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RELATIONSHIPS AMONG TRAINING PHASES AND GROWTH EXPECTATIONS IN THE PREPARATION OF PRESERVICE TEACHERS

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ABSTRACT

This investigation, through a study of effects, examined the impact of combined training phases on the abilities of student teachers to manage the complexity of verbal reinforcements and to demonstrate achievement of comprehension and command growth expectations regarding verbal reinforcements. Subjects were 40 elementary student teachers at the University of Oklahoma who were enrolled in a corequisite course which included approximately 18 hours of training in verbal reinforcements.

The research design was a one-group pretest-post test-post test design. Data were obtained from the responses of subjects to a written, competency based, criterion referenced test designed specifically for this study. The data from the pretest and each subsequent post test were analyzed to respond to four basic research questions. Three questions dealt with the effects of combined training phases on achievement, complexity management, and mastery of growth expectations. The fourth question dealt with the sequence of growth expectations. Three approaches were taken to address these questions: (a) comparison of group mean scores obtained from each test administration, (b) comparison of the proportions of subjects who had attained mastery at the time of each test administration, and (c) comparison of patterns depicting the order of attainment of mastery on each growth expectation for each subject.

Results indicated that training had a positive effect on the achievement of comprehension and command growth expectations. The combination of theory presentation, concept instruction, demonstration, and modeling (Training Phases 1 and 2) had a facilitating effect on achievement of command, but these training phases had their primary impact on comprehension. The combination of practice and feedback (Training Phases 3 and 4) apparently increased achievement on the growth expectation for comprehension as well as for command. Management of the variables (complexity) was positively related to accuracy in recognizing and applying verbal reinforcements (achievement). Statistical analysis of patterns depicting the order of attainment of mastery of growth expectations supported the conclusion that mastery of comprehension was prerequisite to mastery of command. The results of this investigation supported the speculation that the interaction among training phases and growth expectations occurred in a hierarchical order.

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CHAPTER I

BACKGROUND OF THE PROBLEM

A goal of preservice and inservice teacher education is the transfer of skills and concepts learned in training environments into the classroom setting. One focus of research during the past 15 years has been the identification of the attributes of transfer that apply to teacher training and the identification of factors and processes that enable transfer to occur. Two researchers, Gliessman (1981) and Joyce (1980, 1981, 1983), attempted to organize, analyze, and summarize the studies which have accumulated in order to formulate generalizations and hypotheses which could guide teacher educators and researchers.

Gliessman identified four learning processes which had been shown to contribute to change in teacher performance and to the transfer goal of teacher education. These four processes were found to be in common use in the studies he analyzed: (a) learning through observation, (b) concept learning, (c) learning through practice, and (d) learning through feedback. Other factors were also shown to influence whether or not skills and concepts were acquired and upon whether or not transfer occurred. These factors were: (a) the complexity of the skills to be learned; (b) the philosophical commitment of teachers to the skills or concepts being taught; (c) the potential effects of the teaching

skill on student learning; and (d) the support systems available to teachers-in-training from peers, cooperating teachers, supervisors, and administrators (Gliessman, 1981).

The work of Joyce and associates focused on the study of transfer in the training of inservice teachers and on improving inservice teacher training. Joyce and Showers (1980) analyzed over 200 research studies, with preservice or inservice teachers as subjects, in which investigations were made into the effectiveness of various kinds of training methods. Joyce and Showers wanted to find what contributions were made by different training methods toward learning and the effects of training on transfer. Each of the studies selected for analysis had been designed either to assess the acquisition and demonstration of teaching skills and strategies or to measure the transfer of skills and strategies from the training environment into the classroom. Joyce and Showers assumed that skills had been acquired if trainees were observed to exhibit the skill in simulated teaching situations. The assumption that transfer had been accomplished was made when classroom observations that occurred several months after completion of training revealed that the skill was in evidence.

From their analyses, Joyce and Showers developed two classification systems and a set of conclusions as working hypotheses about the apparent relationships among training methods and training outcomes. One classification system was a typology for classifying training components and included those training methods used in the reported studies to teach skills and strategies to trainees. The other classification system was a typology of levels of impact used to categorize training outcomes. These classification systems and conclusions were of special interest for the present study.

Training Components

Joyce and Showers (1980) classified training methods into five categories of training components:

1. Theory Presentation or Description of Skill or Strategy: those methods that dealt with the presentation of theories which supported teaching behaviors and/or provided descriptions of the teaching skills or strategies to be learned. Examples included readings, lectures, films, and discussions.

2. Demonstration and Modeling: those methods aimed at depicting or enacting the teaching skill or strategy in natural or contrived settings. Examples included: (a) instructor demonstrations using trainees as students and observers, (b) taped classroom events of a teacher exhibiting the behavior to be learned by the trainees, and (c) transcripts of instructional events.

3. Practice: those methods designed to give the trainee practice in performing the teaching skill or strategy in simulated situations and in low risk classroom situations. Examples included teaching a group of peers and teaching a small group of children in isolation.

4. Feedback: those methods designed to provide structured and open-ended descriptions and analyses of a trainee's performance. Examples included: (a) video tape playback and discussion as in microteaching; (b) observation, data collection, analysis, and discussion as in clinical supervision; (c) reflection and discussion as in reflective teaching; and (d) self-analysis observation and feedback systems.

5. Coaching: those methods which aided the trainee in making application of teaching skills or strategies in a classroom. Coaching involved aid to the classroom teacher in: (a) analyzing teaching situations to determine the appropriate use of skills, (b) adapting skills or strategies to learner differences,

and (c) adjusting skills or strategies to a variety of teaching situations (Joyce & Showers, 1981). An example was continued clinical supervision by a peer or superordinate.

Joyce and Showers concluded, in effect, that these training components appeared to contribute to teacher trainees being able to acquire and demonstrate skills and strategies and to transfer skills and strategies from the training environment into the classroom. They also concluded that particular training components appeared to contribute to particular levels of impact with varying degrees of power.

