	.50	.56	Retain
27	62	.30	.37	.40	.77	.54	.66	.61	.20	.46	Retain
28	63	.38	.35	.44	.68	.34	.76	.61	.46	.69	Retain
29	64	.31	.61	.75	.75	.82	.74	.68	.48	.61	Retain
30	65	.47	.80	.65	.59	.72	.84	.67	.62	.73	Retain
31	66	.50	.47	.64	.47	.54	.54	.49	.30	.31	Retain
32	67	.36	.53	.42	.13	.44	.28	.75	.48	.62	Retain
33	68	.45	.43	.64	.75	.59	.67	.57	.55	.68	Retain
34	69	.58	.59	.56	.59	.49	.72	.62	.49	.72	Retain
35	70	.52	.47	.32	.55	.33	.67	.61	.28	.70	Reject
Total									24 Sets Retained 11 Sets Rejected		

Table 6

Teacher Commentary on First Field Test of Questionnaire
(n = 28)

Question	Acceptable	Not Acceptable	Comments
1. Format	8	5	Too complicated
2. Length	2	19	Too much per page Intimidating
3. Appearance	9	4	Too much
4. Clarity	10	4	
5. Directions	14	2	Confusing
6. Administration	7	2	Not enough time was given
7. Suggestions			Shorten Simplify Too repetitive

classroom teachers in an effort to establish a level of correlation coefficients at .85 or greater. Teacher comments derived from the open-response form were also utilized in developing the questionnaire and cover letter. If five or more respondents (20 percent) reported that the instrument was not acceptable, revisions were made. The results of the response to this form are summarized and displayed in Table 6.

The data from Table 6 indicated that format, appearance, clarity, directions and administration of the questionnaire were acceptable to the teachers surveyed; the length of the instrument was not acceptable. Format and appearance were intimidating and in need of simplification.

The following changes in the instrument were made as a result of this survey: Items having less than a .35 level of correlation coefficient on three or more of the six coefficients computed for each question set were omitted. Some item language was further refined. Question sets were altered to negative and positive, rather than both positive, at the suggestion of two members of the dissertation reading committee. The cover letter and questionnaire were shortened and simplified. This cover letter and questionnaire may be found in Appendix F.

Analysis of Second Field Test of Questionnaire

The revised questionnaire and cover letter were field tested with thirty-six experienced kindergarten through grade eight classroom teachers enrolled at Montana State University. The test and retest were given within two weeks of each other. Each teacher was again requested to comment on an open-response form after taking the second test. This form is included with the questionnaire and is found in Appendix F.

Twenty-one of the thirty-six teachers surveyed responded to the test/retest. Spearman's rho correlation coefficients (SPSS^{X}, 1986) were generated to measure test/retest reliability and internal consistency of question sets. The criterion established for decision to consider the test/retest items reliable and question sets internally consistent was again planned to be set at a level of .85. However, the use of negative and positive question sets resulted in unforeseen

confusion on the part of the respondents and the correlation coefficients generated for these sets reflected this confusion. Therefore, the criterion level was set at .35 for two or more out of the three coefficients computed using each positive question; negative questions were not included in the analysis. Also, correlation coefficients generated for question sets were not utilized as criteria for acceptance or nonacceptance of questions for the above mentioned reasons; a .35 had previously been established for these same question sets when stated positively. Additionally, the panel of experts had established content (face) validity for this group of questions. The comments of respondents were also utilized to further refine the questionnaire. A summary of the correlation coefficients generated for the combined teacher responses to the second pilot test/retest of the questionnaire using only the positive questions is found in Table 7. Complete data generated for both positive and negative questions is found in Appendix G. Teacher comments derived from the open-response form are summarized and displayed in Table 8.

Table 7 indicates that none of the items had a .85 or greater correlation coefficient. It was determined that the use of negative and positive question sets resulted in confusion on the part of the respondents; also, comments indicated that the length of the instrument significantly affected response to the questionnaire. This table shows that only positive questions were used in the analysis of correlation coefficients; 18 of the initial 24 questions were retained and six were rejected, using the criterion level of .35 or greater correlation on two or more of the three coefficients computed for each

question set. Therefore, a .35 level of test/retest reliability was established for 18 of the 24 questions. A .35 level of internal consistency had previously been established for these same question sets when stated positively, and the panel of experts had established content validity for these questions; the panel had also judged the questions sets to be certain that they said the same thing within sets.

Table 7

Teacher Responses to Second Field Test/Retest
(n=21)

Positive Questions	Test/Retest Ideal	Realistic	Tried	Decision
2	.63	.35	.66	Retain
9	.01	.17	.39	Reject
10	.03	.28	.47	Reject
11	.55	.24	.45	Retain
13	.55	.53	.46	Retain
14	.16	.26	.45	Reject
16	.25	.43	.58	Retain
20	.44	.30	.49	Retain
21	.57	.62	.49	Retain
24	.04	.82	.76	Retain
25	.43	.49	.48	Retain
26	.47	.20	.40	Retain
27	.15	.38	.52	Retain
29	.27	.39	.44	Retain
30	.70	.51	.49	Retain
32	.39	.47	.36	Retain
34	.63	.35	.66	Retain
37	.21	.36	.39	Retain
39	.18	.12	.46	Reject
40	.55	.46	.30	Retain
41	.28	.32	.53	Reject
42	.16	.00	.05	Reject
45	.45	.44	.52	Retain
48	.40	.18	.55	Retain
Total			18 questions Retained 6 questions Rejected	

Table 8

Teacher Commentary on Second Field Test of Questionnaire
(n=21)

Question	Acceptable	Not Acceptable	Comments
1. Format	15	3	Attractive Confusing Too long Specific
2. Length	12	8	Too long
3. Appearance	14	2	Too much Crowded Too many items Double space
4. Clarity	11	9	Negatives were confusing "Advance organizer" question difficult Clarify column two
5. Directions	18	3	
6. Administration	18	0	
7. Suggestions			Shorten Simplify Clarify column two Too repetitive Eliminate negative questions Double space

It is important that a questionnaire be as appealing to the eye and as brief and easy to complete as possible (Berdie and Anderson, 1974). Therefore, it was determined that a questionnaire consisting of only positive questions, without question sets, and with a four-point scale that eliminated the neutral answer would be developed. Sudman (1982) stated that for studies done with similar populations and in similar contexts, and where there is no reason to expect changes, using identical questions (as were used for the test/retest) allows estimation of response reliability.

Teacher comments derived from the open-response form were also utilized in developing the questionnaire and cover letter. The results of the response to this form are summarized and displayed in Table 8. If four or more respondents (20 percent) reported that the instrument was not acceptable, revisions were made. Table 8 indicates that format, appearance, directions and administration of the questionnaire were acceptable to the teachers surveyed; length and clarity were unacceptable to many. Format and appearance required simplification and less confusion.

The following changes in the instrument were made as a result of this survey: Items having less than a .35 level of correlation coefficient on two or more of the three coefficients computed for each positive question were omitted. Negative questions were omitted, and the question regarding advance organizers was not included. Three formerly rejected questions were retained, as was question 39, at the request of one member of the dissertation reading committee. These

questions had educational significance relative to the measure of teaching styles, although statistically they did not adhere to the criterion established. Some item language was further refined, and column two was changed from "Realistically, a teacher can" to "Realistically, a teacher is likely to." Question sets were not used in order to shorten and simplify the instrument. The response "neither agree nor disagree" was removed from the questionnaire in order that respondents be encouraged to make a specific choice when answering the questions. According to Sudman (1982), the general practice in survey research has been to omit middle categories explicitly in order to encourage respondents toward one specific choice for response. This cover letter and questionnaire may be found in Appendix H.

Analysis of Third Field Test of Questionnaire

The revised questionnaire and cover letter were field tested with thirty-three experienced kindergarten through grade eight classroom teachers enrolled at Montana State University. The test and retest were given within two weeks of each other. The second test again included an open-response form. This form was included with the questionnaire and is found in Appendix H.

Twenty-five of the thirty-three teachers surveyed responded to the test/retest. Spearman's rho correlation coefficients (SPSS^{x}, 1986) were generated to measure test/retest reliability of questions. The criterion established for decision to consider the test/retest

items reliable was initially set at a level of .85. However, correlations generated were again moderately low; it was decided to set a level of .37 for continuation of tests. If any two of the three test groups fell below .37, that group set was discarded. The comments of respondents were again utilized to further improve the questionnaire. A summary of the correlation coefficients generated for the combined teacher responses to the third pilot test/retest of the questionnaire is found in Table 9. Teacher comments derived from the open-response form are located in Table 10.

Table 9 shows that only item 13 had a .85 or greater correlation coefficient. Although the questionnaire had been significantly shortened and simplified, teacher comments indicated that fatigue of taking the same test twice influenced response. This table shows that 20 of the initial 21 questions were retained and one was rejected, using the criterion level of .37 or greater on two or more out of the three coefficients computed for each question.

Teacher comments gleaned from the open-response form were utilized in further refining the questionnaire and cover letter. If five respondents (20 percent) indicated that the instrument was unacceptable, revisions were made. The results of the response to this form are summarized and displayed in Table 10.

The data from Table 10 indicated that format, length, appearance, clarity, directions, and the process of administration were acceptable to the teachers surveyed. Therefore, these items were not altered.

The following changes in the instrument were made as a result of this survey: Items having less than a .37 level of correlation

Table 9

Teacher Responses to Third Field Test/Retest
(n=25)

Questions	Test/Retest			Decision
	Ideal	Realistic	Tried	
1	.29	.27	.52	Reject
2	.44	.52	.42	Retain
3	.50	.51	.42	Retain
4	.27	.75	.45	Retain
5	.50	.51	.61	Retain
6	.72	.48	.61	Retain
7	.27	.60	.56	Retain
8	.43	.61	.53	Retain
9	.59	.62	.51	Retain
10	.46	.37	.75	Retain
11	.40	.63	.72	Retain
12	.25	.69	.55	Retain
13	.58	.62	.91	Retain
14	.39	.32	.53	Retain
15	.29	.57	.55	Retain
16	.36	.77	.65	Retain
17	.34	.50	.61	Retain
18	.64	.20	.37	Retain
19	.53	.32	.38	Retain
20	.77	.74	.62	Retain
21	.37	.40	.16	Retain
Total			20 questions retained 1 question rejected	

Table 10

Teacher Commentary on Third Field Test of Questionnaire
(n=25)

Question	Acceptable	Not Acceptable	Comments
1. Format	22	3	Very clear Short and simple SD,D,A,SA is confusing Easy to follow Easy to answer
2. Length	24	1	Adequate Not too long
3. Appearance	25	0	Excellent Very neat Easy to read and understand Attractive
4. Clarity	25	0	
5. Directions	24	1	
6. Administration	25	0	

coefficient on two or more of the three coefficients computed for each question were omitted. The cover letter, the questionnaire itself and the twenty retained questions were not altered nor revised; the open-response form was deleted (Appendix I).

The proposal committee had previously agreed that if a .85 correlation coefficient for a sufficient set of questions could not be achieved after three revisions of the questionnaire, a lower level

of correlation would be set. The highest level of correlation coefficient that could be achieved after surveying one hundred nineteen teachers and receiving eighty-seven responses was .37 on two or more coefficients generated.

It was recognized at this point in the study that the instrument was of low reliability. However, the researcher and the dissertation committee decided that there was value in completing the study. In the interests of learning test development techniques, the researcher continued with all analyses. The analyses that follow were conducted as a means to understand the methodology of questionnaire development, but no conclusive generalizations can be made from them.

Analysis of Final Questions

The final questions of the study were submitted to the panel of six experts; this panel had originally critiqued the questions of the study during the initial stages of questionnaire development. Experts were again asked to judge questions in terms of their appropriateness in measuring individual teaching styles of teachers. This questionnaire and cover letter may be found in Appendix J.

Five of the six experts (see Appendix C) responded to the questionnaire. The criteria established for decision to retain or reject a question were as follows: questions receiving one or more very inappropriate response were rejected; questions receiving one or more inappropariate response were critically reconsidered or reworded; questions receiving four or more appropriate or very appropriate marks were retained. A summary of the expert critique of the questionnaire may be found in Table 11.

Table 11

Expert Critique of Final Questions
(n=5)

Question	Degree of Appropriateness				Decision To Use	Comments
	VA	A	I	VI		
1	4	1			Retain	
2	2	2	1		Retain	
3	5				Retain	
4	3	2			Retain	
5	3	2			Retain	
6	4	1			Retain	
7	5				Retain	
8	4	1			Retain	
9	4	1			Retain	
10	5				Retain	
11	5				Retain	
12	4	1			Retain	
13	5				Retain	
14	4	1			Retain	
15	5				Retain	
16	5				Retain	
17	4	1			Retain	
18	4		1		Retain	
19	5				Retain	
20	5				Retain	
						Questions should more specifically describe teacher action or activity. Underline <u>if</u> on third column.
Total					20 Retained 0 Rejected	

Table 11 shows that all 20 questions were retained. Two questions, number 2 and number 18, each received one inappropriate rating. Question 2, which refers to peer tutoring, was retained unchanged since it was considered to be important to the study; question 18 was

slightly reworded. The word "if" was underlined in the third column heading. Content validity of the group of 20 questions was reestablished by the panel of experts. The 20 questions were then utilized in the finalized questionnaire that was mailed to classroom teachers (Appendix K).

The final questionnaire was mailed to eighty-two classroom teachers from the twenty-six elementary school districts of Gallatin and Lewis and Clark Counties (see Appendix L). This sampling included eighteen single-grade primary; fifteen single-grade intermediate; seventeen single-grade upper-intermediate; six multi-grade primary; eight multi-grade intermediate; nine multi-grade upper-intermediate; and nine kindergarten through grade eight teachers. Questionnaires were number-coded and nonrespondents were contacted two weeks after the original questionnaire forms were sent. The number of classroom teachers responding is shown in Table 12.

Table 12

Classroom Teachers Responding to Questionnaire
(n=68)

Classroom Teachers	Number Surveyed	Number Responding
Single-grade Primary	18	18
Single-grade Intermediate	15	15
Single-grade Upper-intermediate	17	9
Multi-grade Primary	6	6
Multi-grade Intermediate	8	7
Multi-grade Upper-intermediate	9	6
Kindergarten through Grade Eight	9	7
Total	82	68

Table 12 indicates that 68 of the 82 teachers surveyed responded to the questionnaire. Primary and intermediate groups received a higher rate of return than did upper-intermediate groups.

Results of the Factor Analysis Assessment

The data generated by the twenty questions of the questionnaire were submitted to a factor analysis assessment (SPSS^{x}, 1986) to determine whether items fell into consistent categories. Columns one through three, labeled "Ideally, I feel a teacher should," "Realistically, a teacher is likely to" and "I have been successful when I have tried," were factored separately. The factors derived were used to verify the internal construct validity of the questionnaire, and as predictor variables in the discriminant analysis assessment (SPSS^{x}, 1986). The results of the factor analysis assessment are summarized and displayed in Tables 13, 14 and 15.

Tables 13 through 15 show that each of the three questionnaire columns were answered in different ways since different factors were extracted from each of the three columns. The second column labeled "Realistically, a teacher is likely to" (Table 14) received very similar responses to 16 of the 20 questions. This resulted in failure of the factor analysis to reach a rotated solution. Column two was therefore not included in the next stages of analysis. The first and third columns (Table 13 and 15) indicate that questions were answered in different ways by respondents and therefore clustered into distinct groupings. On all three columns, questions 3 and 6 were uniquely grouped.

Table 13

Rotated Factor Matrix 1: Ideal Variable
(n=68)

Variable	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6
Id1	.066	.297	.165	.263	-.264	-.637
Id2	-.021	-.088	.795	-.139	.189	-.084
Id3	-.067	.153	.119	.055	-.249	.712
Id4	.747	.092	.066	.293	-.079	.126
Id5	.720	.220	.088	-.045	.038	-.222
Id6	-.026	.067	-.053	.040	.849	-.079
Id7	.114	.788	-.028	.188	-.095	-.085
Id8	.308	.694	.035	-.326	.091	-.075
Id9	.483	.476	-.029	.225	.050	.157
Id10	.252	.169	.386	.498	.337	.272
Id11	.271	.120	-.022	.811	.025	-.168
Id12	.579	.440	.219	.244	-.007	.013
Id13	.388	.425	.316	.187	-.050	.079
Id14	.493	.404	.334	.162	-.295	.101
Id15	.854	.053	.169	.099	.032	-.121
Id16	.353	.258	.541	.122	-.164	-.049
Id17	.272	.264	.559	.475	-.130	.034
Id18	.174	.642	.431	.126	-.080	-.043
Id19	.201	.262	.638	.131	-.270	.220
Id20	.083	.717	.256	.192	.337	.176

Reliability Analysis for Factor Scale 1

Id4	Id1	Id2	Id10	Id6	Id3
Id5	Id7	Id16	Id11		
Id9	Id8	Id17			
Id12	Id13	Id19			
Id14	Id18				
Id15	Id20				
Alpha	.823	.762	.686	.509	

Table 14

Unrotated Factor Matrix 2: Realistic Variable
(n=68)

Unrotated Factor Matrix 2*					
Variable	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
Re1	.653	.310	-.230	-.099	.034
Re2	.428	.510	.243	-.493	-.001
Re3	.420	-.197	-.215	-.151	.563
Re4	.747	.152	-.365	.001	-.116
Re5	.633	.266	-.464	-.026	.134
Re6	-.298	.465	.140	.335	.581
Re7	.733	-.098	.040	-.268	.165
Re8	.675	.229	-.033	-.085	-.098
Re9	.784	.057	.027	-.121	-.193
Re10	.325	.676	.264	.250	-.026
Re11	.771	-.248	.100	.041	-.094
Re12	.682	.048	-.103	.157	-.211
Re13	.685	.288	.167	.267	-.102
Re14	.739	-.177	-.382	.175	.121
Re15	.627	-.222	.074	.423	.100
Re16	.592	-.144	.418	-.281	.281
Re17	.611	-.236	.333	.300	.096
Re18	.700	-.159	.041	.182	-.114
Re19	.645	-.161	.307	-.070	-.159
Re20	.660	-.231	.102	-.140	.171

*Could not converge on a rotated solution.

Table 15

Rotated Factor Matrix 3: Tried Variable
(n=68)

Rotated Factor Matrix 3

Variable	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6
Tr1	.559	.406	.280	-.002	-.241	.110
Tr2	-.983	.634	-.290	-.034	.318	-.116
Tr3	.089	-.030	.025	-.040	-.022	.899
Tr4	.726	-.089	.300	.115	.096	.095
Tr5	.622	.072	.487	-.030	-.093	-.034
Tr6	-.093	-.017	.169	-.071	.814	-.014
Tr7	.204	.231	.562	.111	.224	.208
Tr8	.557	.516	-.141	.054	-.030	-.024
Tr9	.481	-.095	.009	.666	.195	-.113
Tr10	-.007	.335	.088	.684	.049	.018
Tr11	-.002	.104	.222	.812	-.169	.092
Tr12	.180	.285	.583	.410	-.243	-.155
Tr13	.373	.118	.068	.429	.359	-.265
Tr14	.444	.402	.423	.147	.076	.186
Tr15	.679	.240	.089	.111	.015	.128
Tr16	.352	.222	.031	.182	.531	.479
Tr17	.018	.586	.329	.353	-.121	.139
Tr18	.195	.659	.261	.184	.158	-.007
Tr19	.226	.648	.158	.138	-.132	.022
Tr20	.180	-.029	.794	.142	.194	-.044

Reliability Analysis for Factor Scale 3

Tr1	Tr2	Tr7	Tr9	Tr6	Tr3
Tr4	Tr17	Tr12	Tr10	Tr16	
Tr5	Tr18	Tr20	Tr11		
Tr8	Tr19		Tr13		
Tr14					
Tr15					
Alpha	.796	.647	.648	.655	.390	

The first column of the questionnaire was labeled "Ideally, a teacher should." Rotated Factor Matrix 1 (Table 13) shows that six factors were extracted in the analysis. Table 16 displays the questions included within each factor.

The factors extracted from column one of the questionnaire were labeled in accordance with the questions included within each cluster as follows: (I) flexibility of response to learner characteristics and task sequence, defined by questions 4, 5, 9, 12, 14 and 15; (II) flexibility of materials, methods and room organization, defined by questions 1, 7, 8, 13, 18 and 20; (III) flexibility of student placement and pacing, defined by questions 2, 16, 17 and 19; and (IV) utilization of media and problem solving, defined by questions 10 and 11. Questions 6 and 3 were grouped separately and treated as unique factors. The alphas computed for these four scales demonstrated internal construct validity. The six groups of questions from column one of the questionnaire, labeled "Ideal," were used as predictors of demographic variables in the discriminant analysis assessment. The twenty questions of the study were included in the observation form (Appendix M). These observed items were clustered into groupings identical to the "Ideal" items. These responses were used as predictors of demographic variables in the discriminant analysis assessment in order to assess the presence or absence of the "Ideal" variables in the classroom.

Table 16

Questionnaire Items Within Each Ideal (ID) Factor
(n=68)

Factor	Alpha		Questions
1	.823	Id4	Involve students in manipulating objects
		Id5	Allow student mobility
		Id9	Utilize different styles of teaching
		Id12	Reorganize the sequence of tasks when needed
		Id14	Utilize the discovery method of teaching
		Id15	Provide flexibility in room environment
2	.762	Id1	Provide flexibility of materials
		Id7	Adjust lessons to accommodate learning styles
		Id8	Use positive reinforcement with students
		Id13	Conduct class discussion
		Id18	Reorganize classroom for different needs
		Id20	Teach techniques for effective learning
3	.686	Id2	Place students according to ability
		Id16	Consider student learning characteristics
		Id17	Change group composition periodically
		Id19	Adapt teaching pace to students
4	.655	Id10	Utilize films and other media
		Id11	Utilize problem solving in lessons
5		Id6	Utilize the lecture method of teaching
6		Id3	Utilize peer tutoring

The third column reflecting styles utilized in classrooms was labeled "I have been successful when I have tried." Rotated Factor Matrix (Table 15) shows that six factors were extracted in the analysis. Table 17 displays the questions included within each factor.

The factors extracted from column three were labeled in accordance with the questions included within each cluster as follows: (I) flexibility of response to learner characteristics and materials defined by questions 1, 4, 5, 8, 14 and 15; (II) flexibility of room organization, pacing and student placement, defined by questions 2, 17, 18 and 19; (III) adaptation of instruction to students, defined by questions 7, 12 and 20; and (IV) utilization of media, problem solving and different styles of teaching, defined by questions 9, 10, 11 and 13. Questions 6, 16 and 3 were grouped separately and treated as unique factors. The alphas computed for these four scales demonstrated internal construct validity. The seven groups of questions from column three of the questionnaire, labled "Tried," were used as predictors of demographic variables in the discriminant analysis assessment. The twenty questions of the study, also included in the observation form (Appendix M), were regrouped into clusters identical to the "Tried" items. These responses were used as predictors of demographic variables in the discriminant analysis assessment in order to assess the presence or absence of the "Tried" variables in the classroom.

Table 17

Questionnaire Items Within Each Tried (TR) Factor
(n=68)

Factor	Alpha		Questions
1	.796	Tr1	Provide flexibility of materials
		Tr4	Involve students in manipulating objects
		Tr5	Allow student mobility
		Tr8	Use positive reinforcement with students
		Tr14	Utilize the discovery method of teaching
		Tr15	Provide flexibility in room environment
2	.647	Tr2	Place students according to ability
		Tr17	Change group composition periodically
		Tr18	Reorganize classroom for different needs
		Tr19	Adapt teaching pace to students
3	.648	Tr7	Adjust lessons to accommodate learning styles
		Tr12	Reorganize the sequence of tasks when needed
		Tr20	Teach techniques for effective learning
4	.655	Tr9	Utilize different styles of teaching
		Tr10	Utilize films and other media
		Tr11	Utilize problem solving in lessons
		Tr13	Conduct class discussions
5	.390	Tr6	Utilize the lecture method of teaching
		Tr16	Consider student learning characteristics
6		Tr3	Utilize peer tutoring

Preparation for Observation

The observation form (Appendix M) includes all twenty questions of the study. The observational items were utilized to predict demographic group membership of respondents, and were analyzed in two ways: 1) Observed items were clustered in accordance with the Ideal (ID) factors generated from the factor analysis assessment (SPSS^{X}, 1986) of column one. Discriminant analysis was then conducted to predict grade level taught, single or multi-grade classroom, and other demographic variables as measured by questionnaire and observed responses. 2) Observed items were regrouped in accordance with the Tried (TR) factors generated from the factor analysis assessment (SPSS^{X}, 1986) of column three. Discriminant analysis (SPSS^{X}, 1986) was conducted to predict grade level taught, single or multi-grade classroom, and other demographic variables as measured by questionnaire and observed responses.

The observation form of the study (Appendix M) included a comment section for each item to be observed. All items were defined in detail (Appendix N) so that the observer would be as objectively focused upon evidence or nonevidence of the presence of each item as possible. The observer was an experienced classroom teacher with graduate training in supervision and observation of elementary teachers. She also had experience in supervising and observing paraprofessionals.

The observation form included the following information: observer name; teacher name; date; beginning and ending observation time; grade level(s) observed; single or multi-grade level; and number of students in the class. The twenty observed items of the study were scored as

follows: (1) directly observed negative or no opportunity to observe; (2) evidence suggests negative; (3) evidence suggests positive; and (4) directly observed positive (Appendix M). The twenty "Ideal" and "Tried" items of the study were similarly scored: (1) strongly disagree; (2) disagree; (3) agree; and (4) strongly agree (Appendix K).

The researcher and the observer met three times prior to observation for the purpose of training; once following the initial observation of teachers; and regularly throughout the observational period in order to review and discuss each observation that was made prior to insertion of data into the computer. Appendix O includes training-session objectives, dates met and forms used. Inter-observer reliability was not formally tested since there was only one observer; however, the researcher and the observer reached consensus regarding evidence and nonevidence of the presence of each teaching-style item measured (see Appendix N).

Thirty-one of the sixty-eight teachers who responded to the questionnaire represented school districts within a forty-mile radius of Bozeman. These teachers were contacted by telephone. Twenty-nine agreed to one-hour classroom observations; two did not consent.

It is recognized that the time limitation placed on the classroom observations produced only a sampling of actual classroom practice, which could seriously affect the validity of the observational data. However, the observer used many different indices for evidence and nonevidence of the teaching styles, including lesson plans, charts, and posted grouping information.

