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TEACHERS' INSTRUCTIONAL CLIMATE, MASTERY MODEL
STRATEGY AND STUDENT ACHIEVEMENT AT
DIFFERENT GRADE LEVELS

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TEACHERS' INSTRUCTIONAL CLIMATE, MASTERY MODEL STRATEGY AND STUDENT ACHIEVEMENT AT DIFFERENT GRADE LEVELS

By

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TEACHERS' INSTRUCTIONAL CLIMATE, MASTERY MODEL STRATEGY AND STUDENT ACHIEVEMENT AT DIFFERENT GRADE LEVELS

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The study was designed to investigate how teachers' instructional climate and instructional conditions interrelate to bring forth mastery implementation which, in turn, is associated with student academic achievement. Teacher climate, in this study, is defined as a part of the school learning climate, and consists of teacher expectations, evaluations, and academic norms of school.

Specifically, this study intended to examine the relationship between the teachers' instructional climate and classroom instructional conditions with regard to student academic achievement, and to investigate how teachers' climate is associated with the provision of instructional conditions, and finally, to investigate how the climate variables and instructional conditions are interrelated with mastery model implementation.

To investigate these problems, it is generally hypothesized that the differential teachers' climate is associated with the differential use of mastery strategies. Simply, it means that teachers with higher expectations-evaluations use the mastery related

strategies and procedures to a greater degree than teachers who hold lower expectations-evaluations about student performance. Also, it affects mastery model implementation as well as student outcomes.

The sample of the study consisted of 88 elementary school teachers from six schools in a urban industrial school district with similar community characteristics, student racial composition, school parents' socio-economic status, and teacher racial composition in school. Among six schools, three schools contain lower grade levels and three schools contain upper grade levels.

The main instrument in this study is part of a major research project to improve School Learning Climate directed by Dr. Wilbur B. Brookover. Originally this questionnaire contained over 60 items. Among them, over 40 items were used for data analysis in this study which were relevant to the teacher climate variables, classroom instructional condition variables, and mastery model strategy variables.

The academic tests used in this study were the Basic Skills Achievement Tests (BSAP Tests) in the subjects of reading and mathematics. These tests were made by the School District Authority for the 1978-1970 school year. These tests are a sort of criterion-reference test. These instruments measure the performance of students over a set of instructional objectives identified by school district staff as the measure of the skill levels to be attained by the students.

The results of the study supported the following significant findings:

1. Teacher expectations and evaluations for student performance are positively related to student academic achievement; the combined effectiveness of teacher climates plus instructional conditions on Mathematics is more significant than that on Reading.

2. Teacher expectations and evaluations are more powerful indicators over and above the instructional conditions such as group learning game and reinforcement practice in prediction of student achievement.

3. Schools with higher teacher expectations-evaluations are more favorable to the use of group learning game and group-based corrective reinforcement than schools with lower teacher expectations-evaluations.

4. Group learning game is favored for use by the lower grade elementary schools rather than by the upper grade elementary schools.

5. Schools with higher teacher expectations-evaluations are more favorable to principal-staff cooperative planning for mastery learning strategies in terms of unit objective selection and evaluation planning than schools with lower teacher climate.

6. Teachers high in mastery expectations use more group-based corrective strategies (team study, small group help, reinstructions) than teachers with lower mastery expectations.

7. Schools with higher teacher expectations-evaluations bring forth the higher level of mastery implementation effects in terms of teacher knowledge, utilization, and school system orientation of mastery learning and practical instructional strategies, than do schools with lower teacher expectations.

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CHAPTER I

PROBLEM AND PURPOSE

Statement of the Problem

Traditionally there have been three major explanations[1] of differential school achievement. These three explanations suggest deficiencies in the child, the parents, or the teachers. One of the three major explanations, the IQ-deficit theory suggests that the genetic deficiencies of children explain why they do more poorly in school and in life. The cultural-deficit theory holds that the cultural or family backgrounds are so different or lacking that children cannot learn well in school. The third one suggests that teachers hold low expectations for lower-status or minority children, and that is why these children learn less.

For a long time, these three theories have been debated in terms of the equal opportunity in educational attainment and socio-economical achievement. During the past decade many studies gave support for the idea that the genetic- and cultural-deficit interpretations cannot show strong evidence to explain the inequality of

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[1]Persell (1977) explained these three deficit theories with relation to educational and economic inequality on the basis of a great deal of previous empirical research in her book titled as Education and Inequality.

of educational and economical attainments in general (Bowles and Gintis, 1976:31-35).

Currently much conern has focused on the teachers' variables (teacher-deficit theory), rather than on the IQ- or cultural-deficit explanations. The new trend of school learning is very much concerned with the quality of opportunity to learn. On the basis of many research findings, B. S. Bloom concluded: "What any person in the world can learn, almost all persons can learn, if provided with appropriate prior and current conditions of learning" (Bloom, 1978: 564). Direct evidence can be derived from any mastery learning studies. If provided with favorable learning conditions, most students become very similar with regard to rate of learning and motivation for further learning. Consequently, the individual differences in the genetic/cultural backgrounds of children can be removed in school learning. Mastery learning is one of several teaching-learning strategies that can succeed in bringing a large proportion of students to a high level of achievement and to high motivation for further learning. Fast and slow students become equal in achievement and effect if provided with the favorable learning conditions. The effect of mastery procedures may be caused by the qualities of teaching that can provide the favorable learning conditions. The quality of teaching is closely interrelated to method, strategy and supplementary materials.

Teachers may generally strive to provide equal opportunities for all students. However, the actual situation under group instruction is far from this ideal. Observations of teacher interactions

with students in the classroom demonstrate that teachers direct their teaching and explanation to some students and ignore others. They give much positive reinforcement and encouragement to some students, but not to others, and they encourage active participation in the classroom discussion and question and answer periods from some students and discourage it from others (Brophy and Good, 1970). In relation to these problems, much concern has been given recently to teacher expectancy effects in learning process. The reason is that the teachers make a difference (Good, Biddle and Brophy, 1975), and in turn, the ideal of equal opportunity for learning is negated by teacher's own teaching methods and styles of interaction in the classroom. In a similar position, Brookover and his associates (1977) show that school can make a difference.

If teachers' expectations play a part in the lesser achievement of certain students, it will be necessary to investigate how teachers form the differential expectations for student performance, and how those expectations influence the teachers' instructional behavior and procedures and, in turn, how they affect student learning outcomes.

The present study is mainly concerned with how differential teacher expectations, as well as evaluations related to the use of certain mastery teaching methods and strategies, tend to produce the students' achievement.

To define this problem, two assumptions in this study may be described as follows.

First, from a viewpoint of the quality of teaching, teachers form the differential expectations regarding students' performance, and then they use teaching methods and strategies differently in accordance with their differential expectations. Bloom (1968) suggestion on this fact states:

> Each teacher begins a new term (or course) with the expectation that about a third of his students will adequately learn what he has to teach. He expects about a third of his students to fail or to just "get by." . . . This set of expectations, supported by school policies and practices in grading, becomes transmitted to the students through the grading procedures and through the methods and materials of instruction. The system creates a self-fulfilling prophecy such that the final sorting of students through the grading process becomes approximately equivalent to the original expectations (p. 1).

Teachers' expectations concerning how students will perform are normal components of the daily classroom functioning. Appropriate expectations are extremely useful in helping teachers organize and prepare for instruction. Inappropriate expectations also powerfully influence teachers' behavior toward students. The teacher's behavior toward the high-expectation students could encourage these students to perform at high levels. Teachers' expectations also affect the evaluations that they make of the student performance (Rubovits and Maehr, 1971; Kester and Letchworth, 1972), and they are correlated with teacher instructional behavior related to the provision of learning opportunities such as degree of assistance, amount of time, and materials provided for the class (Peng, 1974).

Secondly, according to the socio-psychological theory of learning, teachers' expectations-evaluations can be represented as the normative behaviors in school social system and impact on the

school learning climate and, in turn, they may influence student achievement. Brookover's socio-psychological theory of interaction and learning (1969) would clarify this assumption. He contended that:

> The school can be thought of as a social system in which the teachers, principal, students, and other staff all come to know the types of behavior that are expected of them. . . . In the contest of the school social system, students come to perceive the role definitions, norms, expectations, values, beliefs, attitudes, and behaviors that others hold for them, and act accordingly. . . . Since these sets of norms and behaviors are different for different students, they are likely to behave in accordance with those differing expectations (p. 3).

In a school learning situation, these types of expectations-evaluations form the learning climate, and as a result they influence student achievement. The learning climate is based on a socio-psychological theory of interaction and learning. This means that people learn and do the things that the people around them expect them to do. Thus, the behavior of students in school is partly a function of the social and cultural characteristics of the school social system.

With relation to teacher expectations and evaluations toward classroom instruction, recent research identifying differences in teacher behavior associated with different teacher expectations about student performance indicates that inequities can occur in the classroom, even when teachers have no intention of slighting students.

The Purpose of Study

Accordingly, this study is designed to investigate how teachers' instructional climates, expectations, evaluations and academic norms, and instructional conditions interrelate to bring forth mastery model implementation which, in turn, is associated with student academic achievement.

Specifically, this study intends to examine the relationship between the school learning climate (teacher's instructional climate plus instructional conditions) and students' achievement, and to investigate how the teacher's climate (expectations, evaluations and academic norms) is associated with the provision of instructional conditions such as group learning games, reinforcement practice and other mastery strategies, and finally to investigte how the climate variables and instructional conditions are interrelated with mastery model implementation.

Assumptions of the Study

This study begins with an assumption that the implementation of mastery model strategies will have different amounts of effectiveness under different learning environment or climate. The learning climate, in this study, defined as selected teacher expectations, evaluations and academic norms, is related to the provision of teaching conditions and student's learning outcomes.

The instructional stream is mostly operated by teachers' teaching behavior. Mastery approach also is a sort of instructional procedure, and the strategies, and cannot make an exception. Thus, there are possibilities that the mastery model implementation results in varying effectiveness, according to teachers' readiness for the use of mastery strategies, which is caused from teacher

expectations and attitudes toward the mastery curriculum. These kinds of classroom phenomena also depend upon the school learning environment as to whether it is a supportive learning climate or a negative climate. In most cases, these climate variables can work as school socio-psychological characteristics.

Therefore, the present study addresses the following questions:

1. Does mastery model implementation bring the same effects in differential teacher and instructional climates?
2. To what extent do teacher expectations-evaluations explain the level of use of mastery learning strategies?
3. How do the teacher climate variables and instructional condition factors relate to explain the student academic achievements?
4. How can these climate variables contribute to the change of school social system, additionally?

To investigate these problems, this study intends to investigate the general hypothesis that the differential school learning climates are associated with the differential use of mastery strategies which, in turn, are associated with differential levels of student's academic achievement.

The school learning climate is defined as a combination of teacher climate and instructional conditions in this study. The climate variables and related mastery model components are as follows:

Teacher Climate Variables

1. Expectations for Mastery of Basic Skills
2. Evaluations of Academic Ability
3. Teachers' Academic Norms

Instructional Condition Variables

1. Group Learning Game
2. Reinforcement Practice
3. Study Grouping Patterns
4. Staff Planning and Support

Mastery Model Strategies

1. Planning for Mastery
2. Tutoring/Team Study
3. Reteaching/Enrichment Strategies
4. Mastery Implementation Variables
    a. Individual Knowledge
    b. Individual Use
    c. System Orientation

Statement of Hypotheses

On the basis of research assumptions and variables mentioned above, some associational relationships form the basis of related hypotheses of this study.

First, the associational relationships of teacher instructional climate and instructional conditions to student achievement is the primary concern in the entire model.

A number of studies indicated the associational relationship between climate factors and achievement. Brookover, et al. (1977) examined the proposition that the differences in school climate explain much of the differences in achievement between schools. With a similar position toward measuring school academic climates, much of the variance in academic achievement were explained by the school norms and expectations variables (McDill and Rigsby, 1973). But this study is primarily concerned with the classroom instructional climate, such as teacher expectations and evaluations, which in turn affect on instructional behaviors between teacher and students. As a behavioral approach, Brophy and Good (1970) found similar teaching behavior when teachers developed their expectations concerning student performance. Otherwise, Garner Bing's (1973) model postulated the expectancy-achievement relation. A great deal of data have been dealt empirically with the expectancy-achievement relation. These previous studies covered the school learning climate or instructional environment in many different ways and a great number of different measures of climate were used. Many different conceptions were applied in order to define the learning climate from the normative compositions to the teacher-students behavioral interaction.

The position of this study is more closed to the classroom behavioral interaction in defining the school learning climate.

Second, the level of teacher's utilization of mastery model strategy is associationally related to teacher's knowledge and cooperative support in school social system.

The use of mastery strategies is closely related to teachers' awareness and attitudes on mastery curriculum. Also it is influenced by the staff cooperation in terms of curriculum planning and supportive atmosphere in school social system. There is no direct literature in this area. Few previous studies indicated that mastery teacher training and use of mastery learning program brought the improvement of teacher's attitude toward mastery curriculum (Okey, 1976; Anderson, et al., 1976).

This study intends to approach different directions, such as how the teacher's perceptual and attitudinal factors and a cooperative system in school society can relate to the degree of mastery model and related strategy use. In other words, this factor is concerned with the extent to which teacher's attitude and belief on mastery curricula impacts the implementation of mastery program knowledge and utilization.

Third, <u>the relationship between mastery strategy components and school learning climate can explain the effectiveness of mastery implementation as well as student achievement</u>.

Teachers use their expectations concerning student's performance as a basis for designing instructional methods and preparation of learning materials. These activities involve the specification for learning objectives, use of diagnostic tests, adaptation of the alternative correctives for individual student, and so on. This kind of teacher behavior provides an important part of the school learning climate, as well as classroom instructional conditions in which

mastery preferred strategies are either implemented or restricted to use. In this sense, this study investigates the possible relationship between the school climate and mastery model strategy, which may affect some relevant implementation factors such as knowledge, utilization and system orientation of school social system.

According to these types of relationships among suggested research questions and variables, this study states the following measureable hypotheses.

Hypothesis 1: Teacher climate and instructional conditions variables will be positively related to student academic achievement.

Hypothesis 2: Among associational school climate variables, teacher climate measures (expectations, evaluations, academic norms) will be more powerful indicators in predicting student academic achievement than instructional condition measures.

Hypothesis 3: Schools high in teacher expectations-evaluations score will use the group learning game more frequently than schools with low teacher expectations-evaluations.

Hypothesis 4: Schools high in teacher expectations-evaluations will show more favorable attitudes toward group corrective reinforcement practice than will those with low expectations-evaluations.

Hypothesis 5: Group learning games will be used more frequently for lower grade levels than will the upper grade levels. Also reinforcement practice will be used more frequently for the upper grade levels rather than with the lower grade levels in elementary school.

Hypothesis 6: Schools high in teacher expectations-evaluations will be more favorable toward mixed grouping learning games than those with lower expectations-evaluations.

Hypothesis 7: Teacher climate will be highly associated with the staff planning for basic skills objectives. Schools high in teacher climate will introduce more frequently the basic skills objectives than will the lower climate schools.

Hypothesis 8: Schools high in teacher climate will adapt more principal-teacher joint planning for mastery strategies than will the lower teacher climate schools.

Hypothesis 9: Teacher high in mastery expectations score will use more alternative correctives for mastery strategies than will teacher with lower mastery expectations score.

Hypothesis 10: The lower grade level of schools will be more favorable to the whole group instruction (mixed grouping) for mastery learning than will the upper grade level of schools.

Hypothesis 11: Schools high in teacher climate school have a higher proportion in use of teacher training modules than do schools with lower teacher climate.

Hypothesis 12: Schools high in teacher mastery expectations have a higher level of mastery implementation effects in terms of teacher knowledge, use, and system orientation of mastery learning and instructional strategies than do schools with low mastery expectations.

Significance of the Study

Over the past four decades there has been a great deal of research on teacher characteristics. Based on the research done to date, we may conclude that the characteristics of teachers have little to do with learning of their students. In general, the relationship between teacher characteristics and student learning has typically be represented by correlations of less than +.20 (Bloom, 1980: 380).

Thus the new direction of classroom research is concerned with the quality of teaching rather than with the quality of teachers. These qualities of teaching are alterable through in-service education that provides teachers with feedback on what they are doing, and what they can do to alter the situation. This study intends to contribute to such kinds of new trends in the education field.

The approach for mastery learning is not a panacea for all the instructional problems facing the classroom teacher. The important thing is how the teacher can manipulate the strategies into a proper condition in classroom teaching, and how the teacher provides a moderate environment for implementation for this strategy. Teacher expectations and evaluations can be assumed as a set of important conditions for this purpose.

As suggested by Benjamin S. Bloom (1968), teachers' expectations, supported by school policies and practices in grading, become transmitted to the students through the methods and materials of instruction. In this sense, the premise that the effect of mastery implementation will be facilitated if teacher expectations-evaluations become a positive environment is basic to this study.

In relation to this premise, some underlying reasons are as follows:

The first reason relates to the need of a new trend for mastery approach. The new trend is closely connected to the development and dissemination program concerning teacher-training program module and material development. This trend of mastery learning approach has been concerned mainly with the supportive environment condition factors which are related to teacher expectations and attitude toward mastery strategy and curriculum. This study will provide the basic provision for further investigation of mastery implementation effectiveness.

Secondly, until this data, numerous research studies of mastery approach have been conducted with concerns of the learner's

characteristics and instructional variables. Thus, the importance of group dynamics in the group instructional process was not of too much concern to mastery learning studies. In contrast, this study is largely concerned with the group process in terms of curriculum planning, group-based learning game and teaching grouping patterns. Even though the mastery strategies implied the group-based activities, a classroom reality is far from this goal in the process of mastery treatments.

Thirdly, a great deal of research has been concerned with the relationship of teacher expectancy and the inequality of educational opportunities. It is a movement from the study of the actors (teacher and students) to the study of teaching and learning as they take place under specific environment conditions. The most methodological change is the movement from stable or static variables to variables that are alterable as a part of these progresses. As the quality of teaching become more central than characteristics of the teachers, we may see more clearly the kinds of training that can improve teaching and learning. In this sense, this study can suggest the variety of conditions that can serve in the equality of educational opportunity through teaching-learning process.

Overview

This study will follow the following format. Chapter I includes statement of the problem, basic assumptions, the purpose of the study, and significance of the study.

Chpater II includes the theoretical basis of this study with relevant research model. Theory for this study will be extrapolated from socio-psychological theory of learning, reference group theory and expectancy theory. In Chapter III the review of literature is presented. This includes the different dimensions of school learning climates, systematic approach for naturalistic and induced expectations studies, and mastery model strategy and implementation effect. The procedures and methodology is followed in Chapter IV. Information in this chapter includes sample, instrumentation, testable hypotheses, operationalization of variables, and modes of analysis.

The analysis of data and findings are presented in Chapter V. Chapter VI includes the summary and conclusions, limitations of the study and implications for further research.

CHAPTER II

THEORETICAL BACKGROUND

This chapter will examine the theoretical basis of the study with special attention of the underlying research model. Theoretical perspectives most pertinent to the study appear in the literature under the rubrics of symbolic interactionism, expectancy theory and mastery model strategy.

The Theoretical Basis

The theoretical basis of the present study is a combination of the social interaction theory of learning, and the underlying mastery learning theory and practice. Brookover's social-psychological conception of learning is mainly concerned with the school learning climate, which is determined by the aggregate attitude, beliefs, norms, and expectations of the persons who make up the school social system (Brookover and Erickson, 1975: 360). Bloom's philosophical foundations of mastery learning are basically concerned with the appropriate learning conditions in which virtually all students can learn well. Both of these theoretical concepts are largely connected to the proper or appropriate environmental conditions (or situations) in which humans can learn and interact with each other. The former focuses on the social interaction aspects of human behavior, and the latter stresses the instructional conditions of human learning.

In this sense, they look at the same thing from different angles. One view is from social structure and system factors; the other is from the instructional environment factors. In their mastery philosophy, both authors focused on the creation of the appropriate conditions of learning in schoool, either through the change of school learning climate or through the control of instructional environment.

Learning for mastery is a group-based, teacher-paced approach to mastery instruction, wherein students learn, for the most part, cooperatively with their classmates (Block and Burns, 1977: 4). The basic ideas of mastery learning were provided by a conceptual model of school learning developed by John B. Carroll (1963, 1965). Simply put, Carroll's model proposed that the degree of school learning would be a function of the time the student actually spent, relative to the time he needed to spend. Benjamin Bloom (1968) transformed this conceptual model of school learning into a working model for mastery learning with relevant instructional condition factors.

In contrast with Bloom's model, a social interaction model which Brookover has postulated, is concerned with the affective aspects of group dynamics such as group norms, expectations, and school learning climates. The general figures of their models of learning process or environment can be compared as follows.

	B. S. Bloom	W. B. Brookover
Learning Model	Structure-Behavioral Model	Attitudinal-Perceptual Model
Learning Components	Cognitive, Affective Entry Behavior	Group Norms, School Social Climates
Learning Mechanism	Internal Structure External Stimuli	Social Context, External-Internal Stimuli
Perspectives	Technological	Symbolic Interactionism

In the behavioral model the teacher presents stimuli to the student, observes or psychometrically assesses the response, and selectly reinforces them. In the structural model, the preprogrammed development of internal mechanisms mainly determine the course of learning. The perceptual model allows for behavioral and structural mechanisms, but holds that the student's conscious perception of internal and external stimuli, and his choices, are the mediating determinants of learning (Walberg, 1976: 142). With relation to these two learning models, the underying theory of this study is primarily concerned with the extent to which the perceptual model of learning can be interrelated to the structual models of learning through the classroom interaction mechanisms. Accordingly, the basic assumption of this study is that the degree of school learning would be a function of the quality of teaching and of the school learning climate which is determined by the aggregate norms, expectations and evaluations held for various members of the group.

This study does not intend to test the independent effect of school climate factors separately. As mentioned above, the school climate encompasses a composite of variables as defined and perceived by the members of the group. These factors may be broadly conceived as the norms of the social system, and expectations held by various members of the group and communicated to members of the group (Brookover and Erickson, 1975: 364).

A series of research studies show that achievement in school is related to the school learning climates (Brookover, et al., 1977). Since successful schools have positive climates, and since some schools have negative climates, there are variations in mastery levels of achievement. Kim, et al. (1969) indicated through the experimental study that fluctuation from school to school in the percentages of students attaining the mastery criterion appear to have been caused by the variation in the school learning climate and variation in teachers' cooperation.

Accordingly, the theoretical perspective most pertinent to this study can be derived from the social interaction theory of learning and the expectation theory of classroom teaching. These basic conceptions stress the influence of reference groups and significant others in the learning-teaching process. From this point of view, students are influenced in their behavior by the expectations-evaluations having been received with relative accuracy in school learning.

Basic components of every society and social group are the norms of behavior which characterize the group and its members.

Thus the social norms and expectations of others define the appropriate behavior for persons in various social situations. Boundaries of appropriate or proper behavior are defined by the social norms and expectations of others. Also, each person learns the norms of appropriate behavior through interaction with others who are important or significant to him. These propositions emphasize the importance of the social environment in which the student lives, and his interaction with others in his social world. Such a conception of human learning has been identified as a social interaction theory, because the individual acquires both the perceptions of appropriate behavior and his ability to learn in interaction with others who are important or significant to him (Brookover and Erickson, 1969: 16).