Levels of Impact

Joyce and Showers (1980) classified training outcomes into four levels of impact: (a) "awareness, (b) the acquisition of concepts or organized knowledge, (c) the learning of principles and skills, and (d) the ability to apply those principles and skills in problem-solving activities" (p. 380). The last level of impact was recognized by Joyce and Showers to yield evidence of transfer.

G. D. Shepherd (personal communications, August, 1982 - December, 1983) at the University of Oklahoma utilized Joyce's concepts of training components and levels of impact in training student teachers and inservice teachers. Shepherd relabeled the classification system for levels of impact and defined the levels in terms of performance behaviors which trainees could be expected to demonstrate as a result of having acquired concepts, skills, and principles of teaching behaviors. The descriptions of levels of impact which follow reflect the organization provided by Shepherd.

1. Awareness: When told what to observe, teachers in training demonstrated awareness of a teaching skill or strategy by recognizing behaviors in the

performance of others that were related to the skill or strategy. They also demonstrated awareness by perceiving some degree of relationship between the observed skill or strategy and other teaching behaviors or learner outcomes.

2. Comprehension: Teachers in training demonstrated the following conceptual indices of comprehension of a teaching skill or strategy: (a) recognized examples of the behavior, (b) analyzed the behavior to identify its component parts, (c) differentiated between positive and negative exemplars of the behavior, and (d) described or defined the behavior in terms of its essential attributes.

3. Command: Teachers in training demonstrated the skill or strategy in identified events in simulated teaching situations. Instructors selected or identified events that were known to be appropriate for the application of the skill or strategy. The situations in which trainees performed were structured in such a way that the number of situational variables to be managed was reduced. This structuring permitted trainees to focus on the execution and effects of the particular behavior being mastered.

4. Control: Teachers in training transferred the teaching skill or strategy acquired and applied in a training environment to a variety of classroom situations. Transfer at this level was evidenced by the teacher making appropriate applications of and accommodations for the newly learned skill or strategy, combining it with known teaching behaviors, and eventually integrating the new behaviors into a personal style of teaching.

Working Hypotheses

Several conclusions about interactions among training components and levels of impact were extrapolated from the investigations analyzed by Joyce and others (Joyce & Showers, 1980; Joyce, Hirsh & McKibbin, 1983). They

qualified these conclusions by presenting them as working hypotheses to guide future researchers.

Figure 1 is an attempt by this researcher to illustrate the relationships among training components and levels of impact that Joyce, Hirsh and McKibbin (1983) have proposed.

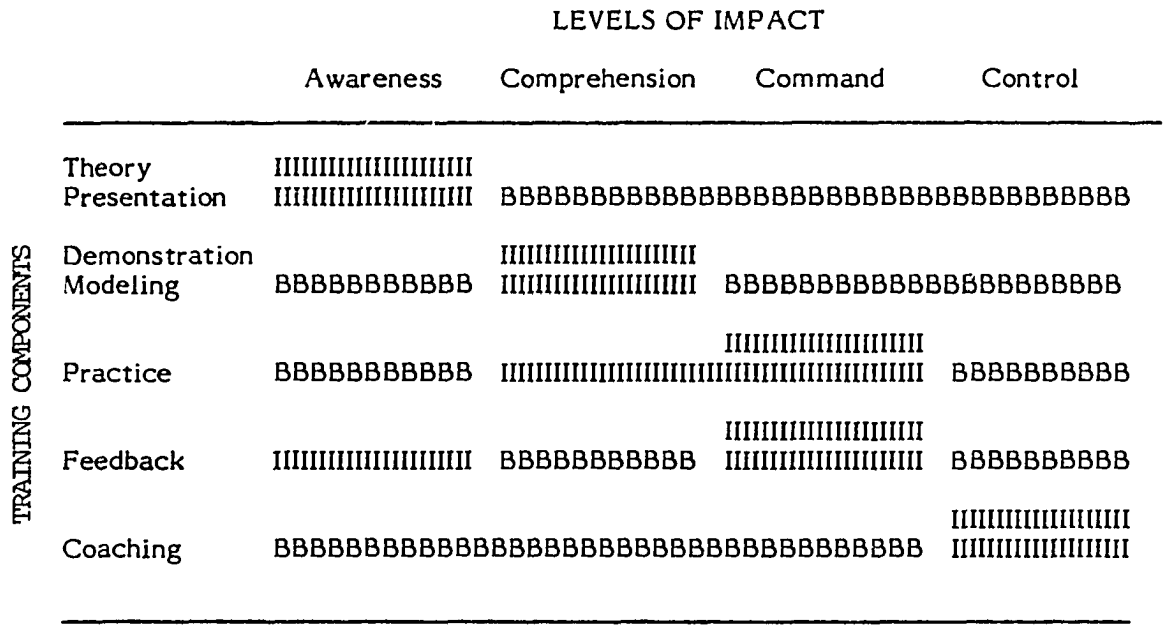

Figure 1. Relationships between training components and levels of impact.

Working Hypothesis 1: When training is limited to methods which present theory and descriptions of teaching behaviors, only in rare instances will trainees be able to demonstrate transfer. However, having been presented with theory

and descriptions, the chances of being able to acquire essential concepts of organized knowledge seem to be increased, so presentation of theory and descriptions of behaviors are said to boost comprehension. When combined with other training components, theory presentation also enhances command and control.

Working Hypothesis 2: When demonstration and modeling are the only methods used for training, the likelihood of transfer is increased, but still only a small percentage of trainees will be able to make the transfer of applications into the classroom. Demonstration and modeling seem to make the theory more meaningful and the skill or strategy more easily recognized, thus augmenting awareness. The combination of the first two components results in an increase in the number of trainees who will achieve transfer. Also, demonstration and modeling seem to make the acquisition of principles and skills easier, thus demonstration and modeling are said to boost command.