The trained observer utilized the observation form related to the questionnaire (Appendix M) to record evidence of the presence or absence of the teaching styles included in the questionnaire. The observer used the guidelines ennumerated in Appendix N to clarify terms, so that a high level of objectivity could be maintained.

Results of the Discriminant Analysis Assessment

The data were then submitted to a discriminant analysis assessment (SPSS^{x}, 1986) in order to understand the methodologies involved in obtaining a statistically reliable assessment of the predictability of demographic data as related to the observed and questionnaire responses. The following tables summarize the results of the discriminant analysis assessment.

Tables are organized in the following manner:

1. ID (Ideally, a teacher should) and OBS (observed) items were clustered in accordance with the factors generated from the factor analysis assessment of column one of the questionnaire. These "Ideal" and observed items represent four factors and two unique factors. These factors were labeled as follows: (IDA and OBSA) flexibility of response to learner characteristics and task sequence; (IDB and OBSB) flexibility of materials, methods and room organization; (IDC and OBSC) flexibility of student placement and pacing; (IDD and OBSD) utilization of media and problem solving; (ID3 and OBS3) utilization of peer tutoring; and (ID6 and OBS6) utilization of the lecture method of teaching.

2. TR (I have been successful when I have tried) and OBS (observed) items were clustered in accordance with the factors generated from the factor analysis assessment of column three of the questionnaire. These "Tried" and observed items represent four factors and three unique factors. These factors were labeled as follows: (TRE and OBSE) flexibility of response to learner characteristics and materials; (TRF and OBSF) flexibility of room organization, pacing and student placement; (TRG and OBSG) adaptation of instruction to students; (TRH and OBSH) utilization of media, problem-solving and different styles of teaching; (TR3 and OBS3) utilization of peer tutoring; (TR6 and OBS6) utilization of the lecture method of teaching; and (TR16 and OBS16) adaptation of lessons to accommodate learning styles.

The commentary that follows each table will be directly related to the following research questions: (1) To what degree is it possible to develop a valid and reliable instrument that ascertains teacher perceptions of responsibilities, abilities and effectiveness in teaching to the individual needs and learning styles of students? It was found that content (face) and internal construct validity were demonstrated for this instrument which was intended to measure teacher perceptions of responsibilities, abilities and effectivness in teaching to the individual needs and learning styles of students. However, this instrument was of low reliability. The researcher and the dissertation committee decided that there was value in the completion of the study, and all analyses were completed in the interests of understanding questionnaire development techniques. (2) To what degree is it possible to predict demographic group membership

of teachers responding to the questionnaire by actual observation of classroom practice? The observations conducted in the study were inconclusive, since the instrument they were designed to reflect was of low reliability. Given the low level of reliability reported (.37), and understanding the difficulty of making generalizations from this data, the researcher continued this study to identify possible trends and explore the process of instrument design and validation. The process employed was valid, yet the researcher was unable to attain a reliable coefficient in this study. The second research question was therefore not possible to answer. Had this been a reliable instrument, it might be concluded from the observations that teachers grouped by grade level taught were significantly predicted by perceptions of effectiveness in flexing to learning characteristics and task sequence.

Teacher perceptions of responsibilities were measured by the variables labeled "Ideally I feel a teacher should." Teacher perceptions of abilities were measured by variables entitled "Realistically, a teacher is likely to." Teacher perceptions of effectiveness were measured by the variables labeled "I have been successful when I have tried." It was determined that the observed significance level would be set at $p \leq .05$. If the canonical correlation between the first discriminant function and the groups of respondents clustered in accordance with each demographic variable was not statistically significant, the responses were judged to not significantly discriminate the groups. The reported percent of predicted group membership

refers to the actual percentage of grouped respondents answering the questionnaire in a manner consistent with other members of their group.

The following predicted variables were analyzed in terms of questionnaire and observed responses: grade level taught; single or multi-grade classroom; years of teaching experience; educational level of teacher; teacher age; teacher gender; number of students in class; attitude toward teaching; vocational commitment, and prior knowledge of accommodating student learning styles. Because instrument reliability was low, no conclusive findings can be reported. However, had this been a reliable instrument it might be concluded from the discriminant analysis assessment that the combined variables grade level taught and single or multi-grade classroom (Tables 18 through 21) and the single variable grade level taught (Tables 22 through 25) were significantly predicted by the questionnaire and observed responses, and also had comparable group sizes. The variables single and multi-grade classroom, years of teaching experience, educational level of teacher, teacher age, number of students in class, attitude toward teaching, and prior knowledge of accommodating student learning styles were not significantly predicted by the questionnaire and observed responses. The variables teacher gender and vocational commitment were significantly predicted by the responses, but group sizes were disproportionate.

Tables 18 through 21 display the results of the discriminant analysis assessment (SPSS^{x}, 1986) of questionnaire response when grouped by the strata grade level taught and single or multi-grade classroom. Group 1 = single primary kindergarten through grade two;

group 2 = single intermediate grade two through five; group 3 = single upper-intermediate grades six through eight; group 4 = multi-group primary kindergarten through two; group 5 = multi-grades intermediate three through five; group 6 = multi-grade upper-intermediate six through eight; and group 7 = multi-grades kindergarten through eight.

It was found that the combined demographic variables grade level taught and single or multi-grade classroom were significantly predicted by the Ideal variables "flexibility of response to learner characteristics and task sequence" and "flexibility of materials, methods and room organization." The observational data predicted group membership in terms of the Ideal variable "flexibility of response to learner characteristics and task sequence" in the classroom. The Tried variable labeled "flexibility of response to learner characteristics and materials" significantly predicted the demographic variables grade level taught and single or multi-grade classroom. The observational data failed to be usable as a predictor in terms of the Tried variable in the classroom.

Ideal Variable: Table 18 shows that the canonical correlation between the first discriminant function and the groups is .627. This is statistically significant ($p \leq .005$), and is responsible for 53.09 percent of the variance. The canonical correlations between the second through sixth discriminant functions and the groups are lower and not statistically significant. Therefore, the groups are discriminated primarily on the first function. The F ratios indicate that IDA ($p \leq .001$) and IDB ($p \leq .045$) have significantly unequal group means.

The standardized discriminant function coefficients indicate that function one is primarily composed of IDA and IDB. Box's M test

Table 18

Classification Results: Ideal Variable Grade Level Taught--Single and Multi-grade
(n=68)

Variable	F-Ratio	Significance	Standardized Canonical Discriminant Function Coefficients Function 1	Function 2	Function 3
IDA	4.521	.001	1.028	-.504	.282
IDB	2.299	.045	.370	.536	.198
IDC	1.417	.222	-.085	.385	-1.085
IDD	1.828	.108	-.785	-.936	.069
ID3	.340	.912	-.057	.189	.588
ID6	.590	.737	-.077	.464	.261

Canonical Discriminant Functions

Function	Eigenvalue	Percent of Variance	Canonical Correlation	Significance
1	.650	53.09	.627	.005
2	.316	25.86	.490	.179
3	.170	13.90	.381	.551
4	.075	6.13	.264	.822
5	.101	.85	.101	.944
6	.002	.18	.046	.716

Group	No. of Cases	Predicted Group Membership
1	18	44.4%
2	15	33.3%
3	9	55.6%
4	6	33.3%
5	7	42.9%
6	6	33.3%

*Prior probability for each group is .142.
Percent of grouped cases correctly classified: 44.12%

Box's M	Approximate F	Degrees of Freedom		Significance
211.16	1.6544	84,	2076.9	.001

Table 19

Classification Results: Observation of Ideal Variable
Grade Level Taught--Single and Multi-grade
(n=29)

Variable	F-Ratio	Significance	Standardized Canonical Discriminant Function Coefficients Function 1	Function 2	Function 3
OBSA	3.097	.023	.896	-1.007	.307
OBSB	1.666	.176	-.950	.025	.792
OBSC	3.055	.025	.413	1.299	-.347
OBSD	1.666	.176	.599	.627	.386
OBS3	.456	.832	-.015	.675	-.121
OBS6	.970	.468	-.680	.108	.534

Canonical Discriminant Functions

Function	Eigenvalue	Percent of Variance	Canonical Correlation	Significance
1	1.827	44.22	.803	.013
2	1.345	32.55	.757	.091
3	.731	17.69	.649	.420
4	.114	2.76	.320	.861
5	.107	2.60	.311	.671
6	.007	.18	.086	.688

Group	No. of Cases	Predicted Group Membership
1	8	87.5%
2	7	42.9%
3	3	66.7%
4	2	100.0%
5	2	50.0%
6	4	75.0%
7	3	66.7%

*Prior probability for each group is .142.
Percent of grouped cases correctly classified: 68.97%

Box's M	Approximate F	Degrees of Freedom		Significance
121.31	2.7246	21,	592.0	.001

Table 20

Classification Results: Tried Variable Grade Level Taught--Single and Multi-grade (n=68)

Variable	F-Ratio	Significance	Standardized Canonical Discriminant Function Coefficients Function 1	Function 2	Function 3
TRE	3.959	.002	-1.074	.329	-.482
TRF	1.303	.269	.310	.144	.557
TRG	1.329	.258	.017	.471	.004
TRH	1.389	.233	.415	-.939	-.362
TR3	.992	.438	.534	.416	.061
TR6	1.287	.276	.570	.384	-.161
TR16	2.346	.042	-.464	-.384	.911

Canonical Discriminant Functions

Function	Eigenvalue	Percent of Variance	Canonical Correlation	Significance
1	.755	49.62	.655	.001
2	.299	19.68	.480	.077
3	.247	16.27	.445	.170
4	.126	8.31	.334	.399
5	.063	4.19	.244	.487
6	.029	1.93	.168	.419

Group	No. of Cases	Predicted Group Membership
1	18	41.1%
2	15	6.7%
3	9	55.6%
4	6	83.3%
5	7	47.1%
6	6	66.7%

*Prior probability for each group is .142.
Percent of grouped cases correctly classified: 51.47%

Box's M	Approximate F	Degrees of Freedom		Significance
194.09	2.3999	56,	2211.2	.001

Table 21

Classification Results: Observation of Tried Variable Grade Level Taught--Single and Multi-grade (n=29)

Variable	F-Ratio	Significance	Standardized Canonical Discriminant Function Coefficients Function 1	Function 2	Function 3
OBSE	5.253	.001	1.163	.187	-.467
OBSF	1.990	.110	-.256	-.937	.359
OBSG	.7817	.593	-.313	.796	-.098
OBSH	1.387	.263	.360	-.142	-.085
OBS3	.4567	.832	.136	-.478	.420
OBS6	.9703	.468	.315	.642	.445
OBS16	2.330	.068	.353	.059	.931

Canonical Discriminant Functions

Function	Eigenvalue	Percent of Variance	Canonical Correlation	Significance
1	2.299	52.16	.834	.061
2	1.180	26.77	.735	.370
3	.713	16.19	.645	.743
4	.161	3.67	.373	.978
5	.030	.70	.173	.981
6	.022	.51	.148	.791

Group	No. of Cases	Predicted Group Membership
1	8	62.5%
2	7	28.6%
3	3	33.3%
4	2	100.0%
5	2	50.0%
6	4	100.0%
7	3	100.0%

*Prior probability for each group is .142.
Percent of grouped cases correctly classified: 62.07%

($p \leq .001$) indicates that covariance matrices are not equal. Of the 68 cases, only 44.12 percent were classified correctly.

This data suggested that the variables IDA, labeled "flexibility of response to learner characteristics and task sequence," and IDB, labeled "flexibility of materials, methods and room organization," significantly discriminated teachers grouped by grade level taught and single or multi-graded classrooms. However, predicted group membership is low as related to this variable.

Observation Related to the Ideal Variable: Table 19 shows that the canonical correlation between the first discriminant function and the groups is +.083. This is statistically significant ($p \leq .013$), and is responsible for 44.22 percent of the variance. The canonical correlations between the second through sixth discriminant functions and the groups are lower and not statistically significant. Therefore, the groups are discriminated primarily on the first function. The F ratio indicates that OBSA ($p \leq .023$) and OBSC ($p \leq .025$) have significantly unequal group means.

The standardized discriminant function coefficients indicate that function one is primarily composed of OBSA and OBSC. Box's M test ($p \leq .001$) indicates that covariance matrices are not equal. Of the 29 cases, 68.97 percent were classified correctly.

This data indicates that observational data for the Ideal variable predicted group membership in terms of the variable IDA, labeled "flexibility of response to learner characteristics and task sequence," in the classroom. The observational data resulted in a higher level of correctly classified group membership than did the Ideal variable.

Tried Variable: Table 20 shows that the canonical correlation between the first discriminant function and the groups is +.655. This is statistically significant ($p \leq .001$) and is responsible for 49.62 percent of the variance. The canonical correlations between the second through sixth discriminant functions and the groups are not statistically significant. Therefore, the groups are discriminated primarily on the first function. The F ratios indicate that TRE ($p \leq .002$) and TR16 ($p \leq .042$) have significantly unequal group means.

The standardized discriminant function coefficients indicate that function one is primarily composed of TRE and TR16. These variables are negatively associated with function one (1.074 and .464). Box's M test ($p \leq .001$) indicates that covariance matrices are not equal. Of the 68 cases, only 51.47 percent were classified correctly.

This data suggests that teachers grouped by grade level taught and single or multi-graded classrooms are significantly discriminated by the variables TRE and TR16, labled as "flexibility of response to learner characteristics and materials." Predicted group membership is low as related to this variable.

Observation Related to the Tried Variable: Table 21 shows that the canonical correlation between the first discriminant function and the groups is .834. This is not statistically significant ($p \leq .061$). The canonical correlations between the second through sixth discriminant functions and the groups are lower and not statistically significant. The groups are not significantly discriminated on any of the six functions. Therefore, the observational data failed to predict group membership in terms of the Tried variables in the classroom.

Analysis of the Ideal variable group centroids is as follows:

	Functions					
Group	1	2	3	4	5	6
1	.768	-.173	-.350	-.068	.061	.027
2	.473	.099	.242	.334	-.099	-.000
3	-1.468	-.429	-.428	.244	.018	-.012
4	.396	-.393	.111	-.301	-.009	-.125
5	-.411	.124	.796	.024	.195	.012
6	-.655	-.507	.337	-.491	-.152	.059
7	-.467	1.433	-.250	-.199	-.024	-.008

Group one scored the highest on function one, followed by group two, four, five, seven, six and three. This indicates that single-grade primary teachers perceive themselves as most flexible in response to learner characteristics, task sequence, materials, methods, and room organization. Single-graded intermediate teachers perceive themselves as less flexible, followed by multi-grade primary, multi-grade intermediate, multi-grade kindergarten through grade eight, multi-grade upper-intermediate, and single-grade intermediate.

Analysis of the Observation Related to Ideal variable group centroids is as follows:

	Function					
Group	1	2	3	4	5	6
1	1.221	-.526	.605	-.113	-.006	.051
2	-.048	-.202	.124	.082	-.177	-.121
3	.151	1.792	.019	-.151	.634	-.041
4	1.225	1.166	-.004	.834	-.145	.075
5	-1.319	2.093	-.048	-.453	-.617	.071
6	-2.327	-.694	.461	.231	.162	.055
7	-.130	-1.161	-1.844	-.302	.090	.015

Groups four and one scored the highest on function one, followed by three, two, seven, five and six. This indicates that the observational data predicted group membership in terms of flexibility of response to learner characteristics and task sequence in the classroom, but did

not predict group membership in terms of flexibility of materials, methods and room organization.

Analysis of the Tried variable group centroid is as follows:

	Functions					
Group	1	2	3	4	5	6
1	-1.090	-.011	.001	-.161	.206	-.035
2	.161	.168	-.409	.008	-.104	.253
3	.974	-1.078	.145	-.282	.024	-.023
4	-.932	-.356	.584	.502	-.511	-.046
5	.811	.110	-.066	.765	.359	-.081
6	.431	.430	-.815	-.183	-.283	-.351
7	.825	.880	.950	-.292	-.015	-.000

Group three scored the highest on function one, followed by seven, five, six, two, four and one. This indicates that single-grade upper-intermediate teachers perceive themselves as least flexible in response to learner characteristics and materials, followed by multi-grade kindergarten through eight, multi-grade intermediate, multi-grade upper-intermediate, single-grade intermediate, multi-grade primary, and single-grade primary, who see themselves as most flexible.

Analysis of the Observation Related to Tried variable group centroids is as follows:

	Functions					
Group	1	2	3	4	5	6
1	1.300	.423	-.473	-.014	.154	.018
2	.323	-.088	-.457	.089	-.245	.028
3	.227	-.772	1.483	.158	.037	.249
4	.424	-2.169	.302	-.860	.009	-.182
5	-.218	-.738	.507	.903	.066	-.304
6	-1.003	1.695	.839	-.280	-.039	-.087
7	-3.250	-.475	-.853	.016	.124	.077

The observational data is not statistically significant. Therefore, it failed to predict group membership in terms of the Tried variables in the classroom.

Tables 22 through 25 show the results of the discriminant analysis assessment (SPSS^{x}, 1986) of questionnaire response when grouped by grade level taught. Group 1 = primary grades kindergarten through grade two; group 2 = intermediate grades through five; group 3 = upper intermediate grades six through eight; group 4 = multi-grades kindergarten through eight.

It was found that the demographic variable grade level taught was significantly predicted by the Ideal variables "flexibility of response to learner characteristics and task sequence;" "flexibility of materials, methods and room organization;" and "utilization of media and problem solving." However, the observational data failed to predict group membership in terms of the Ideal variables in the classroom. The Tried variable "flexibility of response to learner characteristics and materials" significantly predicted the variable grade level taught; similar results were obtained with and was verified by the observational data.

Ideal Variable: Table 22 shows that the canonical correlation between the first discriminant function and the groups is .573. This is statistically significant ($p \leq .001$), and is responsible for 52.90 percent of the variance. The canonical correlation between the second discriminant function and the groups is +.487. This is also statistically significant ($p \leq .007$), and is responsible for 33.70 percent of

Table 22

Classification Results: Ideal Variable--
Grade Level Taught
(n=68)

Variable	F-Ratio	Significance	Standardized Canonical Discriminant Function Coefficients Function 1	Function 2	Function 3
IDA	7.848	.001	1.022	-.497	-.018
IDB	3.204	.029	.380	.556	.622
IDC	.971	.411	-.138	.337	-.959
IDD	3.254	.027	-.729	-.950	.380
ID3	.640	.592	-.057	.211	.599
ID6	.797	.499	.003	.466	.262

Canonical Discriminant Functions

Function	Eigenvalue	Percent of Variance	Canonical Correlation	Significance
1	.490	52.90	.573	.001
2	.312	33.70	.487	.007
3	.124	13.39	.332	.123

Group	No. of Cases	Predicted Group Membership
1	24	58.3%
2	22	40.9%
3	15	53.3%
4	7	71.4%

*Prior probability for each group is .250.
Percent of grouped cases correctly classified: 52.94%

Box's M	Approximate F	Degrees of Freedom	Significance
110.08	1.3049	63, 1987.4	.056

Table 23

Classification Results: Observation of Ideal Variable--
Grade Level Taught
(n=29)

Variable	F-Ratio	Significance	Standardized Canonical Discriminant Function Coefficients Function 1	Function 2	Function 3
OBSA	4.851	.008	-1.054	.124	.362
OBSB	3.683	.025	.706	.666	-.490
OBSC	1.452	.251	- .004	.248	-.358
OBSD	1.758	.180	- .082	.519	.449
OBS3	.521	.664	.420	.186	.697
OBS6	1.477	.244	.575	.349	.131

Canonical Discriminant Functions

Function	Eigenvalue	Percent of Variance	Canonical Correlation	Significance
1	.935	55.95	.695	.054
2	.666	39.85	.632	.206
3	.070	4.20	.256	.815

Group	No. of Cases	Predicted Group Membership
1	10	90.0%
2	9	33.3%
3	7	57.1%
4	3	66.7%

*Prior probability for each group is .250.
Percent of grouped cases correctly classified: 62.07%

Box's M	Approximate F	Degrees of Freedom		Significance
96.677	1.3495	42,	1271.5	.068

Table 24

Classification Results: Tried Variable
Grade Level Taught
(n=68)

Variable	F-Ratio	Significance	Standardized Canonical Discriminant Function Coefficients Function 1	Function 2	Function 3
TRE	6.986	.001	-.939	-.161	.347
TRF	1.590	.200	.349	.640	-.681
TRG	2.038	.117	.007	.360	.520
TRH	1.584	.201	.326	-.923	.005
TR3	1.149	.336	.528	.283	.365
TR6	2.351	.080	.648	.135	.501
TR16	2.788	.047	-.664	.370	-.249

Canonical Discriminant Functions

Function	Eigenvalue	Percent of Variance	Canonical Correlation	Significance
1	.696	66.04	.640	.001
2	.260	24.73	.454	.067
3	.097	9.24	.297	.334

Group	No. of Cases	Predicted Group Membership
1	24	83.3%
2	22	40.9%
3	15	60.0%
4	7	71.4%

*Prior probability for each group is .250.
Percent of grouped cases correctly classified: 63.24%

Box's M	Approximate F	Degrees of Freedom		Significance
102.42	1.4874	56,	6870.6	.010

Table 25

Classification Results: Observation of Tried Variable--
Grade Level Taught
(n=29)

Variable	F-Ratio	Significance	Standardized Canonical Discriminant Function Coefficients Function 1	Function 2	Function 3
OBSE	9.666	.001	1.159	-.426	.016
OBSF	.786	.512	-.333	-.091	.022
OBSG	.773	.519	-.283	.259	-.693
OBSH	1.571	.221	.217	-.193	.692
OBS3	.531	.664	.138	.276	.132
OBS6	1.477	.244	.424	.586	.211
OBS16	4.453	.012	.429	.856	-.195

Canonical Discriminant Functions

Function	Eigenvalue	Percent of Variance	Canonical Correlation	Significance
1	1.801	70.07	.801	.018
2	.704	27.39	.642	.339
3	.065	2.54	.247	.921

Group	No. of Cases	Predicted Group Membership
1	10	70.0%
2	9	33.3%
3	7	85.7%
4	3	100.0%

*Prior probability for each group is .250.
Percent of grouped cases correctly classified: 65.52%

Box's M	Approximate F	Degrees of Freedom		Significance
120.91	2.3127	28,	979.0	.001

the variance. The canonical correlation between the third function and the groups is lower and is not statistically significant. Therefore, the groups are discriminated primarily on the first and second funtions. The F ratios indicate that IDA ($p \leq .001$), IDB ($p \leq .029$) and IDD ($p \leq .027$) have significantly unequal group means.

The standardized discriminant function coefficients indicate that function one is primarily composed of IDA; function two is primarily composed of IDB, and is highly negatively associated with IDD ($p \leq .950$). Box's M test ($p \leq .056$) indicates that covariance matrices are similar, and not normally distributed. Of the 68 cases, 52.94 percent were classified correctly.

This data suggests that teachers grouped by grade level taught are significantly discriminated by the variables IDA, IDB and IDD, labeled "flexibility of response to learner characteristics and task sequence;" "flexibility of materials, methods and room organization;" and "utilization of media and problem solving."

Observation Related to the Ideal Variable: Table 23 shows that the canonical correlation between the first discriminant function and the groups is +.695. This is not statistically significant ($p \leq .054$). The canonical correlations between the second and third discriminant functions are lower and not statistically significant. The groups are not significantly discriminated on any of the three functions. The observational data failed to predict group membership in terms of the Ideal variables in the classroom.

Tried Variable: Table 24 shows that the canonical correlation between the first discriminate function and the groups is +.640. This

is statistically significant ($p \leq .001$), and is responsible for 66.04 percent of the variance. The canonical correlations between the second and third discriminate functions and the groups is lower and not significant. Therefore, the groups are discriminated primarily on the first function. The F ratios indicate that TRE ($p \leq .001$) and TR16 ($p \leq .047$) have significantly unequal group means.

The standardized discriminant function coefficients indicate that function one is primarily composed of TRE and TR16. These variables are negatively associated with function one (.939 and .664). Box's M test ($p \leq .010$) indicates that covariance matrices are not equal. Of the 68 cases, 63.24 percent were classified correctly.

This data indicates that teachers grouped by grade level taught are significantly discriminated by the variable TRE and TR16, labeled "flexibility of response to learner characteristics and materials."

Observation Related to Tried Variable: Table 25 shows that the canonical correlation between the first discriminant function and the groups is +.801. This is statistically significant ($p \leq .018$) and is responsible for 70.07 percent of the variance. The canonical correlations between the second and third discriminant functions and the groups are lower and not statistically significant. Therefore, the groups are discriminated primarily on the first function. The F ratios indicate that OBSE ($p \leq .001$) and OBS16 ($p \leq .012$) have significantly unequal group means.

The standardized discriminant function coefficients indicate that function one is primarily composed of OBSE and OBS16. Box's M test

($p \leq .001$) indicates that covariance matrices are unequal. Of the 29 cases, 65.52 percent were classified correctly.

Analysis of the Ideal variable group centroids is as follows:

	Functions		
Group	1	2	3
1	.643	-.242	-.293
2	.214	.127	.475
3	-1.120	-.477	-.066
4	-.479	1.454	-.345

Group one scored the highest on function one, followed by groups two, four and three. This indicates that primary grade teachers perceive themselves as most flexible in response to learner characteristics and task sequence. Intermediate teachers perceive themselves as less flexible; kindergarten through grade eight teachers perceive themselves as less flexible than the first two groups; and upper-intermediate teachers perceive themselves as least flexible of the four groups.

Group four scored the highest on function two, followed by group two, one and three. This indicates that kindergarten through grade eight teachers perceive themselves as highly flexible in utilization of materials, teaching methods, and classroom organization, but do not highly utilize media or problem solving. Intermediate teachers perceive themselves as less flexible, but use more media and problem solving than group four, primary teachers perceive themselves as less flexible than the first two groups, but use more media and problem solving than the first two groups; and upper-intermediate teachers perceive themselves as least flexible, but use the most media and problem solving of the four groups.

Analysis of the Observation Related to Ideal variable group centroids is as follows:

	Functions		
Group	1	2	3
1	-1.031	.444	.119
2	.318	.138	-.353
3	1.264	.126	.261
4	-.465	-2.191	.049

Group three scored the highest on function one, followed by group two, four, and one. However, the observational data was not statistically significant.