To define this proposition, the socio-psychological perspective of symbolic interaction can be employed in questions concerning the reference groups and the significant others with relevant interpretations.

Symbolic Interaction: Reference Groups and Significant Others

The basic unit of observation for symbolic interactionists is the social act. Mead (1934) and Cooley (1970) content that learning is a social activity involving at least initial interaction with "others." Having been socialized, the individual may engage in "self" interaction by making indications to himself. The social act takes place because men share meanings. The symbolic interactionism focuses on the nature of interaction, the dynamic social activities taking

place between persons. People are constantly undergoing change in interaction, and society is changing through interaction. Interaction implies human beings acting in relation to each others, taking each other into account, acting, perceiving, interpreting, acting again (Charon, 1979: 23).

Interaction means mutual social action, individuals communicating to each other in what they do, orienting their acts to each other. Thus, we arrive at the significance of symbolic interaction: humans are constantly acting in relation to each other, communicating symbolically in almost everything they do. This interaction has meaning to both the giver and the receiver of the action, thus both persons interact symbolically with themselves as they interact with each other. This is a constant, never-ending process.

> Symbolic interaction involves interpretation, or ascertaining the meaning of the actions or remarks of the other person, and definition, or conveying indications to another person as to how he is to act. Human association consists of a process of such interpretation and definition. Through this process the participants fit their own acts to the ongoing acts of one another and guide others in doing so (Blummer, 1966: 537-38).

Elaborating on this basic assumption of social interaction one could support Shneider's definition (1973) or symbolic interaction as "the individual using his perceptions of the evaluations-expectations and behaviors and values about himself and any particular situation or set of situations with which he may come in contact. To the extent that the individual regards the "other" in question as "significant" he will tend to conform to his perception accordingly (p. 29).

To understand the unique and common characteristics of a student involves a knowledge of the groups and persons with whom that student interacts. The group whose standard the individual adopts is the individual's reference groups (Mead, 1934). Reference groups, to Shibutani (1955: 562-69), are simply those groups whose perspectives the individual shares. A reference group is an audience, consisting of real or imagined personifications, to whom certain values are imputed (Shibutani, 1962: 132). And he contended that the human being identifies with a number of social worlds (reference group, societies) learns through communication (symbolic interaction) the perspectives (symbolic/conceptual frameworks, culture) of these social worlds, and uses these perspectives to define or interpret situations that are encountered. Individuals also perceive the effects of their actions, reflect on the usefulness of their perspectives, and adjust them in the ongoing situations.

Through this means, the concept of reference groups can be explained in terms of their functions which connect the individual behavior and social organizational aspects. Thus, in a school social system, the collectivity of teachers and peer group may be the student's reference groups. The concept "reference group" is closely related, although not synonymous, with the concept "significant other." "Significant other" is used in the singular to identify real or imaginary persons who influence the individual's belief about himself and his world. In this sense, the two concepts have similar meaning, although reference group has a group connotation

and significant other more commonly has an individual connotation (Brookover and Erickson, 1969: 66).

From this point of view, Charon (1979: 27) presented a model based on symbolic interactionist thought, utilizing the reference group as a variable intervening to define the perpsective of the relationship between the real situation or other and the behavior of the individual. His model is concerned with understanding how one defines the situation, the reference group one identified with in that situation, the perspective one draws upon, and how the role one plays, the reference groups, and/or the perspectives undergo change in the situation in interaction with other. Charon's model is shown schematically as follows (Figure 1).

Interaction	→	Role	→	Reference Group Identified	→	Perspectives	→
Definition of Situation	→	Action	→	Interpretation and Judgment	→	After Role, Reference group, Perspectives	

Figure 1.--Symbolic Interaction Thought with Reference Groups.

It conceptualizes the human as more complex, less predictable, more contradictory, more situational, more dynamic, and less passive than do all the other social scientific perspectives considered thus far.

Teachers' Expectations Theory

Under the perspective of symbolic interaction and of great importance to present research, is the expectation theory, and the relationship between the academic behavior and the student perceived academic expectations held by "teachers" who may be significant to his beliefs. In the context of the school social system, students come to perceive the role definitions, norms, expectations and behaviors that others (teachers and peers) hold for them, and to act accordingly. Since norms and expected behaviors are different for different students, they are likely to behave in accordance with those differing expectations.

In school society, group norms influence interpersonal relationship by helping individuals to know what is expected of them and what they should expect from others. Norms are group agreements that help to guide the socio-psychological process of the group members. They influence perception--how members view their physical and social world; cognition--how members think about things; evaluation--how they feel about things; and behavior--how the members overtly act. In the real world of a group, it is difficult to separate perceptual, cognitive, evaluative and behavioral process.

Most social behavior involves both the motivations and intentions of an individual, as well as that person's expectations about how others in the immediate environment will behave. An expectation is a prediction of how another person will behave. All people develop expectations for themselves, as well as for other people with whom they interact over the period of time.

Most of the systematic research on expectations in the classroom has been focused on a teacher's expectations for the student.

Good and Brophy (1975) have offered a theoretical sequence to explain the effect of interpersonal expectations in the classroom:

1. Teachers expect different achievements from different students
2. Teachers behave differently toward individual students as a function of their differential expectations
3. Over a period of time, the teachers' differential treatment of students communicate to all students what behaviors their teachers expect them to perform
4. The student behaviors come to conform more and more to be expectations that their teachers continually communicate

Through circular interpersonal processes, teacher's expectations for students affect their interactions of the students. Recent studies in the social psychology of classroom interaction have sought to establish the validity of this general hypothesis, and to go beyond it by pinpointing how the teachers' expectations relate to the quality of the circular interpersonal process, and how different qualities of interpersonal interaction relate to student academic performance. Interpersonal expectations, and the social psychological dynamics of the self-fulfilling prophecy, have stimulated the imagination of many educational researchers and practitioners during the past decade.

Teacher Expectations as an Assessment

Expectations about interpersonal relations involve more psychological content than just cognitive predictions. They also involve making assessments of other people along evaluative dimensions. In other words, interpersonal expectations are made up of both thoughts and feeling.

Finn (1972: 390) wrote that expectations are evaluations--whether conscious or unconscious--that one person forms of another which lead the evaluator to treat that person evaluated as though the assessment were valid. Accordingly, the person doing the expectation typically anticipates that the other person will act in a manner consistent with the assessment.

The power of the self-fulfilling prophecy is also very real to the teacher's evaluations. Therefore, we believe that teachers have an influence on achievement, sociometric position, self-esteem, and satisfaction of students. At the same time, not all teachers have such power, and even very powerful teachers do not influence all their students in the same ways. Even in the classroom, the teacher's expectations and resulting behaviors are mediated by the interpersonal norms and relationships in the peer group, It is believed, therefore, that student performance is influenced simultaneously by the teacher, by the peer, and by the family.

Previous research indicates that the teacher's perceived expectations are related to the provision of learning opportunity, such as the extent and degree of assistance, and amount of time, space and materials provided for class (Peng, 1974).

From the viewpoint of the social interaction and learning, the teachers' expectancies are summarized as follows (Schmuck and Schmuck, 1975: 60).

1. These expectations normally include an evaluative assessment of the students
2. It is important to be aware of the expectations held for each individual student as well as for groups of students
3. The interaction with students becomes stable and regularized over time
4. Continual treatment of students can influence those students to behave in ways teachers expect them to behave
5. The expectations for how the student will behave influence the ways in which the teacher behaves in relation to the student

Mastery Model Strategy

The research on effective schools (Brookover, et al., 1977) suggests that effective schools have a common belief that all students can learn, and they have adopted an instructional orientation that reflects this belief. In planning programs to improve the school learning climate, then, it is important to understand the current beliefs about students as learners. The concept of mastery learning seems especially useful in promoting effective instructional programs. Mastery learning is an instructional orientation to school learning that states the belief that all students can and will learn, if provided the proper conditions for learning.

Positive classroom learning climates not only contain expectations that all students can learn and will learn, they are also organized to insure that mastery learning will occur. The mastery model is heavily oriented toward instructional settings involving the whole group as a unit. The structure of the instructional setting is clearly an important dimension of the effective school learning climate. In keeping with the mastery model, teachers should plan their instructional setting around the whole class and, whenever possible, use class members as instructional resources to help facilitate mastery of the materials being taught.

Accordingly, present study employs some instructional conditions as mastery model strategies. These instructional conditions include classroom organizations and the opportunity to practice in learning-teaching processes such as group-based learning games, reward systems, and instructional support systems.

One effective instructional condition for giving an opportunity to practice the materials being taught is the use of group learning games. Group games are esepcially useful in motivating students; they direct their time and attention toward the knowledge and skills the teachers are seeking to teach, and students take great pride in helping their colleagues, in winning, and in learning.

The reward system that a teacher designs and implements serves a similar function, but in a reactive, rather than proactive, fashion. Over a period of time, teachers can significantly increase the level of effort and quality of work exhibited by students, if they have an effective reward system and use it consistently and appropriately. This is a type of feedback and reinforcement in the classroom instruction. The reward system present in a classroom and school is an important and complex part of the total teaching and learning operation. On the one hand, the reward system should be such that maximum reward goes to those who exhibit high quality work. On the other hand, some students need to be encouraged to make any real effort at completing school task. The teacher has to balance these needs in designing a reward system.

It is indicated, also, that the success of the mastery learning model strategy requires joint planning among staff. The successful accomplishment of these things would be extremely difficult, if not impossible, without a school-wide communication system. This implies that a school staff needs to meet regularly in small groups or total staff settings to plan and evaluate instruction. The mastery learning model provides a framework for wise use of support staff services, since the instructional plans are well articulated.

The Research Model and Variables

According to the theoretical basis of this study, an intended research model will be conceptualized with its relevant variables in this section. This model is derived from the previous research work of teacher expectancy and mastery learning implementation under the symbolic interaction perspectives. Members of a school social system become socialized to behave differently in a given school than they would in another school. These patterns of behavior are acquired in interaction with other members of the school social system.

The social system which defines the patterns of interactions has an impact on the social-psychological climate, as identified by the perceptions of appropriate behavior, expectations, evaluations and values in which members of the social system have their role and the roles of other school members. Since people learn from each other, there must be some mechanism by which an individual's input is incorporated by the learner. This involves the expectations which are held for an individual by another person. This mechanism is called the self-fulfilling prophecy by Cooly (1902), and was redefined by Merton (1968).

The self-fulfilling prophecy is a mechanism by which others' expectations for, evaluation of, and beliefs about an individual are incorporated into the individual self-concept. If the teacher expects the student to exhibit a high level of achievement, the student will, through the self-fulfilling prophecy, come to a high level of achievement himself. The student will then behave so as to meet this expectations. Through interaction with each other, the students, teachers, administrators, and others involved in the school social system communicate their conceptions of the proper student role behavior in the social system, and their conceptions of appropriate and proper expectations and evaluations of the students to the students. The students thus come to perceive their place, the norms and expectations of teachers, principals and others associated with the school community.

Each person learns the definitions of appropriate behavior through interaction with others who are important or significant to him (Brookover and Erickson, 1969). The significant other (Mead, 1934) is an individual whose opinions, evaluations, and expectations are specially valued by the individual. In school learning, the significant others could be teachers, the principal, or fellow students whom the individual aspires to emulate.

Also this school social climate, which is interrelated with the norms, expectations and beliefs within a given school social system, is hypothesized to affect the students learning outcomes.

A second important notion for this research is to employ these climate variables into the mastery model implementation, and to find out the relationship between them. It has been indicated on the basis of past research that implementation of the mastery model is associated with higher teacher expectations for student performance and more favorable teacher attitudes toward curricula (Torshen, 1977: 79). Mastery is the name of a model used to structure curricula. This structure is designed to maximize the likelihood that each student will reach the performance levels of essential competence. The mastery procedures operates on the proposition that almost every student can learn the basic skills and knowledge that are the core of the school curriculum, when the instruction is of good quality and appropriate for the learner (Carroll, 1971; Bloom, 1971). The implementation of the mastery procedures is associated with the teachers' planning and manipulation for providing a supportive instructional conditions. These kinds of instructional efforts and design are highly correlated with teachers' antecedent variables, such as their expectations, evaluations and beliefs toward the process of mastery implementation.

Thus, it has been proposed that one of the primary advantages associated with mastery model implementation is a change in teacher's expectations concerning student performance (Bloom, 1968). Such a change in teacher expectations for students' performance is needed because of the teacher's strong and dominant influence. Accordingly, the new trend of mastery learning research is much concentrated on how the mastery model strategies can be implemented into classroom, and what types of teacher's behavior can be incorporated with mastery strategy utilization. These problems are mainly concerned with the supportive environment conditions created by the teacher's beliefs, expectations, and evaluations toward student performance which may be coped with mastery model strategies.

Specifically, the mastery model strategies can involve as many instructional alternatives as possible. But the main concern in this research is based on the group-bounded learning game, reinforcement practices and other correction activities. It is hypothesized that the teachers with higher expectations-evaluations may use the mastery related strategies and procedures to a greater degree than teachers who held lower expectations-evaluations about student performance. Consequently, it will affect the student learning outcomes.

The general model of this study is to combine the school learning climate variables with relation to the mastery model use as shown in Figure 2.

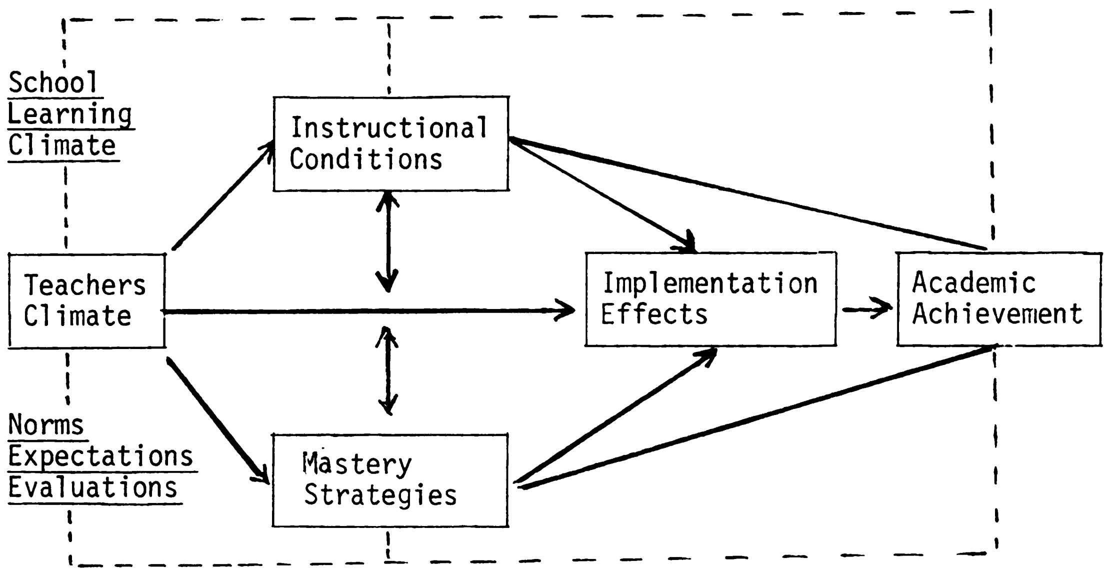

Figure 2.--A Schematic Model of School Learning Climate in Relation to Mastery Model Implementation.

In other words, the study model states that the teachers' climate, which is defined as expectations, evaluations, and academic norms, is causally interrelated with the instructional conditions, and the use of mastery strategies in a given group learning situations affects the extent of mastery model implementation (mastery knowledge, utilization, system orientation) and, in turn, that these interactions will be related to the academic achievement.

The school learning climate, in this framework, is defined as a combination of the teacher's climate and the instructional conditions together. These two research components become the antecedent variables of the mastery model implementation. The final component consists of the learning outcomes (achievement). The arrows in the model indicate the direction of the associational relationship which is hypothesized to exist between the various components. The central problem is in investigating the associational relationships among these components under the best conditions that can be devised. Each relationship inherent in the research framework will be investigated associationally under existing conditions.

In addition, this study model is concerned with the change of school social system through improving the school learning climate, rather than concentrating on change at the individual level. The school staff sets the tone for the school learning climate. Staff members have expectations and evaluations of student ability that are perceived by the students themselves. Also, instructional programs are carried out by the teachers. Thus, successful implementation of a program to improve school learning climate demand that the structural characteristics of curriculum practices, role definitions, and policy procedures be consistent with and supportive of the program goals. For this purpose, the instructional leader is the key to bringing about these changes. This approach is used particularly for implementing the instructional programs. Also, a series of strategies to make the staff more aware of their own school climate and belief system can be applied.

By this means, a positive set of beliefs, expectations and instructional proctices is gradually communicated to staff members and students alike, and they collectively accept their responsibility to that end.

CHAPTER III

REVIEW OF THE LITERATURE

This study investigates the relation of instructional climate to mastery instructional conditions and, in turn, to student academic achievement. Teacher climate, in this study, is defined as a part of the school learning climate, and consists of teacher expectations, evaluations, and academic norms in school.

The concept of school learning climate has not been the subject of intensive research. A few studies in the field are mainly concerned with the school normative academic climate. Otherwise, this present study is more focused on the classroom instructional dynamic of teacher behavior than on the school normative climate.

The following format will be employed in presenting the review of the literature and in supporting theoretical constructs. Section I reviews the available research on school learning climate, with focus on classroom teaching conditions. Section II reviews existing literature on teacher expectancy researches with their methodological implications and findings. Finally, Section III is an attempt to review literature concerning aspects of teacher expectations and evaluations which are related to mastery implementation procedures.

School Learning Climate

The concept of school learning climate has been used in many different ways. For some it means the temperature and other physical conditions of the building. For others, the climate has been associated with other socio-psychological dimensions of the school, like morale.

As described in Chapter I, school learning climate refers to the attitudes, beliefs, norms, evaluations, expectations, and values held by the members of a school social system, that serve to enhance or impede student learning. The instructional program of the school, including the teaching materials, methods used, time devoted to academic tasks, and evaluation of learning will all reflect the goals, values, beliefs, norms, and expectations that characterize the school. In this sense, school learning climate is defined as the sum total of all enduring beliefs, attitudes, expectations, institutional patterns, and behavioral practices present in an educational environment, that either enhance or impede the students' acquisition of intended knowledge and skills (Brookover, et al., 1979: 3). This definition implies that virtually every aspect of the educational environment represents a potentially important part of the overall climate. The critical dimensions of the educational environment include not only attitudinal and perceptual factors such as attitudes, beliefs and expectations, but institutional patterns found in the choice of curricular programs, organizational arrangements, administrative practices, procedures of evaluations and accountability, and behavioral practices evidenced by individuals in the educational environment. In this definition, the word "learning" suggests a specific kind of school climate. The learning climate is but one climate that could be examined. And "climate" when attached to the terms "school learning" serves to direct attention to the atmosphere created by those patterns and practices that endure over time and are apparent throughout the school environment. Thus school learning climate includes from the school normative, perceptual and attitudinal atmosphere to the behavioral components of classroom interaction.

Accordingly, the reviews of literature is greatly concerned with a set of beliefs, expectations and norms that surround the area of the cognitive and affective learning behaviors in the classroom interaction.

Studies in Organizational Climate

Research on school learning climate has examined the relationship of climate to several different outcome measures. Studies conducted in the 1950's and early 1960's focused on the relationship between the socioeconomic composition of the student body and student aspirations. These studies generally concluded that the level of student aspirations in a school is related to school composition. Socioeconomic composition is certainly an important variable in the school social system, but is only a proxy or substitute for climate.

Academic interest in the school social system is by no means a new phenomenon, with even so renowned a scholar as Talcott Parsons

(1959) theorizing on the classroom social system, and discussing the roles of teachers, parents, and peer, and the relative importance of value consensus among these groups for an increase in academic achievement.

Most earlier studies were concerned with organizational climate. The particular concept of climate was influenced by the human relations and organizational leadership. Halpin and Croft (1963) devised a measure of faculty morale, camaraderie, closeness, and good feeling which they defined as school climate. This notion of climate was related to staff satisfaction, but there is no evidence that it is related to student outcomes.

Another early study of school climate by Fox, Lippet, and Schmuck (1964) focused on the socio-psychological interactions of students and teachers. They examined the impact of friendship patterns on the attitudes of students, teachers and parents toward school. Pace (1964) and Stern (1964) developed a method of assessing and reviewing college environment through use of personality theory. They defined the school climate so as to include both individual needs and the school organizational pressures on students. With a similar position, Astin and Holland (1961) assumed that organizational pressures were largely dependent on the people within environment.

More recently, Finlayson (1973) developed a measure of school climate that included both student and teacher perceptions of the atmosphere in a building. But his research did not reach the stage of development to school outcomes.

Conran and Beauchamp (1976) conducted a longitudinal study of curriculum planning and implementation in elementary and junior high schools. They found causal connections between several dimensions of the school climate, leadership, and teacher behaviors on one hand and school achievement on the other.

These studies of organizational climate contribute to our knowledge of the school as a social system, but they do not add substantially to our understanding of school effects on achievement.

Studies in School Learning Climate

In contrast to the large-scale studies of school effects, there are the specific studies of school learning climate. These studies largely demonstrate that schools, and school learning climates in particular, have a significant impact on achievement.

McDill, Rigsby, and Meyers (1969) were among the first to measure school learning climate directly. They defined learning climate in terms of student and teacher attitudes toward academic achievement and related these measures of climate to mathematics achievement. This study overcomes two of the problems in the earlier studies:

1. It uses a content-specific measure of achievement as the dependent variable, and
2. It measures school learning climate directly.

By factor-analyzing 39 school characteristics variables, they found six factors to interpret the school climates: academic emulation, student perception of intellectualism-estheticism, cohesive and egalitarian estheticism, scientism, humanistic excellence and academically oriented student status system. This study indicated that when S.E.S. composition and intelligence are controlled, the climate effects still retain some explanatory power in which academic competition, achievement, intellectualism and subject matter competence are demonstrated and emphasized by faculty and students.

The study demonstrated that the attitude of the staff and students toward academics could explain the differences in mathemathical performance, and showed that differences in the quality of school learning climate is as much or more important than the level of student S.E.S.

Anderson (1970) found that variations in the social-psychological climate of the classroom accounted for much of the differences in physics achievement. He suggested that perhaps the different norms and values of the students within the classroom could explain the individual differences in achevement. O'Reilly (1975) used the learning environment inventory scales from Anderson's (1970) work to measure classroom climates for mathematics in Canadian high schools. Like Anderson, he found that the classroom climate was significantly related to achievement, over and above scholastic aptitude and family background characteristics. Both of these studies measured climate directly in terms of socio-psychological group norms, which are a combination of attitudes and beliefs the school staff and students hold for one another.

Recently, three major studies in England and Ireland have been reported.