Working Hypothesis 3: Figure 1 illustrates that feedback, based on observed teaching behavior, impacts awareness and command. The feedback strategy makes concrete the awareness of present behavior and opens the possibility for consideration of alternatives. Feedback on present behavior serves as a basis for comparison and for interpreting new or different behaviors. In terms of learning new behaviors, feedback has its greatest impact on command of the teaching behavior. The symbols through Comprehension in Figure 1 indicate that feedback, when combined with preceding training components, enhances achievement of comprehension. Having been involved in the process of feedback seems to increase ones ability to apply principles and skills in problem-solving activities, thus boosting control.

Working Hypothesis 4: Similar associations can be extended to the remaining training components and levels of impact in order to construe relationships

among them. The more training components included in a training program the more likely that acquisition, demonstration, and especially transfer will occur for more trainees.

Relationship to the Present Study

The implied relationships represented in Figure 1 provided the impetus for the present study. This study was designed to contribute to an understanding of the relationships among training components and levels of impact in the preparation of preservice teachers through a study of effects.

Training components were established as training phases even though Joyce et al. (1983) emphasized that their analyses did not permit them to infer "that the components must occur in a strict sequence or need to be separated from one another" (p. 144). Learning was recognized as an integrated event and the difficulty to attribute any one component as an isolated factor in the achievement of some intended outcome was also recognized. However, in order to study the effects of training phases, the components were ordered and the focus of instructional strategies, objectives, and learner activities were designed to separate components, thereby establishing the components as training phases.

The levels of impact, as conceived by Shepherd, were envisioned as regions along a continuum of growth expectations. Each subsequent growth expectation required the utilization of increasingly complex thought processes and required the management of an increasingly complex set of concomitant elements in the environment. Perceived in this way, the continuum of growth expectations was related to Gagne's (1970) hierarchy of learning sets in terms of difficulty of task, and to Bloom's (1956) accumulative hierarchy of thinking skills in terms of the thought processes that were involved in each subsequent task. The phrase

continuum of growth expectations was intended to imply that the accumulation of experiences were sequenced in a manner which continually drew upon higher order thought processes and expanded the boundaries for the factors in the environment that must be managed. The accumulative hierarchy concept applied to a continuum of growth expectations led to the speculation that higher order growth expectations subsumed lower order growth expectations and that the accomplishment of subsequent growth expectations was dependent upon the accomplishment of previous ones. The presence or absence of a hierarchy of growth expectations for the accomplishment of a particular teaching behavior was investigated in this study; therefore, this study might also contribute to an understanding of transfer effects in the training of preservice teachers.

STATEMENT OF THE PROBLEM

The problem of this study was to describe the effects of combined training phases on the abilities of student teachers to manage the complexity of Targeted Verbal Reinforcements and to demonstrate achievement of comprehension and command growth expectations regarding Targeted Verbal Reinforcements. Targeted Verbal Reinforcement was the teaching behavior to be learned by subjects in this study.

Complexity of a teaching behavior was assumed to influence the pace and the degree of difficulty student teachers had in moving along the continuum of growth expectations. Complexity was defined and measured in this study in terms of the number of variables, in the behavior itself, that had to be used by student teachers in order to perform in the new way.

Their agility in acquiring new behaviors was also assumed to be influenced by the set of related prior experiences student teachers brought to the instructional event and by their familiarity with the teaching behavior to be learned. Prior knowledge of and performance with Targeted Verbal Reinforcements were measured in this study to acquire base line performance data on the subjects.

TARGETED VERBAL REINFORCEMENTS

The teaching behavior selected for the focus of this study was Targeted Verbal Reinforcements, a term coined by G. D. Shepherd (personal communications, August 1980). This teaching behavior was selected because verbal reinforcement has been demonstrated to have a powerful effect on student learning (Hunter, 1980). Shepherd developed a system for identifying, categorizing, and coding verbal reinforcements which focused on the principle of targetedness. This principle stated that the effectiveness of verbal reinforcement is a function of the specificity encoded in the reinforcement statement.

Targeted Verbal Reinforcements (TVRs) were defined as statements which specified, by their content, the polarity, area, and focus of the reinforcement. Polarity referred to the degree to which a statement was intended to increase or decrease the continuance of the action to which it referred. Statements were judged for polarity as being accepting or rejecting. Area referred to the explicitness with which a statement identified the action being reinforced. Actions were expressed in cognitive, behavioral, or affective terms. Focus referred to the intended recipient of the statement who was either an individual or a group. When a statement failed to explicate any of these three features, it was not identified as a Targeted Verbal Reinforcement (TVR). (See Appendix A for a more complete description of this system.)

It was assumed that all persons had experience in giving and receiving verbal reinforcements. Therefore, it followed that the student teachers in this study possessed, before instruction, an intuitively constructed concept of verbal reinforcements and some operating guidelines for using reinforcements. However, it was thought unlikely that most persons, including these student teachers, had consciously examined and analyzed verbal reinforcement patterns or the effects of verbal reinforcement. Because reinforcements were assumed to exist as part of the student teachers' repertoires of communication behaviors, it was deemed necessary to assess their concepts of and their abilities to apply TVRs in instructional events prior to training. At the same time an entry level of complexity management was obtained to assess the student teachers' abilities to address the variables of TVRs. Polarity, area, and focus, the critical features of TVRs, were the variables used to measure complexity.

RESEARCH QUESTIONS AND HYPOTHESES

Research Questions

The following research questions guided the present investigation:

1. What was the relationship between achievement of growth expectations and training phases?
   a. Were gains made in achievement of growth expectations for comprehension and command, after four training phases, significantly different from gains made after the first two training phases as reflected by mean scores?
   b. Was the training provided during Training Phases 1 and 2 sufficient to enable student teachers to demonstrate mastery of the established growth expectation for comprehension?

c. Did the training provided during Training Phases 1 and 2 effect performance on the growth expectation established for command?

d. Was the additional training provided through Training Phases 3 and 4 sufficient to enable student teachers to demonstrate mastery of the growth expectation established for command?

e. Did the training provided during Training Phases 3 and 4 effect performance on the growth expectation established for comprehension?