Analysis of the Tried variable group centroids is as follows:

	Functions		
Group	1	2	3
1	.643	-.242	-.293
2	.214	.127	.475
3	-1.120	-.477	-.066
4	-.479	1.454	-.345

Group one scored the highest on function one, followed by two, four and three. This indicates that primary grade teachers perceive themselves as most flexible in response to learner characteristics and materials. Intermediate teachers perceive themselves as less flexible; kindergarten through grade eight teachers perceive themselves as less flexible than the other two groups; and upper intermediate teachers perceive themselves as least flexible of the four groups.

Analysis of the Observation Related to Tried variable centroids is as follows:

	Functions		
Group	1	2	3
1	1.082	-.400	-.222
2	.141	-.350	.336
3	-.319	1.363	-.030
4	-3.287	-.794	-.194

Group one scored the highest on function one, followed by group two, three and four. This indicates that the observational data predicted group membership in terms of flexibility of response to learner characteristics and materials at all four levels.

Tables 26 through 29 show the discriminant analysis assessment SPSS^{x}, 1986) of questionnaire response when grouped by single and multi-grade level taught. Group 1 = single grade level; group 2 = multi-grade level. It was found that the demographic variable single or multi-grade level taught was not significantly predicted by the Ideal or Tried variables.

Ideal Variable: Table 26 shows that the canonical correlation between the first discriminant function and the groups is +.362. This is not statistically significant ($p \leq .180$). Teachers grouped by single and multi-grade level classrooms are not significantly discriminated by the Ideal variables.

Observation Related to the Ideal Variable: Table 27 shows that the canonical correlation between the first discriminant function and the groups is +.605. This is not statistically significant ($p \leq .089$). The observational data did not predict group membership in terms of the Ideal variables in the classroom.

Tried Variable: Table 28 shows the canonical correlation between the first discriminant function and the groups is +.378. This is not statistically significant ($p \leq .209$). Teachers grouped by single and multi-grade level classrooms are not significantly discriminated by the Tried variable.

Table 26

Classification Results: Ideal Variable--
Single and Multi-grade
(n=68)

Variable	F-Ratio	Significance	Standardized Canonical Discriminant Function Coefficients Function 1
IDA	5.601	.020	.261
IDB	5.465	.022	.318
IDC	5.865	.018	.402
IDD	3.716	.058	-.297
ID3	.117	.731	-.293
ID6	.585	.446	-.293

Canonical Discriminant Functions

Function	Eigenvalue	Percent of Variance	Canonical Correlation	Significance
1	.151	100.00	.362	.180

Group	No. of Cases	Predicted Group Membership
1	42	71.4%
2	26	65.4%

*Prior probability for each group is .500.
Percent of grouped cases correctly classified: 69.12%

Box's M	Approximate F	Degrees of Freedom		Significance
23.703	1.0087	21,	10381.7	.448

Table 27

Classification Results: Observation of Ideal Variable--
Single and Multi-grade
(n=29)

Variable	F-Ratio	Significance	Standardized Canonical Discriminant Function Coefficients Function 1
OBSA	7.219	.012	.799
OBSB	2.411	.132	-.253
OBSC	1.008	.324	.022
OBSD	6.503	.016	.773
OBS3	.1045	.749	-.048
OBS6	1.081	.307	-.179

Canonical Discriminant Functions

Function	Eigenvalue	Percent of Variance	Canonical Correlation	Significance
1	.578	100.00	.605	.089

Group	No. of Cases	Predicted Group Membership
1	18	72.2%
2	11	81.8%

*Prior probability for each group is .500.
Percent of grouped cases correctly classified: 75.86%

Box's M	Approximate F	Degrees of Freedom		Significance
29.262	1.0160	21,	1644.2	.439

Table 28

Classification Results: Tried Variable--
Single and Multi-grade
(n=68)

Variable	F-Ratio	Significance	Standardized Canonical Discriminant Function Coefficients Function 1
TRE	2.155	.146	-.383
TRF	1.108	.296	-.040
TRG	1.095	.299	-.001
TRH	4.209	.044	-.472
TR3	3.856	.053	.627
TR6	1.454	.232	.378
TR16	.128	.721	.147

Canonical Discriminant Functions

Function	Eigenvalue	Percent of Variance	Canonical Correlation	Significance
1	.166	100.00	.378	.209

Group	No. of Cases	Predicted Group Membership
1	42	59.5%
2	26	57.7%

*Prior probability for each group is .500.

Percent of grouped cases correctly classified: 58.82%

Box's M	Approximate F	Degrees of Freedom		Significance
47.785	1.4952	28,	9881.8	.045

Table 29

Classification Results: Observation of Tried Variable--
Single and Multi-grade
(n=29)

Variable	F-Ratio	Significance	Standardized Canonical Discriminant Function Coefficients Function 1
OBSE	10.830	.002	1.078
OBSF	.245	.624	-.368
OBSG	.762	.390	-.176
OBSH	4.659	.040	.524
OBS3	.104	.749	.048
OBS6	1.081	.307	.009
OBS16	2.131	.155	-.054

Canonical Discriminant Functions

Function	Eigenvalue	Percent of Variance	Canonical Correlation	Significance
1	.865	100.00	.632	.100

Group	No. of Cases	Predicted Group Membership
1	18	83.3%
2	11	81.8%

*Prior probability for each group is .500.
Percent of grouped cases correctly classified: 82.76%

Box's M	Approximate F	Degrees of Freedom	Significance
46.646	1.1374	28, 1565.7	.283

Observation Related to the Tried Variable: Table 29 shows that the canonical correlation between the first discriminant function and the groups is +.632. This is not statistically significant ($p \leq .100$). The observational data did not predict group membership in terms of the Tried variables in the classroom.

Tables 30 through 33 show the results of the discriminant analysis assessment (SPSS^{x}, 1986) of questionnaire response when grouped by years of teaching experience. Group 1 = one to ten years; group 2 = ten plus years. It was found that years of teaching experience was not significantly predicted by the Ideal or Tried variables.

Ideal Variable: Table 30 shows that the canonical correlation between the first discriminant function and the groups is +.117. This is not statistically significant ($p \leq .989$). Teachers grouped by years of teaching experience are not significantly discriminated by the Ideal variable.

Observation Related to the Ideal Variable: Table 31 shows that the canonical correlation between the first discriminant function and the groups is +.311. This is not statistically significant ($\leq .873$). The observational data did not predict group membership in terms of the Ideal variables in the classroom.

Tried Variable: Table 32 shows that the canonical correlation between the first discriminant function and the groups is +.156. This is not statistically significant ($p \leq .980$). Teachers grouped by years of teaching experience are not significantly discriminated by the Tried variable.

Table 30

Classification Results: Ideal Variable--
Years of Teaching Experience
(n=68)

Variable	F-Ratio	Significance	Standardized Canonical Discriminant Function Coefficients Function 1
IDA	.462	.830	.180
IDB	.263	.609	.925
IDC	.369	.951	-.235
IDD	.134	.715	-.788
ID3	.975	.755	-.305
ID6	.485	.826	.237

Canonical Discriminant Functions

Function	Eigenvalue	Percent of Variance	Canonical Correlation	Significance
1	.014	100.00	.117	.989

Group	No. of Cases	Predicted Group Membership
1	35	60.0%
2	33	57.6%

*Prior probability for each group is .500.
Percent of grouped cases correctly classified: 58.82%

Box's M	Approximate F	Degrees of Freedom		Significance
41.647	1.7893	21,	15899.2	.014

Table 31

Classification Results: Observation of Ideal Variable--
Years of Teaching Experience
(n=29)

Variable	F-Ratio	Significance	Standardized Canonical Discriminant Function Coefficients Function 1
OBSA	.931	.343	.773
OBSB	.104	.749	-.132
OBSC	.906	.765	.057
OBSD	.693	.412	.492
OB3	.202	.988	-.212
OBS6	.606	.443	.741

Canonical Discriminant Functions

Function	Eigenvalue	Percent of Variance	Canonical Correlation	Significance
1	.107	100.00	.311	.873

Group	No. of Cases	Predicted Group Membership
1	14	64.3%
2	15	60.0%

*Prior probability for each group is .500.
Percent of grouped cases correctly classified: 62.07%

Box's M	Approximate F	Degrees of Freedom		Significance
35.521	1.2791	21,	2650.8	.176

Table 32

Classification Results: Tried Variable--
Years of Teaching Experience
(n=68)

Variable	F-Ratio	Significance	Standardized Canonical Discriminant Function Coefficients Function 1
TRE	.619	.434	.745
TRF	.185	.989	-.235
TRG	.201	.655	.070
TRH	.251	.618	.419
TR3	.491	.485	.691
TR6	.535	.941	.279
TR16	.788	.977	-.643

Canonical Discriminant Functions

Function	Eigenvalue	Percent of Variance	Canonical Correlation	Significance
1	.025	100.00	.156	.980

Group	No. of Cases	Predicted Group Membership
1	35	51.4%
2	33	60.6%

*Prior probability for each group is .500.
Percent of grouped cases correctly classified: 55.88%

Box's M	Approximate F	Degrees of Freedom	Significance
44.119	1.3965	28, 15064.6	.079

Table 33

Classification Results: Observation of Tried Variable--
Years of Teaching Experience
(n=29)

Variable	F-Ratio	Significance	Standardized Canonical Discriminant Function Coefficients Function 1
OBSE	1.024	.320	.887
OBSF	.481	.493	.037
OBSG	.770	.782	-.329
OBSH	1.200	.283	.720
OBS6	.202	.988	.099
OBS16	1.469	.236	-.927

Canonical Discriminant Functions

Function	Eigenvalue	Percent of Variance	Canonical Correlation	Significance
1	.395	100.00	.532	.347

Group	No. of Cases	Predicted Group Membership
1	14	71.4%
2	15	80.0%

*Prior probability for each group is .500.
Percent of grouped cases correctly classified: 75.86%

Box's M	Approximate F	Degrees of Freedom		Significance
41.080	1.0493	28,	2511.8	.394

Observation Related to the Tried Variable: Table 33 shows the canonical correlation between the first discriminant function and the groups is +.532. This is not statistically significant ($p \leq .347$). The observational data did not predict group membership in terms of the Tried variables in the classroom.

Tables 34 through 37 display the results of the discriminant analysis assessment (SPSSx, 1986) of questionnaire response when grouped by educational level of the teacher. Group 1 = B.S. or B.A., including graduate courses or workshops; group 2 = M.Ed., specialist or other training. It was found that educational level of the teacher was not significantly predicted by the Ideal or Tried variables.

Ideal Variable: Table 34 shows that the canonical correlation between the first discriminant function and the groups is +.258. This is not statistically significant ($p \leq .628$). Teachers grouped by educational level are not significantly discriminated by the Ideal variable.

Observation Related to the Ideal Variable: Table 35 shows the canonical correlation between the first discriminant function and the groups is +.504. This is not statistically significant ($p \leq .315$). The observational data did not predict group membership in terms of the Ideal variables in the classroom.

Table 34

Classification Results: Ideal Variable--
Educational Level of Teacher
(n=68)

Variable	F-Ratio	Significance	Standardized Canonical Discriminant Function Coefficients Function 1
IDA	2.751	.101	1.190
IDB	.132	.717	-.409
IDC	.129	.991	-.437
IDD	.648	.423	.181
ID3	.431	.513	-.296
ID6	.110	.916	.007

Canonical Discriminant Functions

Function	Eigenvalue	Percent of Variance	Canonical Correlation	Significance
1	.071	100.00	.258	.628

Group	No. of Cases	Predicted Group Membership
1	56	51.8%
2	12	66.7%

*Prior probability for each group is .500.
Percent of grouped cases correctly classified: 54.41%

Box's M	Approximate F	Degrees of Freedom		Significance
35.347	1.3233	21,	1424.7	.148

Table 35

Classification Results: Observation of Ideal Variable--
Educational Level of Teacher
(n=29)

Variable	F-Ratio	Significance	Standardized Canonical Discriminant Function Coefficients Function 1
OBSA	1.663	.208	.516
OBSB	5.261	.029	1.093
OBSC	.155	.696	-.420
OBSD	1.130	.297	-.242
OBS3	.286	.866	-.467
OBS6	.107	.745	.629

Canonical Discriminant Functions

Function	Eigenvalue	Percent of Variance	Canonical Correlation	Significance
1	.341	100.00	.504	.315

Group	No. of Cases	Predicted Group Membership
1	20	65.0%
2	9	77.8%

*Prior probability for each group is .500.
Percent of grouped cases correctly classified: 68.97%

Box's M	Approximate F	Degrees of Freedom		Significance
37.286	1.2064	21,	930.1	.236

Table 36

Classification Results: Tried Variable--
Educational Level of Teacher
(n=68)

Variable	F-Ratio	Significance	Standardized Canonical Discriminant Function Coefficients Function 1
TRE	2.076	.154	-1.334
TRF	.458	.831	.287
TRG	.505	.479	.950
TRH	.297	.587	-.217
TR3	.987	.754	.098
TR6	.218	.883	-.203
TR16	.314	.576	.491

Canonical Discriminant Functions

Function	Eigenvalue	Percent of Variance	Canonical Correlation	Significance
1	.141	100.00	.351	.309

Group	No. of Cases	Predicted Group Membership
1	56	66.1%
2	12	75.0%

*Prior probability for each group is .500.
Percent of grouped cases correctly classified: 67.65%

Box's M	Approximate F	Degrees of Freedom		Significance
34.488	.92203	28,	1366.2	.583

Table 37

Classification Results: Observation of Tried Variable--
Educational Level of Teacher
(n=29)

Variable	F-Ratio	Significance	Standardized Canonical Discriminant Function Coefficients Function 1
OBSE	5.823	.022	1.321
OBSF	.669	.797	-.445
OBSG	.841	.367	.003
OBSH	1.139	.295	.092
OBS3	.286	.866	-.237
OBS6	.107	.745	.714
OBS16	.554	.463	-.053

Canonical Discriminant Functions

Function	Eigenvalue	Percent of Variance	Canonical Correlation	Significance
1	.430	100.00	.548	.297

Group	No. of Cases	Predicted Group Membership
1	20	70.0%
2	9	77.8%

*Prior probability for each group is .500.
Percent of grouped cases correctly classified: 72.41%

Box's M	Approximate F	Degrees of Freedom		Significance
59.379	1.3209	28,	888.9	.124

Tried Variable: Table 36 shows that the canonical correlation between the first discriminant function and the groups is +.351. This is not statistically significant ($p \leq .309$). Teachers grouped by educational level are not significantly discriminated by the Tried variable.

Observation Related to the Tried Variable: Table 37 shows that the canonical correlation between the first discriminant function and the groups is +.548. This is not statistically significant ($p \leq .297$). The observational data did not predict group membership in terms of the Tried variables in the classroom.

Tables 38 through 41 display the results of the discriminant analysis assessment (SPSS^{X}, 1986) of questionnaire response when grouped by teacher age. Group 1 = between 20 and 35; group 2 = between 36 and 50+. It was found that teacher age was not significantly predicted by the Ideal or Tried variables.

Ideal Variable: Table 38 shows that the canonical correlation between the first discriminant function and the groups is +.208. This is not statistically significant ($p \leq .834$). Teachers grouped by age are not significantly discriminated by the Ideal variable.

Observation Related to the Ideal Variable: Table 39 shows that the canonical correlation between the first discriminant function and the groups is +.368. This is not statistically significant ($p \leq .744$). The observational data did not predict group membership in terms of the Ideal variables in the classroom.

Table 38

Classification Results: Ideal Variable--
Teacher Age
(n=68)

Variable	F-Ratio	Significance	Standardized Canonical Discriminant Function Coefficients Function 1
IDA	.627	.431	-1.031
IDB	.184	.892	.365
IDC	.192	.661	.500
IDD	.369	.951	.097
ID3	.867	.355	.537
ID6	.181	.671	.316

Canonical Discriminant Functions

Function	Eigenvalue	Percent of Variance	Canonical Correlation	Significance
1	.045	100.00	.208	.834

Group	No. of Cases	Predicted Group Membership
1	29	51.7%
2	39	71.8%

*Prior probability for each group is .500.
Percent of grouped cases correctly classified: 63.24%

Box's M	Approximate F	Degrees of Freedom	Significance
33.698	1.4428	21, 13358.6	.086

Table 39

Classification Results: Observation of Ideal Variable--
Teacher Age
(n=29)

Variable	F-Ratio	Significance	Standardized Canonical Discriminant Function Coefficients Function 1
OBSA	.515	.822	-.622
OBSB	1.140	.295	.403
OBSC	.131	.720	-.146
OBSD	1.534	.226	.704
OBS3	.120	.730	.669
OBS6	.456	.505	-.482

Canonical Discriminant Functions

Function	Eigenvalue	Percent of Variance	Canonical Correlation	Significance
1	.156	100.00	.368	.744

Group	No. of Cases	Predicted Group Membership
1	12	66.7%
2	17	58.8%

*Prior probability for each group is .500.
Percent of grouped cases correctly classified: 62.07%

Box's M	Approximate F	Degrees of Freedom	Significance
36.491	1.2914	21, 2056.8	.168

Table 40

Classification Results: Tried Variable--
Teacher Age
(n=68)

Variable	F-Ratio	Significance	Standardized Canonical Discriminant Function Coefficients Function 1
TRE	2.431	.123	.672
TRF	.110	.740	.219
TRG	2.272	.136	.597
TRH	.153	.696	-.265
TR3	.586	.809	-.000
TR6	.577	.450	-.378
TR16	.201	.887	-.108

Canonical Discriminant Functions

Function	Eigenvalue	Percent of Variance	Canonical Correlation	Significance
1	.063	100.00	.244	.798

Group	No. of Cases	Predicted Group Membership
1	29	55.2%
2	39	64.1%

*Prior probability for each group is .500.
Percent of grouped cases correctly classified: 60.29%

Box's M	Approximate F	Degrees of Freedom	Significance
32.148	1.0133	28, 12684.0	.445

Table 41

Classification Results: Observation of Tried Variable--
Teacher Age
(n=29)

Variable	F-Ratio	Significance	Standardized Canonical Discriminant Function Coefficients Function 1
OBSE	.281	.600	-1.074
OBSF	.742	.396	.045
OBSG	3.222	.083	.667
OBSH	2.073	.161	.176
OBS3	.120	.730	-.593
OBS6	.456	.505	-.593
OBS16	1.276	.268	.219

Canonical Discriminant Functions

Function	Eigenvalue	Percent of Variance	Canonical Correlation	Significance
1	.532	100.00	.589	.186

Group	No. of Cases	Predicted Group Membership
1	12	75.0%
2	17	70.6%

*Prior probability for each group is .500.
Percent of grouped cases correctly classified: 72.41%

Box's M	Approximate F	Degrees of Freedom	Significance
35.556	.88837	28, 1954.6	.634

Tried Variable: Table 40 shows that the canonical correlation between the first discriminant function and the groups is +.244. This is not statistically significant ($p \leq .798$). Teachers grouped by age are not significantly discriminated by the Tried variable.

Observation Related to the Tried Variable: Table 41 shows that the canonical correlation between the first discriminant function and the groups is +.589. This is not statistically significant ($p \leq .186$). The observational data did not predict group membership in terms of the Tried variables in the classroom.

Tables 42 through 45 show the results of the discriminant analysis assessment (SPSS^x, 1986) of questionnaire response when grouped by teacher gender. Group 1 = males; group 2 = females. It was found that teacher gender was significantly predicted by the Ideal variables, but disproportionate group sizes resulted in inconclusive findings. Teacher gender was not significantly predicted by the Tried variables.

Ideal Variable: Table 42 shows that the canonical correlation between the first discriminant function and the groups is +.448. This is statistically significant ($p \leq .028$), and is responsible for 100 percent of the variance. The F ratios indicate that IDA ($p \leq .011$), IDB ($p \leq .003$) and IDC ($p \leq .012$) have significantly unequal group means.

The standardized discriminant function coefficients indicate that function one is primarily composed of IDA, IDB and IDC. Box's M test ($p \leq .210$) indicates that covariance matrices are equal. Of the 68 cases, 80.88 percent were classified correctly.

Table 42

Classification Results: Ideal Variable--
Teacher Gender
(n=68)

Variable	F-Ratio	Significance	Standardized Canonical Discriminant Function Coefficients Function 1
IDA	6.765	.011	.447
IDB	9.237	.003	.560
IDC	6.635	.012	.435
IDD	.362	.849	-.671
ID3	1.145	.288	.217
ID6	.694	.792	.081

Canonical Discriminant Functions

Function	Eigenvalue	Percent of Variance	Canonical Correlation	Significance
1	.251	100.00	.448	.028

Group	No. of Cases	Predicted Group Membership
1	7	71.4%
2	61	82.0%

*Prior probability for each group is .500.
Percent of grouped cases correctly classified: 80.88%

Box's M	Approximate F	Degrees of Freedom		Significance
44.254	1.2438	21,	393.2	.210

Table 43

Classification Results: Observation of Ideal Variable--
Teacher Gender
(n=29)

Variable	F-Ratio	Significance	Standardized Canonical Discriminant Function Coefficients Function 1
OBSA	.144	.905	-.992
OBSB	1.928	.176	.126
OBSC	2.337	.138	.967
OBSD	.471	.498	.733
OBS3	3.415	.075	1.112
OBS6	.471	.829	-.188

Canonical Discriminant Functions

Function	Eigenvalue	Percent of Variance	Canonical Correlation	Significance
1	.633	100.00	.622	.067

Group	No. of Cases	Predicted Group Membership
1	2	100.0%
2	27	88.9%

*Prior probability for each group is .500.
Percent of grouped cases correctly classified: 89.66%

Table 44

Classification Results: Tried Variable--
Teacher Gender
(n=68)

Variable	F-Ratio	Significance	Standardized Canonical Discriminant Function Coefficients Function 1
TRE	2.576	.113	1.319
TRF	.494	.484	.171
TRG	.642	.800	-.539
TRH	.472	.828	-.210
TR3	.528	.818	.082
TR6	.103	.919	.178
TR16	.853	.992	-.470

Canonical Discriminant Functions

Function	Eigenvalue	Percent of Variance	Canonical Correlation	Significance
1	.064	100.00	.245	.791

Group	No. of Cases	Predicted Group Membership
1	7	71.4%
2	61	67.2%

*Prior probability for each group is .500.
Percent of grouped cases correctly classified: 67.65%

Table 45

Classification Results: Observation of Tried Variable--
Teacher Gender
(n=29)

Variable	F-Ratio	Significance	Standardized Canonical Discriminant Function Coefficients Function 1
OBSE	.443	.834	-.775
OBSF	1.867	.183	.817
OBSG	.305	.585	.013
OBSH	.467	.499	.505
OBS3	3.415	.075	.873
OBS6	.471	.829	-.365
OBS16	1.621	.213	.498

Canonical Discriminant Functions

Function	Eigenvalue	Percent of Variance	Canonical Correlation	Significance
1	.489	100.00	.573	.227

Group	No. of Cases	Predicted Group Membership
1	2	100.0%
2	27	88.9%

*Prior probability for each group is .500.
Percent of grouped cases correctly classified: 89.66%

This data suggests that teachers grouped by gender are significantly discriminated by the variables IDA, IDB and IDC, labeled "flexibility of response to learner characteristics and task sequence;" "flexibility of materials, methods and room organization;" and "flexibility of student placement and pacing." Group membership is moderately high as related to this variable. However, the number of males (7) versus females (61) was disproportionate.

Observation Related to the Ideal Variable: Table 43 shows that the canonical correlation between the first discriminant function and the groups is +.622. This is not statistically significant ($p \leq .067$). The observational data did not predict group membership in terms of the Ideal variables in the classroom.

Tried Variable: Table 44 shows that the canonical correlation between the first discriminant function and the groups is +.245. This is not statistically significant ($p \leq .791$). Teachers grouped by gender are not significantly discriminated by the Tried variable.

Observation Related to the Tried Variable: Table 45 shows that the canonical correlation between the first discriminant function and the groups is +.573. This is not statistically significant ($p \leq .227$). The observational data did not predict group membership in terms of the Tried variables in the classroom.

Tables 46 though 49 show the results of the discriminant analysis assessment (SPSS^{x}, 1986) of questionnaire response when grouped by number of students in the class. Group 1 = between 1 and 20; group 2 = between 21 and 26+. It was found that number of students in the class was not significantly predicted by the Ideal or Tried variables.

Table 46

Classification Results: Ideal Variable--
Number of Students in Class
(n=68)

Variable	F-Ratio	Significance	Standardized Canonical Discriminant Function Coefficients Function 1
IDA	.194	.660	-.112
IDB	1.140	.289	1.070
IDC	.126	.722	-.168
IDD	.259	.959	-.357
ID3	.446	.506	.478
ID6	.144	.904	.141

Canonical Discriminant Functions

Function	Eigenvalue	Percent of Variance	Canonical Correlation	Significance
1	.027	100.00	.164	.943

Group	No. of Cases	Predicted Group Membership
1	35	45.7%
2	33	45.5%

*Prior probability for each group is .500.
Percent of grouped cases correctly classified: 45.59%

Box's M	Approximate F	Degrees of Freedom	Significance
32.803	1.4094	21, 15899.2	.100

Table 47

Classification Results: Observation of Ideal Variable--
Number of Students in Class
(n=29)

Variable	F-Ratio	Significance	Standardized Canonical Discriminant Function Coefficients Function 1
OBSA	1.929	.176	.943
OBSB	1.356	.254	.624
OBSC	.906	.765	-.436
OBSD	.693	.412	-.152
OBS3	.159	.692	-.666
OBS6	.138	.712	.643

Canonical Discriminant Functions

Function	Eigenvalue	Percent of Variance	Canonical Correlation	Significance
1	.193	100.00	.402	.643

Group	No. of Cases	Predicted Group Membership
1	14	64.3%
2	15	60.0%

*Prior probability for each group is .500.
Percent of grouped cases correctly classified: 62.07%

Box's M	Approximate F	Degrees of Freedom	Significance
24.048	.86594	21, 2650.8	.637

Table 48

Classification Results: Tried Variable--
Number of Students in Class
(n=68)

Variable	F-Ratio	Significance	Standardized Canonical Discriminant Function Coefficients Function 1
TRE	.420	.519	-.135
TRF	1.109	.296	-.451
TRG	.715	.400	-.484
TRH	1.329	.253	1.086
TR3	.398	.984	.289
TR6	.535	.941	.182
TR16	.633	.429	-.465

Canonical Discriminant Functions

Function	Eigenvalue	Percent of Variance	Canonical Correlation	Significance
1	.103	100.00	.306	.520

Group	No. of Cases	Predicted Group Membership
1	35	54.3%
2	33	57.6%

*Prior probability for each group is .500.
Percent of grouped cases correctly classified: 55.88%

Box's M	Approximate F	Degrees of Freedom	Significance
53.215	1.6844	28, 15064.6	.013

Table 49

Classification Results: Observation of Tried Variable--
Number of Students in Class
(n=29)

Variable	F-Ratio	Significance	Standardized Canonical Discriminant Function Coefficients Function 1
OBSE	3.527	.071	1.339
OBSF	.267	.609	-.272
OBSG	.779	.782	-.197
OBSH	.374	.545	-.060
OBS3	.159	.692	-.346
OBS6	.138	.712	.773
OBS16	.181	.673	-.049

Canonical Discriminant Functions

Function	Eigenvalue	Percent of Variance	Canonical Correlation	Significance
1	.267	100.00	.459	.590

Group	No. of Cases	Predicted Group Membership
1	14	64.3%
2	15	80.0%

*Prior probability for each group is .500.
Percent of grouped cases correctly classified: 72.41%

Box's M	Approximate F	Degrees of Freedom	Significance
30.874	.78861	28, 2511.8	.776

Ideal Variable: Table 46 shows that the canonical correlation between the first discriminant function and the groups is +.164. This is not statistically significant ($p \leq .943$). Teachers grouped by number of students in the class are not significantly discriminated by the Ideal variable.