Rutter, et al. (1979) conducted a longitudinal study of high schools in inner-city London. This study measured the normative school learning climate directly, and demonstrated that schools have a significant effect and differ markedly in quality with respect to behavior in school. This study indicated the differences were due not to physical structures or to organizational differences, but rather to the characteristics of the school as a social institution. Academic emphasis, teacher-student interaction, incentives and rewards, and normative or typical patterns of educational practices were the factors that accounted for differences in achievement. Rutter and associates also noted that the combined measure of overall school process was stronger than any of the individual measures.

Madaus, Kellaghan, Rakow and King (1979) conducted a two-year longitudinal study of high schools in Ireland. They compared levels of school effectiveness on standardized ability tests to the content-specific Irish public examinations. They found that the difference due to factors within each school was significantly greater for the content-specific subjects than for the generalized achievement measures. The factors that accounted for these classroom differences in achievement were the dynamic patterns of beliefs and actions that occurred within school as perceived by the students and teachers.

Brimer, Madams, Chapman, Kellaghan and Wood (1977, cited in Rutter et al., 1979), in a similar study in English schools, obtained results very comparable to those of the Ireland study.

The results of these studies in England and Ireland give cross-cultural confirmation to the finding that differences in quality of school or classroom learning climates account for achievement differences, and the finding that the climate has effects independent of students' family background characterisitics.

Another clear demonstration of the effect of school academic climate on achievement can be seen in research by Brookover and his associates.

Brookover, et al. (1973) conducted a study to identify socio-psychological variables comprising school normative climate that differed between high and low achieving elementary schools, while controlling for school mean, SES, race and urban-rural community type. This study demonstrated that the social-psychological climate variables could explain the achievement differences in these schools.

Following this study, Brookover, et al. (1979) studied 91 randomly selected elementary schools in Michigan. They were interested in the relationship between school inputs, structure, and climate to mean school achievement, mean self-concept, and mean student self-reliance. They found that school learning climate explained school achievement as well as the racial or socio-economic level of the students. Furthermore, the school learning climate and social structure explained approximately 80 percent of the variance in achievement between schools.

This contention is also supported by another study by Brookover and Lezotte (1977). They looked at elementary schools in Michigan that had either improved or declined in achievement over a four-year period. Their findings from these changing schools indicated that the improving schools had a strong commitment to high levels of student achievement, and accepted accountability for achieving the goals. And the levels of expectations and evaluations of student ability were also significantly higher in improving schools than in the declining schools. One particularly interesting finding from this study was the evidence of "creative conflict" that seemed to be associated with the improving schools. The declining schools were characterized by school staffs that were content, satisfied, and got along well with each other.

On the other hand, the improving schools were characterized by a general feeling of dissatisfaction with the school setting, and by considerable conflict between the principal and the school staff. Given this finding, the Halpin and Croft (1962) conception of organizational climate based on staff morale, which was used by Conran and Beauchamp (1976), could be viewed as inappropriate where high achievement is the goal. Indeed, the negative relation that Conran and Beauchamp found between higher levels of schools of school learning climate, as measured by staff morale, and lower levels of achievement suggests an empirical verification of the "creative conflict" finding from the Changing School Study.

In contrast to other studies, one obvious advantage of findings from Brookover and his associates is that we may get closer to the measurement of a climate which is conducive to learning as a dependent variable than we do by focusing on the type of relationship within the school or the classroom.

Classroom Climate as Learning Conditions

The classroom climate is an element of the school learning climate, and can be defined more narrowly than the normative school climate. For the most part, the classroom climate would be a reflection of teacher expectations related to instructional or behavioral practices in classroom interaction. In this sense, the classroom climate implies more direct and feasible interaction between teacher and students.

Walberg and Anderson's model of school climate (1967), developed in connection with the Harvard Physics Projects, was composed of structural factors (role expectations held by students for their own behavior) and the affective factor (students inclination to act in idiosyncratic ways). They probed the problems by relating the perceived classroom climate to cognitive, affective, and behavioral learning.

In this sense, the concept of classroom climate summarizes the group processes that are worked out by the teacher in interaction with students and between the students in the classroom (Schmuck and Schmuck, 1975):

> Climate is what the classroom activity is in carrying out educational goals; it is how the curriculum and learning materials are actually used through the human exchange; and it is the styles of relating among members of the classroom group (p. 24).

On the basis of this climate concept, this study is mainly concerned with the limited school learning climate variables. Those are narrowly defined in classroom teaching behavior and instructional conditions. They are identified as teacher's perceived climate which are closely related to the control of teaching behaviors in relation to student learning.

Teachers' climate comes from their expectations, evaluations and perceived academic norms of students' performance in a particular school system. Also teachers' knowledge and awareness regarding instructional methods and procedures are significantly connected to cognitive readiness for their teaching practice within the classroom interaction. These group dynamics composed an important part of actual classroom learning climates. Thus school can be thought of as a social system in which the teacher, principal, and students all come to know the types of behavior that are expected of them. About this viewpoint, Brookover comments:

> The teacher's behavior in the teacher's lounge may be different from one school to another, but teachers in a particular school learn the appropriate kinds of behavior for that school. In a similar fashion, students passing from classroom to playground may behave differently in one school than do in another. So students in any given school learn to behave in the ways that are considered normal and expected for that setting. This also occurs in the classroom (1979: 3).

In the classroom context, this teacher's climate can be transmitted to the student behavior in general. Through the technical or practical management of teaching, classroom learning climate gradually become consistent with teacher's climate (expectations-evaluations).

Peng's (1974) work provides some insight into how teacher expectations and behaviors and pupils self-expectations may interact to produce differential pupil achievement. Congruence between teacher and self-expectations was related to achievement. Students with high teacher-expectations were higher achievers, and those with low teacher- and self-expectations were low achievers. Teacher behavior, rated in terms of clarity, provision of learning opportunities, and enthusiasm, were related to pupils achievement only for pupils with high teacher- and self-expectations.

Research on Changing School Learning Climate

In the previous section, we found evidence that some schools are effective in achievement from poor and minority families, and that school learning climate explains much of the difference in achievement between schools. How can schools become effective? Numerous programs have been initiated to improve the student achievement, but their success rate is limited. To examine this problem much concern is given to an approach to change that concentrates on the school social system rather than on the individual.

In general, there has been little research on changing school social systems or learning climates. A recent study of federally-sponsored change (Herriott and Gross, 1979) focused on administrative problems and strategies in the implementation of change. But the scope of study is limited to administration and leadership.

A promising inservice project in California employs a cooperative approach to changing teacher expectations (Kerman, 1979).

The project includes teacher observations of one another along with between-grade and subject matter interaction among staff. As a part of its purpose, the present study also intends to examine the potential possibility of mastery implementation procedures based on changing the learning climate of the school social system.

Williams (1978), after analyzing two major studies of school innovation and change, synthesized a staff development model in which the school or building site is the locus of change. Accordingly, this study adopts the position that changing the school learning climate requires normative and structural change rather than any individual oriented program.

Teacher Expectations and Classroom Climate

Many studies have been done relating teacher expectations to student achievement. This involves the self-fulfilling prophecy in which expectations of achievement are communicated by the teacher through both overt and subtle means to the student. The student then conforms to the level of expectations rather than to his/her ability. Teacher, in turn, perceives this performance level as the actual ability level, which conforms the original judgement. The concept of school learning climate used in research by Brookover and associates includes this notion of the self-fulfilling prophecy (1979).

A teacher's belief about his/her ability to positively affect student learning is a necessary but insufficient condition for insuring that all students master the goals and objectives established for them. In the absence of positive beliefs or expectations, teachers will not be motivated to try as hard as they otherwise might and, as importantly, this belief will surely be communicated to students, both verbally and nonverbally. Teacher expectations for students are closely tied to the expectations teachers hold for themselves.

While such vehicles for communicating expectations are important, teacher expectations are also communicated to students in extremely subtle ways. The strategies teachers use to structure reading group, allocate status roles, ask questions, evaluate student performance, and communicate to parents are all indications of the expectations they have for students. They are especially important factors in establishing an effective classroom learning climate.

Teacher expectations regarding student learning behavior and related classroom interaction are simply a special case of the more general phenomenon. Thus, many of the findings of social psychology and learning are applicable to the classroom. Teacher expectations may concern the entire class or specific individuals. General expectations applying to the entire class include such things as the teacher's beliefs about the changeability versus the rigidity of students' ability, about students' potential for benefiting from instruction, and about the difficulty level of the materials for the students.

The present study primarily deals with teacher's general expectations, which may exert influences upon classroom interaction and instructional style. In fact, in extreme cases where teachers have well-formed and inflexible expectations regarding the class as a whole, student behavior may be more influenced by the general expectation than by specific expectations regarding individuals. The degree to which teachers are oriented toward the class as an undifferentiated group, or toward individual students, is itself an individual difference variable among teachers.

Teacher Expectations as Self-fulfilling Prophecies

When a teacher's expectations act as a self-fulfilling prophecy, they function as an antecedent or cause of student behavior, rather than as a result of observed student behavior as in the more typical situation. The self-fulfilling prophecy idea was introduced by Merton (1948). A self-fulfilling prophecy is an expectation or prediction, initially false, which initiates a series of events that cause the original expectation or prediction to become true.

Are expectations related to teacher behaviors and student outcomes? Research addressing these questions has seemingly contradictory results. Some researchers report that teacher expectations are related to teacher behaviors and/or student learning; others find no such relationship. Methodological controversies (Elashoff and Snow, 1971; Snow, 1969; Thorndike, 1968) and burgeoning literature on the subject have made it difficult to resolve this controversy. Those who reject the notion simply note the methodological criticism leveled at Rosenthal and Jacobson's (1968) Pygmalion in the Classroom, and cite a few studies which fail to support their

thesis,[1] thus dismissing the possibility that teacher expectations might be a factor in differential pupil learning (e.g., Jensen, 1973: 260-64).

Rosenthal and Jacobson clearly stated that they believed that teacher expectation effects were communicated through differential teacher behavior toward the students, but offered only a few general suggestions and no behavioral data concerning underlying expectation effects.

In regard to the lack of data concerning the causal mechanism at the work in the Rosenthal and Jacobson study, Brophy and Good (1970) described a model which presents teacher expectation effects as outcomes of a series of cause-and-effect relationships as follows:

1. Teacher forms differential expectations for student performance during the classroom interaction

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[1]Rosenthal and Jacobson (1968) tested the children in elementary school, using a test that they called the "Harvard Test of Inflected Acquisition" which was actually Flanagan's (1960) Tests of General Ability. They told teachers that on the basis of the test they could predict that certain children, whose names were provided, would demonstrate intellectual "booming" or "spurting" during the year. In fact, the alleged "spurters" were a random sample of about 20 percent of the children in the school. All children were retested with the same IQ test after one semeter, one academic year, and two academic years. Gains in IQ from pretest to one year retest were computed, and "expectancy advantage" was defined by the degree to which IQ gains by "experimental" children exceeded gains by "control group" children. A significant expectancy advantage was found, particularly among children in the first and second grades. While both experimental and control groups gained in IQ points, 47 percent of experimental group children gained 20 or more IQ points, compared to 19 percent of control group children.

2. Teacher begins to treat students differently in accordance with his differential expectations for them
3. Students also respond differently to the teacher because the teacher treats them differently
4. In responding to the teacher, each child tends to exhibit behavior which complements and reinforces the teacher's particular expectations for him
5. As a result, the general academic performance of some children will be enhanced while that of others will be depressed, with changes being in the direction of the teacher expectations
6. These effects will show up in the achievement tests given at the end of the year, providing support for the self-fulfilling prophecy" notion

By this model, Brophy and Good observed the process by which teacher communicate differential performance expectations to different children through dyadic interaction analysis in four first-grade classrooms.

Their findings are interpreted as supportive of the hypotheses of Rosenthal and Jacobson concerning teacher-expectation effects, and as indicative of the behavioral mechanisms involved when teacher expectations function as self-fulfilling prophecies.

The Effects of Induced Expectations

To date more than sixty studies have accumulated which bear directly on the question of teacher expectancy effects. These studies vary considerably, and are divided with respect to whether the expectations were experimentally induced or naturally formed, and with respect to results.

About half of the studies assess the natural expectations of teachers, usually by having them rate or rank their own students in terms of expected academic achievement. Slightly more than half are closer replications of the Rosenthal and Jacobson study, in that they attempt to induce an expectation in the teachers, by manipulating test-score information, by random assignment of pupils to pseudo-ability groups and so forth. Most of these efforts to induce expectations do not measure by expectations directly, but assume that they have been affected by the experimental manipulation.

There are some striking patterns in the findings of studies that measure the effects of teacher expectations. In sixteen studies of natural teacher expectations, only three were not related to cognitive changes in children. On the other hand, the results of induced expectations are very mixed. Of 42 such studies, fifteen report a positive relationship between expectations and cognitive changes, six report mixed results, and 21 indicate no relationship (Persell, 1977: 128). According to the rigorous analysis, only four of the 42 induced-expectancy studies measured whether or not the teacher expectancy had been influenced by the experimenter.

Jose, Goldsmith and Fry (1971) discovered that the majority of teachers did not hold the expectations the experimenter had tried to induce. Anderson (1971) specified that positive cognitive changes were contingent upon changes in teacher expectations. Speilberg (1973), however, suggests that teacher's statements alone may be an inadequate measure of the expectation held, since she found that teachers' statements are not related to their behavior. Thus, teacher expectations may be unaffected by the inducement procedure. Moreover, even if the teachers' stated expectancy changes, that may not modify behaviors. Therefore, the lack of results may be due to the nonexistence of an expectancy state in the teachers.

Some possible explanations of failure to induce expectancies can be summerized as follows:

1. A number of teachers may have been similarly skeptical of research purporting to measure something that will happen in the future. There may be a Rosenthal-Jacobson "sensitizing effect" operating so that many people have heard of the "Pygmalion" study, making it virtually impossible to find naive teacher subjects any longer (Speilberg, 1973).

2. The teacher's skepticism or the effectiveness of an induced expectancy may depend in part upon the teacher's prior knowledge of a pupil. A number of induced-expectancy studies reporting no relationship began in the middle of the academic year, allowing considerable time for teachers to form independent expectations (see, e.g., Caiborn, 1969; Fiedler, Cohen and Feeney, 1971; Gosciewski, 1970; Havline, 1969; Pellegrini and Hicks, 1972).

3. Teacher expectations are not very stable over time (Spielberg, 1973). Even if they are successfully induced at one time, they may be changed with subsequent teacher-pupil interaction.

4. An ethical constraint operates in experimental situations which may reduce the efficacy of induced expectations (see e.g., Seaver, 1973). Ethical concerns have understandably precluded most experimenters from attempting to induce negative expectations in teachers.

5. Teachers' attitudes toward tests score may affect how seriously they value score information (Fleming and Anttonen, 1971; Sorotzkin, Fleming and Anttonen, 1974). Hence, attempts to manipulate expectancies by reporting false test scores may be effective with some teachers and completely ineffective with others, depending upon their attitude toward test results.

Out of 44 induced expectancy studies, there were 18 in which both teacher behaviors and pupil outcomes were measured (Persell, 1977). In most of these studies, there were consistent relationships between teacher behaviors and cognitive outcomes. In eight studies, teacher behavior changed in the direction of the induced expectations, and pupils changed as well. In five studies, teacher behaviors remained constant and pupil test scores showed no significant gains. In three studies, teacher behavior was modified in a way that was consistent with the induced expectations, but pupils showed no change (Brown, 1970; Kester, 1969).

Naturalistic Studies and Process Measures

Otherwise, many studies have attempted to link differential teacher expectations toward particular students with teacher treatment of those students in naturalistic classroom settings. In general, the vast majority of those have produced positive results. However, many are open to the criticism that the differential teacher treatment may simply be reaction to differential student behavior rather than evidence of expectation effects, and all are open to criticism that, lacking product measures, they do not demonstrate that differential teacher treatment produced differential student performance.

Compared to the induced teacher expectations researchers, naturalistic studies have contrasting strength (Brophey and Good, 1974: 78).

1. They do not present the kind of inference problems, since there is no question about the reality of the teachers' expectations
2. An additional advantage is that such studies possess greater potential on which to base generalizations or for external validity than studies involving induced expectations

On the other side, however, naturalistic studies involve two major weakness.

1. There is the trade-off between external validity, or generalizability and degree of experimental control

2. Naturalistic studies provide inference problem of their own. Since the interaction to be studied is neither controlled nor predictable, data collection becomes much more difficult

Despite such difficulties a considerable number of naturalistic studies relevant to the teacher expectation hypothesis have been completed. This will be reviewed below.

A case study by Rist (1970) is largely impressionistic and contains little formal data, involving periodic observation of teacher-student interaction with same group of students. This study is a richly descriptive source of hypotheses about how differential teacher expectations will affect the behavior of teachers and students.

Similar findings were reported by Krantz (1970) and Tyo (1972), who studied teacher's interactions with students whom they perceived as high, average, or low achievers. Significantly different treatment of those groups consistent with the teacher expectancy hypothesis were found for the teaching behaviors of positive appraisal, negative appraisal, and managerial behaviors.

Teacher-student inteaction is five special education classrooms were studied by Willis (1970). Analysis of these data indicated that the teachers provided more verbal response to the students rated as least efficient. These data conform Rosenthal and Jacobson's suggestions that teachers may attend more closely to high expectation students and provide them with more appropriate reinforcement.

The process studies reviewed so far suggest that teachers may interact frequently and/or more positively with high expectation students, pay closer attention to their responses, and reinforce these responses more appropriately. Another process variable apparently related to the communication of expectations has been identified by Rowe (1972), in a series of studies of the length of the time teachers are willing to wait for a student response before prompting, giving answer, or calling on someone else.

According to the Brophy-Good Dyadic Interaction Observation System, currently many others are involved in teacher expectations researches which are intended to find the process and behavioral outcomes in the context of classroom interaction between teacher and students.

This system was originally constructed for the explicit purposes of studying the quantity and quality of interactions that teachers have high with individual students in their classrooms, and of relating these data to naturalistically formed teacher expectations for student performance.

Brophy and Good (1970) showed an example of this type of studies using their own system. The research finding of theirs can be summarized as follows:

> The processes by which teachers communicate differential performance expectations to different children were investigated through observational study of dyadic contacts between teacher and individual students in four first-grade classrooms. Differential teacher expectations for different children were associated with a variety of interaction measures, although many of these relationships are attributable to objective differences of the behavior of the children. However, other

> differential teacher behavior was observed which is not attributable to objective differences among the children and which is consistent with the hypothesis that differential teacher expectations function as self-fulfilling prophecies. The teachers demanded better performance from those children for whom they had higher expectations and were more likely to praise such performance when it was elicited. In contrast, they were more likely to accept poor performance from students for whom they held low expectations and were less likely to praise good performance from those students when it occurred, even though it occurred less frequently. The findings are interpreted as supportive of the hypotheses of Rosenthal and Jacobson concerning teacher-expectation effects and as indicative of the behavioral mechanisms involved when teacher expectations function as self-fulfilling prophecies.

Teacher Expectations and Classroom Interaction

Through the self-fulfilling prophecies such as those described above, teachers' expectations for students affect their interaction with the students, and at the same time affect the psychological reactions of the students. Under the conditions in which teachers' expectations appear to be related to differential behaviors, what do we know about how behaviors varies? Two factors are the frequency or rates of interaction between teachers and students, and the kinds of behaviors teachers show toward different children.

Teachers spend more time interacting with pupils for whom they have higher expectations (Adams and Cohen, 1974; Blakey, 1970; Brophy and Good, 1970; Cornbleth et al., 1974; Given, 1974; Jeter, 1973; Kranz, 1970; Rist, 1970; Rubovits and Maehr, 1973, 1971; Silverman, 1969; Willis, 1969). Different studies are different coding schemes for analyzing rates of instruction. Most frequently used are Bales' interaction analysis, Flanders' interaction analysis, and Brophy and Good's dyadic interaction analysis.

The purpose of the coding scheme is to enhance the observer's reliability in coding behaviors of different frequency and type, including who initates the interaction. For example, Brophy and Good found that students for whom teachers held high expectations were more frequently praised when correct, and less frequently criticized when wrong or unresponsive, than were pupils for whom teachers held low expectations. Similarly, Given (1974) found that high-expectancy students received more of Flanders' various modes of verbal interaction than did low-expectancy students. Rist (1970) observed that the teacher initiated many more interactions with pupils for whom she had higher expectations than with other pupils.

Other studies examine how teacher behaviors differ in the type or quality of interactions (Dalton, 1973; Kester, 1969; Meichenbaum et al., 1969; Parson, 1973; Peng, 1974; Rothbart, Dalfen, and Barrett, 1971). Teachers were more friendly, encouraging, and supportive of students who had been designated as particularly "bright" (Kester, 1969). Meichenbaum et al. (1969) found differences among teachers, with some significantly increasing positive interactions with girls purported to be "late bloomers" and others reducing interactions with these girls. While Parsons (1973) inferred teacher expectations from the achievement level of the classes, he observed that teachers gave somewhat more praise and an acceptance to the better classes, although the differences were not significant.

The code category he termed "the restricting behavior index," measured on the Flanders-Galloway interaction anaysis system, was the most responsible for the differences that he did observe. These results are particularly interesting in light of Bowles and Gintis' (1976) assertion that social-control aspects of schooling are more important than cognitive-learning features. Boles and Gintis suggest that schools serve to recreate the social relations of production by organizing the behavioral requirement of school in different ways for different social classes. While Parsons (1973) does not reflect on his findings in these terms, his work indicates another dimension of interaction that may not be captured in the coding schemes used in studies of classroom interaction.

Socio-psychological Mechanism of Expectancy Effects

Thus the Rosenthal and Jacobson study lends credence to the hypothesis that expectations have a symbolic relationship with achievement. Using other studies, Rosenthal (1973) discussed four social psychological mechanisms by which teachers communicate expectations for student's performance. He based this judgment on his review of 285 studies of interpersonal influence, including at least 80 in classrooms or other natural settings.

1. A general climate factor; consisting of overall warmth a teacher shows to children, with more shown to high-expectancy students.

As a related study, Cooper (1971) found that the amount of eye contact an experimenter showed a subject was related to the subject's feeling

about himself. Therefore, Cooper suggests that primary visual cues may be an important determinant of expectancy transmission. Chaikin et al. (1974) observed that tutors did behave differently toward designated bright students showing greater forward lean, eye gaze, affirmative head nods, and smiles.

2. Feedback: teachers give more encouragement and praise to students for whom they have high expectations.

A feature illustrated by Brophy and Good's (1970) findings described above.

3. Input factor: teachers give to students for whom they have high expectations; they rephrase questions, give more helpful hints to answers than to low-ability students.

As Beez (1970) noted, tutors taught many more words to students they thought were bright than to pupils designated slow. Similarly, presentation of more vocabulary words to students of alleged higher ability was noted by Carter (1969) and by Mcqueen (1970). In natural settings, Martinez (1973) found that teachers spent more time on reading instruction in high-achieving classes than in low-achieving classes.

4. An output factor: a response opportunity factor; students for whom the teacher has higher expectations are called on more often and are given more chance to reply, as well as more and tougher questions.

Robinson (1973) found that teachers made a larger proportion (44 percent) of cognitive demands upon perceived high achievers than upon perceived low achievers (24 percent).