2. What was the relationship between training phases experienced and management of the complexity of the behavior to be learned?

   a. Did student teachers demonstrate increased ability to manage the variables of TVRs as they experienced the different phases of training?

   b. Did demonstration of complexity management under training conditions aimed at the comprehension growth expectation differ from demonstration of complexity management under training conditions aimed at the command growth expectation?

3. Was the sequence of growth expectations representative of an accumulative hierarchy?

   Did student teachers consistently achieve criterion for mastery of the comprehension growth expectation before they achieved criterion for mastery of the command growth expectation?

Hypotheses

The following hypotheses regarding the acquisition and demonstration of TVRs by student teachers were tested at the .05 level of significance unless otherwise indicated.

On a measure of achievement of comprehension, Subtest A:

HO_1 There is no significant difference between Pretest and Post Test 1 mean scores.

HO_2 There is no significant difference between Post Test 1 and Post Test 2 mean scores.

HO_3 The proportion of student teachers reaching criterion on Post Test 1 is not significantly different from the proportion reaching criterion on the Pretest.

HO_4 The proportion of student teachers reaching criterion on Post Test 2 is not significantly different from the proportion reaching criterion on Post Test 1.

On a measure of achievement of command, Subtest B:

HO_5 There is no significant difference between Pretest and Post Test 1 mean scores.

HO_6 There is no significant difference between Post Test 1 and Post Test 2 mean scores.

HO_7 The proportion of student teachers reaching criterion on Post Test 1 is not significantly different from the proportion reaching criterion on the Pretest.

HO_8 The proportion of student teachers reaching criterion on Post Test 2 is not significantly different from the proportion reaching criterion on Post Test 1.

On a measure of complexity on the comprehension subtest, Subtest A:

HO_9 There is no significant difference between Pretest and Post Test 1 mean scores.

HO_{10} There is no significant difference between Post Test 1 and Post Test 2 mean scores.

HO_{11} The proportion of student teachers reaching criterion on Post Test 1 is not significantly different from the proportion reaching criterion on the Pretest.

HO_{12} The proportion of student teachers reaching criterion on Post Test 2 is not significantly different from the proportion reaching criterion on Post Test 1.

On a measure of complexity on the command subtest, Subtest B:

HO_{13} There is no significant difference between Pretest and Post Test 1 mean scores.

HO_{14} There is no significant difference between Post Test 1 and Post Test 2 mean scores.

HO_{15} The proportion of student teachers reaching criterion on Post Test 1 is not significantly different from the proportion reaching criterion on the Pretest.

HO_{16} The proportion of student teachers reaching criterion on Post Test 2 is not significantly different from the proportion reaching criterion on Post Test 1.

On a measure to determine whether or not the continuum of growth expectations represents an accumulative hierarchy:

HO_{17} There is no significant difference between the patterns of student teachers depicting the order of attainment of criterion for achievement of comprehension and command. (The test for significance was that 95% of the patterns

showed attainment of criterion for comprehension to be concomitant with or a precondition to the attainment of criterion for command.)

The following hypotheses were tested at the .05 level of significance for differences observed between Pretest and Post Test 2 on achievement, complexity, and attainment of criterion for mastery.

HO_{18} There is no significant difference between Post Test 2 mean scores and Pretest mean scores for both Subtests A and B, respectively.

HO_{19} The proportion of student teachers reaching criterion on Post Test 2 is not significantly different from the proportion reaching criterion on the Pretest for both Subtests A and B, respectively.

RESEARCH DESIGN AND MANAGEMENT OF THE DATA

The research design used for this study was a one-group pretest-post test-post test design. Care was taken to control for as many limitations of this design as possible so that the benefits offered by this design could be realized better. Chapter III provides a detailed description of assumptions and control measures related to the design. The dependent variables for this study were achievement and complexity management. Measures for each dependent variable were taken at each testing period. Training intervention occurred between testing periods. Training Phases 1 and 2 were implemented between the Pretest and the Post Test 1. Training Phases 3 and 4 were implemented between Post Test 1 and Post Test 2.

A competency based, criterion referenced testing instrument was designed for this study. Validity of the test was established by using a content validity procedure. A panel of three experts on TVRs reacted to the instrument in ways

to evaluate its content validity. Reliability of the instrument was measured using a split-half method and the Spearman-Brown correction formula for whole-test reliability. Subjects responses to the criterion referenced instrument provided the data for this study.

The data for each hypothesis related to analyzing the differences between group means on measures of achievement and on measures of complexity for comprehension and command were subjected to the t-test for correlated data. The scores obtained on the Pretest, Post Test 1, and Post Test 2 for each subtest were subjected to an analysis of variance test for repeated measures. Hypotheses 1, 2, 5, 6, 9, 10, 13, 14, and 18 were tested using the procedures just mentioned.

The data for each hypothesis related to analyzing the differences between the proportions of subjects who reached criterion at different testing periods were subjected to a t-test for the difference between proportions for correlated data. The hypotheses tested in this manner included HO 3, 4, 7, 8, 11, 12, 15, 16, and 19.

The following procedure was used to test HO 17 which referred to determining whether or not a hierarchical sequence existed within the continuum of growth expectations.

1. Pattern pairs were recorded for subjects to show when they reached criterion for achievement of comprehension and command.

   0 represented failure to reach criterion

   1 represented attainment of criterion

   Some examples of expected pattern pairs are listed and interpreted below.

   a. Pre-condition Patterns

	Pretest	Post test 1	Post test 2
Comprehension	0	1	1
Command	0	0	1

This pattern pair showed that attainment of criterion for comprehension preceded attainment of criterion for command.

b. Concomitant Patterns

	Pretest	Post test 1	Post test 2
Comprehension	0	0	1
Command	0	0	1

This pattern pair showed that this subject demonstrated attainment of both sets of growth expectations at the same time. Attainment of criterion could have occurred sometime between the administration of Post Test 1 and Post Test 2, but this type of pattern was described as concomitant, meaning that criterion for both comprehension and command occurred at the same time.