Observation Related to the Ideal Variable: Table 47 shows that the canonical correlation between the first discriminant function and the groups is +.402. This is not statistically significant ($p \leq .643$). The observational data did not predict group membership in terms of the Ideal variables in the classroom.

Tried Variable: Table 48 shows that the canonical correlation between the first discriminant function and the groups is .306. This is not statistically signficant ($p \leq .520$). Teachers grouped by number of students in the class are not significantly discriminated by the Tried variable.

Observation Related to the Tried Variable: Table 49 shows that the canonical correlation between the first discriminant function and the groups is +.459. This is not statistically significant ($p \leq .590$). The observational data did not predict group membership in terms of the Tried variables in the classroom.

Tables 50 through 53 show the results of the discriminant analysis assessment (SPSS^{x}, 1986) of questionnaire response when grouped by attitude toward teaching. Group 1 = positive; group 2 = negative. It was found that attitude toward teaching was not significantly predicted by the Ideal or Tried variables.

Table 50

Classification Results: Ideal Variable--
Attitude Toward Teaching
(n=65)

Variable	F-Ratio	Significance	Standardized Canonical Discriminant Function Coefficients Function 1
IDA	3.253	.076	.252
IDB	5.303	.024	.742
IDC	.341	.561	-.475
IDD	3.231	.077	.387
ID3	.684	.794	.115
ID6	1.081	.302	.310

Canonical Discriminant Functions

Function	Eigenvalue	Percent of Variance	Canonical Correlation	Significance
1	.136	100.00	.346	.261

Group	No. of Cases	Predicted Group Membership
1	50	76.0%
2	15	60.0%
Ungrouped cases	3	100.0%

*Prior probability for each group is .500.
Percent of grouped cases correctly classified: 72.31%

Box's M	Approximate F	Degrees of Freedom		Significance
46.636	1.8446	21,	2500.3	.011

Table 51

Classification Results: Observation of Ideal Variable--Attitude Toward Teaching (n=27)

Variable	F-Ratio	Significance	Standardized Canonical Discriminant Function Coefficients Function 1
OBSA	.269	.608	.071
OBSB	.830	.370	-.513
OBSC	.374	.546	.086
OBSD	.320	.576	.558
OBS3	.249	.622	-.285
OBS6	2.052	.164	.772

Canonical Discriminant Functions

Function	Eigenvalue	Percent of Variance	Canonical Correlation	Significance
1	.151	100.00	.362	.796

Group	No. of Cases	Predicted Group Membership
1	19	68.4%
2	8	62.5%
Ungrouped cases	2	100.0%

*Prior probability for each group is .500.
Percent of grouped cases correctly classified: 66.67%

Box's M	Approximate F	Degrees of Freedom		Significance
54.387	1.6418	21,	691.1	.035

Table 52

Classification Results: Tried Variable--
Attitude Toward Teaching
(n=65)

Variable	F-Ratio	Significance	Standardized Canonical Discriminant Function Coefficients Function 1
TRE	3.934	.051	.813
TRF	.778	.781	-.477
REG	1.016	.317	-.129
TRH	1.816	.182	.062
TR3	1.121	.293	-.684
TR6	.278	.599	.063
TR16	2.291	.135	.597

Canonical Discriminant Functions

Function	Eigenvalue	Percent of Variance	Canonical Correlation	Significance
1	.152	100.00	.363	.295

Group	No. of Cases	Predicted Group Membership
1	50	66.0%
2	15	73.3%
Ungrouped cases	3	66.7%

*Prior probability for each group is .500.
Percent of grouped cases correctly classified: 67.69%

Box's M	Approximate F	Degrees of Freedom	Significance
26.748	.76572	28, 2395.0	.805

Table 53

Classification Results: Observation of Tried Variable--
Attitude Toward Teaching
(n=27)

Variable	F-Ratio	Significance	Standardized Canonical Discriminant Function Coefficients Function 1
OBSE	2.050	.164	-.687
OBSF	.317	.955	.467
OBSG	.340	.855	.691
OBSM	.287	.596	.604
OBS3	.249	.622	-.439
OBS6	2.052	.164	.369
OBS16	3.631	.068	-.732

Canonical Discriminant Functions

Function	Eigenvalue	Percent of Variance	Canonical Correlation	Significance
1	.505	100.00	.579	.267

Group	No. of Cases	Predicted Group Membership
1	19	84.2%
2	8	75.0%
Ungrouped cases	2	50.0%

*Prior probability for each group is .500.
Percent of grouped cases correctly classified: 81.48%

Box's M	Approximate F	Degrees of Freedom		Significance
87.958	1.7849	28,	660.9	.008

Ideal Variable: Table 50 shows that the canonical correlation between the first discriminant function and the groups is +.346. This is not statistically significant ($p \leq .261$). Teachers grouped by attitude toward teaching are not significantly discriminated by the Ideal variable.

Observation Related to the Ideal Variable: Table 51 shows that the canonical correlation between the first discriminant function and the groups is +.362. This is not statistically significant ($p \leq .796$). The observational data did not predict group membership in terms of the Ideal variables in the classroom.

Tried Variable: Table 52 shows that the canonical correlation between the first discriminant function and the groups is +.363. This is not statistically significant ($p \leq .295$). Teachers grouped by attitude toward teaching are not significantly discriminated by the Tried variable.

Observation Related to the Tried Variable: Table 53 shows that the canonical correlation between the first discriminant function and the groups is +.579. This is not statistically significant ($p \leq .267$). The observational data did not predict group membership in terms of the Tried variables in the classroom.

Tables 54 through 57 show the results of the discriminant analysis assessment (SPSS^{x}, 1986) of questionnaire response when grouped by vocational commitment. Group 1 = primary vocation; group 2 = supplementary vocation. It was found that vocational commitment was not significantly predicted by the Ideal or Tried variables. Classroom

Table 54

Classification Results: Ideal Variable--
Vocational Commitment
(n=68)

Variable	F-Ratio	Significance	Standardized Canonical Discriminant Function Coefficients Function 1
IDA	.545	.462	-.126
IDB	1.326	.253	.238
IDC	1.417	.238	.037
IDD	1.292	.259	.277
ID3	9.891	.002	.885
ID6	.452	.503	-.146

Canonical Discriminant Functions

Function	Eigenvalue	Percent of Variance	Canonical Correlation	Significance
1	.177	100.00	.388	.112

Group	No. of Cases	Predicted Group Membership
1	62	82.3%
2	6	83.3%

*Prior probability for each group is .500.
Percent of grouped cases correctly classified: 82.35%

Table 55

Classification Results: Observation of Ideal Variable--
Vocational Commitment
(n=29)

Variable	F-Ratio	Significance	Standardized Canonical Discriminant Function Coefficients Function 1
OBSA	6.356	.017	.514
OBSB	1.422	.243	-.700
OBSC	2.666	.114	.544
OBSD	8.403	.007	1.123
OBS3	.196	.889	.266
OBS6	1.122	.298	-.276

Canonical Discriminant Functions

Function	Eigenvalue	Percent of Variance	Canonical Correlation	Significance
1	.876	100.00	.683	.019

Group	No. of Cases	Predicted Group Membership
1	26	100.0%
2	3	100.0%

*Prior probability for each group is .500.
Percent of grouped cases correctly classified: 100.0%

Table 56

Classification Results: Tried Variable--
Vocational Commitment
(n=68)

Variable	F-Ratio	Significance	Standardized Canonical Discriminant Function Coefficients Function 1
TRE	.295	.956	.317
TRF	.103	.748	.314
TRG	.843	.927	-.036
TRH	.398	.842	-.172
TR3	2.039	.158	-.442
TR6	1.600	.210	.744
TR16	1.119	.293	-.696

Canonical Discriminant Functions

Function	Eigenvalue	Percent of Variance	Canonical Correlation	Significance
1	.089	100.00	.286	.619

Group	No. of Cases	Predicted Group Membership
1	62	74.2%
2	6	66.7%

*Prior probability for each group is .500.
Percent of grouped cases correctly classified: 73.53%

Table 57

Classification Results: Observation of Tried Variable--
Vocational Commitment
(n=29)

Variable	F-Ratio	Significance	Standardized Canonical Discriminant Function Coefficients Function 1
OBSE	6.402	.017	.599
OBSF	2.392	.133	.286
OBSG	.210	.649	-.190
OBSH	7.233	.012	1.069
OBS3	.196	.889	.292
OBS6	1.122	.298	-.306
OBS16	.449	.883	-.659

Canonical Discriminant Functions

Function	Eigenvalue	Percent of Variance	Canonical Correlation	Significance
1	.886	100.0	.685	.037

Group	No. of Cases	Predicted Group Membership
1	26	88.5%
2	3	100.0%

*Prior probability for each group is .500.
Percent of grouped cases correctly classified: 89.66%.

observation was a significant predictor of group membership, but disproportionate group sizes resulted in inconclusive findings.

Ideal Variable: Table 54 shows that the canonical correlation between the first discriminant function and the groups is +.388. This is not statistically significant ($p \leq .112$). Teachers grouped by vocational commitment are not significantly discriminated by the Ideal variable.

Observation Related to the Ideal Variable: Table 55 shows that the canonical correlation between the first discriminant function and the groups is +.683. This is statistically significant ($p \leq .019$), and is responsible for 100 percent of the variance. The F ratios indicate that OBSA ($p \leq .017$) and OBSD ($p \leq .007$) have significantly unequal group means.

The standardized discriminant function coefficients indicate that function one is primarily composed of OBSD and OBSA, labeled "utilization of media and problem-solving" and "flexibility of response to learner characteristics and task sequence." Box's M test was not calculated because one group contained too few cases to be non-singular. Of the 29 cases, 100 percent were classified correctly.

This data suggests that observational data for the Ideal variable predicted group membership in terms of the Ideal variables in the classroom. However, the number of teachers grouped by primary (26) versus supplementary (3) vocational commitment was disproportionate.

Tried Variable: Table 56 shows that the canonical correlation between the first discriminant function and the groups is +.286. This is not statistically significant ($p \leq .619$). Teachers grouped by

vocational commitment are not significantly discriminated by the Tried variable.

Observation Related to the Tried Variable: Table 57 shows that the canonical correlation between the first discriminant function and the groups is +.685. This is statistically significant ($p \leq .037$), and is responsible for 100 percent of the variance. The F ratios indicate that OBSE ($p \leq .017$) and OBSH ($p \leq .012$) have significantly unequal group means.

The standardized discriminant function coefficients indicate that function one is primarily composed of OBSH and OBSE, labeled "utilization of media, problem-solving and different styles of teaching" and "flexibility of response to learner characteristics and materials." Box's M test was not calculated because one group contained too few cases to be non-singular. Of the 29 cases, 89.66 percent were classified correctly.

This data suggests that observational data for the Tried variables predicted group membership in terms of the Tried variables in the classroom. However, the numbers of teachers grouped by primary versus supplementary was again disproportionate.

Tables 58 through 61 show the results of the discriminant analysis assessment (SPSS^{x}, 1986) of questionnaire responses when grouped by prior knowledge for accommodating student learning styles. Multiple responses were possible for this item. Group 1 = college classes; group 2 = experience with students; group 3 = college classes and experience with students; group 4 = reading research and other training; group 5 = college classes, reading research and other

Table 58

Classification Results: Ideal Variable--
Prior Knowledge for Accommodating Student Learning Styles
(n=68)

Variable	F-Ratio	Significance	Standardized Canonical Discriminant Function Coefficients Function 1	Function 2	Function 3
IDA	.593	.734	.179	-.569	1.032
IDB	.378	.889	-.157	.110	-1.192
IDC	1.293	.273	-1.161	.054	.006
IDD	.461	.834	-.776	-.406	-.016
ID3	.476	.823	-.102	.730	.343
ID6	.872	.997	.254	.272	.313

Canonical Discriminant Functions

Function	Eigenvalue	Percent of Variance	Canonical Correlation	Significance
1	.207	51.61	.414	.958
2	.103	25.67	.305	.991
3	.061	15.31	.240	.993
4	.023	5.76	.150	.994
5	.005	1.31	.072	.982
6	.001	.33	.036	.777

Group	No. of Cases	Predicted Group Membership
1	2	100.0%
2	20	15.0%
3	8	37.5%
4	4	75.0%
5	1	100.0%
6	13	7.7%
7	20	35.0%

*Prior probability for each group is .142.
Percent of grouped cases correctly classified: 29.41%

Box's M	Approximate F	Degrees of Freedom		Significance
137.06	1.6442	63,	2796.1	.001

Table 59

Classification Results: Observation of Ideal Variable--
Prior Knowledge for Accommodating Student Learning Styles
(n=29)

			Standardized Canonical Discriminant Function Coefficients		
Variable	F-Ratio	Significance	Function 1	Function 2	Function 3
OBSA	.935	.476	-.675	.826	.062
OBSB	5.463	.001	1.224	-.068	-.269
OBSC	1.211	.335	.127	-.587	.903
OBSD	.983	.4491	-.390	.619	.531
OBS3	.473	.792	.115	-.064	.616
OBS6	.959	.462	-.307	-.233	.269

Canonical Discriminant Functions

Function	Eigenvalue	Percent of Variance	Canonical Correlation	Significance
1	1.736	69.29	.796	.175
2	.363	14.49	.516	.781
3	.283	11.32	.470	.777
4	.092	3.68	.290	.857
5	.030	1.22	.171	.718

Group	No. of Cases	Predicted Group Membership
1	0	0.0%
2	9	55.6%
3	3	66.7%
4	2	100.0%
5	1	100.0%
6	4	25.0%
7	10	40.0%

*Prior probability for each group is .166.
Percent of grouped cases correctly classified: 51.72%

Box's M	Approximate F	Degrees of Freedom		Significance
74.275	2.1362	21,	1032.9	.002

Table 60

Classification Results: Tried Variable--
Prior Knowledge for Accommodating Student Learning Styles
(n=68)

Variable	F-Ratio	Significance	Standardized Canonical Discriminant Function Coefficients Function 1	Function 2	Function 3
TRE	.459	.835	.176	-.028	.465
TRF	.388	.883	-.705	.085	.341
TRG	.654	.686	-.677	.302	-.802
TRH	1.011	.426	.845	-.590	-.359
TR3	1.021	.420	.110	.510	-.225
TR6	.442	.846	-.295	-.433	.533
TR16	1.070	.385	.556	.565	.374

Canonical Discriminant Functions

Function	Eigenvalue	Percent of Variance	Canonical Correlation	Significance
1	.349	54.22	.508	.776
2	.155	24.10	.366	.974
3	.072	11.32	.260	.990
4	.040	6.28	.197	.084
5	.018	2.90	.135	.955
6	.007	1.17	.086	.798

Group	No. of Cases	Predicted Group Membership
1	2	50.0%
2	20	20.0%
3	8	12.5%
4	4	50.0%
5	1	100.0%
6	13	38.5%
7	20	40.0%

*Prior probability for each group is .142.
Percent of grouped cases correctly classified: 32.35%

Box's M	Approximate F	Degrees of Freedom		Significance
166.55	1.4116	84,	2722.7	.008

Table 61

Classification Results: Observation of Tried Variable--
Prior Knowledge of Accommodating Student Learning Styles
n=29)

Variable	F-Ratio	Significance	Standardized Canonical Discriminant Function Coefficients Function 1	Function 2	Function 3
OBSE	2.325	.075	.758	.099	-.685
OBSF	1.494	.230	.515	.135	.474
OBSG	.608	.693	-.672	.295	-.269
OBSH	.550	.736	.792	-.024	.096
OBS3	.473	.792	.455	.198	.864
OBS6	.959	.462	.148	-.542	-.116
OBS16	1.156	.360	-.643	.642	.397

Canonical Discriminant Functions

Function	Eigenvalue	Percent of Variance	Canonical Correlation	Significance
1	1.123	57.49	.727	.638
2	.501	25.65	.577	.911
3	.204	10.48	.412	.968
4	.111	5.72	.317	.958
5	.013	.67	.113	.964

Group	No. of Cases	Predicted Group Membership
1	0	0.0%
2	9	44.4%
3	3	66.7%
4	2	50.0%
5	1	100.0%
6	4	75.0%
7	10	40.0%

*Prior probability for each group is .166.
Percent of grouped cases correctly classified: 51.72%

Box's M	Approximate F	Degrees of Freedom		Significance
100.17	1.9160	28,	979.0	.003

training; group 6 = experience with students, reading research, and other training; group 7 = college classes, experience with students, reading research and other training. It was found that prior knowledge for accommodating student learning styles was not significantly discriminated by the Ideal or Tried variables.

Ideal Variable: Table 58 shows that the canonical correlation between the first discriminant function and the groups is +.414. This is not statistically significant ($p \leq .958$). Teachers grouped by prior knowledge for accommodating student learning styles are not significantly discriminated by the Ideal variable.

Observation Related to the Ideal Variable: Table 59 shows that the canonical correlation between the first discriminant function and the groups is +.796. This is not statistically significant ($p \leq .175$). The observational data did not predict group membership in terms of the Ideal variables in the classroom.

Tried Variable: Table 60 shows that the canonical correlation between the first discriminant function and the groups is +.508. This is not statistically significant ($p \leq .776$). Teachers grouped by prior knowledge for accommodating student learning styles are not significantly discriminated by the Tried variable.

Observation Related to the Tried Variable: Table 61 shows that the canonical correlation between the first discriminant function and the groups is +.727. This is not statistically significant ($p \leq .638$). The observational data did not predict group membership in terms of the Tried variables in the classroom.

Summary of Research Findings

Two research questions were investigated in this study: 1) to what extent if any can a valid and reliable instrument be developed to ascertain teacher perceptions of responsibilities, abilities and effectiveness in teaching to the individual needs and learning styles of students, considering the pragmatic limitations of this educational research community? and, 2) to what extent is demographic group membership of teachers responding to the questionnaire predictable by actual observation of classroom practice? It was determined that content (face) validity and internal construct validity of the instrument were demonstrated. However, the instrument was of low reliability (.37). The researcher and the dissertation committee decided that there was value in the completion of the study, and all analyses were completed in the interests of understanding questionnaire development techniques. The process employed was valid, yet the researcher was unable to attain a reliable coefficient in this study. Therefore, the second question of the study was not possible to answer. However, in the interests of learning the process involved, the results of all analyses were reported, but no conclusive generalizations can be made from them.

The predicted variables analyzed in terms of questionnaire response were: grade level taught; single or multi-grade classroom; years of teaching experience; educational level of teacher; teacher age; teacher gender; number of students in class; attitude toward teaching; vocational commitment; and prior knowledge of accommodating student learning styles.

Preliminary field-testing beginning with seventy question sets gleaned from the literature resulted in a final group of twenty questions. One hundred nineteen kindergarten through grade eight classroom teachers were surveyed, and eighty-seven responded to the survey. The highest level of correlation coefficient that could be achieved for the set of twenty questions was .37. Therefore, test/retest reliability was low. It was recognized at this point in the study that the instrument was of low reliability. However, in the interests of understanding the methodologies of questionnaire development, the researcher continued with all analyses. While no conclusive generalizations may be made from the results of the factor analysis assessments, the process of completing these analyses was of value to the researcher, and may be of value to future students involved with instrumentation development. Had this been a reliable instrument, it might be concluded that the following results of the factor analysis and discriminant analysis assessments were found: The factor analysis resulted in acceptable reliability alpha scores for four clusters of questions from column one and four different clusters from column three. Column two questions were answered so similarly that rotation of factors was not achieved. Internal construct validity was established for the Ideal and Tried variables; it was not possible to further assess the Realistic variables designed to measure teacher abilities.

Teachers grouped by grade level taught, combined with a single or multi-grade class, were significantly discriminated by the variable IDA labeled "flexibility of response to learner characteristics and

task sequence," and IDB, labeled "flexibility of materials, methods and room organization." Predicted group membership was low (44.12 percent). Observational data predicted group membership in terms of flexibility of response to learner characteristics and task sequence in the classroom; it failed to predict group membership in terms of flexibility of materials, methods and room organization. Group membership in terms of flexibility of student placement and pacing was predicted by observation, but not by questionnaire responses to the Ideal variable. Therefore, teacher perceptions of responsibilities in teaching to the individual needs and learning styles of students were significantly discriminated by the variables IDA and IDB, but only the variable IDA was significantly discriminated by observation. Teachers were also significantly discriminated by the variables TRE and TR16, labeled "flexibility of response to learner characteristics and materials." Predicted group membership was low (51.47 percent). Observational data failed to predict group membership in terms of this variable in the classroom. Therefore, teacher perceptions of effectiveness in teaching to the individual learning styles of students was significantly discriminated by the variables TRE and TR16, but group membership was not predicted by observation.

Teachers grouped by single or multi-grade classroom were not significantly discriminated by the Ideal or Tried variables. Teachers grouped by grade level taught were significantly discriminated by the variables IDA, labeled "flexibility of response to learner characteristics and task sequence;" IDB, "labeled flexibility of materials, methods and room organization;" and negatively by IDD,

labeled "utilization of media and problem solving." Predicted group membership was low (62.94 percent). Observational data failed to predict group membership in terms of these variables in the classroom. Therefore, teacher perceptions of responsibilities in teaching to the individual needs and learning styles of students was discriminated by the IDA, IDB and IDD variables, but group membership was not predicted by observation. Teachers were also significantly discriminated by the variables TRE and TR16, labeled "flexibility of response to learner characteristics and materials." Predicted group membership was acceptable (63.24 percent). Observational data predicted group membership in terms of response to learner characteristics and task sequence in the classroom. Therefore, teacher perceptions of effectiveness in teaching to the individual learning styles of students was significantly negatively discriminated by the variable TRE and TR16. A similar result was obtained with the observations.

Teachers grouped by years taught, educational level, age, number of students, attitude toward teaching, and prior knowledge of accommodating student learning styles were not significantly discriminated by the variables.

Teachers grouped by gender were significantly discriminated by the variables IDA, labeled "flexibility of response to learner characteristics and materials;" IDB, labeled "flexibility of materials, methods, and room organization;" and IDC, labeled "flexibility of student placement and pacing." Predicted group membership indicates that group membership is moderately high (80.88 percent). However, the number of male respondents (7) versus female respondents (61) was

disproportionate. Box's M test indicates that covariance matrices are equal. Observational data failed to predict group membership in terms of the Ideal variables in the classroom. Therefore, teacher perceptions of responsibilities in teaching to the individual needs and learning styles of students were discriminated by the IDA, IDB and IDC variables, but group membership was not predicted by observation. Teachers were not significantly discriminated by the Tried variable.

Teachers grouped by vocational commitment were not significantly discriminated by the Ideal nor Tried variables. However, observational data for the Ideal variable predicted group membership in terms of OBA and OBSD in the classroom, labeled "flexibility of response to learner characteristics and task sequence," and "utilization of media and problem solving." Observational data for the Tried variable predicted group membership in terms of OBSE and OBSH in the classroom, labeled "flexibility of response to learner characteristics and materials," and "utilization of media, problem solving and different styles of teaching." However, the number of teachers for whom teaching is the primary vocation (26) versus supplementary (3) was disproportionate. Box's M test was not calculated because of the small group size of the supplementary respondents.

Summary

The highest level of test/retest reliability that could be achieved for the questionnaire that was developed in this study was $r = .37$. Therefore, the instrument was shown to be of low reliability.

It was concluded that the established instrumentation-development procedure was important to complete, since it was of value to the researcher as a vehicle for understanding the methodology of questionnaire development. Therefore, the data derived from the field-testing of the final questionnaire of the study is inconclusive. However, had this been a reliable instrument, it might have demonstrated that the following results were found:

Teachers grouped by single and multi-grade, years taught, educational level, age, number of students, attitude toward teaching and prior knowledge for accommodating student learning styles were not significantly discriminated by the Ideal nor Tried variables. Teachers grouped by the combination of single and multi-grade and grade level taught were significantly discriminated by the Ideal variable labeled "flexibility of response to learner characteristics and task sequence," and a similar result obtained with the observations; the Ideal variable labeled "flexibility of student placement, pacing and room organization," although observation was not usable as a predictor; and the Tried variable labeled "flexibility of response to learner characteristics and materials," but observation was not usable as a predictor. Questionnaire-predicted group membership of the Ideal variables was 68.97 percent, and was 61.47 percent for the Tried variables.

Teachers grouped by grade level taught were significantly discriminated by the Ideal variables labeled "flexibility of response to learner characteristics and task sequence;" "flexibility of materials, methods and room organization;" and negatively by "utilization of problem solving." Observation failed to predict group membership in

terms of these variables in the classroom. This group of teachers was significantly discriminated by the Tried variable labeled "flexibility of response to learner characteristics and materials," and a similar result was obtained with observations. Predicted group membership of the Ideal variables was 52.94 percent, and was 63.24 percent for the Tried variable.

Teachers grouped by gender were significantly discriminated by the Ideal variables "flexibility of response to learner characteristics and task sequence;" "flexibility of materials, methods, and room organization;" and "flexibility of student placement and pacing." Predicted group membership of the Ideal variables was 80.88 percent. However, observation failed to predict group membership in terms of these variables in the classroom. Also, group size was disproportionate and covariance matrices were equal.

Teachers grouped by vocational commitment were not significantly discriminated by the Ideal or Tried variables. However, these groups were significantly discriminated by the observational Ideal variables "flexibility of response to learner characteristics and task sequencing" and "utilization of media and problem solving." The groups were also significantly discriminated by the Tried observational variables "flexibility of response to learner characteristics and materials," and "utilization of media, problem solving and different styles of teaching." However, group size was disproportionate and equality of covariance matrices was not possible to measure.