A fifth way, which Rosenthal does not mention, but which has been observed by others, is the different type of curriculum that teachers may present to children for whom they have different expectations. This influential factor of teacher expectations is most pertinent to this study. Peng (1974) found that provision of learning opportunities, extent and degree of assistance, and amount of time, space and materials provided for the class, and willingness exhibited in helping pupils was correlated with perceived pupil problem-solving ability. He measured teacher instructional behavior related to the provision of learning opportunities through the perceptions of pupils. Such ratings may be biased by individual pupil variations. He indicated that positive teacher behaviors may produce student gains only when they occur in an already positive situation with respect to both teacher and student expectations.

Sociological factors also modify a student's susceptibility to teacher expectations. Krupcezak (1972) found that black pupils were more affected by teacher expectations than were white students. Yee (1968) and Baker (1973) suggest that the lower-class students are more vulnerable to teacher expectations than are middle-class pupils. Rosenthal and Jacobson (1968) found that younger children showed more expectancy effects than pupils in higher elementary grades. All these characteristics (race, class, and age) may be viewed as indicators of pupil efficacy.

The consequences of teacher expectations for pupil achievement appear when those expectations are strongly held and are related to modified teacher behavior in teaching process. Specifically, students exhibit more cognitive gains if teachers teach more and show more warmth toward them. Pupil personality characteristics, including sensitivity to verbal communication of emotions, internal locus of control, and self-expectations, seem to interact with teacher expectations with attendant consequences for cognitive gains.

The expectations held by members of a school social system are brought into play by the self-fulfilling prophecy. If teachers, principals, and other members of the school social system hold high expectations for students, they are likely to create a program that is consistent with this expectations and in which students learn what is expected. If, on the other hand, some students are expected to learn less than others, they will tend to conform to those expectations.

Teacher Expectations about Mastery Procedures

How can teacher expectations be related to the use of mastery strategies and related procedures? There are not direct literatures in this subject. On the basis of the previous researches in this area, we can find some relevant references for this study.

The mastery procedures begin with the expectation that each student can reach the level of performance defined as acceptable for competence. In contrast, average-based procedures may encourage teachers and students to begin an instructional program with the expectation that some students will achieve very well, but others will be only moderately successful and still others will be minimally successful at best (Bloom, 1968). These expectations are important

when they influence teachers' behavior toward students, students' willingness to persist and self-confidence. To this end, the mastery procedures clearly define activities the student is to perform as he works toward mastery.

Since the research investigating affective consequences associated with the mastery model is rather sparse to date, additional research relevant to the conditions associated with mastery model implementation is considered herein. For this purpose, the study has two assumptions related mastery model implementation.

1. Teachers form expectations concerning how their students will perform. Even when in appropriate, these expectations affect teachers' behaviors and evaluations toward student performance, as well as students' opportunities to attempt difficult instruction.

2. Evaluations of students' academic performance determined by their teachers and communicated directly and frequently to the students were significantly related to student's self-concepts in academic areas, expectations concerning future performance and motivation.

The proposition that teachers typically do not expect most of their students to master the curriculum objectives were supported in the investigation by Good and Dembo (1973), in which 162 in-service teachers were asked to estimate the percentage of their students whom they expected to "really master the material" that they intended to teach. More than one-half of the teachers expected fewer than 50 percent of their students to master the material. Expectations that 95 percent or more of the students would demonstrate mastery were reported by more than 6 percent of the teachers.

Results of one series of investigations, conducted by Okey (1974, 1975, 1976), Okey and Ciesla (1975), and a second series conducted by Anderson, et al. (1975) indicated that mastery model implementation was associated with highly positive teacher expectations concerning student performance. Okey and Ciesla developed an inservice teacher-training module to teach the basic mastery philosophy and procedures to preservice and inservice elementary and middle school teachers. This module, which requires from 7 to 10 hours of instructional time, employs a slide-tape or filmstrip-tape format with an accompanying manual containing objectives and practice exercises. The manual includes self-tests with answers for each of the seven sections, as well as a pretest on prerequisites in a project section.

Mastery Model Strategy

Mastery learning is a philosophy about teaching. Mastery is the name of a model used to structure curricula. It asserts that under appropriate instructional conditions, virtually all students can and will learn well most of what they are taught. The roots of this philosophy go back several hundred years. But only in roughly the last decade have teaching strategies been developed whereby it might be feasibly implemented in the classroom.

Learning for Mastery (LFM) is a group-based, teacher-paced approach to mastery instruction, wherein students learn, for the most part, cooperatively with their classmates (Block and Burns,

1976: 4). Through this chapter, the underlying philosophical basis of LFM and related research will be reviewed.

The Theoretical Basis for LFM

The theoretical basis for the strategy was provided by a conceptual model of school learning developed by John B. Carroll (1963, 1965). Carroll's model proposed that if each student was allowed the time needed to learn the subject to some criterion level, and if he spent the necessary time to do this, then he would probably attain that level.

In other words, the degree of school learning will depend on the time the student actually spent in learning in relation to the time he needed to spend. The complete Carroll's model can be represented with its relevant components as follows:

$$\text{Degree of School Learning} = f\left(\frac{\text{Time Spent}}{\text{Time Needed}}\right)$$

$$= f\left(\frac{\text{Perseverance or Opportunities}}{\text{Aptitude + (Quality of Instruction x IQ)}}\right)$$

In brief, the degree of school learning of a given subject depended on the student's perseverance or his opportunity to learn, relative to his aptitude for the subject, the quality of his instruction, and his ability to understand this instruction.

Benjamin Bloom (1968) transformed this conceptual model of school learning into a working model for mastery learning by the following logic. If aptitude were predictive of the time a student would require to learn, it should be possible to fix the degree of

school learning expected of each student at some criterion level of mastery performance. Then, by attending to the variables under teacher control in Carroll's model, such as "the opportunity to learn" and the "quality of instruction," the teacher should be able to ensure that student's attain this level.

In accordance with this logic, Bloom suggested the outline for the original LFM strategy. Some of the basic features of this outline have been summarized by McNeil (1969:308).

1. The learner must understand the nature of the task he is to learn and the procedure he is to follow in learning it.

2. Formulation of specific instructional objectives for the learning task is important.

3. It is useful to break a course or subject into small units of learning and to test at the end of each unit learning.

4. The teacher should provide feedback on the learner's particular errors and difficulties after each test.

5. The teacher must find ways to alter the time some individuals need to learn.

6. It may be profitable to provide alternative learning opportunities.

7. Student effort is increased when small groups of two or three pupils meet regularly for as long as an hour to review their test results, and to help one another overcome the difficulties.

Block and Anderson (1975) have refined and elaborated upon this outline, so as to make Bloom's ideas more systematic and practical.

Mastery Learning Research

To date, numerous studies related to LFM have been based on Carroll's model and Bloom's LFM strategies. Most part of these studies are concerned to the cognitive effects of mastery learning rather than the affective components. In addition, mastery learning strategies were mainly applied to treat the individual variance than to group-based interaction in many previous studies. Accordingly many of these studies were contributed to define the individual characteristics such as the learning rate, aptitude and cognitive styles. Some of them involved extensive investigations of the curriculum components of LFM strategies. Most instructional research has been weak, historically, in terms of measuring the dependent variables and in specifying the experimental treatments, especially the control treatments.

Block and Burns (1976) recently conducted a thorough review of mastery learning research. They described four types of LFM studies.

The early Type 1 studies tended to be fairly restricted in scope. They were executed in basic courses that were required and structured, and that emphasized convergent thinking (Bloom, 1971). The objectives to be taught for mastery were typically drawn from introductory textbooks. The recent type 1 studies, however, have become broader. They are being executed in courses that are intermediate or advanced, elective, loosely structured or nonstructured and amenable to divergent thinking. Moreover, the objectives to be

taught for mastery are being formulated from wider range of curricular materials. And these objectives are increasingly asking the student to perform "higher order" cognitive behaviors, such as application, synthesis, and analysis (Block and Tierney, 1974; Ware, 1976).

The Type 2 research focused on the affective consequences of learning for mastery. The affective consequences of mastery strategies have been studied under a range of conditions, though certainly under a more limited range than their cognitive consequences. Many studies in this type of research indicated that mastery approaches have typically elicited more favorable affective responses from students than their nonmastery counterparts and, in some cases, significantly more favorable responses. In particular, the mastery strategies have had a positive impact in students' interest in and attitudes toward the subject matter learned, academic self-confidence, attitude toward cooperative learning and so on (Anderson, 1976; Block, 1972; Jones et al., 1975).

The Type 3 studies used the complexity of the research design and precluded a detailed treatment of each study and its findings. Such treatments of number of studies already appear in several sources: Block and Burns (1975), Bloom (1976), Johnston (1975), and Ruskin (1974).

The fourth Type of research is attempting to translate what has been learned about why mastery learning strategies work into detailed statements of how they can be implemented. This new trend has concentrated on the development and dissemination of better

teacher-training programs and materials. Okey and Ciesla (1975) have developed a self-instructional module on teaching for mastery at the elementary and junior high school levels; and Anderson and Block (1976) have prepared a chapter on teaching educational psychology for mastery at the college level.

Okey and Ciesla's mastery teacher-training module has evolved over the last five years under the auspices of first the national center for the improvement of educational systems. The module is designed to train preservice and inservice elementary and middle-school teachers in basic mastery teaching areas such as identifying and sequencing instructional objectives, developing evaluation measures, identifying learning difficulties, prescribing instruction and measuring learning outcomes. The teacher training did have some positive effects on student achievement, though Okey was able to gather usable data for only about two-thirds of his 40 planned mastery vs. nonmastery comparisons.

Brookover and his associate (1977) developed the teacher-training module for mastery learning at the elementary level. This program focused on the change of school learning climate related to mastery model implementation. The module consists of ten subcategories which were based on their research findings from the school learning climate project (1977).

These include modules on the following:

1. School Learning Climate
2. Expectations and Mastery Learning
3. Group Learning Games

4. Grouping and Differentiation
5. Use of Evaluation
6. Parental Involvement
7. Academic Engaged Time
8. The Role of Principal
9. Individual Reinforcement Principles
10. Teacher Commitment and Student learning

These module provides an interplay between relevant school norms and expectations concerning learning objectives, teaching-learning environment, appropriate teaching behaviors and practical activities.

The Effects of Mastery Model Implementation

It has been proposed that one of the primary advantages associated with mastery model implementation is a change in teacher expectations concerning student performance (Bloom, 1968). The mastery philosophy asserts that most students in a classroom can master the basic skills and knowledge in instructional settings in which the mastery components are implemented (Bloom, 1971; Carroll, 1971).

Generally, the mastery model consists of six or seven components: objectives, preassessment, instruction, diagnostic assessment, prescription, and post-assessment. Simply, these procedures can be applied as a repeated learning process of Teach-Practice-Test-Reteach-Retest.

Mastery studies have also begun to explore the impact on student learning and study behavior of nearly every component of

mastery strategies. These components and examples of studies considering them are:

1. Instructional objectives and study questions: Bassett and Kibler (1974), Bowen and Faissler (1975), Burrows and Okey (1975), Collins (1970), T. Levin (1975), and Semb (1975).
2. Learning-Unit size: Born (1975), O'Neil et al. (1975) and Semb (1974).
3. Unit pacing: Coldeway et al. (1974), Robin and Graham (1974).
4. Unit social organization: Caponigri (1972), Ware (1976).
5. Unit feedback instruments: Blackburn, Semb, and Hopkins (1975), Malott (1971), Semb (1975).
6. Unit mastery requirement: Anderson (1973); Block (1972, 1973), Calhoun (1973), Davis (1975).
7. Unit correctives: Block and Tierney (1974), Burrows and Okey (1975), Collins (1970), Lee et al. (1971).
8. Course grading policy: Johnston and O'Neill (1973), Sheppard and MacDermot (1970), Whitehurst and Whitehurst (1975).

While these components have been shown to have some independent and interdependent effects on student learning or study behavior, it has been the unit mastery requirement that has

consistently produced the strong effects. Also many of these mastery component studies are associated with the Type 3 research mentioned above.

In investigating the effectiveness of mastery teaching, Okey and Ciesla (1975) used this model components to train 20 preservice and 20 inservice teachers. Pretest data indicated that although the teachers were unfamiliar with mastery philosophy and procedures, the mastery model had been implemented in some of the model components.

This study begins with an assumption that the implementation of mastery learning strategies may have different effects under the differential teacher expectations, evaluations and academic norms. As mentioned above, the implementation of a mastery model cannot be an exception from this premise. Other investigations have demonstrated that implementation of the mastery model is associated with positive attitudes of teachers and favorable attitude for mastery curricula (Okey, 1976; Anderson, 1976).

In sum, many of these results indicate that implementation of the mastery model is associated with higher teacher expectations for student performance and more favorable attitudes toward the curricula.

From the mastery implementation view point, we have two keys to the cultivation of mastery model strategies: one is dissemination of mastery ideas and practices to more preservice and especially inservice teachers. The other key is the development of better mastery teacher-training materials. Such materials might result from comprehensive product evaluations of the materials that are already

on the market. There have been a few such studies to date: Harrison and Harrison (1975) and Lee et al. (1971), and Kim et al. (1970).

One of the larger implementations of mastery has been conducted in Korea under the direction of Hogwaon Kim (1970), and Young Dug Lee (1971). The best example of the power of Bloom mastery learning strategies to affect student achievement was conducted by Kim and Kim (1969). This pilot study used group based mastery procedures for teaching students in secondary schools. They taught 272 seventh graders in an eight-session learning unit on simple geometric figures. The students were randomly assigned to two groups. Half of the students learned under mastery conditions and the other half learned using the lecture-recitation approach. Two groups were comparable in terms of their IQ's and past achievement in mathematics. The result indicated that 75 percent of the mastery learning students, compared to only 40 percent of the nonmastery learning students, were able to attain the mastery criterion of a score of at least 80 percent correct on the final exam.

Based on these results of pilot study, Kim et al. (1970) proceeded to expand this mastery learning program. In the next study, 5,800 seventh graders, coming from nine middle schools in Seoul, were taught mathematics and English over an eight-week period. The same experimental procedures were used as in the pilot study. Once again their findings favored the mastery learning treatment. In English, 72 percent of the mastery learning students compared to 28 percent of the nonmastery students reached the 80 percent mastery

criterion. In mathematics the figures were 61 percent versus 30 percent respectively.

The third project involved teaching mathematics, English, physics and biology to more than 25,000 middle school students from rural and urban schools during an entire academic year. The results brought thousands to the attainment of mastery criteria. Lee et al. (1971) replicated Kim's procedures in elementary schools.

CHAPTER IV

PROCEDURES AND METHODOLOGY

The research design for the study is presented in this chapter; the sampling population is thoroughly described with an overview of the study; the instrumentation employed is operationally defined and the data collection process presented. Also included will be the hypotheses stated in testable form, and the data analysis techniques explained and justified.

The proposed research can be best described as causal-comparative research. Isaac and Michael (1977: 22) state that causal-comparative research is appropriate in many circumstances where the more powerful experimental method is not possible and when the following conditions are present:

1. When it is not always possible to select, control, and manipulate the factors necessary to study cause-and-effect relations directly.
2. When the control of all variations except a single independent variable may be highly unrealistic and artificial.

Samples and Sites of Research

The population for this study consisted of elementary school teachers in an urban industrial school district with similar

community characterisitcs, student racial composition, school patents' socioeconomic status, and teacher racial composition in school.

School/Community Type

As part of the Michigan State Assessment of School program, the Michigan Department of Education had collected data on socio-economic status level, racial composition of schools, and achievement level from every elementary school in Michigan. According to previous research data (Brookover, et al., 1978), several elementary schools were selected for this study. Actually these schools are involved in this research project (School Climate Project) on a voluntary basis. Selected schools were paired with regard to similarities in socioeconomic status level and racial composition.

All six schools sampled in this study are located at the urban industrial fringe within a large city of the southeast Michigan. There are 24 elementary schools. As a result of a busing program, these schools contain a similar racial composition of student bodies (about 70 percent Black and about 30 percent White). The majority of school parents are working class and of low socioeconomic status. And the achievement levels of the schools in this district were below the state average.

Because of these educational problems, the school administrative authorities are seeking to improve achievements. As a part of such efforts, the School Climate Project was introduced into the school district by Dr. Wilbur Brookover, et al. (1977) with

cooperation of the Michigan Department of Education and the school district authority. The schools in the present study were involved in this project.

Sample Procedures

According to the results of pretests of the Basic Skills Assessment Program (BSAP Test) provided by the School District of the City during the 1978-79 school year, six schools showed a comparable achievement level of reading and mathematics. In the grade level achievement, a few schools revealed slightly above the mean of fifty, and a few other schools attained slightly below the mean of fifty.

The BSAP tests consists of a series of grade level objectives represented in both reading and mathematics. They are designed to measure the performance of students over a set of instructional objectives identified by the instructional staff as representative of the reading and mathematics skill levels to be attained by the normal students at each grade level. The selection of schools was based on the voluntary and cooperative participations. For the try-out of the school climate project, three schools were participated in 1977-1978 school year. Nine schools cooperated in the project during the 1978-79 school year. Among nine schools, six schools were used for data analysis by research design, three lower grade level schools and three upper grade level schools.

As part of teacher training program, the teacher's manual for School Climate Activities Training was delivered to individual

teachers, and the regular in-service training were given to sampled school teachers by trained research assistants during the school academic year.

There was variation in training progress among schools. In a few schools, the school principals organized the training program and gave a regular in-service training to the teaching staff over the period. At the remaining schools, the teaching staff had a regular seminar session three times weekly by trained research assistants. The training activities were conducted during the academic year in 1978-1979.

The six schools employed in this study were all of low and similar socio-economic status and student racial composition, and comparable to teacher racial ratio in general. Also the mean achievement score of these six school buildings were slightly below the state standard mean scores. The sample unit is the school building, and the subjects of sampling are all grade level teachers in sampled schools. The total samples consisted of 88 elementary school teachers. Table 1 presents the characteristics of schools selected for the study.

Instrumentation

The instrument used in this study is part of a major research project to improve School Learning Climate, directed by Dr. Wilbur B. Brookover (Appendix A). This questionnaire contained over 60 items designed to elicit attitudes, perceptions and activities associated with classroom teaching-learning behaviors. The

TABLE 1.--Characteristics of Schools Selected for the Study

School	Grade	S.E.S.	Achievement* Level (pre-test)	No. of Teachers
A	4, 5, 6th	Low	52.15	15
B	1,2,3,4,5th	Low	51.10	15
C	5, 6th	Low	48.72	12
D	1, 2, 3th	Low	50.07	15
E	1,2,3,4th	Low	45.30	15
F	5, 6th	Low	48.54	16
Total			49.31	88

*This score indicates the aggregated mean of reading and mathematics in Basic Skills Assessment Tests

questionnaire was developed in the fall of 1977, and the pre-test was administered to check for needed revisions at a few elementary schools which were involved in the research project mentioned above. This resulted in the elimination or rephrasing of several items.

Data Collections

Teacher data were collected by a staff of three who were participated in during the 1978-79 academic year. The teacher questionniare was administered in each school by the project staff at the end of the 1978-1979 school year. Nearly all of the teachers in sampled schools responded. A small number of teachers, never more than three or four in the same school, refused to complete the questionnaire.

The pre- and post-tests of the district's Basic Skills Assessment Program (BSAP Test) were administred to all grade level students within the project schools at the beginning and the end of the academic school year under the sponsorship of the School District of the City. The student achievement test scores on the BSAP tests were reported by the research department of the School District of the City of Pontiac.

Coding of the questionnaire data was done by the staff, including the writer, during the summer of 1979 at the Center for Urban Development under the supervision of Dr. Brookover. In many cases, all questionnaires were retained. Data were key punched and verified by the Data Processing Office at the Computer Lab of Michigan State University.

Major Variables

The basic instrument is the Teacher Climate Questionnaire (Appendix A). The total instrument is divided into subscales. This section will present the operational definition of each of these variables with included scales.

Teacher Climate Variables

Teacher climate refers to the present and future perceptions of the school and students held by the teaching staff in school. These variables include the teacher perceived expectations and evaluations, and teacher perceived academic norms for student performance. The overall measurement of teacher climate is consisted of three subscales as follows:

1. Expectations for mastery achievement.--This is defined as the teachers' perceived expectations of how many of their students they believe are capable of mastering the basic academic skills at grade level. The scale consists of three multiple-choice items. High value in the scale is indicated by a low score on all items. To facilitate analysis, low scores were all linearly transformed to their high score equivalents. Each item scored from one to five (Appendix A-1).

2. Evaluations of academic ability.--This indicates the teachers' present evaluations in respect to their students' ability in academic tasks compared with others in their school or other school students. This scale consists of three multiple-choice items. Each item scored from one to five. To facilitate analysis, low scores were all linearly transformed to their high score equivalents (Appendix A-1).

3. Teachers' academic norms (expectations for ability).--Norms can be defined as the "general expectation of a demand character for all role memebers of an organization." Therefore, academic norms of the school means the demand within the school for academic performance as reported by the school members. This is operationally defined as the degree to which teachers perceive that there is a concern among themselves regarding student ability and achievement within school, as measured by two multiple-choice items. Each item scored from one to five. To facilitate analysis, low scores were all linearly transformed to their high score equivalents (Appendix A-1).

Instructional Condition Variables

These variables refer to the practical classroom teaching-learning activities and behaviors, and teachers' curriculum planning. The measurement consists of four subscales as follows:

1. Group learning games.--This is defined as the group-based competition game to facilitate peer help learning and motivation for practice within group, and to provide the opportunities for active self-involvement in classroom learning activities. The scale consists of three open-ended items and four multiple-choice items (Appendix A-2).

2. Reinforcement practice.--This refers to the teacher's corrective and feedback activities regarding students' correct or incorrect answers during classroom instruction. These activities include both positive and negative reinforcements, and are presented in the verbal form or in a written form. The scale consists of two multiple-choice items and four attitude measuring items which scored from one to five. High value in the scale is indicated by a low score on all items. To facilitate analysis, low scores were all transformed to their high score equivalents (Appendix A-3).

3. Study grouping.--This indicates the small size of student learning groups to promote the peer cooperative climate among group members. Basically, there are two types of grouping: homogeneous vs. heterogeneous grouping. These two types of groups can be formed differently, according to subject matters and the difficult level of

learning tasks. Homogeneous grouping is formed on the basis of student academic ability, and heterogeneous grouping is typically randomly assigned. The scale consists of five open-ended items (Appendix A-4).

4. Staff planning and support.--This refers to the frequencies of staff communication, and meeting for curriculum planning and evaluations at grade level or within school building. The scale consists of four multiple-choice items (Appendix A-5).

Mastery Model Strategy

Several components of the mastery model have been identified in a somewhat different fashion, but the following are the essential ones:

1. Specification of instructional objectives
2. Identifying sequential learning units
3. Presentation of entire class instruction
4. Student practice and exercise
5. Formative or diagnostic testing
6. Reinstruction and supplemental activities
7. Summative evaluation testing

On the basis of these seven steps to implement mastery strategies into classroom instruction, Block and Anderson (1975) have refined and elaborated upon this outline, so as to make Bloom's idea more systematic and practical. In relation to their practical strategies, this study is mainly concerned with three components of mastery teaching as follows (Appendix A-6).