Patterns like those illustrated in examples a and b were compatible with patterns that would have been depicted if the continuum of growth expectations, as established, was an accumulative hierarchy.

c. Incompatible Patterns

	Pretest	Post test 1	Post test 2
Comprehension	0	0	0
Command	0	1	1

This pattern pair was an example of the kind of pattern pairs that were inconsistent or incompatible with patterns one could expect to find if the established continuum of growth expectations was an accumulative hierarchy. This pattern pair showed that attainment of criterion for achievement of command occurred before attainment of criterion for achievement of comprehension.

2. A pattern showing the loss of attainment of criterion after once gained (0 1 0) resulted in the pattern pair being classified as compatible or incompatible depending on whether it occurred in the comprehension sequence or the command sequence. Because of an expected regression effect, subjects had to drop below the base criterion line by at least the number of points equivalent to the total possible score for an accurate statement before it was said that they lost criterion. (3 points on Subtest A, 4 points on Subtest B on the measure of achievement)
3. The pattern pairs were categorized and counted and the percentage of patterns in each category was determined.
4. In order for HO 17 to be rejected, 95% of all pattern pairs had to be compatible with those which could be expected if the continuum of growth expectations was an accumulative hierarchy. That is, 95% of the patterns had to be either concomitant or pre-condition patterns. The 95% criterion for this hypothesis was selected so that if this criterion were met, significance could be assumed.

OPERATIONAL DEFINITIONS

Teacher in training referred to both preservice teachers and teachers who were employed as classroom teachers and participated in additional teacher training.

Student teacher referred to the university student who was assigned to a cooperating teacher and a classroom of pupils in a public school with whom they practiced teaching and studied the effects of acquired teaching behaviors.

Teaching behavior was any skill, strategy, model, or procedure used by teachers to accomplish instructional goals, or any deliberate action taken on the part of a student teacher or inservice teacher to influence the learning behavior of classroom students.

Training phase referred to a set of related training methods selected and/or designed to promote the accomplishment of different growth expectations.

Growth expectations were statements of intended performance outcomes of training. They were behavioral descriptions of the ways in which student teachers were expected to perform in relation to the teaching behavior they were learning.

Comprehension was a growth expectation defined as the ability to demonstrate conceptualization of a teaching behavior: by recognizing examples of the behavior, by analyzing the behavior to identify its component parts, by differentiating between positive and negative exemplars of the behavior, and by describing or defining the behavior in terms of its essential attributes.

Command was a growth expectation defined as the ability to perform a teaching behavior in identified events in simulated teaching situations.

Achievement was a descriptor for the measurement of performance of growth expectations.

Achievement of Comprehension referred to the ability to perform in the manner described by the comprehension growth expectation.

Achievement of Command referred to the ability to perform in the manner described by the command growth expectation.

Complexity was a descriptor for the measurement of a student teacher's ability to demonstrate management of the content variables of the behavior being learned. The variables of TVRs by which complexity was measured were polarity, area, and focus.

Reinforcement was any action taken which was calculated to increase, decrease, or extinguish a learner's exhibited behavior.

Targeted Verbal Reinforcements were teacher statements which specified, by their content, the polarity, area, and focus of the reinforcement.

Polarity referred to the degree to which a statement was intended to increase or decrease the continuance of the action about which the statement was made. Polarity was judged as accepting or rejecting.

Area referred to the explicitness with which a statement identified the action being reinforced. Actions were expressed in cognitive, behavioral, or affective terms.

Focus referred to the intended recipient of the statement who was either an individual or a group.

The purpose of this chapter was to introduce this study. In order, the remaining chapters will (a) present a review of related literature; (b) expound the methods used to implement the study; (c) organize, display, and interpret the data; and (d) summarize the study and make recommendations for future research.

CHAPTER II

REVIEW OF THE LITERATURE

Literature selected for this review focused on (a) transfer of training as it applied to teacher training, (b) teaching methods appropriate to preservice teacher training, and (c) teacher verbal reinforcement. Studies cited in this chapter were representative samples of studies reported in the literature between 1960 and 1983 and were selected for inclusion because of their relevance to the present study. The chapter is divided into three sections, one for each area of focus.

TRANSFER OF TRAINING

This section of the literature review will present principles of transfer that are related to learning. A discussion of the application of these principles of transfer to teacher training will also be presented.

Principles of Transfer

"The ability to learn in one situation and then to use that learning, possibly in modified or generalized form in other situations where it is appropriate, is known as transfer of learning" (Hunter, 1979, p. 2). This transfer of learning has been shown to have three different effects. One effect was positive transfer which occurred when the learning of one task facilitated the learning of a subsequent task. A second effect, negative transfer, occurred when subsequent learning was impaired or inhibited by previous learning. A third possibility, referred to as zero transfer, was in effect when learning of one task was shown to have no measurable influence upon the learning of a subsequent task (Klausmeier & Davis, 1969).

Systematic attempts to account for the amount and direction of transfer have focused on task characteristics, organismic or individual characteristics, environmental characteristics, and initial learning (Klausmeier & Davis, 1969; Haberman, 1965; Hunter, 1979). Hunter (1979) identified four factors which have been demonstrated to generate transfer:

(a) The similarity of the situation in which something is learned and the situation to which that learning may transfer,

(b) The student's association of the old and new learnings,

(c) The degree of effectiveness of the original learning, and

(d) The perception of essential or unvarying elements which exist in old and new learnings (p. 9).

According to Klausmeier and Davis (1969) the greater the similarity between two events in terms of stimulus and response variables the greater the likelihood of positive transfer. Hunter (1979) pointed out that teachers must assume responsibility for transfer and identified three ways in which this could be done.

(a) In the selection of appropriate tasks, teachers can control for elements of similarity which will transfer to future learning and for association between prior learning and present learning.

(b) By drawing students' attention to the likenesses and differences in tasks, teachers can control students' focus and thereby reduce potential inhibiting factors.

(c) By guiding students in the identification of invariant elements of learning tasks, teachers foster conceptualization and generalization. Both have been shown to effect positive transfer in a wider range of situations and to be longer lasting than factual knowledge.