CHAPTER FIVE

CONCLUSIONS

The purpose of this study was to determine the extent to which a valid and reliable instrument could be developed to assess teacher perceptions of responsibilities, abilities and effectiveness in teaching to the individual needs and learning styles of students, and to further measure the degree to which demographic group membership could be predicted by observation of classroom practice. A thorough review of the literature pertaining to teaching styles and student learning styles was conducted, and questions were generated by asking items similar to those asked by experts in the field of teaching and learning styles. These questions were selected to measure the following areas of teaching style: instructional planning; teaching characteristics; teaching methods; student groupings; and classroom environment. A procedure for instrumentation development was clearly outlined and followed in this study.

A panel of experts judged the questions in terms of their appropriateness as a measure of teaching style relative to accommodating the needs and individual learning styles of students. Questions were formatted in accordance with precedent set in the literature, and were field tested with one hundred nineteen classroom teachers in an attempt to develop the highest levels of test/retest reliability and internal consistency possible. Following the field testing, which

included three revisions of the questionnaire, the survey was utilized with eighty-two kindergarten through grade eight single and multi-grade classroom teachers from Gallatin and Lewis and Clark Counties in Montana. Consenting respondents within a forty-mile radius of Bozeman were directly observed in order to assess the predictability of the demographic group membership of the respondents.

Predicted variables were identified as differences in: single or multi-graded settings; primary, intermediate or upper-intermediate grade level of pupil taught; years of teaching experience; educational level of teacher; teacher age; teacher gender; number of students in class; attitude toward teaching; vocational commitment; and prior knowledge of accommodating student learning styles. Responses to the questionnaire were submitted to a factor analysis assessment, and items and observational data were clustered according to the factors derived. A discriminant analysis assessment was then conducted, utilizing the questionnaire and observed responses as predictors of demographic group membership.

Summary of Results

The development of a reliable instrument designed to measure teacher perceptions of responsibilities, abilities and effectiveness in teaching to the individual needs and learning styles of students was not achieved in this study. Preliminary field testing of the questionnaire, which involved surveying one hundred nineteen classroom teachers and receiving responses from eighty-seven of this group, resulted in a test/retest correlation coefficient of .37. Therefore,

test/retest reliability was low. The factor analysis assessment resulted in acceptable reliability alpha scores for four clusters of questions from column one of the questionnaire, labeled Ideal; and four different clusters of questions from column three, labeled Tried. However, column two labeled Realistic was unable to be further assessed because questions were answered very similarly; questions did not cluster into distinct groupings. The Ideal variable was designed to measure perceptions of responsibility, and the Tried variable was developed to assess perceptions of effectiveness. Therefore, these two dimensions of teacher perceptions were utilized in further analysis; construct validity was established for them. Face validity of the instrument was established by the panel of experts.

Given the low level of reliability reported (.37), and understanding the difficulty of making generalizations from this data, the researcher continued this study to identify possible trends and explore the process of instrument design and validation. Had this been a reliable instrument, the following conclusions might have been demonstrated by the discriminant analysis assessment:

The demographic variables shown not to be significantly predicted by questionnaire response were single or multi-grade classrooms; years of teaching experience; educational level of teacher; teacher age; teacher gender; number of students in class; attitude toward teaching; vocational commitment; and prior knowledge of accommodating student learning styles.

The only demographic variable measured that appeared to be statistically significant when predicted by questionnaire response and by observation was grade level taught. The Tried variables TRE and TR16, designed to measure perceptions of teacher effectiveness in flexing to learner characteristics and materials, were shown to be statistically significant predictors of grade level taught when measured by questionnaire response and also as measured by direct classroom observation. It was found that primary teachers (kindergarten through grade two) perceived themselves to be the most flexible of the groups in response to learner characteristics and materials. Intermediate teachers (grades three through five) perceived themselves to be less flexible; multi-grades kindergarten through grade eight teachers viewed themselves as less flexible than the first two groups; and upper-intermediate teachers reported that they were least flexible of all. These findings were supported by the observational data for primary, intermediate and upper-intermediate. However, multi-grade kindergarten through grade eight teachers were observed to be the least flexible of the groups. Predicted group membership was 63.24 percent; therefore, grade level taught was not shown to be highly predicted by questionnaire response.

Discussion of Results

The first research question of this study was: To what extent, if any, can a valid and reliable instrument be developed to ascertain teacher perceptions of responsibilities, abilities and effectiveness in teaching to the individual needs and learning styles of students,

considering the pragmatic limitations of this research community? The answer to this question is complex. Content and internal construct validity were demonstrated, but acceptable reliability was not achieved. It may be possible to develop a reliable self-assessment instrument related to teaching styles, but the means to do this was not found in this study.

There are many possible reasons why reliability may be difficult to achieve. A larger sample of teachers from each strata might have resulted in higher test/retest correlation coefficients. Perhaps a larger number of cases could have also resulted in clusters of factor scores for all three columns of the questionnaire, rather than only for two. The predicted variables teacher gender and vocational commitment may have been more adequately represented if more teachers had been surveyed.

Perhaps teaching and self-reflection related to teaching are so variable, based on classroom conditions, types of students at given times, moods, and so forth that it is difficult to get consistency of response using repeated measures. It is also possible that teachers responding to the test/retest may not have had sufficient motivation to focus seriously enough on the survey task.

The notion of mind-set may also affect reliability. It is possible that preconceived ideas of "expected" questionnaire answers might have influenced responses.

The nature of this self-report questionnaire suggests another possibility for reliability problems. Questions were phrased carefully in order that they be interpreted as uniformly as possible.

However, there appeared to be variance in the way in which questions were understood and reacted to. The scale, including strongly disagree to strongly agree, also imposed limitations on the study, since there was variance in this implied attitudinal assessment.

Although the instrument developed in this study was of low reliability, it was demonstrated to have content (face) and internal construct validity. The panel of experts determined face validity for the instrument, and the factor analysis assessment clearly determined construct validity. The most significant information that emerged from the discriminant analysis assessment of the items was that teachers grouped by grade level taught were discriminated by the Tried variable "flexibility in response to learner characteristics and materials." Teachers of younger students tended to be more effective in their use of a wider variety of teaching styles and materials than upper-level teachers. However, these findings were based upon an unreliable instrument, and are, therefore, uncertain.

There was some evidence to support the notion that teacher gender and vocational commitment might be predicted by questionnaire items. However, numbers within the groups were disproportionate, and tests were, therefore, inconclusive.

The second research question of this study was: To what extent is it possible to predict demographic group membership of teachers responding to the questionnaire by actual observation of classroom practice? Since the instrument that was developed in this study was of low reliability, the observations that were conducted could not conclusively predict demographic groups in terms of measured

perceptions. Therefore, this research question was impossible to conclusively answer. However, the completion of this project served as a vehicle for understanding the methodology of questionnaire development, which was of value to the researcher; this process may also be of value to other students involved with instrumentation design. Had this been a reliable instrument, we might have been able to conclude that the observations predicted group membership in terms of teachers' perceptions of their effectiveness in flexibility of response to learner characteristics and materials. This conclusion is seriously limited by the low reliability of the questionnaire. Observational data supported the notion that vocational commitment might be predicted of questionnaire response, but disproportionate group sizes caused inconclusive findings.

A larger sample of teacher observations from each strata might have resulted in more conclusive prediction results. Also, the one-hour limitation placed upon classroom observations resulted in only a general indication of teaching styles present. Since the instrument was found to be of low reliability, the observations that were intended to predict demographic group membership were further limited. Longer observations would have resulted in exposure to more classroom activities, and might have determined the presence of an increased number of teaching styles. Also, repeated observations conducted at different times during the school year may have increased the reliability of the observational data.

Recommendations for Further Research

It is generally agreed that students learn in uniquely individual ways. Research theory, generated by psychologists and educational researchers, supports the concept of adaptation of teaching styles to meet the requirements of individual learners. However, there is lack of agreement with respect to how and to what extent this should be done.

It is recommended that further research be conducted in the following areas:

1. Further investigations should be made of the adaptation of teaching styles to meet the needs of individual students, in order to determine the effects of particular styles on particular learners. This implies an assessment of success/failure rates at different levels.
2. Teaching styles present in classrooms grouped by primary, intermediate and upper-intermediate grade levels should be further researched.
3. It is also likely that a study involving comparison of special education versus regular education teaching styles would be productive, since special education teachers generally utilize more prescriptive methods than do regular education teachers.
4. An alternative format, such as interview/observation, should be explored to determine if it has merit as a tool to assess teaching styles present in classrooms. This recommendation is made because of the difficulty in obtaining acceptable reliability with self-report

questionnaires. Greater reliability might be obtained with well-trained observers and interviewers.

Educational Implications

The instrument developed in this study was of low reliability. Although each step in questionnaire design was carefully established and carried out, the resulting self-report attitudinal measure did not adequately assess the perceptions that it was designed to reflect. Therefore, any conclusions drawn from the data would be statistically uncertain.

Despite the fact that the product of this study, the questionnaire which was developed, was not shown to be significantly reliable, the process involved in the development of this instrument was extremely valuable to the researcher, and perhaps to other researchers. This study demonstrated that the design of a self-report assessment of perceptions is difficult in terms of developing a reliable instrument. This finding may be valuable to future researchers, in that it suggests that new avenues for assessing teaching styles need to be pursued. Perhaps the area that is potentially most fruitful is the development of a long-term interview format for assessment of perceptions. Educators frequently make decisions based upon survey data. However, a survey instrument that is either invalid or unreliable seriously effects research results, and negates the veracity of conclusions drawn.

It is recommended that questionnaires not be used to gather data unless they have been demonstrated to be both valid and reliable. While this is a very basic assumption, it is often violated in practice.

Final Summary

The goal of this study was to determine the extent to which a valid and reliable instrument could be developed to assess teacher perceptions of responsiblities, abilities and effectiveness in teaching to the individual needs and learning styles of students, and to further measure the degree to which demographic group membership can be predicted by direct observation of classroom practice. It was found that the instrument developed in this study was demonstrated to have content (face) and internal construct validity but was of low reliability.

Had this been a reliable instrument, it might be concluded that teacher perceptions of effectiveness in flexibility of response to learner characteristics and materials were statistically significant predictors of questionnaire response for respondents grouped by grade level taught; a similar finding was observed in the classroom. However, predicted group membership was relatively low. This might be a fruitful area for future research.

This study demonstrated the difficulty of developing a reliable instrument to assess perceptions in a self-report mode. The researcher cautioned against the use of untested survey instruments in gathering

data, and recommended that no conclusions be drawn from such instruments until they have been found to be both valid and reliable. The results of this study were judged to be valuable to future researchers, in that they suggest that new avenues for assessing teaching styles need to be pursued. Perhaps the area that is potentially most productive is the development of a long-term interview format for assessment of perceptions.

LITERATURE CITED

LITERATURE CITED

Allport, Floyd H. Theories of Perception and the Concept of Structures. NY: John Wiley and Sons, Inc., 1955.

Allport, G. W. Personality: A Psychological Interpretation. NY: Holt, Rinehart and Winston, Inc., 1937.

Amidon, Edmund, and Ned. A. Flanders. "The Effects of Direct and Indirect Teacher Influence on Dependent-Prone Students Learning Geometry." Journal of Educational Psychology 52 (No. 6 1961): 286-291.

Anderson, Wesley R., and S. William Bruce. "A Plan for Matching Learning and Teaching Styles." Student Learning Styles: Diagnosing and Prescribing Programs, ed. National Association of Secondary School Principals. Reston, VA: National Association of Secondary School Principals, 1979, p. 81-88.

Ausubel, David P. "Cognitive Structure and the Facilitation of Meaningful Verbal Learning." Journal of Teacher Education 14 (1963): 217-221.

Ausubel, David P. "Introduction." Readings in the Psychology of Cognition, ed. R. C. Anderson and D. P. Ausubel. NY: Holt, Rinehart and Winston, 1965, p. 3-17.

Atwood, Beth. "Helping Students Recognize Their Own Learning Styles." Learning 3 (April 1975): 72-78.

Barnes, Ronald E. "Tomorrow's Educator: An Alternative to Today's School Person." Curriculum Planning: A New Approach, Third Edition, ed. Glen Hass. Boston, MA: Allyn and Bacon, Inc., 1980, p. 33-34.

Bennett, Neville. Teaching Style and Pupil Progress. Cambridge, MA: Harvard University Press, 1976.

Berdie, Douglas R., and John F. Anderson. Questionnaires: Design and Use. NJ: Scarecrow Press, Inc., 1974.

Bernstein, Barbara E. "Tailoring Teaching to Learning Styles." Independent School Bulletin 34 (December 1974): 50-51.

Bloom, Benjamin S. "Learning For Mastery." Social Studies Strategies: Theory Into Practice, ed. Peter H. Martorella. NY: Harper and Row, 1976, p. 20-21.

Bower, Gordon H., and Ernest R. Hilgard. Theories of Learning. Fifth Edition. Englewood Cliffs, NJ: Prentice-Hall, Inc., 1981.

Brandwein, Paul and Robert Ornstein. The Dualities of the Mind." Instructor (Jan. 1977).

Bruner, Jerome S. "Learning and Thinking." Harvard Education Review 29 (1959): 184-192.

Bruner, Jerome S. The Process of Education. Cambridge, MA: Harvard University Press, 1960.

Bruner, Jerome S. "Some Theorems on Instruction Illustrated with Reference to Mathematics." Theories on Learning and Instruction: Sixty-third Yearbook of the National Society for the Study of Education. Part I. Chicago, IL: University of Chicago Press, 1964.

Burton, William H. The Guidance of Learning Activities. Third Edition. NY: Appleton-Century-Crofts, Inc., 1962.

Butler, Kathleen A. "Working Your Curriculum with Style." Challenge 5 (1983): 38-42).

Butler, Kathleen A. Learning and Teaching Style in Theory and Practice. Olympia, WA: Timberline Regional Library Service Center, 1984.

Canfield, Albert, and Judith Canfield. "Canfield Teaching Styles Inventory." Arlington, VA: ERIC Document Reproduction Service, ED 228 235, 1975.

Cantor, Nathaniel. Dynamics of Learning. NY: Henry Stewart, Publishers, 1946.

Chall, Jeanne. Learning to Read: The Great Debate. NY: McGraw-Hill Book Company, 1967.

Combs, Arthur W. "Some Basic Concepts in Perceptual Psychology." Curricular Planning: A New Approach, Third Edition, ed. Glen Hass. Boston, MA: Allyn and Bacon, Inc., 1980, p. 157-162.

Combs, Arthur W. A Personal Approach to Teaching: Beliefs that Make a Difference. Boston, MA: Allyn and Bacon, Inc., 1982.

Coop, Richard A., and Irving E. Sigel. "Cognitive Style: Implications for Learning and Instruction." Psychology in the Schools 8 (April 1971): 152-161.

Cornett, Claudia. "What You Should Know About Teaching and Learning Styles." Arlington, VA: ERIC Document Reproduction Service, ED 228-235, 1983.

Cortes, Carlos. "Chicano Culture, Experience and Learning." Extracting Learning Styles from Social/Cultural Diversity. A Study of Five Minorities, ed. Lee Morris. Arlington, VA: ERIC Document Reproduction Service, ED 158 952, 1978, 29-40.

County Superintendent of Schools. Gallatin County. Bozeman, MT, 1986.

County Superintendent of Schools. Lewis and Clark County. Helena, MT, 1986.

Cronbach, Lee J., and Richard E. Snow. Aptitudes and Instructional Methods. NY: John Wiley and Sons, Inc., 1977.

Daines, Jeanette. Learning Styles of Vocational Child Care and Development Students in Wisconsin. Final Report. Arlington, VA: ERIC Document Reproduction Service, ED 145 235, 1977.

Dunn, Rita, and Kenneth Dunn. Administrator's Guide to New Programs for Faculty Management and Evaluations. West Nyack, NY: Parker Publishing Division of Prentice-Hall, 1977.

Dunn, Rita, and Kenneth Dunn. Teaching Students Through Their Individual Learning Styles: A Practical Approach. Reston, VA: Reston Publishing Co., Inc., 1978.

Dunn, Rita, and Kenneth Dunn. "Using Learning Style Data to Develop Student Prescriptions." Student Learning Styles: Diagnosing and Prescribing Programs,. ed. N.A.S.S.P. Reston, VA: N.A.S.S.P., 1979, 109-122.

Dunn, Rita, Kenneth Dunn, and Gary E. Price. Learning Style Inventory Manual. Lawrence, KS: Price Systems, 1975.

Dunn, Rita, Kenneth Dunn, and Gary E. Price. "Identifying Individual Learning Styles." Student Learning Styles: Diagnosing and Prescribing Programs, ed. N.A.S.S.P. Reston, VA: N.A.S.S.P., 1979, 39-54.

Dunwell, Robert P., and Robert L. Wendel. Foundations of Teaching and Learning. NY: Praeger Publishers, 1976.

Durkin, Delores. Teaching Them to Read. Boston, MA: Allyn and Bacon, Inc., 1969.

Ebel, Kenneth E. "Teaching Styles and Faculty Behavior." New Directions for Teaching and Learning: Improving Teaching Styles, ed. Kenneth E. Ebel. San Francisco, CA: Jossey-Bass inc., 1980.

Epstein, Herman T., and Conrad F. Toepfer, Jr. "A Neuroscience Basis for Reorganizing Middle Grade Education." Educational Leadership (May 1978): 656-660.

Fischer, Barbara B., and Louis Eischer. "Styles in Teaching and Learning." Educational Leadership 36 (January 1979): 245-254.

Flanders, Ned A. Teacher Influence, Pupil Attitudes and Achievement. U.S.O.E. Cooperative Research Project No. 397. Minneapolis: University of MN, 1960.

Flanders, Ned A. Helping Teachers Change Their Behavior. U.S.O.E. Project Nos. 1721012 and 7320560. Michigan: University of MI.

Flanders, Ned A. Teacher Influence, Pupil Attitudes, and Achievement. U.S.O.E. Project No. OE-25040, Cooperative Research Monograph No. 12, 1965.

Gage, N. L. Handbook of Research on Teaching. Chicago, IL: Rand McNally and Co., 1963.

Gagne, R. M. "Some New Views of Learning and Instruction." Curricular Planning: A New Approach, Third Edition, ed. Glen Hass. Boston, MA: Allyn and Bacon, Inc., 1980, p. 162-170.

Gagne, R. M., and R. T. White. "Memory Structures and Learning Outcomes." Review of Educational Research 48 (Spring 1978): 198-222.

Gardner, Riley W., Phillip S. Holzman, George S. Klein, Harriet B. Lintonk and Donald P. Spence. "Cognitive Control: A Study of Individual Consistencies in Cognitive Behavior." Psychological Issues, Vol. 1, No. 4, 1959.

Gilley, Daryl V. "Personal Learning Styles: Exploring the Individual's Sensory Input Processes." Ed.D. Dissertation. Dissertation Abstracts International, 36/98A: 5223, 1975.

Glasser, Robert. "Individuals and Learning: The New Aptitudes." Learning and Instruction, ed. Merlin C. Wittrock. Berkeley, CA: McCutchan Pub. Co., 1977.

Glasser, William. Schools Without Failure. NY: Herper Colophon Books, 1969.

Glassman, Edward. "The Teacher as Leader." Improving Teaching Styles: New Directions for Teaching and Learning, ed. Kenneth E. Ebel and John Noonan. San Francisco, CA: Jossey-Bass Inc., 1980, 31-40.

Granrose, John J. "Conscious Teaching: Helping Graduate Assistants Develop Teaching Styles." Improving Teaching Styles: New Directions for Teaching and Learning, ed. Kenneth E. Eble and John Noonan. San Francisco, CA: Jossey-Bass Inc., 1980, 21-30.

Gregorc, Anthony F. "Learning/Teaching Styles: Their Nature and Effects." Student Learning Styles: Diagnosing and Prescribing Programs, ed. N.A.S.S.P. Reston, VA: N.A.S.S.P., 1979, 19-26.

Gregorc, Anthony F. Gregorc Style Delineator: Development, Technical, and Administration Manual. Maynard, MA: Gabriel Systems, Inc., 1982.

Gregorc, Anthony F., and Helen R. Ward. "A New Definition for Individual." N.A.S.S.P. Bulletin (Feb. 1977): 20-26.

Gregorc, Anthony F. and H. Ward. An Adult's Guide to Style. Maynard, MA: Gabriel Systems, Inc., 1982.

Grieve, Tarrance D., and J. K. Davis. "The Relationship of Cognitive Style and Method of Instruction to Performance in Ninth-Grade Geography." The Journal of Educational Research 65 (Nov. 1971): 137-141.

Griffin, Thomas E. Preferred Learning Styles: A Design for Future Curricula. Arlington, VA: ERIC Document Reproduction Service, ED 103 056, 1974.

Guild, Patricia. "Learning Styles: Knowledge, Issues and Applications for Classroom Teachers." Ann Arbor, MI: University Microfilms International, 80-19,462, 1980.

Guilford, J. P. "Three Faces of Intellect." Readings in the Psychology of Cognition, ed. R. C. Anderson and D. P. Ausubel. NY: Holt, Rinehart and Winston, Inc., 1965, 194-214.

Guthrie, E. R. The Psychology of Learning. NY: Harper and Row, 1935.

Hart, Leslie A. "Programs, Patterns and Downshifting in Learning to Read." The Reading Teacher (Oct. 1983): 5-11.

Hass, Glen. Curriculum Planning: A New Approach, Third Edition. Boston, MA: Allyn and Bacon, Inc., 1980.

Heikkinen, Michael W. The Teaching Style Q-Sort: A Description of Its Uses in Assessing Teaching Style. Arlington, VA: ERIC Document Reproduction Service, ED 151 351, 1978.

Heilman, Arthur W. Teaching Reading, Second Edition. Columbus, OH: Charles E. Merrill Publishing Company, 1969.

Hill, Winifred F. Learning: A Survey of Psychological Interpretations. San Francisco, CA: Chandler Publishing Co., 1963.

Horak, William H. An Analysis and Comparison of Elementary Pre-Service and In-Service Teacher's Beliefs About Science Teachers' Classroom Behaviors. Arlington, VA: ERIC Document Reproduction Service, ED 184 889, 1980.

Hughes, Marie H. Development of the Means for the Assessment of the Quality of Teaching in Elementary Schools. USOE Cooperative Research Project No. 353. UT: University of Utah, 1959.

Hughes, Marie H. "Utah Study of the Assessment of Teaching." Theory and Research in Teaching, ed. Arno A. Bellack. NY: Teachers College, 1963.

Hunt, David E. "A Model for the Training of Training Agents." NY: Syracuse University, unpublished manuscript, 1965.

Hunt, David E. "A Conceptual Level Matching Model for Coordinating Learner Characteristics With Educational Approaches." Interchange: A Journal of Educational Studies 1 (No. 3, 1970): 68-82.

Hunt, David E. "Learning Style and the Interdependence of Practice and Theory." Phi Delta Kappan (May, 1981): 647.

Hunt, J. McV. "Experience and the Development of Motivation: Some Reinterpretations." Human Dynamics in Psychology and Education, ed. Don E. Hamachek. Boston, MA: Allyn and Bacon, Inc., 1968: 92-108.

Hunter, Madeline. "Right-Brained Kids in Left-Brained Schools." Today's Education (Nov./Dec. 1976): 45-48.

Ishler, Richard E., and Margaret F. Ishler. "Developing Desirable Teaching Behaviors." Improving Teaching Styles: New Directions for Teaching and Learning, ed. Kenneth E. Ebel and John Noonan. San Francisco, CA: Jossey-Bass Inc., 1980, 69-80.

Jaeger, Richard M. Sampling in Education and the Social Sciences. NY: Longman, Inc., 1984.

Joyce, Bruce R., and Marsha Weil. Models of Teaching. Englewood Cliffs, NJ: Prentice Hall, Inc., 1972 and 1980.

Joyce, Bruce R., C. C. Brown, and L. Peck. Flexibility in Teaching: An Excursion into the Nature of Teaching and Training. NY: Longman, Inc., 1981.

Kagan, Jerome. "Impulsive and Reflective Children: Significance of Conceptual Tempo." Learning and the Educational Process, ed. J. D. Krumboltz. Chicago, IL: Rand McNally and Co., 1965, 133-161.

Kagan, Jerome. "Reflection-Impulsivity: The Generality and Dynamics of Conceptual Tempo." Journal of Abnormal Psychology 71 (Feb. 1966): 17-24.

Kagan, Jerome, and N. Kogan. "Individual Variation in Cognitive Processes." Carmichael's Manual of Child Psychology, ed. P. H. Mussen. NY: John Wiley, 1970: 1273-1365.

Karlin, Robert. Teaching Elementary Reading. Chicago, IL: Harcourt, Brace, Jovanovich, Inc., 1971.

Keefe, James W. "Learning Style: An Overview." Student Learning Styles: Diagnosing and Prescribing Programs, ed. N.A.S.S.P. Reston, VA: N.A.S.S.P., 1979a: 1-18.

Keefe, James. "School Applications of the Learning Style Concept." Student Learning Styles: Diagnosis and Prescribing Programs, ed. N.A.S.S.P. Reston, VA: N.A.S.S.P., 1979b: 123-132.

Kimble, Gregory A. Hilgard and Marquis' Conditioning and Learning. NY: Appleton-Century-Crofts, Inc., 1961.

Klecka, William R. "Discriminant Analysis." Statistical Package for the Social Studies, ed. Norman H. Nie, Dale H. Bent, and C. Hadlai Hunt. NY: McGraw-Hill Book Co., 1975: 434-467.

Koffka, K. The Growth of the Mind. Translated by R. M. Ogden. London: Kegan Paul, Trench, Trubner, 1924.

Kohlberg, Lawrence. "The Cognitive-Developmental Approach to Moral Education." Curriculum Planning: A New Approach, Third Edition, ed. Glen Hass. Boston, MA: Allyn and Bacon, Inc., 1980: 129-139.

Kohler, W. The Mentality of Apes. Translated by E. Winter. NY: Harcourt, Brace and World, 1925.

Kolb, David A., I. M. Rubin, and J. M. McIntyre. Organizational Psychology: A Book of Readings, Second Edition. Englewood Cliffs, NJ: Prentice-Hall, 1974.

Labaw, Patricia J. Advanced Questionnaire Design. Cambridge, MA: Abt Books, 1982.