Planning for Mastery

This refers to the grade level planning for introducing new objectives and frequencies of introducing new objectives in the subjects of reading and mathematics. The scale consists of five items to measure the planning for instructional objectives in terms of basic skills, subject units, and individual differences.

Tutoring/Team Study

This strategy is interrelated with the above-mentioned grouping. This is defined as a type of small-group study sessions, and considered a group presentation/involvement strategy. The "faster" learner can tutor the "slow" learner by cooperatively helping each other. Students are encouraged to attempt cooperative small group (two or three persons) study.

Reteaching/Enrichment Strategy

Reteaching is a "group presentational" corrective. It is used to reteach particular material in a unit to a group of students who had difficulty with this material. Using the test results (formative test) the teacher certifies those students who have achieved the unit mastery standard and identifies those who have not. This strategy helps ensure that both the "faster" and "slower" learner are exposed to as much course materials as they would encounter. The faster learners are free to engage in enrichment activities, and the slower learners are asked to use supplementary materials through the reteaching procedures.

These three teaching strategies for mastery are measured by four open-ended items and one multiple-choice item.

Implementation Process Variables

To measure overall effects of the mastery implementation over the whole school social system, some relevant criterion measures are employed in this study. This measure refers to the aggregated sum of rating by two trained research staff, including the writer, regarding the responses of questionnaire items such as mastery strategies, group learning games, and reinforcement practice.

The evaluation categories are modifications of Hall and Loucks (1977: 266): A conceptual model for assessing the extent of implementation in the social system of a school. This model can be used to measure the level of use of the innovation in schools. The evaluation criteria employed in this study are divided into three subcategories: individual knowledge, individual utilization, and system orientation.

Each category is scored from one to four. The reliability coefficients were obtained using coder agreement percentage computation--Agreement = 1 - (A-B/A+B) developed by Good and Brophy (1973). Inter-rater reliabilities ranged from .78 to .92 on the overall level of subcategory scales. The definitions of the categories in the indicators of change in social system are as follows:

1. Individual Knowledge

Nonawareness: The user has little or no awareness of or knowledge of the innovation or educational practice.

Awareness: The user has become aware of the innovation or practice, and displays minimal understanding of the concepts and its relation to the goals of the program.

Knowledgable Understanding: The innovation or practice is thoroughly conceptualized and accurately related to program goals and objectives.

Re-evaluation: The user focuses on new and refined knowledge and more effective understanding of the innovation or practice to improve the present situations.

2. Individual Utilization

Nonuse: State in which the innovation or practice is not utilized, and the individual has no involvement with the program.

Mechanical Use: State in which the user focuses most effort on the short-term, day-to-day use of the innovation with little time for reflection.

Routine Use: State in which the innovation or practice is stabilized. Use is reasonably consistent with guidelines, and few changes are occurring in day-to-day routines. But little or no emphasis is given to improving the practice or effecting better results.

Refinement/Renewal: The user modifies and improves the program based on client needs performance. Alternatives incorporated are consistent with the philosophy of the innovation.

3. System Orientation

Resistence: The individual (teacher) actively interferes with or passively resists efforts to implement the innovation or practice. A negative state develops concerning the program and/or its goals.

Individual Use: The individual adopts the program and is consistent in daily usage. But the user is an autonomous member of the social system who does not or will not share information or practice with other members in his/her social system.

Informal Sharing: The network of sharing is limited to cliques, and does not reach all members of the staff. But this happens in an informal setting which is not officially prescribed. There is no pressure to adopt the program or practice in general.

Collective Use: The staff cooperatively agrees to and participates in the innovation or practice. Both informal networks of sharing and formal organization prescriptions support the program. Pressure to conform to the collective practices become positive reinforcement and negative sanctions.

Assessment of Student Achievement

Academic achievement refers to the level of performance which the school or child has demonstrated in academic subjects. The main academic tests used in this study are the Basic Skills Achievement Program (BSAP tests) in the subjects of reading and mathematics. These tests were made by the School District of the City of Pontiac for the 1978-79 school year. The BSAP tests are criterion-reference

tests. These instruments measure the performance of students over a set of instructional objectives identified by members of the school district staff as the measure of the skill levels to be attained by the students.

The analysis of student achievement was based on the mean achievement for each grade level in each school. The number of grade level objectives varied from 23 to 26 in reading, and from 17 to 25 in mathematics. Each objective through all grade levels contained three items equally. The mastery level is decided when the students passed certain objectives for which three of three items were answered correctly. General mastery level was accepted as 75 percent achievement of given objectives.

Statistical Analysis of Data

Several kinds of statistical analysis for hypothesis testing are used in this study. A null form for each of testing hypotheses is stated along with suitable statistical procedures.

Testable Hypotheses

The following null and alternate hypotheses will be used to test the relationship between variables in each hypothesis.

Associational Relationship Between Teacher Climate and Instructional Conditions on Academic Achievement

1. H_0: There is no significant interrelationship between teacher climate and instructional conditions to explain the student achievement.

   H_1: Teacher climate and instructional condition variables are positively related to the student academic achievement.

2. H_0: There is no significant difference in degree of prediction of student achievement between teacher climate measure and other instructional measures.

   H_2: Among associational school climate measures, teacher climate score will be a more powerful predictor of the student achievement than will instructional conditions.

<u>Relationship Between Teacher Expectations-Evaluations and Provision of Instructional Conditions</u>

3. H_0: There is no significant difference in the use of group learning game between schools with higher teacher expectations-evaluations and with lower expectations-evaluations.

   H_3: Schools high in teacher expectations-evaluations score will use group learning more frequently than schools with low teacher expectations-evaluations.

4. H_0: There will be no significant difference in the level of reinforcement practice between schools with higher teacher expectations-evaluations and schools with lower expectations-evaluations.

   H_4: Schools high in teacher expectations-evaluations will be more favorable toward group corrective reinforcement than schools with lower expectations-evaluations.

5. H_0: There is no significant difference in use of group learning game and reinforcement practice between upper grade levels and lower grade levels.

   H_5: Group learning game will be used more frequently for the lower grade levels than the upper grade levels. And the reinforcement practice will be used more frequently for upper grade levels than for the lower grade levels.

6. H_0: There is no significant difference in grouping type of group learning game between schools with higher teacher expectations-evaluations and schools with lower expectations-evaluations.

   H_6: Schools high in teacher expectations-evaluation will be more favorable toward mixed grouping of group learning game than schools with lower expectations-evaluations.

Associational Relationship Between Teacher Climate and Use of Mastery Learning Strategies

7. H_o: There is no significant difference in staff planning for introducing Basic Skills Achievement Program (BSAP) objectives between schools with higher teacher climate and with lower teacher climate.

   H_7: Teacher climate (expectations, evaluations and academic norms) will be significantly associated with the school staff planning for the BSAP objectives: Schools high in teacher climate will introduce the BSAP objectives more frequently than will the lower climate schools.

8. H_o: There is no significant difference in the level of school staff communication for mastery planning between schools with higher teacher climate and schools with lower climate.

   H_8: Schools high in teacher climate will have more principal-teacher joint planning for mastery strategies than will the lower climate school.

9. H_o: There is no significant difference in the level of use for corrective mastery strategies (team study, reteaching, tutoring, etc.) between teachers with higher mastery expectations and those with lower mastery expectations.

   H_9: Teachers with high expectations for mastery will use more alternative correctives for mastery strategies than will the teacher with lower expectations.

10. H_o: There is no significant difference in the grouping of mastery learning between upper grade level schools and lower grade level schools.

   H_{10}: The lower grade level of schools will be more favorable to the whole group instruction (mixed grouping) than will the upper grade level schools.

Teacher Climate, Instructional Conditions and the effects of Mastery Model Implementation

11. H_o: There will be no significant difference in the use of mastery implementation modules between schools depending on the level of teacher climate score.

H_{11}: Schools high in teacher climate score will use relatively more training modules for mastery teaching than will the schools with the lower levels of teacher climate.

12. H_0: There is no significant difference in the degree of mastery implementation effects between schools depending on the level of teacher expectations for student mastery.

H_{12}: Schools high in teacher expectations for mastery will show higher degree of mastery implementation effects regarding teacher knowledge and utilization for mastery learning, and group learning game and reinforcement practice than will the schools with lower levels of teacher expectations for student mastery.

Statistical Analyses

For hypotheses testing, several kinds of statistical analyses methods are employed in this study.

Since a primary hypothesis concerns the relative contribution of teacher climate and instructional variables in mean school/grade achievement, a series of multiple regression analyses was carried out on each sample of schools (Hypothesis 1 and 2). The purpose of the multiple regression analyses is to assess the unique contributions of climate and instructional variables to prediction of school mean achievement. This multicollinearity among independent variables cannot be eliminated.

To test the difference between the two groups of variables mean scores, one-tail t-tests was employed. The hypotheses related to the relationship between teacher climate and instructional conditions (Hypothesis 3, 4, 5 and 7) were suitable to this method. The t-tests assume the samples are drawn from populations with normal

distributions and that variances are equal. The former assumption cannot be verified in this study because this study takes a representative sample. Thus, a significance level is decided by t-value from separate variance estimate.

Cumulative responses to open-ended questions and organized categories from sub-groups of teacher classified on the basis of climate and instructional variables were compared by use of the chi-square statistic. More than a third of the quesions in the research instrument were constituted with categorical forms and coded by categorical responses. The chi-square statistic is used to test for significant difference for any number of variables in a contingency table. The results yield only the understanding of whether or not a difference exists between the categorical variables. For the hypothesis testing of associational relationship between teacher climate and mastery strategy use, mainly a chi-square statistic was used in hypotheses 6, 8, 9, 10 and 11.

Significant differences in responses were noted, and in cases of significance involving more than two sub-groups, a one-way analysis of variance (ANOVA) was performed in Hypothesis 11 and 12 partially. The use of an ANOVA test requires the assumptions of normality, equality of variance and independence. This study has some limitation in this assumptions.

Additionally, simple correlation and multiple correlation coefficients were computed in Hypothesis 1.

For all the statistical tests, the 5 percent (.05) level of significance was selected in this study.

CHAPTER V

RESULTS

This chapter, which presents the results of the study in the context of each hypothesis, is divided into two sections. First, the hypothesis will be stated followed by the specific results for that hypothesis. Some detailed statistical analysis tables will be found in Appendix B. This is done in an attempt to make the chapter more readable.

A summary of all scale means and standard deviations in this study is reported in Table 2. In Table 2, the pre- and post-test score indicates the means of the standard scores of the School District. And the number of cases in achievement scores represent the group of elementary grade levels in six schools sampled in this study.

In Table 1, Chapter IV, we can find that the mean achievement score on the pre-test is slightly below the District standard mean achievement. Also the mean pre-test scores in reading and mathematics, in Table 2, are below the District standard mean of fifty. But the post-test scores in both subject are increased slightly above the standard mean of fifty. There are differences among post-test scores between schools and grade levels. The rank order correlations between pre-test and post-test are -.18 in reading and 0.2 in

mathematics. We notice that the observed correlations between pretest and post-tests are not significant in both subjects. We also notice that the increased post-test scores of six schools are not correlated to the pre-test scores in both subjects, and it is negatively related in mathematics between pre- and post-test.

The teacher climate scores indicates the combined mean score of teacher expectations and evaluations scales. Other subscales of the study indicate average mean scores based on 88 indivdiual teachers' responses.

All hypotheses were tested using the .05 alpha level with the appropriate degree of freedom.

TABLE 2.--Means and Standard Deviations of Dependent and Independent Variables

Variables		Mean	S.D.	No. of Cases
Reading	pretest	49.36	1.76	19
	posttest	50.96	1.52	19
Math	pretest	49.26	2.06	19
	posttest	51.68	1.99	19
Combined teacher climate scores		23.52	7.63	88
1. Achievement expectations		5.89	2.54	88
2. Mastery expectations		10.90	4.06	88
3. Ability evaluations		6.73	2.35	88
Group Learning Games		8.14	5.51	88
Reinforcement		17.15	3.88	88

Hypothesis 1: Teacher climate and instructional condition variables (group learning game, reinforcement practice) are positively related to the student academic achievements.

This hypothesis was tested by examining the correlations between teacher climate and instructional conditions variables, and student achievement. As the dependent variables, the measure of final achievement in mathematics and reading were used. In this study, post-test achievement was considered to be equivalent to achievement gain, since the score on the pre-test was close to the standardized mean of fifty. Thus, post-test achievement and achievement gain in this study are the same. Total number of grade levels in sampled schools has been included in the analysis because the total number of groups of grade levels was limited to 19 units.

The achievement scores represent the grade mean achievement of Basic Skill Achievement tests. For the analysis, the mean scores of the grades were used in this study. Thus the correlations would be smaller than the other cases which used individual achievement scores.

The simple and multiple correlations of teacher climate and instructional condition variables with achievements are shown in Table 3. The table is divided in such a way as to show comparisons between Mathematics and Reading achievement. We notice that the simple correlations are all significant at either .05 level or .01 level in Mathematics. In Reading, the correlations are not significant in all variables. The teacher climate variables show the similar relationships to total achievement. We also notice that

TABLE 3.--Correlations between the Grade Means on the School Learning Climate Variables and Mean School Grade Achievement

Variables	Post-Test Achievement		Total Achievement
	Mathematics	Reading	
Teacher Climate	.58**	.22	.50**
1. Achievement Expectations	.44*	.15	.37*
2. Mastery Expectations	.52*	.21	.46*
3. Ability Evaluations	.52**	.28	.56**
Group Learning Games	.54**	.23	.21
Reinforcement Practice	.40*	.12	.24
Multiple R	.69	.43	.51

*p < .05
**p < .01
***p < .001

NOTE: The following convention for level of significance is used throughout the chapter: .05 level = *; .01 level = **; and .001 = ***.

three correlation coefficients fall well within the significant range in mathematics. The teacher climate group learning game and reinforcement practice show less relationship to Reading. But the multiple correlation explains more than 50 percent of the variance in total achievement and explains about 70 percent of variance in Math.

It is important to emphasize that the signfiicant relationship between climate variables and achievement holds in combined subjects. But an associational relationship between school climate variables (teacher climate plus instructional condition variables) and achievement was found in Mathematics achievement. It is concluded that all three categories of teacher climate variables are significantly related to achievement in Mathematics, while none of three variables are significantly related to Reading achievement. One possible explanation for this discrepancy can be made in terms of the subject matter itself. Reading is relatively non-sequential in nature and covers broad content areas such as spelling, vocabulary, language art, comprehension, etc. Therefore, it may be more difficult to select the objectives for criterion measures. In addition, Reading may include a great variation of learning activities from one classroom to another and from one school to another. The group learning games and reinforcement practice are also highly correlated to the math achievement but not to the reading achievement.

Since it was found in Hypothesis 1 that the school learning climates are significantly related to Mathematics achievement, it is

TABLE 4.--Step-wise Regression Analysis with Teacher Climate, Group Learning Game, and Reinforcement Practice as Independent Variables and Math Achievement on Dependent Variables

Step No.	Variable Entered	Simple r	Multiple R	R^2	R^2 Change	Signifi.
1	Teacher Climate	.58	.58	.33	.33	.009**
2	Reinforcement Practice	.40	.60	.36	.03	.028**
3	Group L. Game	.54	.69	.47	.11	.020*
1	Teacher Climate	.58	.58	.33	.33	.009**
2	Group L. Game	.54	.68	.46	.13	.007**
3	Reinforcement	.40	.69	.47	.01	.020*
1	Group L. Game	.54	.54	.29	.29	.018*
2	Reinforcement	.40	.59	.34	.05	.035*
3	Teacher Climate	.58	.69	.47	.13	.020*
1	Group L. Game	.54	.54	.29	.29	.018*
2	Teacher Climate	.58	.68	.46	.17	.007**
3	Reinforcement	.40	.69	.47	.01	.020*
1	Reinforcement	.40	.40	.16	.16	.090
2	Teacher Climate	.54	.60	.36	.20	.028*
3	Group L Game	.58	.69	.47	.11	.020*
1	Reinforcement	.40	.40	.16	.16	.090
2	Group L. Game	.54	.59	.34	.18	.035*
3	Teacher Climate	.58	.69	.47	.13	.020*

of interest to determine which variables influence achievement more positively.

Hypothesis 2: Teacher expectations and evaluations measures are a more powerful predictor of student academic achievement than insturctional condition measures.

In Hypothesis 1, we can find that the teacher climate, group learning games and reinforcement practice variables are significantly related to mathematics achievement. These variables have been demonstrated to have predictive significance for achievement measures. All three variables are highly related to achievement in Mathematics, and this achievement score is used as a criterion to test Hypothesis 2 in this study.

Since this hypothesis concerns the relative contribution of teacher climate and instructional condition variables to differences in mean school achievement, the multiple regression analysis was carried out on all sample schools. In an attempt to test this hypothesis, the variables of teacher climate, group learning game, and reinforcement practice were entered into a step-wise multiple regression analysis, with academic achievement as the dependent variable. The results of step-wise regression analysis are found in Table 4.

To assess the unique contributions of three variables to the prediction of school mean achievement, three step-wise multiple regression analyses were employed. In the first regression analysis, the mean teacher climate of school was entered as a set into the multiple regression analysis, followed by reinforcement practice and group learning game variables. In the second analysis, the group

learning game and reinforcement practice variables were entered prior to the teacher climate variables.

About one-half of the variance in mean achievement between schools is explained by the combination of three variables. In three step-wise regression analysis, most of the explained variance in mean achievement between schools is attributable to the teacher climate variables. More than 33 percent of the total variance in mean school achievement is explained by teacher climate variables, after controlling two instructional variables. About 29 percent and 16 percent of the total variance in mean school achievement are explained by group learning game and reinforcement practice, after controlling the teacher climate variables.

When reinforcement and group game variables are entered second, they add only 3 and 13 percent (after teacher climate variables) to the explained variance in mean achievement. But when teacher climate is entered second, it adds 17 percent (after group game) and 20 percent (after reinforcement practice).

In the second part of the analysis, the teacher climate variables showed 13 percent of the added variance to the explanation of the mean school achievement over and above both instructional variables such as group learning game and reinforcement practice.

Teacher climate variables explain a very significant additional amount of the variance after the effect of reinforcement practice has been removed. About 18 percent of the total variance is explained by the teacher climate. When the reverse process is

used in the multiple regression analysis, the mean group learning game adds 13 percent to the explained variance after the effect of the teacher climate variables has been controlled (Appendix B-1).

Brookover, et al. (1978) found in their state representative sample study that the climate variables were powerful predictors of mean school achievement. This previous study indicated that more than 60 percent of explained variance is attributable to the climate variables. The result of this study also is very consistent with the previous research findings. But this study has a limitation of smaller number of climate variables.

By examining these findings we see that teacher climate variables do add significantly ($p < .01$) to the predictive power of two instructional variables. We are able to conclude that teacher climate is a significant variable, over and above the variables of group games and reinforcement practice, in prediction of academic achievement.

In addition, we can find the unique contribution of three climate variables to the prediction of school mean achievement between upper grade levels schools and lower grade level schools. In Appendix B-1, about four-fifths (78 percent) of the variance in mean achievement in lower grade level schools is explained by the combination of three variables, while only 23 percent of variance is explained in upper grade level schools.

In three step-wise multiple regression analysis, more than 60 percent of variance in mean Mathematics achievement between lower

grade schools is explained by teacher climate variables after controlling two instructional variables. And 56 percent and 41 percent of total variances in mean Math achievement between lower grade schools are explained by group learning game and reinforcement practice, after controlling the teacher climate variables. The unique contribution of the three variables are all significant at the level of either .01 or .05 in lower grade level schools. But in the upper grade level schools, the unique contribution of the three predictor variables does not reach a significant level between schools.

In lower grade level schools, when reinforcement practice and group learning game are entered as the second step, they add less than .1 percent variance after teacher climate variables to the explained variance in mean Mathematics achievement. But when teacher climate is entered second, it adds 33 percent after reinforcement and 12 percent after group learning game. So we are able to conclude that the teacher climate variables are more powerful predictor over the instructional variables in mean Mathematics achievement within lower grade level schools, but not in upper grade level schools (see Appendix B-1).

Hypothesis 3: Schools high in teacher expectations-evaluations score use the group learning games more frequently than those with low teacher expectations-evaluations.

Hypothesis 4: Schools high in teacher expectations-evaluations show more favorable attitudes toward group corrective reinforcement practice than do those with low expectations-evaluations.

Both Hypotheses 3 and 4 will be investigated by examining the means and standard deviations of high and low teacher expectations-evaluations scores. The high group was identified as showing above mean teacher expectations-evaluations scores, and low groups as showing below mean teacher expectations-evaluations scores of total samples.

The mean, standard deviations, and analysis of variance result among six sampled schools are shown in Table B-2, Appendix B. According to this table, the mean teacher climate scores of three schools rank below the total mean of six schools, and three schools rank above the total mean score. Thus each group included three schools.

Table 5 contains the mean,standard deviations, and correlated t-tests for using group learning game and corrective reinforcement practice between two groups. We can see in Table 5 that the higher expectations-evaluation group was also high in mean scores of group learning game, and reinforcement practice in comparison to low or expectations-evaluation group. In use of the group learning games, the high expectations-evaluations group shows much smaller standard deviations compared to the lower expectations group.

In reinforcement practice, we can see also that there is a significant difference of mean scores between the two groups, but standard deviations are not much different between groups. By observing the t-tests in Table 5, we can assume that there is a significant difference in using group learning game depending on the

TABLE 5.--Means, Standard Deviations, and T-tests for Use of Group Learning Game and Reinforcement Practice between Schools with High and Low teacher Expectations-Evaluations

Groups	N*	Mean	S.D.	T-Value	Significant Probabilities
Use of Group Learning Game					
High in Teacher Expectations-Evaluations	46	17.98	1.71	2.07	.044*
Low in Teacher Expectations-Evaluations	42	16.23	5.21		
Use of Reinforcement Practice					
High in Teacher Expectations-Evaluations	46	9.52	5.94	2.57	.012*
Low in teacher Expectations-Evaluations	42	6.62	4.61		

*N indicates the number of responded teachers.

levels of school climate as measured by teacher, evaluation expectations. It means that schools with high teacher expectations-evaluations on academic performance would use group learning game more frequently than would the counterparts of these schools (t-value = 2.07, $p < .05$).

Also we can see that schools with high teacher expectations-evaluations show more positive attitudes toward group corrective reinforcement compared to the counterparts of these schools (t-value = 2.57, $p < .02$). As a result, we can conclude that the teacher expectations-evaluations are strongly related to the use of group learning game and reinforcement practice in classroom instruction.

In details, the complete analysis of variance and contrasts among six schools are found in Table B-3 and Table B-4, Appendix B.

<u>Hypothesis 5</u>: Group learning games are used more frequently for the lower grade level schools than for the upper grade level schools. Also reinforcement practice is used more frequently for the upper grade level schools than for the lower grade level schools in elementary schools.

As with Hypotheses 3 and 4, this hypothesis will be examined by a simple t-test of correlated sample. Table 6 contains the means, standard deviations, and t-tests for the group learning game and reinforcement practice between lower grade schools and upper grade level schools.