Based on his interpretations of some research on transfer, Haberman (1965) advocated the need for teachers to provide many examples and experiences to facilitate generalization and the need to provide numerous opportunities for practice. As reported by Klausmeier and Davis (1969), the study by Callentine and Warren (1955) on concept learning and the study by Morrisett and Hovland (1959) on problem solving demonstrated that practice on a variety of related initial tasks resulted in greater transfer than did constant practice on one type of task.

Gagne (1970) hypothesized that learning set was one of the principal categories of variables essential to explaining and facilitating transfer. Learning sets were clusters of related behavioral objectives that were sequenced in the order to be learned. Gagne demonstrated that through task analysis, sets of related tasks could be organized into a hierarchical structure of simple to complex such that each higher order task was dependent upon the learning of each immediately preceding task. Gagne further demonstrated, particularly in mathematics, that the acquisition of knowledge of increasingly higher complexity was facilitated by the acquisition of learning sets or capabilities which had been identified as relevant prior learning sets. In doing so he demonstrated the positive transfer capabilities of simple tasks to complex tasks.

Bloom and others (1956) developed taxonomies to classify "student behaviors which represent the intended outcomes of an educational process" (p. 12). The taxonomy for the cognitive domain represented an accumulative hierarchical arrangement of "those objectives which deal with recall or recognition of knowledge, and the development of intellectual abilities and skills" (p. 7). The cognitive domain included the behaviors of remembering, reasoning, problem solving, concept formation, and creative thinking. The objectives were divided into

subdivisions and ordered from the simplest behaviors to the most complex behaviors and resulted in the following order of classes of cognitive behaviors: knowledge, comprehension, application, analysis, synthesis, and evaluation. The taxonomical structure of the classes of cognitive skills was intended to reflect the intention of educators to structure learning experiences so that students' behaviors changed from a simple type to a more complex type as they interacted with the content of instruction. The concept of an accumulative hierarchy was represented symbolically with type A behaviors forming one class, type AB behaviors forming the next higher order class and type ABC behaviors forming the next higher order class. Research conducted to test this concept of order and difficulty of mental processes was reported by Bloom to show "an unmistakable trend pointing toward a hierarchy of classes of behavior which is in accordance with our present tentative classification of these behaviors" (p. 19). Klausmeier and Davis concluded a discussion on securing positive transfer by saying that abilities like the mental abilities defined by Bloom and the learning strategies defined by Bruner facilitated positive transfer to subsequent tasks of the same class and to other classes of tasks (Klausmeier & Davis, 1969).

Applications to Teacher Training

Transfer of training as discussed in teacher training research literature has been evaluated under two conditions: (a) the training environment wherein trainees were asked to perform in simulated teaching events, and (b) the teachers' own classrooms. By far, the effects of most teacher training efforts have been evaluated under the first condition (Joyce & Showers, 1981; Mohlman, 1982). In the evaluation of the effects of teacher training, the answers to two questions related to transfer were typically sought. First, had the skill or strategy being taught been acquired as demonstrated by the trainees ability

to perform the skill or strategy on call? Joyce and Showers (1981) indicated that a positive answer to this question reflected the influence of horizontal transfer from the training tasks to the performance task. Second, had the skill or strategy been applied in regular classroom settings in appropriate ways in varied situations? Joyce and Showers (1981) indicated that a positive answer to this question reflected the influence of vertical, cumulative transfer from training tasks to the performance tasks.

Joyce and Showers (1981) concluded that positive vertical transfer of complex teaching skills and strategies was a very complicated phenomenon. The implementation of a newly learned and complex set of behaviors in the classroom was found to require several reorganizations on the part of the teacher. These included: (a) accommodation of new knowledge with prior knowledge; (b) integration of the new behavior with previously established behaviors; (c) reexamination of the curriculum to identify appropriate uses; (d) review and adaptation or extention of goals to accommodate new knowledge, skills, or strategies; and (e) orientation of students toward changes in teaching strategies. The more complex the skills or strategies being learned, the more intensive and extensive the training had to be to insure vertical transfer (Joyce & Showers, 1981; Joyce, Hersh, & McKibben, 1983).

Mohlman (1982) identified two categories of factors surrounding training which influenced the process of change and transfer: organizational factors and training factors. Under organizational factors for inservice teachers such things as school policies, principal leadership styles, and norms for collaboration and experimentation were identified. For beginning teachers expected to make transfer from preservice training, Haberman (1965) cited similar organizational factors as critical elements affecting transfer: leadership of the building

principal, the individual characteristics of a new set of pupils, the climate of the school, and the decision-making demands of the teaching role.

Training factors which Mohlman recognized as influencing the effectiveness of inservice teacher training included characteristics of the skills and strategies being taught, teacher characteristics, and characteristics of training strategies. Characteristics of teaching skills or strategies were discussed as influencing factors in the process of vertical transfer in terms of the degree to which the new learning could be made clear and specific and in terms of the payoff benefits for learner achievement (Mohlman, 1982; Gliessman, 1981).

Differences in individual teacher reception and implementation of recommended practices have been demonstrated sufficiently to convince Johnson and Sloat (1980) to recommend that "teacher training should be individualized as much as possible. Some behaviors were more responsive to particular interventions than were others, some procedures affected certain teachers more than others, and some teachers did maintain behavior change" (p. 114). Gliessman (1981) offered the following generalization about the influence of teacher characteristics: "A set of skills is more likely to be used if a teacher has a philosophical commitment to those skills. To be adopted, a new way of teaching had best be in harmony with a teacher's beliefs about the nature and goals of teaching" (p. 15). Mohlman (1982) may have been describing the same phenomenon in terms of "congruence, the degree of match between the proposal and the teacher's preferred mode of conducting classroom activities" (p. 6).

Characteristics of training strategies as a set of factors related to transfer of training has been researched more fully than either of the other two sets of training factors. Most of the studies reviewed by Joyce and Showers (1980, 1981), Gliessman (1981), and Mohlman (1982) measured acquisition of

skills and strategies. A few studies attempted to measure application and retention of learned teaching skills and strategies in regular classroom settings. The latter studies were concerned with measuring the effects of training components utilized in inservice teacher training events on teachers' classroom performances.