Lawrence, Gordon. People Types and Tiger Stripes. Gainesville, FL: Psychological Types, Inc., 1982.

Leedy, Paul D. Practical Research: Planning and Design, Second Edition. NY: Macmillan Publishing Co., Inc., 1980.

Leinhardt, Gaea, and James G. Greeno. "The Cognitive Skill of Teaching." Journal of Educational Psychology, vol. 78, No. 2 (1986): 75-95.

Mager, Robert F. Developing Attitude Toward Learning, or Smats 'n Smuts. Belmont, CA: Pitman Learning, Inc., 1984.

McCarthy, Bernice. The 4Mat System: Teaching to Learning Styles With Right/Left Mode Techniques. IL: Excel, Inc., 1981.

Medley, Donald M. Teacher Competence and Teacher Effectiveness: A Review of Process-Product Research. Washington, D.C.: American Association of Colleges for Teacher Education, 1977.

Meichenbaum, D. H., and J. Goodman. "Reflection-Impulsivity and Verbal Control of Motor Behavior." Child Development 40 (1969): 785-797.

Melton, A. W. "Individual Differences and Theoretical Process Variables: General Comments on the Conference." Learning and Individual Differences, ed. R. M. Gagne. Columbus, OH: Charles E. Merrill, 1967.

Munby, Hugh. "Thirty Studies Involving the 'Scientific Attitude Inventory': What Confidence Can We Have in This Instrument?" Journal of Research in Science Teaching, ed. James A. Shymansky, 20 (Feb., 1983): 141-162.

Munby, Hugh. "A Qualitative Approach to the Study of a Teacher's Beliefs." Journal of Research in Science Teaching, ed. James A. Shymansky, 21 (Jan., 1984): 27-38.

Munroe, Mary Jeanne. "Teacher Behavior/Student Learning Style: A Vital Link." Arlington, VA: ERIC Document Reproduction Service, Ed 228 167, 1983.

Nunney, Derek N. "Educational Cognitive Style: A Basis for Personalizing Foreign Language Instruction." Personalizing Foreign Language Instruction: Learning Styles and Teaching Options, ed. Renate A. Schultz. Skokie, IL: National Textbook Co., 1977: 14-27.

Oen, Urban T. Investigating the Interaction of Learning Styles and Types of Learning Experience in Vocational-Technical Education, Interim Report. Arlington, VA: ERIC Document Reproduction Service, ED 086 836, 1973.

Office of Public Instruction. Helena, MT, 1986.

Oppenheim, A. N. Questionnaire Design and Attitude Measurement. NY: Basic Books, Inc., 1966.

Papalia, Anthony. "Assessing Students' Learning Style and Teaching For Individual Differences." Hispania 61 (May 1978): 318-322.

Paradise, Louis V., and Cielle Block. "The Relationship of Teacher-Student Cognitive Style to Academic Achievement." Journal of Research and Development in Education, Vol. 17, No. 4 (1984): 57-61.

Parakh, J. S. To Develop a System for Analyzing the Reactions of Teachers and Students in Biology Classes. U.S.O.E. Cooperative Research Project No. S-269. NY: Cornell University, 1965.

Piaget, Jean. The Origins of Intelligence in Children. NY: International Universities Press, 1952.

Pizzo, Jeanne. "An Investigation of the Relationships Between Selected Accoustic Environments and Sound, and Element of Learning Style, as They Affect Sixty-Grade Students' Reading Achievement and Attitudes." Learning Styles Network Newsletter 2 (Spring 1981).

Reissman, Frank. "Students' Learning Styles: Now to Determine, Strengthen and Capitalize on Them." Today's Education 65 (Sept. - Oct. 1976): 94-98.

Reissman, Frank. The Strategy of Style. Work Conference on Curriculum and Teaching in Depressed Urban Areas, July 1-12. Arlington, VA: ERIC Document Reproduction Service, ED 001 074, undated.

Rennels, Max R. "Cerebral Symmetry: An Urgent Concern for Educators." Phi Delta Kappan 57 (March 1976): 471-472.

Renzulli, Joseph, and Linda Smith. Learning Styles Inventory: A Measure of Student Preference for Instructional Techniques. Mansfield Center, CT: Creative Press, 1978.

Robinson, Jack E., and Jerry L. Gray. "Cognitive Style as a Variable In School Learning." Journal of Educational Psychology 66 (Oct. 1974): 793-799.

Rohwer, W. D. Jr. "Images and Pictures in Children's Learning." Psychological Bulletin 73 (1970): 393-403.

Rosner, J. A. A Formative Evaluation of the Perceptual Skills Curriculum Project. Pittsburgh, PA: University of Pittsburgh Learning Research and Development Center, 1972.

Ryans, David G. Characteristics of Teachers: Their Description, Comparison and Appraisal. WA: American Council of Education, 1960.

Sagan, Carl. Broca's Brain. NY: Random House, Inc., 1979.

Salmon, James A. "A Process for Identifying Learning Styles in Community College Students." Dissertation Abstracts International, 36/02A: 821, 1975.

Saracho, Olivia M., and Bernard Spodek. "Cognitive Style and Children's Learning: Individual Variation in Cognitive Processes." Arlington, VA: ERIC Document Reproduction Service, ED 247 034, 1984.

Satterly, D. J., and M. A. Brimer. "Cognitive Styles and School Learning." The British Journal of Educational Psychology 41 (Nov. 1971): 294-303.

Schmeck, Ronald R. "Inventory of Learning Processes." Student Learning Styles and Brain Behavior: Programs, Instrumentation, Research. Reston, VA: N.A.S.S.P., 1982: 73-80.

Scott, William A., D. W. Osgood, C. Peterson, and R. Scott. Cognitive Structure: Theory and Measurement of Individual Differences. Washington, D.C.: V. H. Winston and Sons, 1979.

Shelby, Alice V. "Is Your Teaching Style Frustrating Your Students?" Learning, Vol. 14, No. 3 (Oct. 1985): 46-48.

Shumsky, Abraham. In Search of Teaching Style. NY: Appleton-Century-Crofts, 1968.

Shumsky, Adaia. "Individual Differences in Learning Styles." In Search of Teaching Style. ed. Abraham Shumsky, NY: Appleton-Century-Crofts, 1968.

Silberman, Charles e. Crisis in the Classroom. NY: Random House, Inc., 1970.

Silver, Harvey F., and J. Robert Hanson. The T. L. C. Learning Preference Inventory: User's Manual. NJ: Hanson Silver and Associates, Inc., 1980.

Simon, Anita, and C. Bryan. You've Got To Reach 'Em to Teach 'Em. Dallas, TX: TA Press, 1977.

Skinner, B. F. Verbal Behavior. NY: Appleton-Century-Crofts, 1957.

Smith, B. Othanel. "A Concept of Teaching." Teachers College Record 61 (Feb. 1960): 229-241.

Spaulding, Robert L. Adapting Teaching Styles to Learning Styles, Arlington, VA: ERIC Document Reproduction Service, ED 161 870, 1978.

Sperry, Roger W. "The Great Cerebral Commissure." Scientific American (Jan. 1964): 42-52.

SSPS: User's Guide. Edition 2. NY: McGraw-Hill Book Co., 1986.

Sudman, Seymour, and Norman M. Bradburn. Asking Questions. San Francisco, CA: Jossey-Bass Publishers, 1982.

Tallmadge, G. Kasten, and James W. Shearer. "Interactive Relationships Among Learning Styles, Learner Characteristics, Types of Learning, Instructional Methods, and Subject Matter Variables." Journal of Educational Psychology 62 (Feb. 1971): 31-38.

Thorsland, Martin N., and Joseph D. Novak. "The Identification and Significance of Intutitive and Analytic Problem Solving Approaches Among College Physics Students." Arlington, VA: ERIC Document Reproduction Service, ED 072 922, 1972.

Tolman, E. C. Purposive Behavior in Animals and Men. NY: Appleton-Century-Crofts, 1932.

Travers, Robert M. Measured Needs of Teachers and Their Behavior in the Classroom. U.S.O.E. Cooperative Research Project. No. 444. UT: University of Utah, 1961.

Van Dalen, Deobold B., and William J. Meyer. Understanding Educational Research: An Introduction. NY: McGraw-Hill Book Company, 1966.

Wallen, Norman E., and R. M. Travers. "Analysis and Investigation of Teaching Methods." Handbook of Research on Teaching, ed. N. L. Gage. Chicago, IL: Rand McNally and Co., 1963.

Washburne, C. N. "Adapting the Schools to Individual Differences." Twenty-Fourth Yearbook of the National Society for the Study of Education. Part II, Ed. NSSE. Chicago, IL: NSSE, 1925.

White, Robert W. "Motivation Reconsidered: The Concept of Competence." Human Dynamics in Psychology and Education, ed. Don E. Hamachek. Boston, MA: Allyn and Bacon, Inc., 1968, 48-91.

Wiles, Jon, and Joseph Bondi. Curriculum Development: A Guide to Practice. Columbus, OH: Charles E. Merrill Publishing Company, 1979.

Williams, Frederick. Reasoning with Statistics, Second Edition. NY: Holt, Rinehart and Winston, 1979.

Williams, Linda V. Teaching for the Two-Sided Mind: A Guide to Right/Left Brain Education. Englewood Cliffs, NJ: Prentice-Hall, Inc., 1983.

Witkin, H. A., R. B. Dyk, H. P. Paterson, D. R. Goodenough, and S. A. Karp. Psychological Differentiation: Studies of Development. NY: John Wiley and Sons, Inc., 1962.

Witkin, H. A., P. K. Oltman, E. Raskin, and S. A. Karp. A Manual For The Embedded Figure Tests. Palo Alto, CA: Consulting Psychologists Press, Inc., 1971.

Witkin, H. A., and C. A. Moore. Cognitive Style and the Teaching Learning Process. Princeton, NJ: Educational Testing Service, 1974.

Witkin, H. A., R. W. Cox, and F. Friedman. Field-Dependence/Independence and Psychological Differentiation: Bibliography With Index, Supplement No. 2. Arlington, VA: ERIC Document Reproduction Service, ED 144 946, 1976.

Witkin, H. A., and Donald R. Goodenough. "Field-Dependence and Interpersonal Behavior." Psychological Bulletin 84 (July 1977): 661-689.

Witkin, H. A., D. R. Goodenough, and P. K. Oltman. "Psychological Differentiation: Current Status." Journal of Personality and Social Psychology 37 (July 1979): 1127-1145.

Yando, P. M., and J. Kagan. "The Effect of Teacher Tempo on the Child." Child Development 39 (1968): 27-34.

Zeidler, Dana L. "Thirty Studies Involving the 'Scientific Attitude Inventory': What Confidence Can We Have In This Instrument?: Comment and Criticism." Journal of Research in Science Teaching 21 (March 1984): 341-342.

APPENDICES

APPENDIX A

SETS OF LIKE QUESTIONS

SETS OF LIKE QUESTIONS

1. Adjust tasks to individual students
   Vary tasks to meet student needs
2. Tape record directions or tasks
   Prerecord lessons
3. Utilize tutorial help
   Utilize assistants with students
4. Give verbal and visual directions
   Utilize words and pictures together
5. Seat students according to need
   Provide preferential seating
6. Utilize peer tutoring
   Allow students to teach one another
7. Provide one-to-one teaching
   Teach students individually
8. Allow student mobility
   Allow students to move about the classroom
9. Provide a quiet environment for students
   Provide for students who require quiet
10. Utilize different styles of teaching
    Vary teaching styles
11. Base instructional program on student needs
    Plan instructional goals to fit student needs
12. Adapt instruction to individual students
    Provide for individual needs of students
13. Provide flexibility for task completion
    Allow students choices in task completion
14. Provide flexibility of materials used
    Allow students choice of materials
15. Utilize question/answer method of teaching
    Engage students in answering questions
16. Utilize discussion method
    Involve students in discussions
17. Utilize discovery method
    Involve students in discovery learning
18. Teach in small groups
    Vary group size
19. Change group composition
    Regroup according to need
20. Adapt instructional method to subject
    Employ particular teaching method with subjects

21. Group students according to learning style
    Instruct groups of students with similar styles
22. Utilize different methods for reteaching
    Reteach concepts in alternate ways
23. Teach alternate ways of learning to students
    Teach students many ways to learn concepts
24. Adapt learning pace to students
    Vary learning pace to suit students
25. Engage students in spatial activities
    Involve students in spatial activities
26. Utilize active application in lessons
    Allow students to actively apply knowledge
27. Teach students to reflect upon new concepts
    Engage students in reflection upon concepts
28. Adapt instructional method to purpose
    Adapt teaching style to specific purposes
29. Teach thinking skills
    Instruct students in learning to think
30. Accept individual differences in students
    Recognize individual differences in learners
31. Match teaching style to learning style
    Teach students in their preferred style
32. Provide flexibility in environment
    Provide alternate environments for learning
33. Utilize films and other media
    Utilize audiovisual materials
34. Utilize problem solving in lessons
    Instruct students in problem solving
35. Utilize creative thinking in lessons
    Employ creative-thinking activities
36. Utilize lecture method
    Lecture students
37. Engage students in manipulative activities
    Allow students to manipulate objects for learning
38. Engage students in sensory activities
    Utilize the five senses in teaching
39. Utilize varied questioning strategies
    Ask varied levels of questions
40. Reorganize sequence of tasks when needed
    Analyze and sequence tasks
41. Consider student characteristics in learning
    Consider student learning styles
42. Reorganize classroom for differnt needs
    Provide flexibility in classroom arrangement
43. Utilize advance organizers in teaching
    Teach concepts using advance organizers
44. Assist students in categorizing topics
    Teach students to categorize ideas

45. Teach students methods of recall
    Teach students memory techniques
46. Teach students learning strategies
    Create student awareness of learning styles
47. Use positive reinforcement with students
    Give students positive feedback
48. Give all students opportunities for success
    Insure success for all students
49. Accommodate different learning styles
    Provide for individual learning styles
50. Assess student learning styles
    Identify individual learning styles
51. Place students according to ability
    Group students by ability
52. Teach techniques for effective learning
    Teach students how to learn effectively

APPENDIX B

SURVEY FOR PANEL OF EXPERTS

Irving School
611 South Eighth
Bozeman, MT 59715

Dear

With the assistance of the Department of Elementary Education at Montana State University, I am conducting a study of teaching styles relative to meeting the needs of individual learners. This study will involve teachers from the public kindergarten through grade eight classrooms in Montana. In the formulation of this study, it is necessary to develop a questionnaire designed to measure teacher perceptions of teaching styles. There is a need to consult experts in the field in order to develop important and relevant questions to be asked of teachers.

Therefore, I would sincerely appreciate your assistance in completing the enclosed survey. A copy of the final results of this project will be sent to you at your request.

Please return the survey before February 8, 1985. Your frank opinions and comments will be greatly appreciated in this study. Thank you very much.

Sincerely,

Shirley Handsaker

The following statements are intended to measure individual teaching styles relative to meeting the needs of individual learners. Teachers will be asked to respond to each statement in terms of whether they consider each item their responsibility, whether they have the implied ability, and how effective their teaching has been in regard to each statement. Teaching style is defined as the teacher's personal behaviors and media technologies chosen to deliver and receive information.

Please indicate whether you feel each response set is an appropriate measure of teaching style relative to meeting the needs of individual learners. Also, please indicate whether both statements say the same thing (the use of NEITHER reflects this view), or whether one statement is clearly better than or different from the other.

Please do not leave out any statements.

VA - Very Appropriate
A - Appropriate
U - Undecided
I - Inappropriate
VI - Very Inappropriate

The use of NEITHER indicates that both statements say the same thing.

			(Circle One)					Circle the better statement if any; NEITHER if the same.		
	A.	Adjust tasks to individual students	VA	A	U	I	VI			
Set 1	B.	Vary tasks to meet student needs	VA	A	U	I	VI	A	B	NEITHER
	A.	Tape record directions or tasks	VA	A	U	I	VI			
Set 2	B.	Prerecord lessons	VA	A	U	I	VI	A	B	NEITHER
	A.	Utilize tutorial help	VA	A	U	I	VI			
Set 3	B.	Utilize assistants with students	VA	A	U	I	VI	A	B	NEITHER
	A.	Give verbal and visual directions	VA	A	U	I	VI			
Set 4	B.	Utilize words and pictures together	VA	A	U	I	VI	A	B	NEITHER
	A.	Seat according to student needs	VA	A	U	I	VI			
Set 5	B.	Provide preferential seating	VA	A	U	I	VI	A	B	NEITHER
	A.	Utilize peer tutoring	VA	A	U	I	VI			
Set 6	B.	Allow students to teach one another	VA	A	U	I	VI	A	B	NEITHER
	A.	Provide one-to-one teaching	VA	A	U	I	VI			
Set 7	B.	Teach students individually	VA	A	U	I	VI	A	B	NEITHER
	A.	Allow student mobility	VA	A	U	I	VI			
Set 8	B.	Allow students to move about classroom	VA	A	U	I	VI	A	B	NEITHER
	A.	Provide a quiet environment for students	VA	A	U	I	VI			
Set 9	B.	Provide for students who require quiet	VA	A	U	I	VI	A	B	NEITHER
	A.	Utilize different styles of teaching	VA	A	U	I	VI			
Set 10	B.	Vary teaching styles	VA	A	U	I	VI	A	B	NEITHER

			Circle One					Circle the better statement if any; NEITHER if the same.		
	A.	Base instructional program on student needs	VA	A	U	I	VI			
Set 11	B.	Plan instructional goals to fit student need	VA	A	U	I	VI	A	B	NEITHER
	A.	Adapt instruction to individual students	VA	A	U	I	VI			
Set 12	B.	Provide for individual needs of students	VA	A	U	I	VI	A	B	NEITHER
	A.	Provide flexibility for task completion	VA	A	U	I	VI			
Set 13	B.	Allow students choices in task completion	VA	A	U	I	VI	A	B	NEITHER
	A.	Provide flexibility of materials used	VA	A	U	I	VI			
Set 14	B.	Allow students choice of materials	VA	A	U	I	VI	A	B	NEITHER
	A.	Utilize question/answer method of teaching	VA	A	U	I	VI			
Set 15	B.	Engage student in answering questions	VA	A	U	I	VI	A	B	NEITHER
	A.	Utilize discussion method	VA	A	U	I	VI			
Set 16	B.	Involve students in discussions	VA	A	U	I	VI	A	B	NEITHER
	A.	Utilize discovery method	VA	A	U	I	VI			
Set 17	B.	Involve students in discovery learning	VA	A	U	I	VI	A	B	NEITHER
	A.	Teaching in small groups	VA	A	U	I	VI			
Set 18	B.	Vary group size	VA	A	U	I	VI	A	B	NEITHER
	A.	Change group composition	VA	A	U	I	VI			
Set 19	B.	Regroup according to need	VA	A	U	I	VI	A	B	NEITHER
	A.	Adapt instructional method to subject	VA	A	U	I	VI			
Set 20	B.	Use specific methods with certain subjects	VA	A	U	I	VI	A	B	NEITHER
	A.	Group students according to learning style	VA	A	U	I	VI			
Set 21	B.	Instruct groups of students with like styles	VA	A	U	I	VI	A	B	NEITHER
	A.	Utilize different methods for retreaching	VA	A	U	I	VI			
Set 22	B.	Reteach concepts in alternate ways	VA	A	U	I	VI	A	B	NEITHER
	A.	Teach students alternate ways of learning	VA	A	U	I	VI			
Set 23	B.	Teach students many ways to learn concepts	VA	A	U	I	VI	A	B	NEITHER
	A.	Adapt learning pace to students	VA	A	U	I	VI			
Set 24	B.	Vary learning pace to suit students	VA	A	U	I	VI	A	B	NEITHER
	A.	Engage students in spatial activites	VA	A	U	I	VI			
Set 25	B.	Involve students in spatial activites	VA	A	U	I	VI	A	B	NEITHER
	A.	Utilize active application in lessons	VA	A	U	I	VI			
Set 26	B.	Allow students to actively apply knowledge	VA	A	U	I	VI	A	B	NEITHER

			Circle One					Circle the better statement if any; NEITHER if the same.		
	A.	Teach students to reflect upon new concepts	VA	A	U	I	VI			
Set 27	B.	Engage students in reflection upon conepts	VA	A	U	I	VI	A	B	NEITHER
	A.	Adapt instructional method to purpose	VA	A	U	I	VI			
Set 28	B.	Adapt teaching style to specific purposes	VA	A	U	I	VI	A	B	NEITHER
	A.	Teach thinking skills	VA	A	U	I	VI			
Set 29	B.	Instruct students in learning to think	VA	A	U	I	VI	A	B	NEITHER
	A.	Accept individual differences in students	VA	A	U	I	VI			
Set 30	B.	Recognize individual differences in learners	VA	A	U	I	VI	A	B	NEITHER
	A.	Match teaching style to learning style	VA	A	U	I	VI			
Set 31	B.	Teach students in their preferred styles	VA	A	U	I	VI	A	B	NEITHER
	A.	Provide flexibility in environment	VA	A	U	I	VI			
Set 32	B.	Provide alternate environments for learning	VA	A	U	I	VI	A	B	NEITHER
	A.	Utilize films and other media	VA	A	U	I	VI			
Set 33	B.	Utilize audiovisual materials	VA	A	U	I	VI	A	B	NEITHER
	A.	Utilize problem solving in lessons	VA	A	U	I	VI			
Set 34	B.	Instruct students in problem solving	VA	A	U	I	VI	A	B	NEITHER
	A.	Utilize creative thinking in lessons	VA	A	U	I	VI			
Set 35	B.	Employ creative-thinking activities	VA	A	U	I	VI	A	B	NEITHER
	A.	Utilize lecture method	VA	A	U	I	VI			
Set 36	B.	Lecture to students	VA	A	U	I	VI	A	B	NEITHER
	A.	Engage students in manipulative activities	VA	A	U	I	VI			
Set 37	B.	Allow students to manipulate objects	VA	A	U	I	VI	A	B	NEITHER
	A.	Engage students in sensory activities	VA	A	U	I	VI			
Set 38	B.	Utilize the five senses in teaching	VA	A	U	I	VI	A	B	NEITHER
	A.	Utilize varied questioning strategies	VA	A	U	I	VI			
Set 39	B.	Ask varied levels of questions	VA	A	U	I	VI	A	B	NEITHER
	A.	Reorganize sequence of tasks when needed	VA	A	U	I	VI			
Set 40	B.	Analyze and sequence tasks	VA	A	U	I	VI	A	B	NEITHER
	A.	Consider student characteristics in learning	VA	A	U	I	VI			
Set 41	B.	Consider student learning styles	VA	A	U	I	VI	A	B	NEITHER
	A.	Reorganize classroom for different needs	VA	A	U	I	VI			
Set 42	B.	Provide flexibility in classroom arrangement	VA	A	U	I	VI	A	B	NEITHER

			Circle One					Circle the better statement if any; NEITHER if the same.		
	A.	Utilize advance organizers in teaching	VA	A	U	I	VI			
Set 43	B.	Teach concepts using advance organizers	VA	A	U	I	VI	A	B	NEITHER
	A.	Assist students in categorizing ideas	VA	A	U	I	VI			
Set 44	B.	Teach students to categorize ideas	VA	A	U	I	VI	A	B	NEITHER
	A.	Teach students methods of recall	VA	A	U	I	VI			
Set 45	B.	Teach students memory techniques	VA	A	U	I	VI	A	B	NEITHER
	A.	Teach students learning strategies	VA	A	U	I	VI			
Set 46	B.	Create student awareness of learning styles	VA	A	U	I	VI	A	B	NEITHER
	A.	Use positive reinforcement with students	VA	A	U	I	VI			
Set 47	B.	Give students positive feedback	VA	A	U	I	VI	A	B	NEITHER
	A.	Give all students opportunities for success	VA	A	U	I	VI			
Set 48	B.	Insure success for all students	VA	A	U	I	VI	A	B	NEITHER
	A.	Accommodate different learning styles	VA	A	U	I	VI			
Set 49	B.	Provide for individual learning styles	VA	A	U	I	VI	A	B	NEITHER
	A.	Assess student learning styles	VA	A	U	I	VI			
Set 50	B.	Identify individual learning styles	VA	A	U	I	VI	A	B	NEITHER
	A.	Place students according to ability	VA	A	U	I	VI			
Set 51	B.	Group students by ability	VA	A	U	I	VI	A	B	NEITHER
	A.	Teach techniques for effective learning	VA	A	U	I	VI			
Set 52	B.	Teach students how to learn effectively	VA	A	U	I	VI	A	B	NEITHER

APPENDIX C

PANEL OF EXPERTS

PANEL OF EXPERTS

Dr. Keith Chambers: Superintendent of Bozeman School District 7. Former principal and educator.

Dr. Bryan Dunn: Assistant Superintendent of Bozeman School District 7. Former principal and educator.

Dr. James Hauwiller: Professor of Elementary Education at Montana State University, Bozeman, Montana.

Ms. Nonnie Hughes: Principal of Emerson Elementary School, Bozeman, Montana.

Dr. Bruce Joyce: Educator and author of books dealing with teaching styles.

Mr. Larry Williams: Personnel Director for Bozeman School District 7. Former administrator and educator.

APPENDIX D

INITIAL PILOT TEST OF SURVEY

Irving School
611 South Eighth
Bozeman, MT 59715

Dear Colleague:

With the assistance of the Department of Elementary Education at Montana State University, I am conducting a study of teaching styles relative to meeting the needs of individual learners. This study will involve teachers from the public kindergarten through grade eight classrooms in Montana. In the formulation of this study, there is a need to consult knowledgeable and experienced people in the field in order to identify the provisions currently being made to accommodate the differences in the way students learn.

Therefore, I would sincerely appreciate your assistance in completing the enclosed survey. All responses will be reported in combined tabulated form only, ensuring individual confidentiality in all reported results. A copy of the final results of this project will be sent to you at your request.

Please return the survey as soon as possible. Your frank opinions and comments will be greatly appreciated in this study. Thank you very much for your prompt and courteous attention.

Sincerely,

Shirley Handsaker

SURVEY CONCERNING TEACHER PERCEPTIONS
OF TEACHING STYLES

The purpose of this survey is to gather information in order to identify the provisions that are currently being made to accommodate the differences in the way students learn. This information will be used for a research study being conducted at Montana State University.

Please return to: Shirley Handsaker
Irving School
611 South Eighth
Bozeman, Montana 59715

For the purpose of this study, teaching style is defined as the teacher's personal behaviors and media technologies chosen to deliver and receive information.