TABLE 6.--Means, Standard Deviations, and T-tests for Use of Group Learning Game and Reinforcement Practice between Upper Grade Schools and Lower Grade Schools

Groups	N*	Mean	S.D.	T-Value	Significance
		Use of Group Learning Game			
Upper grades	43	16.30	4.39	1.93	.033*
Lower Grade Schools	42	17.96	3.16		
		Use of Reinforcement Practice			
Upper Grade Schools	43	7.86	5.81	1.21	.650
Lower Grade Schools	42	8.40	5.27		(N.S.)

*N indicates the number of responded teachers.

For the analysis, the lower grade level schools included grade one to grade three, and the upper grade level schools contained grade four through grade six. Among six sampled schools, three schools were classified as lower grade level schools and the other three schools as upper grade schools. The lower level schools contained two fourth grade and one fifth grade, but for the analysis, these three teachers' data were eliminated.

At the first part of Table 6, we can see that there is a significant difference in use of group learning games between two grade levels (t-value = 1.93, $p < .05$). But we can find also that there is no significant difference of mean score in the use of reinforement practice between two grade level schools (t-value = 1.21, $p < .1$).

This test revealed that the lower grade level schools used the group learning game more frequently than the upper grade level schools did, but there was no significant difference for use of reinforcement practice between two sets of schools. They are comparable in the use of group corrective reinforcement practice.

This hypothesis does not come from a concrete theoretical basis. It is an exploratory step for further research. But in the present study, it is assumed that in human development stages, the younger children are easily motivated to engage in the game situations than are the older children. Also the game situations can possibly be related to the learning behaviors for them.

But the reinforcement practices are accompanied by more cognitive related responses from children than are the game activities.

In other words, reinforcement practices are given to induce cognitive adjustment in the process of teacher's feedback on a particular question. Therefore, the older children can respond more sensitively than the younger children.

Hypothesis 6: Schools high in teacher expectations-evaluations are more favorable toward mixed grouping for group learning game than are those with lower expectations-evaluations.

This hypothesis is tested by using the chi-square statistical test of relationship among variables. A .05 level of significance was selected. The responses of this hypothesis were formed as related categories, the chi-square tests are a powerful and suitable method to test this hypothesis. Rejection of a null hypothesis involving two or more groups of respondents is indicated by a chi-square value or F ratio larger than the maximum acceptable at the .05 level of error. This is indicated in the tables of this study by listing the calculated X^2 or F-ratio followed by $p < .05$. This means that the probability of the observed differences between the groups in question may occur due to chance alone less than 5 percent of the time.

To test Hypothesis 6, descriptive data in terms of frequency counts and percentage of each response are shown in Table 7.

Responses to the question totalled 79, consisting of 44 respondents (55.7 percent) in the high expectations schools group compared to 35 respondents (44.3 percent) from the low expectations schools. In both groups, the largest response was about the mixed ability grouping. Other responses in both groups revealed smaller

TABLE 7.--Relationship Between the Grouping Formation for Group Learning Game and the Level of Teacher Expectations-Evaluations

( ) = %

Grouping Formation	High Expectations-Evaluations Schools	Low Expectations-Evaluations Schools	Total
Mixed Ability	38 (48.1)	29 (36.7)	67 (84.8)
Similar Ability	2 (2.5)	1 (1.3)	3 (3.8)
Student Self-select	1 (1.3)	4 (5.1)	5 (6.4)
Others	3 (3.8)	1 (1.3)	4 (5.0)
TOTALS	44 (55.7)	35 (44.3)	79 (100)

Chi-Square = 3.361
d.f. = 3
Significance = .339 (N.S.)
No respones = 9

proportions through three categories. A cross-tabulation analysis was done, employing the chi-square statistical test for relationship. The chi-square value was 3.361 with a resulting significance of .339. Thus no significant relationship between the grouping method of group learning game and the level of teacher expectations ensued. The null hypothesis cannot be rejected in Hypothesis 6.

This indicates that no significant difference exists among the grouping methods of group learning games, depending on the level of teacher expectations-evaluations for student achievement.

Hypothesis 7: Teacher expectations-evaluations is highly associated with the staff planning for Basic Skills Assessement Program (BSAP objectives): Schools high in teachers expectations-evaluations introduce the BSAP objectives more frequenlty than do lower expectations-evaluations schools.

To test this hypothesis, the same method and procedures for classifications of groups in Hypothesis 3 were applied here. Table 8 contains the means, standard deviations and t-test for introducing BSAP objectives between two different teacher expectations-evaluations groups. In average mean score of introducing BSAP objectives, the high expectations-evaluations group indicates almost twice as much as the lower expectations-evaluations group. But the difference of standard deviations between two groups is small.

TABLE 8.--Mean, Standard Deviation and T-test for Introducing Mastery Objectives (BSAP Objectives) between Schools with Higher and Lower Teacher Expectations-Evaluations

Groups	N	Mean	S.D.	T-Value	Significance
High Expectations-Evaluations	46	8.61	4.75	4.07	.001***
Low Expectations-Evaluaitons	42	4.98	3.59		

The mean difference between two groups reveals that there is a significant difference in introducing BSAP objectives between high expectations-evaluations schools and low expectations-evaluations schools (t-value = 4.07, $p < .001$). Thus, the null hypothesis is rejected. We can conclude that schools with high teacher expectations-evaluations plan BSAP objectives more frequently on the basis of school staff cooperation than do schools with low teacher expectations-evaluations. The BSAP objectives can be identified as a type of

mastery learning criterion and used for measurement of mastery levels in this school buildings sampled in this study.

> <u>Hypothesis 8</u>: Schools high in teacher expectations-evaluations adapt more principal-teacher joint planning for mastery strategies than do the lower teacher expectations-evaluations schools.

This hypothesis is investigated by using the chi-square test of relationship among response categories. General procedures for testing hypothesis were employed as in Hypothesis 6. A .05 level of significance was selected. This hypothesis is concerned with the relationship of the mastery curriculum planning according to the level of teacher expectations-evaluations. Four categories of mastery curriculum planning are employed: principal scheduled, staff scheduled, joint schedules, individual teacher scheduled, and others. The crosstabulation test of relationship between high and low teacher climates is presented in Table 9. A large difference in response between the two groups was found in two categories. The low expectations group showed a higher proprotion of staff planning (about 26 percent), while the high expectations group represented a higher proportion of principal-staff joint planning (about 14 percent). Other categories were comparable between two groups. A chi-square test resulted in a chi-square value of 17.93, with a significance level of less than .01. This result indicates that for mastery curriculum high expectation schools focused on the principal-staff joint planning, but low expectation schools stressed on staff-oriented planning.

TABLE 9.--Relationship Between the Level of Teacher Expectations by Schools and the Status of Curriculum Planning for Mastery Objectives ( ) = %

Planning Status	High in Expectations-Evaluations	Low in Expectations-Evaluations	Total
Principal Schedules	4 (4.60)	5 (5.74)	9 (10.34)
Staff Scheduled	12 (13.79)	22 (25.59)	34 (39.08)
Principal and Staff joint scheduled	28 (32.18)	11 (12.64)	39 (44.83)
Individual Teacher Schedules	0	3 (3.4)	3 (3.4)
Other	2 (2.30)	0	2 (2.30)
TOTAL	46 (52.8)	41 (47.13)	87 (100.0)

Chi-Square = 17.93
d.f. = 4
Significance = .0064**
No response = 1

Hypothesis 9: Schools high in mastery expectations use more alternative correctives for mastery strategies (team study, tutoring, and reinstruction, etc.) than schools with lower mastery expectations

Schools sampled in this study can be divided into two groups according to their mastery expectation scores. The higher mastery expectations group was identified as showing a greater than mean mastery expectations score of teaching and the lower group is indicated as showing below the mean expectations score of total sampled teachers. This hypothesis attempts to ascertain if there is a significant relationship between school teachers' perception of

mastery expectations and the alternative use of correctives as mastery strategies. The analysis of relationship tabulation is presented in Table 10.

TABLE 10.--Relationship Between Teacher Mastery Expectations and Use of Correctives as Mastery Strategies ( ) = %

Mastery	High Expectations	Low Expectations	Total
Mastery Model Use	8 (14.81)	10 (18.52)	18 (33.33)
Team Study/Tutoring	9 (16.67)	2 (3.70)	11 (20.37)
Diagnostic Test	2 (3.70)	3 (5.56)	5 (9.26)
Reinstruct/Enrichment	7 (12.96)	2 (3.70)	9 (16.67)
Use Contests	0	4 (7.41)	4 (7.41)
Teach until Mastery Charting Individual Progress	5 (9.26)	1 (1.85)	6 (11.11)
Other	1 (1.85)	0	1 (1.85)
TOTAL	33 (61.11)	21 (38.89)	54 (100.0)

Chi-Square 14.33
d.f. = 6
Significance .045*
No Responses 34

The high mastery expectations group showed a high proportion (16.7 percent) in response to the team study (tutoring) category compared to lower mastery expectations group (3.7 percent). Also the higher mastery expectations group differs in proportion of reinstruction category (about 13 percent) from that of lower mastery

expectation group. But in the category of total mastery model use, both groups were comparable in their responses and their proportion. This model indicates the seven steps mastery learning model.

Over-all, about two-thirds of subjects responded (54 respondents). The chi-square analysis of relationship was found as $X^2 = 4.33$ with the accompanying level of significance of .045. Thus a significant relationship between the level of teacher mastery expectations and the use of alternative mastery correctives ensued. We can conclude that teachers with high mastery expectations use more alternative mastery correctives than do teachers with low mastery expectations. The number of no responses in the low expectation group (21 persons) is much larger than in the high expectation group (13 persons).

<u>Hypothesis 10</u>: The lower grade level schools are more favorable to the whole group instruction for mastery learning (mixed grouping) than are the upper grade level schools.

The procedure of group distinctions was the same as Hypothesis 6. The lower grade level schools consists of first, second, and third grades. The upper grade level schools includes from fourth grade to sixth grade. To test the hypothesis, the chi-square statistical analysis was employed.

The cross-tabulation test of relationship between the grade levels and the study grouping pattern for mastery learning is presented in Table 11. The responsed categories were organized by responses of open-ended question, and the over-all numbers of respondents reached only 55 persons.

TABLE 11.--Relationship Between Mastery Teaching Grouping and Grade Levels

Grouping Types	Mathematics		Total
	Lower Grade Schools	Upper Grade Schools	
Mixed Ability	3 (5.5)	2 (3.6)	5 (9.1)
Whole Group Instruction (Group Reinstruction Necessary)	24 (45.6)	9 (16.4)	33 (62.0)
No Grouping	3 (5.5)	6 (10.9)	9 (16.4)
By Achievement Level	0	1 (1.8)	1 (1.8)
Other	1 (1.8)	6 (10.9)	7 (12.7)
	31 (56.4)	24 (43.6)	55 (100.0)

Chi-Square 13.00
d.f. = 5
Significance .033*
No Responses = 33

In the lower grade level schools, whole group instruction showed a greater proportion than other categories (45.6 percent). Otherwise, in upper grade level schools, whole group instruction reveals 16.4 percent, and other categories showd dispersed responses. Both groups indicated a higher proportion in the whole group instruction category, but the lower grade level schools attained higher proportions than the upper grade schools. A chi-square test of analysis resulted in a value of 13.00, and with a significance level of .033. Thus, we can indicate that the lower grade level schools

are more favorable to forming the mixed group or whole group for mastery teaching than the upper grade level schools.

Hypothesis 11: Schools high in teacher expectations-evaluations score show a higher proportion of the use of teacher training modules than do schools with lower levels of teacher expectations-evaluations.

As mentioned in Chapter IV of Procedures and Methodology, this study employed 10 modules for teacher training of mastery learning which were developed by Dr. Brookover and his associates (1978). The frequency and percent of module use between the two groups are presented in Table 12. Each module was responded to by yes-no dichotomy categories, thus chi-square statistical test was used in the analysis.

TABLE 12.--Relationship Between Implementation (Training) Modules and the Level of Teacher Expectations-Evaluations

Implementation Modules	Frequencies of Response		X^2
	High Expectations-Evaluations Schools	Low Expectations-Evaluations Schools	
Module 1	24 (52.2)	5 (11.9)	.0002***
Module 2	31 (67.4)	14 (33.3)	.002**
Module 3	23 (50.0)	15 (35.7)	.256 (NS)
Module 4	18 (39.1)	7 (16.7)	.036*
Module 5	17 (37.0)	12 (28.6)	.542 (NS)
Module 6	14 (30.4)	4 (9.5)	.030*
Module 7	19 (41.3)	5 (11.9)	.004**
Module 8	9 (19.6)	3 (7.1)	.166 (NS)
Module 9	10 (21.7)	2 (4.8)	.045*
Module 10	22 (47.8)	5 (11.9)	.0006***

Through 19 modules, the higher expectations group showed a higher proportion of using each module compared to the lower expectations groups. Particularly in module 1 (The School Learning Climate), module 2 (Expectations and Mastery Learning), and Module 10 (Teacher Commitment and Student Learning) a great difference between the two groups is revealed.

To simplify this result, Figure 3 indicates a clear contrast with each module by comparison of two groups. The highest use of module was revealed as module 2 (67.4 percent) followed by module 1 (52.2 percent) and module 3 (50 percent) in higher expectations groups. In contrast, the lower expectations group showed high proportions of module use in Module 3 (35.7 percent), module 2 (33.3 percent) followed by module 5 (28.6 percent).

Except for modules 3, 5, and 9, a significant difference was found in seven modules between two groups. In general, we can indicate that the higher expectations-evaluations teacher is more positive toward mastery training modules in contrast with the lower expectations-evaluations teacher.

> Hypothesis 12: Schools high in teacher expectations-evaluations have a higher level of mastery implementation effects in terms of teacher knowledge, use, and system orientation of mastery learning and instructional strategies (group learning game and reinforcement practice) than do schools with low mastery expectations.

This hypothesis will be investigated by examining the means, and standard deviations of two groups of schools with different expectations and evaluations scores. Two groups were divided according to teache expectations-evaluations measures which were presented

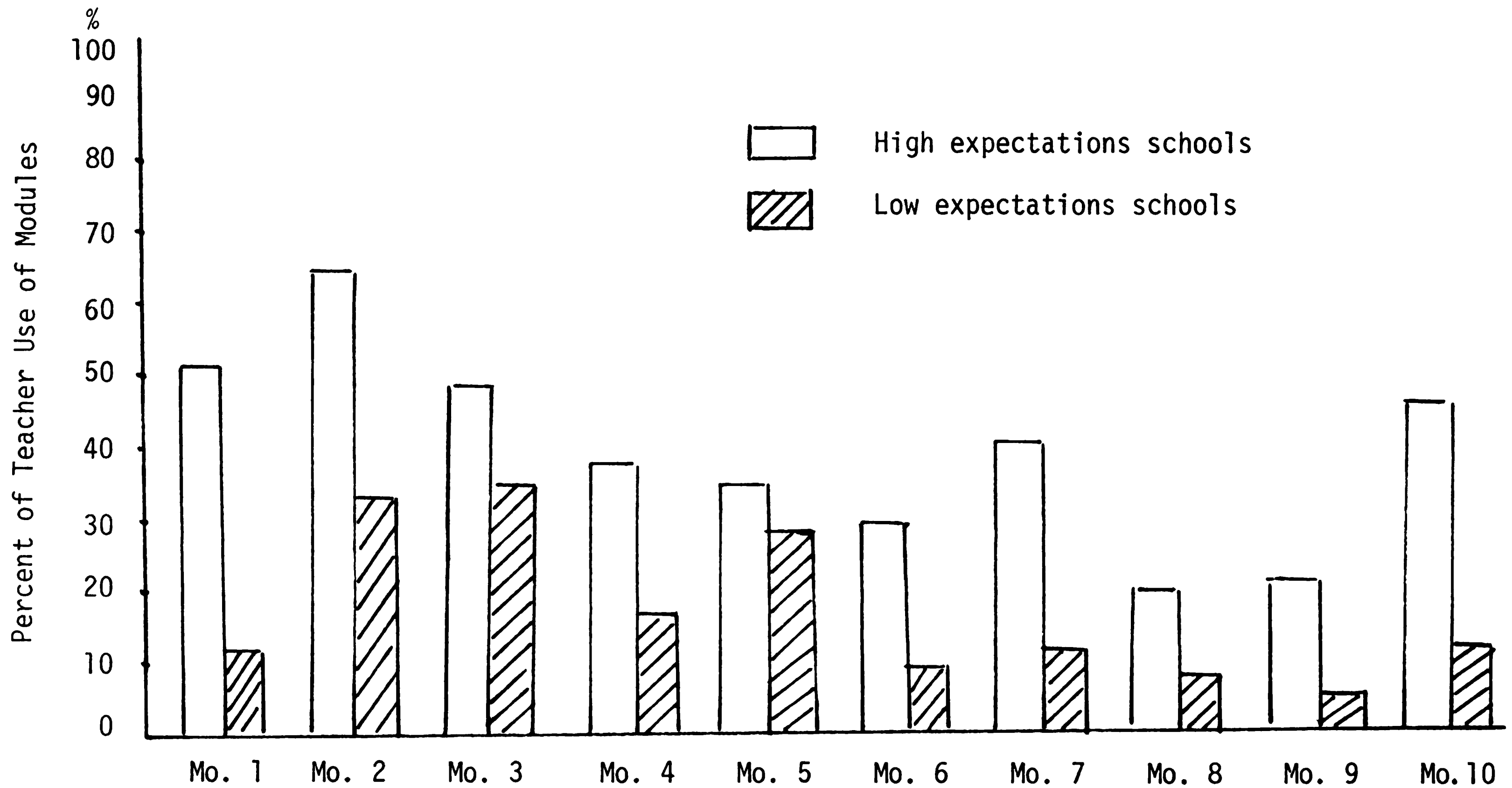

Figure 3.--Percent of Teachers Use of 10 Training Modules Among Schools with High Expectations-Evaluations and Teachers with Low Expectations-Evaluations.

in Table 1. The schools with higher expectations was identified as ranking above the mean expectations-evluations score. The schools with lower expectations-evaluations was identified as ranking below the mean teachers expectations-evaluations score of the total sample.

The mean, standard deviations of two groups are shown in Table 13. For hypothesis testing, t-tests and analysis of variance mehtods were employed. First, to test the mean difference between the groups t-values were calculated in three subcategories related to hypothesis. Each subcategory score represents the sum score of three subscales such as Knowledge, Use, and System Orientation variables. The detailed t-test results of each subscale (9 subscales)

TABLE 13.--Means, Standard Deviations, and T-tests for the Mastery Implementation Effects of Mastery Strategies, Group Learning Game and Reinforcement Practice between High and Low Expectation Groups

	Mastery Strategies			Group L. Game		Reinforcement Prac.	
	N	Mean	S.D.	Mean	S.D.	Mean	S.D.
High Expectations-Evaluations	46	5.52	1.94	6.00	1.49	5.17	1.37
Low Expectations-Evaluations	42	4.33	2.18	4.78	1.88	4.14	1.56
T-Value		2.67		3.34		3.29	
Significance		.009**		.001***		.001***	

were presented in Table 14. Among nine subcategories, only Reinforcement Knowledge reveals no significant difference between the two different groups of expectations-evaluations schools. The other eight implementation factors indicated that there are significant differences in implementation effects between low and high expectations-evaluations schools, with a significance level from .05 to less than .01 in Table 14. When we summarize these results into three implementation criteria, these three categories also indicated that there is a great difference between the two different expectations-evaluations groups of schools in their implementation effects shown as in Tables 15, 16, and 17.

When we summarize the three implementation factors, the results of analysis of variance shows a very significant difference in the mean scores between groups through all three implementation factors. Table 15, 16, and 17 presents the results of ANOVA for three implementation effects between high and low mastery expectations groups.

We can find that the level of knowledge, use, and system orientation for mastery module implementation reveals a significant difference between the two groups with a significance value of less than .01 in all three factors. And these results are positively related to high mastery expectations group.

In relation to Table 13 and 14, we can conclude that the teachers with higher mastery expectations use the group learning game and reinforcement practice more positively for mastery strategy

TABLE 14.--Means, Standard Deviations, and T-tests for Mastery Implementation Effects of Mastery Learning, Group Learning Game and Reinforcement Practice Between High and Low Teacher Expectations-Evaluations

Variables	High Expectation		Low Expectation		T-Value	Significance
	Mean	S.D.	Mean	S.D.		
Mastery Strategies						
Knowledge	2.07	.80	1.45	.63	4.00	.009**
Use	1.98	.73	1.33	.75	3.58	.050*
System Orientation	1.78	.72	1.21	.73	4.39	.007**
Group Learning Game						
Knowledge	1.93	.77	1.42	.77	3.08	.003**
Use	2.26	.68	1.88	.77	2.44	.017*
System Orientation	1.80	.45	1.48	.59	2.89	.005**
Reinforcement Practice						
Knowledge	1.48	.69	1.31	.68	1.15	.252
Use	1.98	.57	1.45	.59	4.21	.001***
System Orientation	1.72	.59	1.38	.58	2.89	.005**

TABLE 15.--Analysis of Variance for the Level of Knowledge of Implementation Model by High vs. Low Expectations Groups

Source	d.f.	SS	MS	F-Ratio	Prob.
Between Groups	1	26.83	26.83	8.20	.005**
Within Groups	86	281.53	3.27		
Total	87	308.36			

TABLE 16.--Analysis of Variance for the Level of Use of Implementation Model by High vs. Low Expectations Groups

Source	d.f.	SS	MS	F-ratio	Prob.
Between Groups	1	35.82	35.82	10.92	.001***
Within Groups	86	282.13	3.28		
Total	87	317.95			

TABLE 17.--Analysis of Variance for the Level of System Orientation of Implementation Model by High vs. Low Expectations Groups

Source	d.f.	SS	MS	F-ratio	Prob.
Between Groups	1	24.24	24.24	12.00	.0008***
Within Groups	86	173.66	2.02		
Total	87	197.90			

than do the teachers with lower mastery expectations and, in turn, this classroom phenomenon of teaching affects teacher awareness (knowledge) and readiness of utilization for mastery learning strategies. Both of these efforts result in a more favorable climate of mastery implementation as a part of the school system orientation or changes.

The Effects of Mastery Implementation on Achievement

Finally, this study attempts to examine the percent of students mastery attainment of the 75 percent criterion level in

each grade level. To determine the overall effects of mastery implementation on the students mastery achievement, an additional hypothesis was established as follows:

> Hypothesis 13: Schools with higher levels of mastery implementation effects produce a higher level of students mastery achievement than do schools with lower levels of mastery implementation effects.

As examined in Hypothesis 2, we can see that higher expectations of teachers bring forth better achievement, and also it results in a positive effect on the implementation of mastery strategy in classroom learning. Thus, this hypothesis focused on the combined effects of teachers' climate and mastery strategy on student mastery attainments between grade levels and between subject matters.