Borg's 1975 study was an example of the kinds of studies reviewed by Joyce, Gliessman, and Mohlman. Borg related the use of protocol materials not only to teacher performance but also to pupil achievement. An experimental group of 25 inservice intermediate grade teachers were trained using four prototype modules which covered 12 specific teaching behaviors. Their performances before and after training were observed and compared with the performances of 15 comparable control-group teachers. The four prototype modules were designed to help teachers use 12 language behaviors that had been found to relate to pupil achievement in at least one previous study. Defining, use of student ideas, cueing, and voice modulation were some of the behaviors being taught through the modules. Each of the modules contained protocol audio and video tapes and protocol transcripts. The steps in the modules included: (a) presenting information, (b) identifying instances of the teaching behavior in audio and video tapes, (c) generating appropriate verbal remarks for transcribed lessons, (d) planning and teaching a 20-30 minute lesson designed to practice the behaviors, and (e) self-analyzing and receiving feedback from another experimental teacher on the lesson taught. Practice of the behaviors was cumulative. The experimental group was reported to have made significant gains in all 12 behaviors as measured by their classroom performances. Frequencies of negative behaviors were reduced to 64% of their pre-training level. Frequencies of positive behaviors were increased to an average of 174% of

their pre-training level. Five of the 12 behaviors were shown to be significantly related to pupil achievement and two others approached significance.

Joyce and Showers (1980) constructed a typology of five components of training: (a) presentation of theory or description of skill or strategy, (b) demonstration or modeling, (c) practice, (d) feedback, and (e) coaching. An analysis of 16 studies selected by Mohlman (1982) and Joyce and Showers (1981) yielded two basic conclusions. First, vertical transfer of the most complex teaching strategies (usually models of teaching) occurred in situations where all five components of training were employed. Second, vertical transfer of less difficult or less complex skills or strategies occurred in situations where various combinations of less than five training components were employed. The variety of skills or strategies being taught and the varied methods used to measure change in behavior made it difficult to generalize from these studies to future training events.

TRAINING METHODS FOR TEACHERS

This section of the literature review will examine research related to the efficacy of instructional methods used in the preparation of teachers. Studies selected for review focused on protocol training materials which have emerged since the late 1960's and research related to practice and feedback.

Protocol Training Materials

Othanel Smith (1969) in Teachers for the Real World built a case for the need to place fundamental concepts at the center of teacher education programs. He recommended the development of protocol materials to illustrate key concepts drawn from psychology, sociology, and philosophy. Such materials were expected to reproduce behaviors in life-like situations and exemplify

theoretical or conceptual elements of the disciplines as they applied to teaching. Between 1969 and 1974 approximately 140 protocol products had been developed as part of the Protocol Materials Project of the U S Office of Education (Cooper, 1975).

Cooper (1975) collected 73 samples of films, video tapes, audio tapes and typed dialogues of classroom interactions from this project and studied them for evidence of the effectiveness of protocol materials in the improvement of teaching. Concepts being taught through the protocol materials included such teaching ideas as extension, clarity, feedback, assessment, goal setting, task roles, antigroup roles, questioning, cognitive interaction, and syntactic features of Black English. Cooper examined reported results on the use of these protocol materials for evidence of:

(a) changed behavior of children taught by teachers who had been trained by protocol materials,

(b) changed on-the-job performance of trainees, and

(c) concept learning as tested following instruction using the protocol materials (p. 70).

Results of Cooper's analyses showed that no attempts had been made to discover the influence on behavior of students, and only one study showed that the use of protocols resulted in favorable changes in teaching behavior. Cooper noted that the primary explanation for lack of evidence of this type was due to the short term of the grants funding the development of protocol materials. Twenty-five of the programs that were reviewed provided evidence on the acquisition of concepts and all 25 indicated positive results.

The one study which provided evidence of change in teacher behavior tested six protocol modules dealing with the language concepts of extension,

encouragement, clarity, emphasis, feedback, and organization as they related to teaching. A criterion level requiring 80% mastery by 80% of the subjects for each module was established. Subjects were evaluated on their ability to recognize teacher use of a concept presented on film and in typed manuscripts of class discussions, and on their application of the concept to typed manuscripts of classroom discussion lessons. More that 80 percent of the subjects reached the criterion level of mastery on all three criterion measures for each module (Borg, 1973).

One of the first studies of the use of video-taped protocol materials for instructional purposes was a study done by Fitzgerald (1971) to determine the effects of a perceptual modeling concept on the verbal behaviors of student teachers. The experimental group received perceptual modeling instruction via video tape, live modeling and discussion over 10 categories of a modified Flanders Interaction Analysis System (Flanders, 1967). The control group received symbolic modeling instruction through discussion and other verbal means, but no modeling through live or video-taped demonstrations was available. During their student teaching, subjects were observed five times for 15 minutes each time during a variety of instructional lessons. Those student teachers who had received perceptual modeling instruction were reported to have exhibited significantly different verbal behavior patterns on 13 of the 16 variables tested. Fitzgerald concluded that the use of the video tape recorder to present modeling sequences of definite behaviors was an effective instructional technique and an effective means of transmitting behavior.

Rezba and Anderson (1976) conducted a study comparing the training effects of a printed model and a video tape model on science teachers' acquisition of verbal behaviors intended to elicit inquiring behaviors from students.

The instructional treatment of training with video tape protocols was reported to have significant effects on 10 of 14 indirect criterion variables as measured by Flanders Interaction Analysis System during two consecutive instructional episodes.

Another study in the science area assessed the effects of model viewing accompanied by the use of a teaching analysis strategy on preservice teachers' selection of science teaching strategies. Data collected via video tape during student teaching were analyzed. The results indicated that the experimental treatment which combined both methods in the training demonstrated significant effects on the teaching styles and attitudes of the subjects (Yeany, 1977).