Please indicate whichever response gives the most correct picture of your own view. Please do not leave out any statements.

1. I teach grade(s):
(Please check all that apply.)
1)_____ Kindergarten
2)_____ One
3)_____ Two
4)_____ Three
5)_____ Four
6)_____ Five
7)_____ Six
8)_____ Seven
9)_____ Eight

2. My total past full years of teaching experience are: (Please check one.)
1)_____ 0 - 3 years
2)_____ 4 - 7 years
3)_____ 8 -12 years
4)_____13 -19 years
5)_____20 -29+years

3. My educational level is:
(Please check one.)
1)_____ BA
2)_____ BA + 15 credits
3)_____ BA + 30 credits
4)_____ Fifth Year
5)_____ MA
6)_____ MA + 15 credits
7)_____ MA + 30 credits
8)_____ Other:_____

4. My age is:
(Please check one.)
1)_____ between 20 - 29
2)_____ between 30 - 39
3)_____ between 40 - 49
4)_____ between 50 - 59
5)_____ between 60 - 69+

5. I am a:
(Please check one.)
1)_____ female
2)_____ male

6. The number of students in my class is:
(Please check one.)
1)_____ between 1 - 10
2)_____ between 11 - 20
3)_____ between 21 - 30+
4)_____ Other:_____

7. If I were just entering college for the first time, I would:
(Please check one.)
1)_____ Train to be a teacher
2)_____ Not train to be a teacher
3)_____ Other:_____

8. Teaching is my:
(Please check one.)
1)_____ Primary vocation
2)_____ Supplementary vocation

9. My knowledge of techniques for accommodating individual student learning styles was gained by:
(Please check all that apply.)
1)_____ College classes
2)_____ Experience with students
3)_____ Reading research in the field
4)_____ Other:_____

Please indicate which response gives the most correct picture of your own view relative to meeting the needs of individual learners.
Please do not leave out any statements.

SD - Strongly Disagree
D - Disagree
N - Neither Agree nor Disagree
A - Agree
SA - Strongly Agree

	Should a teacher: (Circle One)					Can a teacher: (Circle One)					I have been successful when I: (Answer only if you have tried the following) (Circle One)				
	SD	D	N	A	SA	SD	D	N	A	SA	SD	D	N	A	SA
1. Adjust tasks to individual students	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
2. Utilize peer tutoring	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
3. Allow student mobility	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
4. Provide a quiet environment for students	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
5. Utilize different styles of teaching	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
	SD	D	N	A	SA	SD	D	N	A	SA	SD	D	N	A	SA
6. Base instructional program on student needs	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
7. Adapt instruction to individual students	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
8. Provide flexibility of materials used	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
9. Utilize discussion method	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
10. Utilize discovery method	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
	SD	D	N	A	SA	SD	D	N	A	SA	SD	D	N	A	SA
11. Teach in small groups	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
12. Change group composition	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
13. Utilize different methods for reteaching	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
14. Adapt learning pace to students	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
15. Engage students in spatial activities	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
	SD	D	N	A	SA	SD	D	N	A	SA	SD	D	N	A	SA
16. Adapt instructional method to purpose	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
17. Teach thinking skills	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
18. Accept individual differences in students	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
19. Provide flexibility in environment	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
20. Utilize films and other media	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
	SD	D	N	A	SA	SD	D	N	A	SA	SD	D	N	A	SA
21. Utilize problem solving in lessons	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
22. Utilize creative thinking in lessons	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
23. Utilize lecture method of teaching	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
24. Engage students in manipulating objects	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
25. Engage students in sensory activities	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5

Please indicate which response gives the most correct picture of your own view relative to meeting the needs of individual learners.
Please do not leave out any statements.

SD - Strongly Disagree
D - Disagree
N - Neither Agree nor Disagree
A - Agree
SA - Strongly Agree

	Should a teacher: (Circle One)					Can a teacher: (Circle One)					I have been successful when I: (Answer only if you have tried the following) (Circle One)				
	SD	D	N	A	SA	SD	D	N	A	SA	SD	D	N	A	SA
26. Reorganize sequence of tasks when needed	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
27. Consider student learner characteristics	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
28. Reorganize classroom for different needs	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
29. Utilize advance organizers in teaching	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
30. Assist students in categorizing topics	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
	SD	D	N	A	SA	SD	D	N	A	SA	SD	D	N	A	SA
31. Teach students methods of recall	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
32. Use positive reinforcement with students	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
33. Assess student learning styles	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
34. Place students according to ability	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
35. Teach techniques for effective learning	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
	SD	D	N	A	SA	SD	D	N	A	SA	SD	D	N	A	SA
36. Vary tasks to meet student needs	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
37. Allow students to teach one another	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
38. Allow students to move about the classroom	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
39. Provide for students who require quiet	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
40. Vary teaching styles	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
	SD	D	N	A	SA	SD	D	N	A	SA	SD	D	N	A	SA
41. Plan instructional goals to fit student needs	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
42. Provide for individual needs of students	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
43. Allow students choice of materials	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
44. Involve students in discussions	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
45. Involve students in discovery learning	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
	SD	D	N	A	SA	SD	D	N	A	SA	SD	D	N	A	SA
46. Vary group size	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
47. Regroup according to need	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
48. Reteach concepts in alternate ways	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
49. Vary learning pace to suit students	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
50. Involve students in spatial activities	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5

SD - Strongly Disagree
D - Disagree
N - Neither Agree nor Disagree
A - Agree
SA - Strongly Agree

Please indicate which response gives the most correct picture of your own view relative to meeting the needs of individual learners.
Please do not leave out any statements.

	Should a teacher: (Circle One)					Can a teacher: (Circle One)					I have been successful when I: (Answer only if you have tried the following) (Circle One)				
	SD	D	N	A	SA	SD	D	N	A	SA	SD	D	N	A	SA
51. Adapt teaching style to specific purposes	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
52. Instruct students in learning to think	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
53. Recognize individual differences in learners	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
54. Provide alternative environments for learning	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
55. Utilize audiovisual materials	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
	SD	D	N	A	SA	SD	D	N	A	SA	SD	D	N	A	SA
56. Instruct students in problem solving	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
57. Employ creative-thinking activities	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
58. Lecture to students	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
59. Allow students to manipulate objects	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
60. Utilize the five senses in teaching	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
	SD	D	N	A	SA	SD	D	N	A	SA	SD	D	N	A	SA
61. Analyze and sequence tasks	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
62. Consider student learning styles	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
63. Provide flexibility in classroom arrangement	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
64. Teach concepts using advance organizers	1	2	3	4	5	1	2	3	4	5					
65. Teach students to categorize ideas	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
	SD	D	N	A	SA	SD	D	N	A	SA	SD	D	N	A	SA
66. Teach students memory techniques	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
67. Give students positive feedback	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
68. Identify individual learning styles	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
69. Group students by ability	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
70. Teach students how to learn effectively	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5

If you would like a copy of the results of this study, please provide the following information:

Name: _____

Address: _____

_____

Thank you very much for participating in this study. Please return your survey to:

Shirley Handsaker
Irving School
611 South Eighth
Bozeman, Montana 59715

RESPONSE TO SURVEY

Thank you for your time and willingness to complete this survey. Would you please complete this final section regarding the survey itself. This feedback will be invaluable to the study, in that it will enable the further refinement of the questionnaire. I sincerely appreciate your input.

1. The format of the survey was:

2. The length of the survey was:

3. The general appearance of the survey was:

4. Were the questions of the survey clear?

5. Were the directions of the survey clear?

6. The process of survey adminstration was:

7. Suggested changes or improvement:

APPENDIX E

FIRST REVISION OF SURVEY

Irving School
611 South Eighth
Bozeman, MT 59715

Dear Colleague:

With the assistance of the Department of Elementary Education at Montana State University, I am conducting a study of teaching styles relative to meeting the needs of individual learners. This study will involve teachers from the public kindergarten through grade eight classrooms in Montana. In the formulation of this study, there is a need to consult knowledgeable and experienced people in the field in order to identify the provisions currently being made to accommodate the differences in the way students learn.

Therefore, I would sincerely appreciate your assistance in completing the enclosed survey. All responses will be reported in combined tabulated form only, ensuring individual confidentiality in all reported results. A copy of the final results of this project will be sent to you at your request.

I realize that this questionnaire is bulky. However, it is necessary at this time to include all statements in order that a high level of confidence of use be established for the instrument. The finished questionnaire will be approximately half this length. I would appreciate it is you would seriously consider each statement.

Please return the survey as soon as possible. Your frank opinions and comments will be greatly appreciated in this study. Thank you very much for your prompt and courteous attention.

Sincerely,

Shirley Handsaker

SURVEY CONCERNING TEACHER PERCEPTIONS OF TEACHING STYLES

The purpose of this survey is to gather information in order to identify the provisions that are currently being made to accommodate the differences in the way students learn. This information will be used for a research study being conducted at Montana State University.

Please return to: Shirley Handsaker
Irving School
611 South Eighth
Bozeman, Montana 59715

For the purpose of this study, teaching style is defined as the teacher's personal behaviors and media technologies chosen to deliver and receive information.

Please indicate whichever response gives the most correct picture of your own view. Please do not leave out any statements.

1. I teach grade(s):
(Please check all that apply.)
1)_____ Kindergarten
2)_____ One
3)_____ Two
4)_____ Three
5)_____ Four
6)_____ Five
7)_____ Six
8)_____ Seven
9)_____ Eight

2. My total past full years of teaching experience are: (Please check one.)
1)_____ 0 - 3 years
2)_____ 4 - 7 years
3)_____ 8 -12 years
4)_____13 -19 years
5)_____20 -29+years

3. My educational level is:
(Please check one.)
1)_____ BA
2)_____ BA + 15 credits
3)_____ BA + 30 credits
4)_____ Fifth Year
5)_____ MA
6)_____ MA + 15 credits
7)_____ MA + 30 credits
8)_____ Other:_____

4. My age is:
(Please check one.)
1)_____ between 20 - 29
2)_____ between 30 - 39
3)_____ between 40 - 49
4)_____ between 50 - 59
5)_____ between 60 - 69+

5. I am a:
(Please check one.)
1)_____ female
2)_____ male

6. The number of students in my class is:
(Please check one.)
1)_____ between 1 - 10
2)_____ between 11 - 20
3)_____ between 21 - 30+
4)_____ Other:_____

7. If I were just entering college for the first time, I would:
(Please check one.)
1)_____ Train to be a teacher
2)_____ Not train to be a teacher
3)_____ Other:_____

8. Teaching is my:
(Please check one.)
1)_____ Primary vocation
2)_____ Supplementary vocation

9. My knowledge of techniques for accommodating individual student learning styles was gained by:
(Please check all that apply.)
1)_____ College classes
2)_____ Experience with students
3)_____ Reading research in the field
4)_____ Other:_____

Please write the last four digits of your Social Security number here: _____
This will be used only for confidential tabulation of responses.

Please indicate which response gives the most correct picture of your own view relative to meeting the needs of individual learners.
Please do not leave out any statements.

SD - Strongly Disagree
D - Disagree
N - Neither Agree nor Disagree
A - Agree
SD - Strongly Agree

	Ideally, a teacher should: (Circle One)					Realistically, a teacher can: (Circle One)					I have been successful when I: (Answer only if you have tried the following) (Circle One)				
	SD	D	N	A	SA	SD	D	N	A	SA	SD	D	N	A	SA
1. Adjust tasks to individual students	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
2. Utilize peer tutoring	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
3. Allow student mobility	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
4. Provide a quiet environment for students	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
5. Utilize different styles of teaching	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
	SD	D	N	A	SA	SD	D	N	A	SA	SD	D	N	A	SA
6. Base instructional program on student needs	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
7. Adapt instruction to individual students	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
8. Provide flexibility of materials used	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
9. Utilize discussion method	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
10. Utilize discovery method	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
	SD	D	N	A	SA	SD	D	N	A	SA	SD	D	N	A	SA
11. Teach in small groups	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
12. Change group composition	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
13. Utilize different methods for reteaching	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
14. Adapt learning pace to students	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
15. Engage students in spatial activities	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
	SD	D	N	A	SA	SD	D	N	A	SA	SD	D	N	A	SA
16. Adapt instructional method to purpose	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
17. Teach thinking skills	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
18. Accept individual differences in students	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
19. Provide flexibility in environment	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
20. Utilize films and other media	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
	SD	D	N	A	SA	SD	D	N	A	SA	SD	D	N	A	SA
21. Utilize problem solving in lessons	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
22. Utilize creative thinking in lessons	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
23. Utilize lecture method of teaching	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
24. Engage students in manipulating objects	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
25. Engage students in sensory activities	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5

Please indicate which response gives the most correct picture of your own view relative to meeting the needs of individual learners.
Please do not leave out any statements.

SD - Strongly Disagree
D - Disagree
N - Neither Agree nor Disagree
A - Agree
SA - Strongly Agree

	Ideally, a teacher should: (Circle One)					Realistically, a teacher can: (Circle One)					I have been successful when I: (Answer only if you have tried the following) (Circle One)				
	SD	D	N	A	SA	SD	D	N	A	SA	SD	D	N	A	SA
26. Reorganize sequence of tasks when needed	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
27. Consider student learner characteristics	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
28. Reorganize classroom for different needs	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
29. Utilize advance organizers in teaching	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
30. Assist students in categorizing topics	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
	SD	D	N	A	SA	SD	D	N	A	SA	SD	D	N	A	SA
31. Teach students methods of recall	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
32. Use positive reinforcement with students	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
33. Assess student learning styles	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
34. Place students according to ability	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
35. Teach techniques for effective learning	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
	SD	D	N	A	SA	SD	D	N	A	SA	SD	D	N	A	SA
36. Vary tasks to meet student needs	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
37. Allow students to teach one another	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
38. Allow students to move about the classroom	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
39. Provide for students who require quiet	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
40. Vary teaching styles	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
	SD	D	N	A	SA	SD	D	N	A	SA	SD	D	N	A	SA
41. Plan instructional goals to fit student needs	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
42. Provide for individual needs of students	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
43. Allow students choice of materials	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
44. Involve students in discussions	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
45. Involve students in discovery learning	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
	SD	D	N	A	SA	SD	D	N	A	SA	SD	D	N	A	SA
46. Vary group size	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
47. Regroup according to need	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
48. Reteach concepts in alternate ways	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
49. Vary learning pace to suit students	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
50. Involve students in spatial activities	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5

SD - Strongly Disagree
D - Disagree
N - Neither Agree nor Disagree
A - Agree
SA - Strongly Agree

Please indicate which response gives the most correct picture of your own view relative to meeting the needs of individual learners.
Please do not leave out any statements.

	Ideally, a teacher should: (Circle One)					Realistically, a teacher can: (Circle One)					I have been successful when I: (Answer only if you have tried the following) (Circle One)				
	SD	D	N	A	SA	SD	D	N	A	SA	SD	D	N	A	SA
51. Adapt teaching style to specific purposes	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
52. Instruct students in learning to think	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
53. Recognize individual differences in learners	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
54. Provide alternative environments for learning	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
55. Utilize audiovisual materials	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
	SD	D	N	A	SA	SD	D	N	A	SA	SD	D	N	A	SA
56. Instruct students in problem solving	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
57. Employ creative-thinking activities	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
58. Lecture to students	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
59. Allow students to manipulate objects	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
60. Utilize the five senses in teaching	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
	SD	D	N	A	SA	SD	D	N	A	SA	SD	D	N	A	SA
61. Analyze and sequence tasks	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
62. Consider student learning style	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
63. Provide flexibility in classroom arrangement	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
64. Teach concepts using advance organizers	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
65. Teach students to categorize ideas	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
	SD	D	N	A	SA	SD	D	N	A	SA	SD	D	N	A	SA
66. Teach students memory techniques	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
67. Give students positive feedback	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
68. Identify individual learning styles	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
69. Group students by ability	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
70. Teach students how to learn effectively	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5

If you would like a copy of the results of this study, please provide the following information:

Name: _____

Address: _____

_____

Thank you very much for participating in this study. Please return your survey to:

Shirley Handsaker
Irving School
611 South Eighth
Bozeman, Montana 59715

RESPONSE TO SURVEY

Thank you for your time and willingness to complete this survey. Would you please complete this final section regarding the survey itself. This feedback will be invaluable to the study, in that it will enable the further refinement of the questionnaire. I sincerely appreciate your input.

1. The format of the survey was:

2. The length of the survey was:

3. The general appearance of the survey was:

4. Were the questions of the survey clear?

5. Were the directions of the survey clear?

6. The process of survey administration was:

7. Suggested changes or improvements:

APPENDIX F

SECOND REVISION OF SURVEY

Irving School
611 South Eighth
Bozeman, MT 59715

Dear Colleague:

With the assistance of the Department of Elementary Education at Montana State University, I am conducting a study of teaching styles relative to meeting the needs of individual learners. This study will involve randomly chosen Montana teachers because there is a need to consult knowledgeable and experienced people in the field. I am interested in finding out:

a) what provisions are currently being made to accommodate the differences in the way students learn;

b) which teaching styles are practiced at particular grade levels; and

c) whether a difference exists between what can be done and what should be done in classrooms, considering class size, etc.

I know that you are extremely busy, but I would appreciate your assistance in completing the enclosed survey. Your responses will be reported in combined tabulated form only, encuring individual confidentiality in all reported results. A copy of the final results of this project will be sent to you at your request.

Please return the survey as soon as possible. Your frank opinions and comments will be greatly appreciated in this study. Thank you very much for your time and thoughtful effort.

Sincerely,

Shirley Handsaker
Classroom Teacher

SURVEY OF TEACHERS' PERCEPTIONS OF TEACHING STYLES

Part I:

Please indicate which response gives the most correct picture of your own view of teaching styles relative to meeting the needs of individual learners. Please do not leave out any statements.

SD - Strongly Disagree D - Disagree N - Neither Agree nor Disagree A - Agree SA - Strongly Agree

	Ideally a teacher should: (Circle One)	Realistically a teacher can: (Circle One)	I have been successful when I: (Circle One if You Do This)
	SD D N A SA	SD D N A SA	SD D N A SA
1. Avoid whole class discussions	1 2 3 4 4	1 2 3 4 5	1 2 3 4 5
2. Teach in small groups	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
3. Not expect students to tutor one another	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
4. Discourage the use of manipulative objects	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
5. Disregard ability in placement of students	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
6. Avoid the assessment of student learning styles	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
7. Not teach methods of recall	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
8. Ignore particular learner characteristics	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
9. Engage students in manipulating objects	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
10. Utilize creative thinking in lessons	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
11. Place students according to ability	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
12. Avoid the use of small groups	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
13. Utilize peer tutoring	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
14. Adapt learning pace to students	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
15. Keep group composition the same during the year	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
16. Involve students in spatial activities	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
17. Require students to remain seated most of the time	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
18. Avoid the use of advance organizers	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
19. Not use positive reinforcement with students	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
20. Allow student mobility	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
21. Utilize lecture method of teaching	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
22. Minimize the use of spatial activities	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
23. Use the same style of teaching for all lessons	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
24. Assess student learning styles	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
25. Use positive reinforcement with students	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5

	(Circle One) Ideally a teacher should:	(Circle One) Realistically a teacher can:	(Circle One if You Do This) I have been successful when I:
	SD D N A SA	SD D N A SA	SD D N A SA
26. Utilize different styles of teaching	1 2 3 4 4	1 2 3 4 5	1 2 3 4 5
27. Provide flexibility in environment	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
28. Teach directively rather than through discovery	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
29. Utilize films and other media	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
30. Utilize problem solving in lessons	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
31. Not use the lecture method of teacing	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
32. Reorganize sequence of tasks when needed	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
33. Maintain predetermined learning pace for class	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
34. Utilize class discussions	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
35. Keep classroom arrangement unchanged during year	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
36. Maintain predetermined sequence of tasks	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
37. Utilize discovery method	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
38. Avoid rearranging classroom for particular students	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
39. Consider student learner characteristics	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
40. Change group composition	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
41. Teach students methods of recall	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
42. Assist students in categorizing topics	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
43. Minimize the use of films and other media	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
44. Discourage creative thinking in lessons	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
45. Reorganize classroom for different needs	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
46. Assume that students know how to categorize topics	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
47. Not problem solve	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
48. Utilize advance organizers in teaching	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5

Part II:

Please circle the number beside all responses that apply to you.

A. What grade(s) do you teach?

1. Kindergarten
2. First
3 Second
4. Third
5. Fourth
6. Fifth
7. Sixth
8. Seventh
9. Eighth

B. How many years have you taught?
1. 1 - 3 2. 4 - 6 3. 7 - 10 4. 10+

C. Which of the following indicates your university coursework?
1. B.S. or B.A.
2. B.S. or B. A. plus graduate courses
3. B.S. or B.A. plus workshops
4. M.Ed.
5. Specialist (Please specify) _____
6. Other (Please specify) _____

D. What is your age?
1. Between 20 - 35 2. Between 36 - 50 3. 50+

E. Are you male or female?
1. Male 2. Female

F. How many students are in your class this year?
1. Between 1 and 10
2. Between 11 and 20
3. Between 21 and 26
4. Other (Please specify) _____

G. If you were entering college for the first time, would you train to be a teacher?
1. Yes
2. No
3. Other (Please specify) _____

H. Is teaching your primary or supplementary vocation?
1. Primary 2. Supplementary

I. Which of the following indicates how you learned techniques for accommodating individual student learning styles?
1. College classes
2. Experience with students
3. Reading research in the field
4. Other (Please specify) _____

J. Please write the last four digits of your Social Security number here: _____
This will be used only for confidential tabulation of respones.
If you would like a copy of the results of this study, please provide the following information:
Name: _____
Address: _____

Thank you very much for participating in this study. Please return your survey to:
Shirley Handsaker
Irving School
Bozeman, MT 59715

RESPONSE TO THE SURVEY

Thank you for your time and willingness to complete this survey. Would you please complete this final section regarding the survey itself. This feedback will be invaluable to the study, in that it will enable the further refinement of the questionnaire. I sincerely appreciate your input.

1. The format of the survey was:

2. The length of the survey was (This survey contains sets of questions. The final form will have approximately half the number of questions):

3. The general appearance of the survey was:

4. Were the survey questions clear?

5. Were the survey directions clear?

6. Was the process of survey administration acceptable?

7. Are there any suggestions you would like to make for improvement of the survey?

APPENDIX G

TEACHER RESPONSES TO SECOND PILOT TEST/RETEST

COMPLETE DATA

Teacher Responses to Second Pilot Test/Retest
Complete Data
(n=25)

Question Sets		Test/Retest ID/PID		RE/PRE		TR/PTR		Question Sets ID	RE	TR
A-	B+	A-	B+	A-	B+	A-	B+	A&B	A&B	A&B
1	34	.37	.63	.51	.35	.56	.66	.27	.32	.36
12	2	.48	.63	.62	.35	.22	.66	.20	.11	.29
3	13	.39	.55	.55	.53	.49	.46	.62	.36	.41
4	9	.28	.01	.44	.17	.44	.39	.58	.17	.55
5	11	.37	.55	.61	.24	.50	.45	.09	.24	.59
6	24	.04	.04	.04	.82	.09	.76	.56	.47	.28
7	41	.21	.28	.59	.32	.34	.53	.41	.13	.47
8	39	.08	.18	.69	.12	.34	.46	.33	.09	.44
44	10	.01	.03	.44	.28	.47	.33	.38	.11	.28
33	14	.43	.16	.61	.26	.48	.45	.07	.03	.13
15	40	.26	.55	.50	.46	.33	.30	.37	.21	.32
22	16	.72	.25	.68	.43	.23	.58	.44	.33	.51
17	20	.19	.44	.68	.30	.83	.49	.50	.06	.72
18	48	.37	.40	.64	.18	.74	.55	.45	.28	.33
19	25	.09	.43	.52	.49	.54	.48	1.00	.55	.63
31	21	.43	.57	.25	.62	.54	.49	.51	.17	.48
23	26	.09	.47	.47	.20	.63	.40	.22	.43	.39
38	27	.24	.15	.19	.38	.38	.52	.33	.20	.03
28	37	.09	.21	.54	.36	.16	.39	.51	.23	.09
43	29	.17	.27	.59	.39	.71	.44	.40	.07	.42
47	30	.57	.70	.54	.51	.51	.49	.52	.31	.09
36	32	.28	.39	.63	.47	.36	.36	.12	.18	.27
35	45	.72	.45	.54	.44	.61	.52	.32	.27	.18
46	42	.19	.16	.60	.00	.35	.05	.22	.10	.03

Total
24 Sets

APPENDIX H

THIRD REVISION OF SURVEY

Irving School
611 South Eighth
Bozeman, MT 59715

Dear Colleague:

With the assistance of the Department of Elementary Education at Montana State University, I am conducting a study of teaching styles relative to meeting the needs of individual learners. This study will involve randomly chosen Montana teachers because there is a need to consult knowledgeable and experienced people in the field. I am interested in finding out:

a) what provisions are currently being made to accommodate the differences in the way students learn;

b) which teaching styles are practiced at particular grade levels; and

c) whether a difference exists between what can be done and what should be done in classrooms, considering class size, etc.

I know that you are extremely busy, but I would appreciate your assistance in completing the enclosed survey. Your responses will be reported in combined tabulated form only, encuring individual confidentiality in all reported results. A copy of the final results of this project will be sent to you at your request.

Please return the survey as soon as possible. Your frank opinions and comments will be greatly appreciated in this study. Thank you very much for your time and thoughtful effort.

Sincerely,

Shirley Handsaker
Classroom Teacher

TEACHING STYLES:
A SURVEY OF TEACHERS' PERCEPTIONS

Part I:

Please indicate which response gives the most correct picture of your own view of teaching styles relative to meeting the needs of individual learners. Please do not leave out any statements.