This hypothesis examined the tendency of student mastery attainment by grade levels depending on the levels of mastery implementation effects. Figure 5, Appendix B, reveals the general trends of mastery achievement in each grade level. In Figure 5, we see two interesting trends. First, students in lower grade level schools exhibit a tendency to reach higher mastery achievement in both areas of subject matter compared to those in upper grade level schools. But students in the third and fourth grades reveal a lower proportion of mastery achievement than do those in other grade levels. Secondly, in Math the slope of the mastery proportion line shows a tendency of decline until fifth grade, while in Reading it shows a tendency of decline until fourth grade. In regard to the mastery levels in Mathematics a higher tendency to achievement is revealed in the grade

levels in comparison with the upper grade levels. But in Reading the upper grade levels have a higher mastery tendency compared with the lower grade levels.

The mastery level, in this study, is estimated as the percentage of students who mastered 75 percent of the objectives on the Basic Achievement Skills Program (BASP) administered by the School District. Each objective contained three items, and the mastery of each objective was decided when students answered three of three items correctly at the posttests.

The mastery percentage of each grade levels between two expectations-evaluations groups are shown in Table 17. These scores indicate the mean percentage of grade students who mastered 75 percent of the objectives on that instrument.

TABLE 17.--The Percentage of Grade Mastery Levels Between High and Low Expectations Schools

Score = %

Grade	Reading			Mathematics		
	Low-Exp.	High-Exp.	Mean	Low-Exp.	High-Exp.	Mean
1	45.3	48.5	46.5	63.1	70.0	67.6
2	45.0	67.2	59.8	50.7	81.5	71.2
3	29.0	31.4	30.6	58.3	64.5	61.3
4	5.2	6.1	5.7	33.5	37.1	35.3
5	26.1	36.5	30.6	9.8	15.8	13.4
6	30.2	42.1	38.1	31.0	37.4	35.3

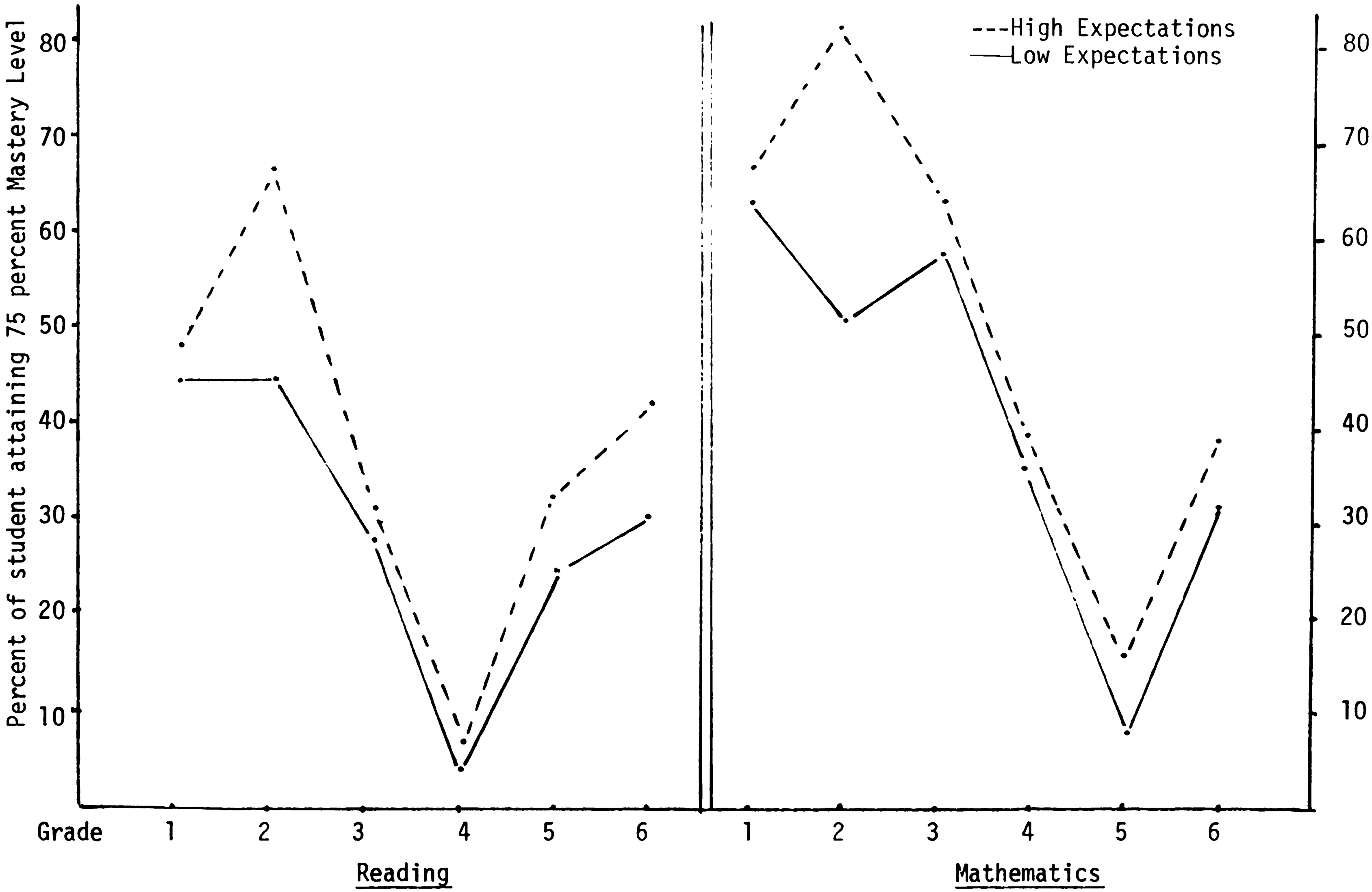

Figure 4.--Student Mastery Levels Between High and Low Expectations Schools

These mastery trends of each grade levels between two different expectations group can be more easily seen by looking at Figure 4.

When we look at Figure 3 we see that in Reading and Mathematics the slope lines of grade mastery reveal the similar curve. There is a general trend over the two subject matters (Reading and Mathematics) for the high expectation schools to yield higher mastery achievement ratios through all grade levels in comparison to the low expectations schools. The greatest difference in mastery achievement between two expectations groups is shown at second grade in both subject matters.

In conjunction with Hypothesis 12, it would seem that higher expectation schools bring forth more mastery implementations effects, which, in turn, are highly associated with the extent of mastery achievement through all grade levels in general. In other words, the teachers' higher expectations for student mastery performance significantly related to the positive effects on mastery implementation, which affect the higher rate of student mastery achievement at all grade levels.

CHAPTER VI

SUMMARY AND CONCLUSIONS

This chapter of the study is presented in three sections. The first section is a summary of the study containing a statement of the problem investigated, the instrument and methodology. A summation of the findings and the resultant conclusions make up the second section. The third and final section contains some implications of the results, and recommendations for further research.

Summary of the Study

The study was designed to investigate how teachers' instructional climate and instructional conditions interrelate to bring forth mastery implementation which, in turn, is associated with student academic achievement. Teacher climate, in this study, is defined as a part of school learning climate, and consists of teacher expectations, evaluations, and academic norms of school.

Specifically, this study intended to examine the relationship between the teachers' instructional climate and classroom instructional conditions with regard to student academic achievement, and to investigate how teachers' climate is associated with the provision of instructional conditions, and finally, to investigate how the climate variables and instructional conditions are interrelated with mastery model implementation.

The basic assumption of the study is that mastery model strategy and its implementation will bring the differential effectiveness under different teacher climate and instructional conditions.

The research model underlying this study is a combination of the social interaction theory of learning and the practical work of mastery model strategy. Brookover's social-psychological conception of learning is mainly concerned with the school learning climate, which is determined by the aggregate attitude, beliefs, norms, and expectations in a school social system. Bloom's and Block's practical work of mastery model strategy is basically concerned with the appropriate learning conditions in which virtually all students can learn well. Both of Brookover's and Bloom's theoretical conceptions for mastery approach were largely related to the proper or appropriate environmental conditions or situations. In this sense, they deal with the same purpose from a different approach. Both of them focused on the creation of the appropriate learning conditions, either through the change of school learning climate, or through the control of instructional environment.

Referring to these two mastery model approaches for school learning, the undelying theory of the study is primarily concerned with the extent of how the perceptual model of learning can be interrelated to the structual model of learning through the classroom interaction mechanism. Thus the basic theme of the model in this study is that the degree of school learning would be a function of the quality of teaching (instructional conditions) and the learning climate which is determined by the aggregate norms, expectations and

evaluations held for various members of the group. Thus, the model is based on the group-based interaction and instructional conditions, and the effectiveness of group dynamics on achievement. In other words, the study model stated that the teachers' climate, which is defined as expectations, evaluations, and academic norms, is causally interrelated with the instructional conditions and use of mastery strategies in a given learning situation and affects the extent of mastery model implementations (knowledge, utilization, and system orientation) and, in turn, that these interactions will be related to the student achievement.

To investigate these problems, it is generally hypothesized that the differential teachers' climate is associated with the differential use of mastery strategies. Simply, it means that teachers with higher expectations-evaluations use the mastery related strategies and procedures to a greater degree than teachers who hold lower expectations-evaluations about student performance. Also, it affects mastery modle implementation as well as student outcomes.

The sample of the study consisted of 88 elementary school teachers from six schools in a urban industrial school district with similar community characteristics, student racial composition, school parents' socio-economic status, and teacher racial composition in school. According to the Michigan State Assessment Tests, the mean achievements in this school district revealed scores below the state average. The School Climate Project was introduced into this school district from 1977-1978 academic year as a part of educational efforts

to improve student achievement in this area. The schools sampled in this study were involved in that School Climate Project. The previous achievement of six schools were comparable in reading and mathematics. Their achievement levels were near the mean of the school district. Among the six schools, three schools contain lower grade levels and three schools contain upper grade levels.

The main instrument in this study is part of a major research project to improve the School Learning Climate directed by Dr. Wilbur B. Brookover. Originally, this questionnaire contained more than 60 items. Among them, more than 40 items were used for data analysis in this study which were relevant to the teacher climate variables, classroom instructional condition variables, and mastery model strategy variables.

To measure overall effects of the mastery implementation, the related items were evaluated by two research assistants with regard to teacher knowledge, utilization, and system orientation of mastery learning, group learning games, and reinforcement practice.

The academic tests used in this study were the Basic Skills Achievement Tests (BSAP Tests) in the subjects of reading and mathematics. These tests were made by the School District Authority for the 1978-1979 school year. These tests are a kind of criterion-reference test. These instruments measure the performance of students over a set of instructional objectives identified by school district staff as the measure of the skill levels to be attained by the students.

The Results of the Study

Twelve hypotheses were formulated and tested. For the hypothesis testing, several kinds of statistical analyses methods are employed. A null form for each of the testing hypotheses is stated along with suitable statistical procedures.

For a better understanding, the associational area of hypothesis testing summarized the findings with additional explanations as follows.

Relationship Between Teacher Climate and Instructional Conditions on Achievement

The first hypothesis was formulated to determine if there exists an associational relationship between school learning climate (teacher climate and instructional conditions) and student achievement. The results indicated that the relationship does exist in mathematics but does not exist in reading. The simple and multiple correlations between the two variables were highly significant in mathematics. The single correlations were all significant at .05 or .01 level in mathematics. In total achievement (reading plus mathematics), the relationships exist only with teacher climate. The climate variables showed less relationship in reading. Also multiple correlations revealed about 70 percent of variance between climate variables to explain the achievement in mathematics, and 43 percent of variance in reading. But this associational relationship between climate variables explained more than 50 percent of variance in total achievement. It is important that the significant

relationship between teacher climate variables and achievement held in total achievement. But associational relationship between total climate variables (teacher climate and instructional conditions) and achievement was found when mathematics achievement was the criterion, but not in reading. One possible explanation for this discrepancy can be made in terms of the subject matter itself. Reading is non-sequential in nature, and covers a broad sub-area in contents for criterion measures. Therefore, it may be difficult to select common objectives for testing in a particular school district.

The second hypothesis established to determine the relative contribution of teacher climate and instructional conditions variables to differences in mean school achievement. To assess the unique contributions of three climate variables to the prediction of school mean achievement, three step-wise multiple regression analysis were employed. More than 33 percent of the total variance in mean math achievement between schools is explained by teacher climate variables ($p < .01$) after controlling two instructional variables, while about 29 percent and 16 percent of the total variance are explained by group learning games ($p < .05$), and reinforcement practice ($p < .05$) after controlling the teacher climate variables. We are able to conclude that teacher climate is a powerful predictor, over and above the variables of group game and reinforcement practice, in prediction of student achievement.

Relationship Between Teacher Climate and Provision of Instructional Conditions

Hypothesis 3 to Hypothesis 6 were concerned with these relationships. Hypothesis 3 and 4 were tested by t-test statistical method. The result of hypothesis indicated that there is significant difference in using group learning game depending on the levels of teacher climate. It means that schools with high teacher expectations-evaluations for student achievement use group learning games more frequently compared to the schools of counterpart ($p < .05$).

Also, we can conclude in Hypothesis 4 that schools with high teacher expectations-evaluations showed more positive attitude toward group corrective reinforcement compared to the schools of counterpart ($p < .02$).

In connection with Hypothesis 3 and 4, Hypothesis 5 tested the degree of use of group learning game and reinforcement practice by grade levels. The result revealed that the lower grade schools used the group learning game more frequently than did the upper grade schools. But there was no significant difference for use of reinforcement practice between the lower and the upper grade level schools.

This hypothesis is an exploratory step for further research. According to human development stages, the younger children of elementary level are easily involved in game situations and motivated to game learning behavior than are older children. But reinforcement practice usually accompanies some reasonable reactions from children

in learning situation, and it is also followed by cognitive reactions rather than affective reactions. Thus, reinforcement practice can be assumed to be more effective to upper grade children in elementary schools. The possible explanation of the lack of significant relationship between reinforcement practice and grade levels in Hypothesis comes from the nature of scale in this study. Most of the items in this part of the questionnaire consisted of attitudinal measures rather than cognitive practices.

Hypothesis 6 was concerned with the grouping format in the group learning game with regard to teacher expectations on achievement. This hypothesis is tested by using the chi-sqare statistical test of relationship among variables. The results indicated that no significant difference exists among the grouping methods of group learning game, depending on the levels of teacher expectations-evaluations for student achievement.

Relationship Between Teacher Climate and Use of Mastery Learning Strategy

Hypotheses 7, 8, and 9 were to determine the effect of different levels of teacher climate on the use of mastery strategies. Hypothesis 7 was concerned with the staff planning for the basic skill objectives depending on the level of teacher expectations-evaluations. As a result, in the average mean score of introducing the basic skill objectives, high climate group indicated almost twice as much as the lower climate group. The mean difference between the two groups

revealed that there is a significant difference of introducing objectives between two groups ($p < .001$). It is found that schools with high teacher climate plan unit learning objectives more frequently on the basis of school staff cooperation than schools with lowr teacher climate. The basis skill objectives can be identified as a type of mastery learning objectives in schools sampled for this study.

In conjunction to Hypothesis 7, Hypothesis 8 intended to determine the effect of staff cooperation patterns. This hypothesis was examined by using the chi-square test of relationship among variables. The result of testing indicated that for mastery curriculum high expectations-evaluations schools focused on the principal-staff joint planning, but lower expectations schools showed higher proportion in staff scheduled pattern. The significant level was less than .01. Also in Hypothesis 9, the result indicated that teachers with high mastery expectations use more alternative mastery corrective method such as team study, tutoring help, and reinstruct/enrichment method compared to teachers with low mastery expectations ($p < .05$).

In addition, Hypothesis 10 was to examine the relationship between the grade levels and mastery learning grouping. The tracking and streaming system in American schools have been the crucial issues. The discrepancy of achievement is more serious in upper grade level than the lower grade level. Thus, upper grade level school was apt to form the ability grouping to facilitate individual progress of learning achievement.

The result of this hypothesis was supported with a significance of less than .05 level. Thus it was found that the lower grade level schools are more favorable to form the mixed group or whole group instruction for mastery teaching than the upper grade level of schools.

School Learning Climate and the Effects of Mastery Model Implementation

Hypothesis 11 was to examine the relationship between the level of teacher climate and the use of teacher training modules. These modules were used for teacher in-service training in school district during the study period. To test the proportion of use of each module, the chi-square statistical method was employed to test the relationship between two groups. Among ten modules, module 1 (The school learning climate), module 2 (Expectations and mastery learning) and Module 10 (Teacher commitment and student learning) revealed a great difference between two groups.

Except Module 3, 5, and 9, a significant difference was found in seven modules between two groups. It was found that higher expectations-evaluations teacher is more positively involved in the use of implementation modules relative to lower expectations-evaluations teacher.

Hypothesis 12 was to determine the effect of teacher's mastery expectations on mastery model implementation regarding teachers' knowledge, use, and system orientation. This hypothesis was examined by looking at the mean scores and standard deviations

of three subcategories of mastery model implementation between two groups. All three categories of mastery implementation showed a significant difference between the two groups. The detailed t-test result of each category indicated that the teacher group with higher mastery expectations brings much better implementation effects in terms of group learning games, reinforcement practice, and general mastery procedure compared to the lower expectations group.

To support this hypothesis, a summation of three implementation factors also tested by analysis of variance method (ANOVA). The three factors were identified as the knowledge, the use, and the system orientation of implementation model of mastery. The results of analysis of variance indicated a great significant difference in the mean scores between two groups through all three implementation factors with a significance level from .005 to less than .001.

As a result of both separate analyses, it was found that the teachers with higher mastery expectations use the group learning game and reinforcement practice more positively for mastery strategy than the teacher with lower mastery expectations, and in turn, that this classroom climate affects teachers' awareness and readiness of utilization for mastery learning strategies.

The results of the study of selected school learning climates and the statistical analyses supported the following significant findings:

1. Teacher expectations and evaluations for student performance are positively related to student academic achievement; the

combined effectiveness of teacher climates plus instructional conditions on Mathematics is more significant than that on Reading.

2. Teacher expectations and evaluations are more powerful indicators over and above the instructional conditions such as group learning game and reinforcement practice in prediction of student achievement.

3. Schools with higher teacher expectations-evaluations are more favorable to the use of group learning game and group-based corrective reinforcement than schools with lower teacher expectations-evaluations.

4. Group learning game is favored for use by the lower grade elementary schools rather than by the upper grade elementary schools.

5. Schools with higher teacher expectations-evaluations are more favorable to principal-staff cooperative planning for mastery learning strategies in terms of unit objective selection and evaluation planning than schools with lower teacher climate.

6. Teachers high in mastery expectations use more group-based corrective strategies (team study, small group help, reinstructions) than teachers with lower mastery expectations.

7. Schools with higher teacher expectations-evaluations bring forth the higher level of mastery implementation effects in terms of teacher knowledge, utilization, and school system orientation of mastery learning and practical instructional strategies, than do schools with lower teacher expectations.

8. Overall effects of mastery implementation in schools of higher expectations affect the higher rate of mastery achievement.

Implications of the Results

The major implication of this study was derived from the effects of teacher's expectations on curriculum planning for mastery learning and the implementation for mastery strategies.

In a school social system, the set of teachers' expectations as well as evaluations becomes transmitted to the students through the instructional procedures: the methods and practice of instruction. Teachers' beliefs about student performance as well as about student ability are communicated to students through the group mechanism of symbolic interaction, both verbally and nonverbally. It is essential for teachers to have high expectations for themselves as teacher and high expectations for students as learners. Teachers' expectations also affect the evaluations that they make of students' performance, and are correlated with teachers' instructional behavior and the provision of opportunities.

The basic assumption of mastery learning is that all children can learn and achieve at a high level. This assumption must be clearly communicated to the students in the form of high teacher expectations. Teacher expectations and subsequent student learning has often been described as the self-fulfilling prophecy. Nearly every type of activity in a classroom represents an opportunity to communicate expectations to students. Many teachers wrongly believe that expectations can be communicated only by formal written and spoken statements. While such vehicles for communicating expectations are important, teacher expectations are also communicated to students in extremely subtle ways.

Thus, the first set of implications concerns the importance of creating an appropriate classroom instructional condition through group learning games and reinforcement practice as a supportive learning environment.

The strategies teachers use to form group academic games, allocate status roles in group activities, encourage answers, and evaluate student performance are all indications of the expectations they have for students. One effective strategy for giving students an opportunity to practice the materials being taught is the use of group learning games which have several important implications to follow. First, group games should be organized around heterogeneous teams (of five or six students). Second, team competition should result in teams winning rather than in individuals winning. Third, students on a team should be encouraged to help their group member through a variety of peer tutoring strategies.

Group games are especially useful in motivating students; they direct their time and attention toward the knowledge and skills the teachers are seeking to teach, and students take great pride in helping their peers in learning. These games clearly convey the expectation that all students can make a positive contribution to their team.

The reinforcement practice services a similar function as the reward system. Over time, teachers can significantly increase the level of effort and quality of work exhibited by students if they have an effective reward system and use it appropriately. The

reward system present in a classroom and school is an important and complex part of the total instructional process.

On one hand, the reinforcement practice should be such that maximum reward goes to those who exhibit high quality of work. On the other hand, this practice needs to accompany the corrective encouragement to make any real effort at completing learning tasks. Teachers should design reward system that both signal an expectation for quality work and encourage even the most reticent to try. The reinforcement practices bring the complementary effects on group learning games. Thus teachers should carefully plan their reward system, use it to the best interests for each student, and above all clearly communicate the "rules of the game" to the students.

A second set of implications stems from the underlying variables which are interrelated with the implementation of mastery model strategies.

Mastery learning is an instructional orientation to school learning that states the beliefs that all students can, and will, learn if provided the proper conditions for learning. Effective schools have the common belief that all students can learn, and they have adapted an instructional orientation that reflects this belief. The implication of these findings is concerned with the importance of establishing mastery objectives, various communication systems, and the roles to be played by principals and support staff.

The mastery learning model provides an extremely useful framework for translating broad educational goals into specific instructional objectives and units. Planning the mastery learning model in

a school requires substantial planning, staff commitment, cooperation, and communication. There are several points to make sure of at this time. First, we indicated that the success of the mastery learning model requires joint planning among staff. The successful accomplishment of these things would be extremely difficult if not impossible without a school-wide communication system. It suggests that a school staff needs to meet regularly in small groups or total staff meetings to plan and evaluate instruction.

The second point is the important role of principals in the joint staff planning. They have an especially important role in clarifying and changing a school's learning climate and resulting instructional effectiveness. In the mastery procedures, principals should coordinate the mastery learning model which includes the unit objective planning, support staff for reinstruction, use of the small group activities, evaluation forum, and so forth. Also the principal is responsible for communicating the goals, objectives, and progress to both central administration and the parent community.

The third point is that in the context of the mastery learning model, the availability of the support staff (e.g., teacher aides, parent volunteers) represents a valuable instructional resource and should be encouraged. Such support personnel can assist the teachers in providing both reinstruction and enrichment activities for students. Also in team study or small group study, the mastery learning model provides a framework for the wise use of support staff services in general.

Schools differ in their current organizational patterns for curriculum planning and staff cooperation systems for communication. Thus it is sufficient to suggest that if such a forum does exist, it should be used for mastery planning and evaluation; if such a forum does not exist one must be created.

The final implication of the study is concerned with the combined effects of teachers' expectations and instructional conditions such as group academic games and reinforcement practices which affect student achievement.

As noted earlier, teaches' expectations and evaluations are significantly associated with the extent in using mastery model strategies and academic group games which, in turn, impact on academic norms and behaviors of students as well as teachers. A positive school climate with high expectations for all students and a belief that all students can master the basic skills is strongly associated with high achievement. Other factors such as academic team games (Slavin, 1977; Slavin and Devries, 1978), reinforcement practice, and instructional cooperation systems for mastery learning are likewise of equal importance as teachers' expectations. Both of these factors are causally related to student achievement in each grade levels of elementary schools.

Recent research indicates that the school learning climate explain the great differences in achievement between schools and among students within schools (Brookover, et al., 1977). More specifically, Peng's (1974) work provides some insight into how

teacher expectations and the provision of learning opportunities are related to produce differential pupil achievement. The present study supports the findings of these studies in a position of the combined effects of both findings. The major implication of this study is that the proper instructional conditions with high expectations of teachers brings forth better implementation effects of mastery strategies which result in higher levels of achievement.

Recommendations for Further Research

The related implication of the present study is concerned with the change of school social system by improving the school social system and by improving the school learning climate, rather than concentrating on change at the individual level. The staff sets the tone for the school learning climate. The staff members have expectations and evaluations of student ability and academic performance that are perceived by the students themselves. Also, instructional programs are carried out by the teachers. Thus successful implementation of a program to improve school learning climate demands that the structual characteristics of curriculum practices, role definitions, and policy procedures be consistent with and supportive of the program goals.

In this point of view, this study has a delimitation of the factors relative to the validity of changing dynamics in school social system. The changes of school learning climate, in this study, was restricted to the teacher's conceptions of mastery model components rather than the inertia of school social system. It would

seem worthwhile to conduct field experimental research which can examine the normative ans structural changes in school social system, rather than the individually oriented program. Lately, one such effort was made by Hathaway (1980).

Another delimitation noted for the study restricted the investigation to those school divisions whose principals expressed willingness to be involved in the study. Thus, the findings are far from the theoretically attainable prescriptive generalization of teaching, in part because of the difficulty of replicating research findings, and in part because of the enormous differences between classrooms. It has even been suggested that a generalizable prescriptive theory of instruction is an impossible goal, because factors unique to each teaching-learning situation are powerful enough to produce numerous exceptions to every proposed law (Cronback, 1975). Eventually it would seem worthwhile to conduct parallel investigations in a cross-cultural validation and replication studies. Particularly in Korea there has been a series of mastery approach programs in middle schools from 1970. But the main educational problems of mastery implementation have been caused from the school learning climates in terms of the teachers' group morale, staff cooperation and supportive learning environment and so forth. To remedy these problems there was a theoretical inquiry for comprehensive studies of educational climate (Chung, 1976).

Even though mastery learning approach was introduced to the Korean educational arena from 1970, it is still far from the desired

attainment of student achievement. Also, the main strategy was restricted to a material development, as curricula components without the improvement of school learning climate relate to the preconception of teacher to the poor and low-socio-economic background students. In Korea, as well as American schools, it is strongly recommended that the creation of appropriate school learning climate is a more effective remedy for low achievement than the clinical analysis of individual students. It implies that improvement of school achievement has a causal relationship for changing the school learning climate in the context of mastery implementation process.

APPENDICES

APPENDIX A

TEACHER QUESTIONNAIRE

SPRING 1979

In an effort to improve our work in implementing the school climate project, we would appreciate your completing this questionnaire. The information you give us on this questionniare is completely confidential. No one will see your answers except members of the climate project staff.

Please write the name of this school

____

What grade level do you teach?

Kindergarten	0
First	1
Second	2
Third	3
Fourth	4
Fifth	5
Sixth	6
Other	7

APPENDIX A-1

TEACHER CLIMATE SCALE

1. On the average, what acheivement level do you expect of the students in <u>this school</u>?

Much above national norm . . .	1
Slightly above national norm .	2
Approximately at national norm .	3
Slightly below national norm .	4
Much below national norm . . .	5

2. On the average, what achievement level do you expect of the students in <u>your class</u>?

Much above national norm . . .	1
Slightly above national norm .	2
Approximately at national norm .	3
Slightly below national norm .	4
Much below national norm . . .	5

3. How many of the students in your <u>class</u> do you believe are capable of mastering the basic academic skills at grade level?

90% or more	1
70% to 89%	2
50% to 69%	3
30% to 49%	4
Less than 30%	5

4. How many of the students in this school do you believe are capable of masterying the basic academic skills at grade level?

90% or more	1
70% to 89%	2
50% to 69%	3
30% to 49%	4
Less than 30%	5

5. What proportion of students in this school do you think the principal believes is capable of mastering the basic academic skills at grade level?

90% or more	1
70% to 89%	2
50% to 69%	3
30% to 49%	4
Less than 30%	5

6. How would you rate the academic ability of the students in this school compared to other schools in this area?

Ability here is much higher	1
Ability here is somewhat higher	2
Ability here is about the same	3
Ability here is somewhat lower	4
Ability here is much lower	5

7. How many teachers in this school feel that all their students regardless of their interests or ability should be thought to master the basic academic skills?

Almost all of the teachers	1
Most of the teachers	2
Half of the teachers	3
Some of the teachers	4
Almost none of the teachers	5

APPENDIX A-2

GROUP LEARNING GAME SCALE

1. Please describe the strategy of group learning game as you understand it.

(Responses)

Teaching using competition and reinforcement . . .	1
Competition as a means of motivation	2
Competition involving children of mixed ability .	3
Enrichment and reinforcement of a particular skills or objectives	4
Opportunity for children to express themselves as individuals or group	5
Provision of material or special privilege awards for motivation	6
Other	7

2. Have you used group learning game in your classroom this year for reading instruction?

Yes	1
No	2

If yes, how often have they been used?

____

____

3. Have you used group learning game in your classroom this year for mathematics instruction?

Yes	1
No	2

If yes, how often have they been used?

____

____

4. Why do you use group learning games?

   As an important part of mastery learning for student practice 1
   As motivation for students 2
   Because the rest of the staff does 3
   To fill unscheduled time 4
   I don't use group learning games 5
   Other 6

5. Which of the following aspects of group learning games do you consistently use in reading instruction? (Circle all that apply)

   Contests at grade level (between classrooms) . . 1
   Contests between teams in classroom 2
   To facilitate peer instruction 3
   To facilitate motivation for practice within groups 4
   To enhance social relations 5
   To improve test taking skills 6

6. Which of the following aspects of group learning games do you consistently use in mathematics instruction? (Circle all that apply)

   Contests at grade level (between classrooms) . . 1
   Contests between teams in classrooms 2
   To facilitate peer instruction 3
   To facilitate motivation for practice within groups 4
   To enhance social relations 5
   To improve test taking skills 6

7. If you use group learning games, how do you form the groups?

   Heterogeneously (by mixed ability) 1
   Homogeneously (by similar ability) 2
   Student self-selection of groups 3
   Other 4

APPENDIX A-3

REINFORCEMENT PRACTICE SCALE

1. How would you characterize your use of reinforcement.

    I only positively reinforce correct answer 1
    I usually positively reinforce any answer so as to encourage students to respond 2
    I seldom reinforce any student 3
    Other 4

2. What do you do when a student gives an incorrect answer?

    Rephrase question 1
    Simplify question 2
    Probe student for correct answer 3
    Tell student "good try," and continue 4
    Other 5

3. How important are the following concepts for your classroom isntruction? (Circle one number for each question.)

	Very Important (1)	Important (2)	Somewhat Important (3)	Not Important (4)
4. All correct answers should be encouraged by positive reinforcement				
5. Students must have a clear understanding of what is being asked				
6. Teacher's feedback to students should clearly indicate whether an answer was correct or incorrect				

	Very Important (1)	Important (2)	Somewhat Important (3)	Not Important (4)
7. Teachers should make a clear effort to see that all students give correct answers				

APPENDIX A-4

STUDY GROUPING SCALE

1. How are students assigned to classroom in this school?

   Heterogeneously (by mixed ability) 1
   Homogeneously (by similar ability) 2
   Other 3

2. If you use group learning games, how do you form the groups?

   Heterogeneously (by mixed ability 1
   Homogeneously (by similar ability) 2
   Student self-selection of groups 3
   Other 4

3. How do you group students for matehmatics in your class?

   (Responses) By mixed ability (homogeneously 1
   Whole group instruction 2
   No grouping (heterogeneously) 3
   Individualized instruction 4
   By grade level 5
   Other 6

4. How do you group students for the BSAP reading objectives in your class?

   ____

   ____

5. How do you form reading groups in your class?

   ____

   ____

APPENDIX A-5

STAFF PLANNING SCALE

1. Did the teachers at your grade level have a common time schedule for teaching the BSAP objectives for this year?

    Yes 1
    No 2

    If yes, who scheduled these objectives?

    Principal 1
    Grade-level staff 2
    Principal and Grade-Level staff 3
    Individual teachers 4
    Other 5

2. How often do you and your fellow grade-level teachers meet and share instructional strategies?

    Very often 1
    Sometimes 2
    Rarely 3
    Never 4

3. Were the results of the BSAP pre-test discussed with you?

    Yes 1
    No 2

    If yes, who discussed these results?

    Principal 1
    Team Leader 2
    R & E Staff 3
    Other 4

APPENDIX A-6

MASTERY STRATEGY SCALE

1. How often do you introduce a new reading objective to entire class?

(Responses)	Weekly	1
	2-3 times a week	2
	Several times a month	3
	Each month	4
	Depending on Mastery	5
	Other	6

2. How often do you introduce a new mathematics objectives to the entire class?

(Responses) same as above responses

____

3. What instructional strategies are used by you and others in this school to insure that all students master the basic skills objectives?

(Responses)	Work with small groups	1
	Follow each step of mastery model	2
	Frequent and through reinforcement	3
	Group games	4
	Common scheduling of objectives	5
	Charting individual progress	6
	Reteach objectives	7
	Other	8

4. How have you used the mastery learning strategy for reading instruction this year?

____

____

5. How have you used the mastery learning stragety for <u>mathematics</u> instruction this year?

____

____

6. Please describe the mastery learning instructional stragegy as you understand it?

(Responses) Steps 1-7 of the mastery learning model 1
Instructing all children with the expectations that all will master the learning objectives. 2
Teach, test, and reteach 3
Teaching and practice using group games 4
Accuracy of performance of a particular skill . 5
Other 6

7. When testing over an objective, what percentage of the students must master the objective before you proceed with the next objective?

All students 1
90% or more 2
80% - 89% 3
70% - 79% 4
60% - 69% 5
50% - 59% 6
Less than 50% 7
Those who master on first try 8
Other 9

8. Which of the following components of the mastery learning strategy do you consistently use in your classroom instruction? (Circle all that apply)

Define objectives 1
Schedule objectives 2
Present objective to the entire class 3
Student practice 4
Formative test (Diagnostic) 5
Reinstruction to mastery/enrichment 6
Summative test (Final). 7
None of the above 8

9. How would you characterize your testing objectives?

They are the same for all students 1
They are the same for most of the students . . . 2
They are the same for some of the students . . . 3
They are different for most of the students . . . 4
They are different for each student 5

10. The modules contained in the School Climate Project manual are listed below. Please refer to the list in answering the next few questions on how we may further improve the project.

    1. The School Learning Climate
    2. Expectations and Mastery Learning
    3. Group Learning Games
    4. Grouping and Differentiation
    5. Use of Evaluation
    6. Parental Involvement
    7. Academic Engaged Time
    8. The Role of the Principal
    9. Individual Reinforcement Principles
    10. Teacher Commitment and Student Learning

11. Of these ten modules, which do you feel you used most consistently in your classroom to help maximize student achievement? (Please write the number(s) of the appropriate modules below)

    ____

12. Which of these has had the most impact on climate and achievement in your classroom? (Please write the numbers of the appropriate modules below)

    ____

13. Of those consistently used, why have these made an impact on your classroom?

    ____

    ____

14. What could be done to improve these?

    ____

    ____

15. Of these ten modules, which do you feel were used least consistently in your classroom? (Please write the numbers of the appropriate modules below)

    ____

APPENDIX B

SUPPLEMENTARY TABLES

APPENDIX B

TABLE B-1.--Summary of Stepwise Multiple Regression Analysis with Teacher Climate, Group Game, and Reinforcement Practice as Independent Variables and Achievement as Dependent Variable

Step No.	Variable Entered	Upper Grade		Lower Grade		Total	
		R^2	R^2 added	R^2	R^2 added	R^2	R^2 added
1.	Teacher Climate	.04	.04	.66	.66**	.33	.33**
2.	Reinforcement	.05	.01	.74	.08*	.36	.03*
3.	Group Game	.28	.23	.78	.04*	.47	.11*
1.	Group Game	.26	.26	.56	.56*	.29	.29*
2.	Reinforcement	.26	.00	.74	.18*	.34	.05*
3.	Teacher Climate	.28	.02	.78	.04*	.47	.13*
1.	Reinforcement	.03	.03	.41	.41*	.16	.16*
2.	Teacher Climate	.05	.02	.74	.33*	.36	.20*
3.	Group Game	.28	.23	.78	.04*	.47	.11*
1.	Teacher Climate	.04	.04	.66	.66**	.33	.33**
2.	Group Game	.27	.23	.69	.03*	.46	.13**
1.	Group Game	.26	.26	.56	.56*	.29	.29*
2.	Teacher Climate	.27	.01	.68	.12*	.46	.18**

TABLE B-2.--Means, Standard Deviations and Analysis of Variance for Teacher Expectation-Evaluations Among Six Sampled Schools

School Code	N	Mean	S.D.
1.	15	24.87	4.26
2.	15	22.27	9.56
3.	12	18.50	11.62
4.	15	22.20	6.75
5.	15	27.33	4.25
6.	16	24.88	5.95

Source	d.f.	Sum of Squares	Mean Squares	F-Ratio	Pro.
Between Groups	5	625.80	125.36	2.31	.05*
Within Groups	82	4445.15	54.21		
Total	87	5071.95			

TABLE B.3.--Means, Standard Deviations and Analysis of Variance for the Use of Group Learning Game Among Six Sampled Schools

School Code	N	Mean	S.D.
1.	15	6.67	4.65
2.	15	5.93	4.83
3.	12	3.83	4.80
4.	15	8.80	3.27
5.	15	10.47	6.46
6.	16	12.00	4.95

Source	d.f.	Sum of Squares	Mean Squares	F-ratio	Pro.
Between Groups	5	654.30	130.86	5.40	.0002***
Within Groups	82	1988.06	24.24		
Total	87	2642.36			

TABLE B-4.--Means, Standard Deviations and Analysis of Variance for the Attitude Toward Reinforcement Practice Among Six Sampled Schools

School Code	N	Mean	S.D.
1.	15	16.80	4.24
2.	15	18.60	1.35
3.	12	14.00	6.20
4.	15	17.47	4.98
5.	15	17.80	2.00
6.	16	17.56	1.63

Source	d.f.	Sum of Squares	Mean Squares	F-ratio	Pro.
Between Groups	5	162.00	32.60	2.33	.049*
Within Groups	82	1146.07	13.98		
Total	87	1309.07			

APPENDIX B

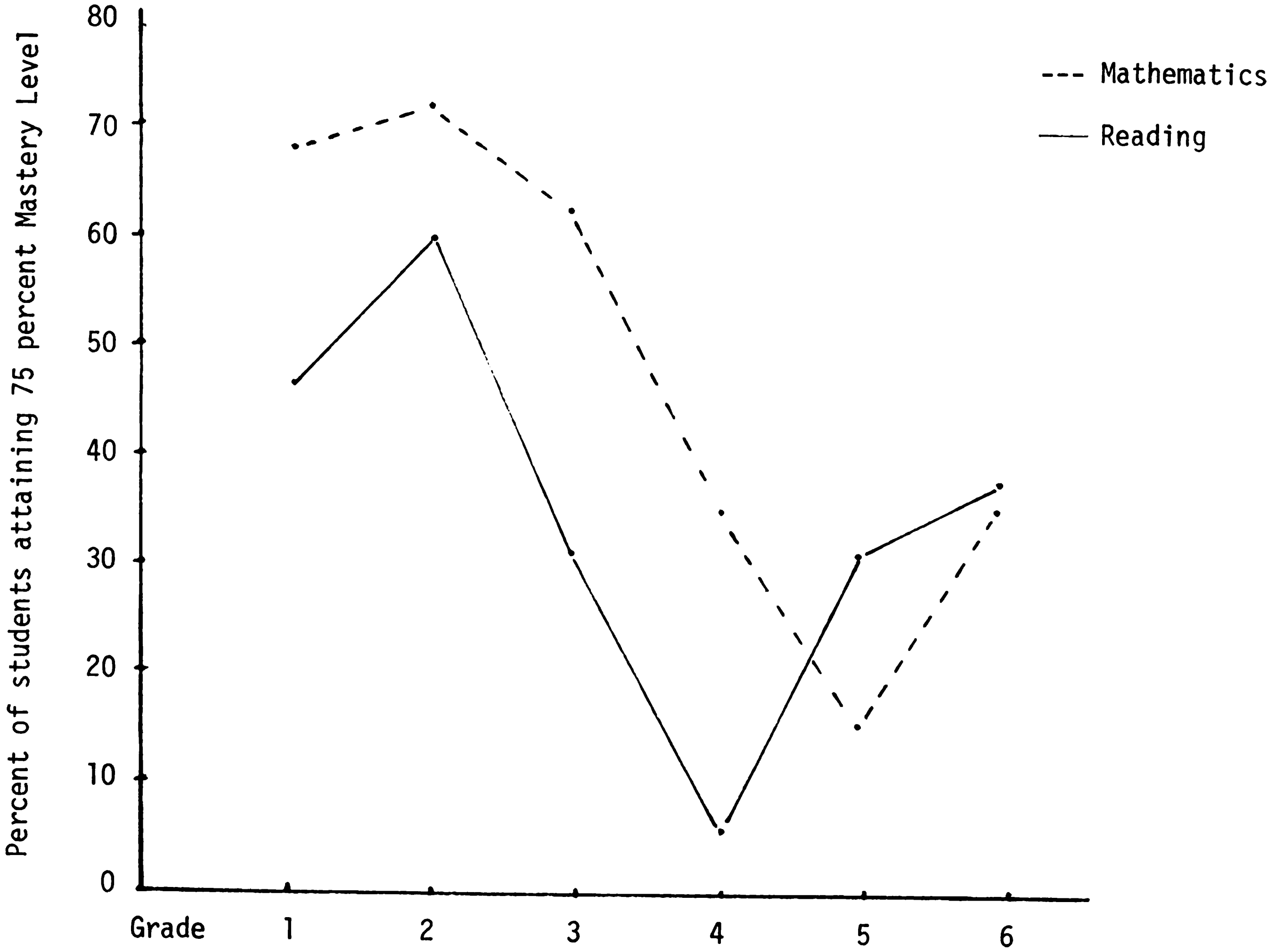

Figure 5.--Student Mastery Levels for BSAP Posttest

APPENDIX C

SELECTED GAMES FROM

77 GAMES FOR READING GROUPS

SEYMOUR METZER, ED.D.

SCHOOL OF EDUCATION

CALIFORNIA STATE UNIVERSITY, NORTHRIDGE

Fearson Publishers, Inc.

Belmont, California

Chop-off (PI)

Objective: Word analysis, vocabulary development.

Materials: Paper, pencils, text.

Procedure: Group the children in teams of five or six.
Any number of letters from the given section of text may be chopped off the beginning or end of a word to make a new word (Example: "habits" become "bits" or "barren" becomes "bar).
One point is awarded for each letter in the new words

Beginnings (PI)

Objective: Sentence construction, word usage.

Materials: Paper, pencils, text.

Procedure: Group children in teams of five or six.
Choose a particular sentence in the text.
Each team attempts to form two new sentences using the first letter of each word in the designated sentence. (Example: "The dog ran away" might become "Tall ducks race awkwardly.")
One point is scored for each letter used in the new sentence.

Wriet-a-rhyme (PI)

Objective: Rhyme recognition.

Materials: Paper, pencils, text, chalkboard.

Procedure: Group the children in teams of five or six.
Write several end sounds on the childboard (Example: ick, an, op).
Each team, working with a particular part of the text, writes down as many words as possible that have the given sounds.

Join-up (PI)

Objective: Consonant blends, word recognition and construction.

Materials: Paper, pencils, text, chalkboard.

Procedure: Group the children in teams of five or six.
Using the text, each team writes as many initial consonant blends as it can find (Example: br, str, ch, sp). Each blend should be written on a separate line.
Write several phonograms on the childboard (Example: ain, ite, aw, ack).
Each team tries to combine as many consonant blends and phonograms as they can to make the most actual words.

X-words (I)

Objective: Vocabulary development, spelling.

Materials: Paper, pencils, text.

Procedure: Children form teams of five or six.
Each team folds or draws a piece of paper making a 6" x 6" grid of thirty-six squares.
The children write as many words as possible from a given section of text on this grid, one letter to a square. The words may read horizontally or vertically. A word may begin in the square immediately following the end of another word. A letter used in a horizontal word may also become part of a vertical word. Unlike crossword puzzles, adjacent letters do not necessarily have to form words. The team that squeezes the most text words into its grid wins.

Phase-o-grams (I)

Objective: Phrase structure.

Materials: Pencils, paper cut into 2" squares, text.

Procedure: Group the children in teams of five or six.
Assign each team a different paragraph in the text.
Each team breaks the paragraph into phrases, with one phrase per square of paper. (Example: "Bill ran into the house for his cat" would become

Bill ran	into the house	for the cat

Collect all the papers and mix them in a box.
Each team draws a paper from the box.
The first team to piece together a logical sentence (not necessarily the same as those in the text) is the winner.

Get Together (PI)

Objective: Spelling, word analysis, alphabetization.

Materials: Paper cut into 2" squares, pencils, text.

Procedure: Assign each student three words from the text to be written on separate squares of paper.
Divide the group into teams of five or six.
Collect all the papers and mix them in a box.
Each team draws three words from the box.
Within a specified time limit (one minute or so), each team must write one complete, correct sentence using all three words in order to score a point.
Repeat steps (3), (4), and (5).
The team with the most points wins.

Poetry Party (PI)

Objective: Rhyme recognition and recall.

Materials: Paper, pencils, text.

Procedure: Divide the group into teams of three or four.
Read one word from the text.
Each team writes as many rhyming words as it can in a given time limit.
The team with the most rhymes wins.

Letter Bank (PI)

Objective: Vocabulary development, spelling.

Materials: Paper, pencils, text.

Procedure: Children form teams of five or six.
Each team folds or draws a piece of paper to make a 4" x 4" grid of sixteen squares.
They write a letter in each square. Letters may be repeated.
Using only the letters in the boxes, they try to write as many words as possible that appear in a given section of text. Letters may be used over again for different words. (The letters actually put into the grid, therefore, should be keyed to this section in order to form a large number of words.)

Sentence Go-go (I)

Objective: Sentence construction, comprehension.

Materials: Paper, pencils, text.

Procedure: Group the children in teams of five or six.
Choose one page in the text.
Each team takes one word from each sentence on that page and tries to form a new sentence. The words must be used in the same order in which the original sentences occur.
The winning sentence is the one that has the most letters in it.

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