SD - Strongly Disagree D - Disagree N - Neither Agree nor Disagree A - Agree SA - Strongly Agree

	Ideally I feel a teacher should: (Circle One)				Realistically a teacher is likely to (Circle One)				I have been successful when I: (Circle One if You Do This)			
	SD	D	A	SA	SD	D	A	SA	SD	D	A	SA
1. Teach in small groups	1	2	3	4	1	2	3	4	1	2	3	4
2. Place students according to ability	1	2	3	4	1	2	3	4	1	2	3	4
3. Utilize peer tutoring	1	2	3	4	1	2	3	4	1	2	3	4
4. Involve students in manipulating objects	1	2	3	4	1	2	3	4	1	2	3	4
5. Allow students mobility	1	2	3	4	1	2	3	4	1	2	3	4
6. Utilize the lecture method of teaching	1	2	3	4	1	2	3	4	1	2	3	4
7. Adjust lessons to accommodate learning styles	1	2	3	4	1	2	3	4	1	2	3	4
8. Use positive reinforcement with students	1	2	3	4	1	2	3	4	1	2	3	4
9. Utilize different styles of teaching	1	2	3	4	1	2	3	4	1	2	3	4
10. Utilize films and other media	1	2	3	4	1	2	3	4	1	2	3	4
11. Utilize problem solving in lessons	1	2	3	4	1	2	3	4	1	2	3	4
12. Reorganize the sequence of tasks when needed	1	2	3	4	1	2	3	4	1	2	3	4
13. Conduct class discussions	1	2	3	4	1	2	3	4	1	2	3	4
14. Utilize the discovery method of teaching	1	2	3	4	1	2	3	4	1	2	3	4
15. Provide flexibility in room environment	1	2	3	4	1	2	3	4	1	2	3	4
16. Consider student learning characteristics	1	2	3	4	1	2	3	4	1	2	3	4
17. Change group composition periodically	1	2	3	4	1	2	3	4	1	2	3	4
18. Reorganize classroom for different needs	1	2	3	4	1	2	3	4	1	2	3	4
19. Adapt learning pace to students	1	2	3	4	1	2	3	4	1	2	3	4
20. Teach techniques for effective learning	1	2	3	4	1	2	3	4	1	2	3	4
21. Provide flexibility of materials	1	2	3	4	1	2	3	4	1	2	3	4

Part II:

Please circle the number beside all responses that apply to you.

A. What grade(s) do you teach?

1. Kindergarten	4. Third	7. Sixth
2. First	5. Fourth	8. Seventh
3 Second	6. Fifth	9. Eighth

B. How many years have you taught?

1. 1 - 3 2. 4 - 6 3. 7 - 10 4. 10+

C. Which of the following indicates your university coursework?

1. B.S. or B.A.
2. B.S. or B. A. plus graduate courses
3. B.S. or B.A. plus workshops
4. M.Ed.
5. Specialist (Please specify) _____
6. Other (Please specify) _____

D. What is your age?

1. Between 20 - 35 2. Between 36 - 50 3. 50+

E. Are you male or female?

1. Male 2. Female

F. How many students are in your class this year?

1. Between 1 and 10
2. Between 11 and 20
3. Between 21 and 26
4. Other (Please specify) _____

G. If you were entering college for the first time, would you train to be a teacher?

1. Yes
2. No
3. Other (Please specify) _____

H. Is teaching your primary or supplementary vocation?

1. Primary 2. Supplementary

I. Which of the following indicates how you learned techniques for accommodating individual student learning styles?

1. College classes
2. Experience with students
3. Reading research in the field
4. Other (Please specify) _____

J. Please write the last four digits of your Social Security number here: _____
This will be used only for confidential tabulation of respones.
If you would like a copy of the results of this study, please provide the following information:

Name: _____
Address: _____

Thank you very much for participating in this study. Please return your survey to:

Shirley Handsaker
Irving School
Bozeman, MT 59715

RESPONSE TO THE SURVEY

Thank you for your time and willingness to complete this survey. Would you please complete this final section regarding the survey itself. This feedback will be invaluable to the study, in that it will enable the further refinement of the questionnaire. I sincerely appreciate your input.

1. The format of the survey was:

2. The length of the survey was (This survey contains sets of questions. The final form will have approximately half the number of questions):

3. The general appearance of the survey was:

4. Were the survey questions clear?

5. Were the survey directions clear?

6. Was the process of survey administration acceptable?

7. Are there any suggestions you would like to make for improvement of the survey?

APPENDIX I

FOURTH REVISION OF SURVEY

Irving School
611 South Eighth
Bozeman, MT 59715

Dear Colleague:

With the assistance of the Department of Elementary Education at Montana State University, I am conducting a study of teaching styles relative to meeting the needs of individual learners. This study will involve randomly chosen Montana teachers because there is a need to consult knowledgeable and experienced people in the field. I am interested in finding out:

a) what provisions are currently being made to accommodate the differences in the way students learn;

b) which teaching styles are practiced at particular grade levels; and

c) whether a difference exists between what <u>can</u> be done and what <u>should</u> be done in classrooms, considering class size, etc.

I know that you are extremely busy, but I would appreciate your assistance in completing the enclosed survey. Your responses will be reported in combined tabulated form only, encuring <u>individual confidentiality</u> in all reported results. A copy of the final results of this project will be sent to you at your request.

Please return the survey as soon as possible. Your frank opinions and comments will be greatly appreciated in this study. Thank you very much for your time and thoughtful effort.

Sincerely,

Shirley Handsaker
Classroom Teacher

TEACHING STYLES:
A SURVEY OF TEACHERS' PERCEPTIONS

Part I:

Please indicate which response gives the most correct picture of your own view of teaching styles relative to meeting the needs of individual learners. Please do not leave out any statements.

SD - Strongly Disagree D - Disagree N - Neither Agree nor Disagree (Circle One) A - Agree (Circle One) SA - Strongly Agree (Circle One if You Do This)

	Ideally I feel a teacher should:	Realistically a teacher is likely to	I have been successful when I:
	SD D A SA	SD D A SA	SD D A SA
1. Place students according to ability	1 2 3 4	1 2 3 4	1 2 3 4
2. Utilize peer tutoring	1 2 3 4	1 2 3 4	1 2 3 4
3. Involve students in manipulating objects	1 2 3 4	1 2 3 4	1 2 3 4
4. Allow students mobility	1 2 3 4	1 2 3 4	1 2 3 4
5. Utilize the lecture method of teaching	1 2 3 4	1 2 3 4	1 2 3 4
6. Adjust lessons to accommodate learning styles	1 2 3 4	1 2 3 4	1 2 3 4
7. Use positive reinforcement with students	1 2 3 4	1 2 3 4	1 2 3 4
8. Utilize different styles of teaching	1 2 3 4	1 2 3 4	1 2 3 4
9. Utilize films and other media	1 2 3 4	1 2 3 4	1 2 3 4
10. Utilize problem solving in lessons	1 2 3 4	1 2 3 4	1 2 3 4
11. Reorganize the sequence of tasks when needed	1 2 3 4	1 2 3 4	1 2 3 4
12. Conduct class discussions	1 2 3 4	1 2 3 4	1 2 3 4
13. Utilize the discovery method of teaching	1 2 3 4	1 2 3 4	1 2 3 4
14. Provide flexibility in room environment	1 2 3 4	1 2 3 4	1 2 3 4
15. Consider student learning characteristics	1 2 3 4	1 2 3 4	1 2 3 4
16. Change group composition periodically	1 2 3 4	1 2 3 4	1 2 3 4
17. Reorganize classroom for different needs	1 2 3 4	1 2 3 4	1 2 3 4
18. Adapt learning pace to students	1 2 3 4	1 2 3 4	1 2 3 4
19. Teach techniques for effective learning	1 2 3 4	1 2 3 4	1 2 3 4
20. Provide flexibility of materials	1 2 3 4	1 2 3 4	1 2 3 4

Part II:

Please circle the number beside all responses that apply to you.

A. What grade(s) do you teach?

1. Kindergarten	4. Third	7. Sixth
2. First	5. Fourth	8. Seventh
3 Second	6. Fifth	9. Eighth

B. How many years have you taught?

1. 1 - 3 2. 4 - 6 3. 7 - 10 4. 10+

C. Which of the following indicates your university coursework?

1. B.S. or B.A.
2. B.S. or B. A. plus graduate courses
3. B.S. or B.A. plus workshops
4. M.Ed.
5. Specialist (Please specify) _____
6. Other (Please specify) _____

D. What is your age?

1. Between 20 - 35 2. Between 36 - 50 3. 50+

E. Are you male or female?

1. Male 2. Female

F. How many students are in your class this year?

1. Between 1 and 10
2. Between 11 and 20
3. Between 21 and 26
4. Other (Please specify) _____

G. If you were entering college for the first time, would you train to be a teacher?

1. Yes
2. No
3. Other (Please specify) _____

H. Is teaching your primary or supplementary vocation?

1. Primary 2. Supplementary

I. Which of the following indicates how you learned techniques for accommodating individual student learning styles?

1. College classes
2. Experience with students
3. Reading research in the field
4. Other (Please specify) _____

J. Please write the last four digits of your Social Security number here: _____
This will be used only for confidential tabulation of respones.
If you would like a copy of the results of this study, please provide the following information:

Name: _____

Address: _____

Thank you very much for participating in this study. Please return your survey to:

Shirley Handsaker
Irving School
Bozeman, MT 59715

APPENDIX J

SECOND SURVEY FOR PANEL OF EXPERTS

Irving School
611 South Eighth
Bozeman, MT 59715

Dear

In the Spring of 1985 I requested your input regarding questions to be included in a survey designed to measure teacher perceptions of teaching styles. This survey is part of a study of teaching styles relative to meeting the needs of individual learners, and will be mailed to a sample of kindergarten through grade eight classroom teachers in Gallatin and Lewis and Clark Counties this fall.

Your assistance with question development was extremely helpful, and was vital to the successful formulation of relevant questionnaire contents. Since I last contacted you for input, the survey has been piloted with one hundred nineteen elementary teachers and has been revised four times. It is important that experts be consulted once again prior to mailing the survey to teachers to be certain that the questions are adequate in terms of relevance, importance and clarity.

Therefore, I would sincerely appreciate your assistance in reacting to the enclosed survey; your comments will be very helpful. Please return the survey by September 12, 1986, if possible.

Thank you very much.

Sincerely,

Shirley Handsaker

EXPERT RESPONSE TO THE SURVEY

Thank you for your time and willingness to react to the enclosed survey. Would you please complete this section only regarding the attached questionnaire. This feedback will be invaluable to the study, in that it will enable the further assessment of content validity. I sincerely appreciate your input.

VA - Very Appropriate
A - Appropriate
I - Inappropriate
VI - Very Inappropriate

1.	Place students according to ability	VA	A	I	VI
2.	Utilize peer tutoring	VA	A	I	VI
3.	Involve students in manipulating objects	VA	A	I	VI
4.	Allow student mobility	VA	A	I	VI
5.	Utilize the lecture method of teaching	VA	A	I	VI
6.	Adjust lessons to accommodate learning styles	VA	A	I	VI
7.	Use positive reinforcement with students	VA	A	I	VI
8.	Utilize different styles of teaching	VA	A	I	VI
9.	Utilize films and other media	VA	A	I	VI
10.	Utilize problem solving in lessons	VA	A	I	VI
11.	Reorganize the sequence of tasks when needed	VA	A	I	VI
12.	Conduct class discussions	VA	A	I	VI
13.	Utilize the discovery method of teaching	VA	A	I	VI
14.	Provide flexibility in room environment	VA	A	I	VI
15.	Consider student learning characteristics	VA	A	I	VI
16.	Change group composition periodically	VA	A	I	VI
17.	Reorganize classroom for different needs	VA	A	I	VI
18.	Adapt learning pace to students	VA	A	I	VI
19.	Teach techniques for effective learning	VA	A	I	VI
20.	Provide flexibility of materials	VA	A	I	VA

Comments:

Irving School
611 South Eighth
Bozeman, MT 59715

Dear Colleague:

With the assistance of the Department of Elementary Education at Montana State University, I am conducting a study of teaching styles relative to meeting the needs of individual learners. This study will involve randomly chosen Montana teachers because there is a need to consult knowledgeable and experienced people in the field. I am interested in finding out:

a) what provisions are currently being made to accommodate the differences in the way students learn;

b) which teaching styles are practiced at particular grade levels; and

c) whether a difference exists between what can be done and what should be done in classrooms, considering class size, etc.

I know that you are extremely busy, but I would appreciate your assistance in completing the enclosed survey. Your responses will be reported in combined tabulated form only, encuring individual confidentiality in all reported results. A copy of the final results of this project will be sent to you at your request.

Please return the survey as soon as possible. Your frank opinions and comments will be greatly appreciated in this study. Thank you very much for your time and thoughtful effort.

Sincerely,

Shirley Handsaker
Classroom Teacher

TEACHING STYLES:
A SURVEY OF TEACHERS' PERCEPTIONS

Part I:

Please indicate which response gives the most correct picture of your own view of teaching styles relative to meeting the needs of individual learners. Please do not leave out any statements.

SD - Strongly Disagree D - Disagree N - Neither Agree nor Disagree A - Agree SA - Strongly Agree

	Ideally I feel a teacher should: (Circle One)				Realistically a teacher is likely to (Circle One)				I have been successful when I: (Circle One if You Do This)			
	SD	D	A	SA	SD	D	A	SA	SD	D	A	SA
1. Place students according to ability	1	2	3	4	1	2	3	4	1	2	3	4
2. Utilize peer tutoring	1	2	3	4	1	2	3	4	1	2	3	4
3. Involve students in manipulating objects	1	2	3	4	1	2	3	4	1	2	3	4
4. Allow students mobility	1	2	3	4	1	2	3	4	1	2	3	4
5. Utilize the lecture method of teaching	1	2	3	4	1	2	3	4	1	2	3	4
6. Adjust lessons to accommodate learning styles	1	2	3	4	1	2	3	4	1	2	3	4
7. Use positive reinforcement with students	1	2	3	4	1	2	3	4	1	2	3	4
8. Utilize different styles of teaching	1	2	3	4	1	2	3	4	1	2	3	4
9. Utilize films and other media	1	2	3	4	1	2	3	4	1	2	3	4
10. Utilize problem solving in lessons	1	2	3	4	1	2	3	4	1	2	3	4
11. Reorganize the sequence of tasks when needed	1	2	3	4	1	2	3	4	1	2	3	4
12. Conduct class discussions	1	2	3	4	1	2	3	4	1	2	3	4
13. Utilize the discovery method of teaching	1	2	3	4	1	2	3	4	1	2	3	4
14. Provide flexibility in room environment	1	2	3	4	1	2	3	4	1	2	3	4
15. Consider student learning characteristics	1	2	3	4	1	2	3	4	1	2	3	4
16. Change group composition periodically	1	2	3	4	1	2	3	4	1	2	3	4
17. Reorganize classroom for different needs	1	2	3	4	1	2	3	4	1	2	3	4
18. Adapt learning pace to students	1	2	3	4	1	2	3	4	1	2	3	4
19. Teach techniques for effective learning	1	2	3	4	1	2	3	4	1	2	3	4
20. Provide flexibility of materials	1	2	3	4	1	2	3	4	1	2	3	4

Part II:

Please circle the number beside all responses that apply to you.

A. What grade(s) do you teach?

1. Kindergarten
2. First
3 Second
4. Third
5. Fourth
6. Fifth
7. Sixth
8. Seventh
9. Eighth

B. How many years have you taught?

1. 1 - 3
2. 4 - 6
3. 7 - 10
4. 10+

C. Which of the following indicates your university coursework?

1. B.S. or B.A.
2. B.S. or B. A. plus graduate courses
3. B.S. or B.A. plus workshops
4. M.Ed.
5. Specialist (Please specify) _____
6. Other (Please specify) _____

D. What is your age?

1. Between 20 - 35
2. Between 36 - 50
3. 50+

E. Are you male or female?

1. Male
2. Female

F. How many students are in your class this year?

1. Between 1 and 10
2. Between 11 and 20
3. Between 21 and 26
4. Other (Please specify) _____

G. If you were entering college for the first time, would you train to be a teacher?

1. Yes
2. No
3. Other (Please specify) _____

H. Is teaching your primary or supplementary vocation?

1. Primary
2. Supplementary

I. Which of the following indicates how you learned techniques for accommodating individual student learning styles?

1. College classes
2. Experience with students
3. Reading research in the field
4. Other (Please specify) _____

J. Please write the last four digits of your Social Security number here: _____
This will be used only for confidential tabulation of respones.
If you would like a copy of the results of this study, please provide the following information:

Name: _____
Address: _____

Thank you very much for participating in this study. Please return your survey to:

Shirley Handsaker
Irving School
Bozeman, MT 59715

APPENDIX K

FINAL REVISION OF SURVEY

Irving School
611 South Eighth
Bozeman, MT 59715

Dear Colleague:

With the assistance of the Department of Elementary Education at Montana State University, I am conducting a study of teaching styles relative to meeting the needs of individual learners. This study will involve randomly chosen Montana teachers because there is a need to consult knowledgeable and experienced people in the field. I am interested in finding out:

a) what provisions are currently being made to accommodate the differences in the way students learn;

b) which teaching styles are practiced at particular grade levels; and

c) whether a difference exists between what can be done and what should be done in classrooms, considering class size, etc.

I know that you are extremely busy, but I would appreciate your assistance in completing the enclosed survey. Your responses will be reported in combined tabulated form only, encuring individual confidentiality in all reported results. A copy of the final results of this project will be sent to you at your request.

Please return the survey as soon as possible. Your frank opinions and comments will be greatly appreciated in this study. Thank you very much for your time and thoughtful effort.

Sincerely,

Shirley Handsaker
Classroom Teacher

TEACHING STYLES:
A SURVEY OF TEACHERS' PERCEPTIONS

Part I:

Please indicate which response gives the most correct picture of your own view of teaching styles relative to meeting the needs of individual learners. Please do not leave out any statements.

SD - Strongly Disagree D - Disagree N - Neither Agree nor Disagree A - Agree SA - Strongly Agree

	Ideally I feel a teacher should: (Circle One)	Realistically a teacher is likely to (Circle One)	I have been successful when I: (Circle One if You Do This)
	SD D A SA	SD D A SA	SD D A SA
1. Provide flexibility of materials	1 2 3 4	1 2 3 4	1 2 3 4
2. Place students according to ability	1 2 3 4	1 2 3 4	1 2 3 4
3. Utilize peer tutoring	1 2 3 4	1 2 3 4	1 2 3 4
4. Involve students in manipulating objects	1 2 3 4	1 2 3 4	1 2 3 4
5. Allow student mobility	1 2 3 4	1 2 3 4	1 2 3 4
6. Utilize the lecture method of teaching	1 2 3 4	1 2 3 4	1 2 3 4
7. Adjust lessons to accommodate learning styles	1 2 3 4	1 2 3 4	1 2 3 4
8. Use positive reinforcement with students	1 2 3 4	1 2 3 4	1 2 3 4
9. Utilize different styles of teaching	1 2 3 4	1 2 3 4	1 2 3 4
10. Utilize films and other media	1 2 3 4	1 2 3 4	1 2 3 4
11. Utilize problem solving in lessons	1 2 3 4	1 2 3 4	1 2 3 4
12. Reorganize the sequence of tasks when needed	1 2 3 4	1 2 3 4	1 2 3 4
13. Conduct class discussions	1 2 3 4	1 2 3 4	1 2 3 4
14. Utilize the discovery method of teaching	1 2 3 4	1 2 3 4	1 2 3 4
15. Provide flexibility in room environment	1 2 3 4	1 2 3 4	1 2 3 4
16. Consider student learning characteristics	1 2 3 4	1 2 3 4	1 2 3 4
17. Change group composition periodically	1 2 3 4	1 2 3 4	1 2 3 4
18. Reorganize classroom for different needs	1 2 3 4	1 2 3 4	1 2 3 4
19. Adapt learning pace to students	1 2 3 4	1 2 3 4	1 2 3 4
20. Teach techniques for effective learning	1 2 3 4	1 2 3 4	1 2 3 4

Part II:

Please circle the number beside all responses that apply to you.

A. What grade(s) do you teach?

1. Kindergarten
2. First
3 Second
4. Third
5. Fourth
6. Fifth
7. Sixth
8. Seventh
9. Eighth

B. How many years have you taught?

1. 1 - 3
2. 4 - 6
3. 7 - 10
4. 10+

C. Which of the following indicates your university coursework?

1. B.S. or B.A.
2. B.S. or B. A. plus graduate courses
3. B.S. or B.A. plus workshops
4. M.Ed.
5. Specialist (Please specify) _____
6. Other (Please specify) _____

D. What is your age?

1. Between 20 - 35
2. Between 36 - 50
3. 50+

E. Are you male or female?

1. Male
2. Female

F. How many students are in your class this year?

1. Between 1 and 10
2. Between 11 and 20
3. Between 21 and 26
4. Other (Please specify) _____

G. If you were entering college for the first time, would you train to be a teacher?

1. Yes
2. No
3. Other (Please specify) _____

H. Is teaching your primary or supplementary vocation?

1. Primary
2. Supplementary

I. Which of the following indicates how you learned techniques for accommodating individual student learning styles?

1. College classes
2. Experience with students
3. Reading research in the field
4. Other (Please specify) _____

If you would like a copy of the results of this study, please provide the following information:

Name: _____

Address: _____

Thank you very much for participating in this study. Please return your survey to:

Shirley Handsaker
Irving School
Bozeman, MT 59715

APPENDIX L

LIST OF ELEMENTARY SCHOOL DISTRICTS SURVEYED

ELEMENTARY SCHOOL DISTRICTS SURVEYED

LEWIS AND CLARK COUNTY

#1 Helena
#2 Kessler
#4 Trinity
#9 East Helena
#13 Wolf Creek
#25 Craig
#27 Auchard Creek
#38 Lincoln
#45 Augusta

GALLATIN COUNTY

*#1 Logan
*#3 Manhattan
*#7 Bozeman
#15 Willow Creek
*#20 Spring Hill
*#22 Cottonwood
*#24 Three Forks
#25 Pass Creek
*#27 Monforton
*#35 Gallatin Gateway
*#41 Anderson
*#43 LaMotte
*#44 Belgrade
*#47 Malmborg
#69 West Yellowstone
#72 Ophir
*#75 Amsterdam

*Districts contacted for observation

APPENDIX M

OBSERVATION FORM

CLASSROOM TEACHER OBSERVATION SUMMARY

Observer: _____
Teacher: _____
Date: _____
Time: Beg._____ End: _____
Grade Level(s): _____
Single Grade _____ Multi-Grade_____
Number of Students: _____

DN - Directly Observed Negative or No Opportunity to Observe
EN - Evidence Suggests Negative
EP - Evidence Suggests Positive
DP - Directly Observed Positive

	DN	EN	EP	DP	Comments
1. Provide flexibility of materials	1	2	3	4	
2. Place students according to ability	1	2	3	4	
3. Utilize peer tutoring	1	2	3	4	
4. Involve students in manipulating objects	1	2	3	4	
5. Allow student mobility	1	2	3	4	
6. Utilize the lecture method of teaching	1	2	3	4	
7. Adjust lessons to accommodate learning styles	1	2	3	4	
8. Use positive reinforcement with students	1	2	3	4	
9. Utilize different styles of teaching	1	2	3	4	
10. Utilize films and other media	1	2	3	4	
11. Utilize problem solving in lessons	1	2	3	4	
12. Reorganize the sequence of tasks when needed	1	2	3	4	
13. Conduct class discussions	1	2	3	4	
14. Utilize the discovery method of teaching	1	2	3	4	
15. Provide flexibility in room environment	1	2	3	4	
16. Consider student learning characteristics	1	2	3	4	
17. Change group composition periodically	1	2	3	4	
18. Reorganize classroom for different needs	1	2	3	4	
19. Adapt teaching pace to students	1	2	3	4	
20. Teach techniques for effective learning	1	2	3	4	

Additional Comments:

APPENDIX N

CLASSROOM TEACHER OBSERVATION SUMMARY

CLASSROOM TEACHER OBSERVATION SUMMARY

1. Provide flexibility of materials: Varied types of materials; could use different materials to accomplish the same task.
2. Place students according to ability: Evidenced by ability groups of students for instruction; varied tasks; varied ability-based materials; special attention or directions for individuals. Charts of student groups; lesson plans.
3. Utilize peer tutoring: Students explaining or teaching concepts to one another.
4. Involve students in manipulating objects: Evidenced by more than mere presence of objects in classroom; objects should be actually used by students, or in a task setting, etc. Lesson plans.
5. Allow student mobility: Students moving out of seat for varied reasons.
6. Utilize the lecture method of teaching: All teacher talk. Lesson plans.
7. Adjust lessons to accommodate learning styles: Evidenced by combination auditory/visual/tactile lessons; varied materials and directions. Students working in varied settings: apart from group in study carrels, etc.
8. Use positive reinforcement with students: Positive comments, etc. by teacher.
9. Utilize different styles of teaching: Evidenced by combination of methods at same time, or more than one method used; use of auditory/visual/kinesthetic is one example. Lesson plans.
10. Utilize films and other media: Films, library materials, pictures, puppets, etc.
11. Utilize problem solving in lessons: Actual problem solving lesson; problem solving involved with tasks, games, etc. Lesson plans.
12. Reorganize the sequence of tasks when needed: Evidenced by tasks being reorganized during lessons. Certain students being instructed in a different sequence than others.
13. Conduct class discussions: Teacher-student or student-student interchange; small or large group communications.
14. Utilize the discovery method of teaching: Any inductive thinking, open-response questions, etc.
15. Provide flexibility in room environment: Room set up to accommodate different students; those requiring quiet, etc. Room furnishings being moved to accomodate needs or lessons.
16. Consider student learning characteristics: Accommodations made for different student-learning styles; students working in varied settings; lessons including visual/auditory.
17. Change group composition periodically: Evidenced by grouping for particular skills on a given day; students working together in different groups for different reasons; lesson plans.
18. Reorganize classroom for different needs: Evidenced by desks, tables, etc., being moved to accommodate different lessons, students, situations.

19. Adapt teaching pace to students: Students at different places in subjects; students being instructed at different paces; students working on materials at different levels of difficulty.
20. Teach techniques for effective learning: Evidenced by teaching of study habits, learning to think (as in Models of Teaching "unpacking"), left to right cues, etc.

APPENDIX O

TRAINING OF OBSERVER

TRAINING OF OBSERVER

Session 1: September 22, 1986

Objective: To familiarize the observer with the observation form and to discuss evidence and nonevidence of each item (see Appendix M).

Session 2: September 29, 1986

Objective: To familiarize the observer with the detailed definitions of each item to be observed in order to promote objective focus upon evidence or nonevidence of the presence of each item (see Appendix N).

Session 3: October 1, 1986

Objective: To practice using the observation form and to generate a consensus of meaning regarding evidence and nonevidence of each item. To request the observer to observe the researcher in a teaching situation, fill out the observation form, and discuss results together.

Session 4: October 3, 1986

Objective: To discuss the results, including comments, of one actual classroom observation in order to insure objectivity and agreement of interpretation.

Session 5 - 10: October 7, 10, 14, 15, 21 and 24, 1986

Objective: To discuss the results, including comments, of each completed observation form prior to insertion of data into computer.