Kleucker (1974) investigated the direct, differential, and combined-effects outcomes of protocol and skill training instruction. Thirty-eight undergraduate students enrolled in an educational psychology course were randomly assigned to four groups, three experimental treatment groups and one control group. Subjects received either protocol instruction, skill training instruction, both, or neither. Asking probing questions and offering accepting reactions served as the content base for instruction. Protocol instruction involved identification or recognition of exemplars of each concept, but students were given no practice in generating their own exemplars. Training instruction bypassed the identification and recognition activities and went directly to writing or orally responding to stimuli that called for a probing question or an accepting response. This group also taught three lessons to peers which were video-taped and accompanied by instructor feedback. The third experimental group had both sets of instruction in twice the length of time. In other words, the two strategies were not integrated. Non-related instruction was provided for the control group and for each of the first two experimental groups to serve as a time variable control.

The results of the study, as reported by Kleucker (1974), indicated that:

(a) Protocol and skill training instruction lead to acquisition of concepts and skills, respectively;

(b) Neither one alone appeared to lead to differential outcomes; that is, both lead to concept and skill acquisition; and that

(c) A combination of the two strategies is at least as effective and frequently significantly more effective, than either type of instruction used alone (p. 24-25).

Martin and Fanslow (1980) conducted a study using home economics preservice teachers to investigate the effectiveness of live-model versus videotape-model presentations on the acquisition of knowledge and on a measure of performance in two teaching strategies, demonstration teaching and laboratory teaching. This study also contrasted the effectiveness of practice with no practice of the strategies in a micro-teaching experience. Though the authors explained why the results needed to be interpeted conservatively, they claimed that their results suggested that the type of instruction and practice versus no practice had no effect on performance ratings for either teaching strategy.

Gliessman (1981) suppported the utilization of protocol materials in preservice teacher training over the traditional practicums and internships because the use of protocol materials enabled teacher educators to control and guide experiences. He considered the gaining of control over the models and examples that were observed by preservice teachers important because substantial evidence existed regarding the effects of observational learning on behavior changes.

Laktasic (1976) pointed out the salient features of simulated teaching events including reproductions of classroom teaching events. These features were the identical and similar elements of events to which preservice teachers

must transfer knowledge and skills. Simulated observations, possible through protocol materials, were supported as well because of their potential to enhance decision-making skills by providing trainees the opportunity to identify and react to instructional situations like those they may encounter later.

Another reason Gliessman (1981) supported protocol materials was because they were concept based. He cited several concept based studies which he believed confirmed the following generalizations:

a. concept learning in the absence of practice influences teaching performance,

b. concept acquisition scores increase along with increased use of the skills to which they refer, and

c. a positive relationship {exists} between level of concept acquisition and frequency of using the referent skills (p. 7).

Practice and Feedback

In the context of preservice teacher education, Gliessman (1981) defined practice as "performing under controlled conditions with the intention of improving one's performance" (p. 8). Conditions for practice have taken many forms. Microteaching, peer teaching, and role playing were identified by Laktasic (1976) as simulation activities which provided the similarities essential for generalization to parallel classroom situations. These learning situations have often been the situations in which preservice teachers practiced their skills. These practice situations have enabled educators: (a) to control for the complexity of the teaching setting, (b) to arrange the content and conditions for practice, and (c) to focus the practice on targeted skills (Gliessman, 1981).

Practice as a step in a learning sequence has been very difficult to isolate and an attempt to isolate it has not been thought to be useful. "Ample evidence shows that training on the basis of this sequence (overview followed by practice followed by feedback) results in changes in teaching performance" (Gliessman, 1980, p. 8).

Feedback as defined by Joyce and Showers (1980) and by Gliessman (1981) referred to information gained by teachers about their use of a teaching skill, strategy or process and about the resulting effects. Gliessman (1981) said, "Gaining information on their own classroom performance has been found to significantly affect teachers in various aspects of teaching" (p. 10). He cited studies on the use of indirect influence, studies on varying the level of questions asked according to pupil responses, and a study on style of body posture to support his statement.

The Good and Brophy (1974) study of the effects of feedback on practicing teachers interactions with first graders demonstrated that through feedback teachers could be influenced in several ways. They could be influenced to prolong their contacts with low extension pupils, to initiate contacts with low participating pupils, and to provide more second chances for pupils in low groups.

VERBAL REINFORCEMENT

Much of the reinforcement research in educational settings has focused on the power of teacher verbal reinforcement to influence student achievement and behavior. Stringer and Thomas (1981) presented a set of confirmed generalizations abstracted from a review of research literature, extending from 1924 through 1980, which related verbal praise to achievement, behavior, and motivation. They abstracted the following eight generalizations.

1. Some form of attention, either praise or criticism, is more effective in reinforcing student achievement than is ignoring achievement.
2. Positive verbal reinforcement generally leads to improved achievement.
3. Praise can result in improved achievement, but only when it is congruent with student needs.
4. Incongruent praise can inhibit student motivation.
5. Inappropriate classroom behavior can best be controlled by ignoring rather than punishing.
6. Verbal praise reinforces appropriate behavior.
7. Extrinsic rewards lessen intrinsic motivation.
8. Praise is effective and not detrimental to students intrinsic motivation when it is used as informational feedback.

Teacher verbal reinforcers in the form of acceptance or rejection statements were found to convey to students the appropriateness or inappropriateness, the accuracy or inaccuracy, the desirability or undesirability of students' beha-viors. Another powerful message found to convey rejection of a behavior was the practice of ignoring the behavior; that is, no verbal reinforcement followed the behavior that was being rejected. Most research studies conducted in classrooms have used these three broad categories of acceptance, rejection, and ignoring, or variations thereof, to classify the reinforcement actions of teachers.

No studies were found in this researcher's review of the literature which examined specifically the extent to which specificity or clarity of verbal reinforcement statements increased the power of the effects of reinforcement

treatments in changing social or academic behaviors of children in school settings. Nevertheless, authors of several educational psychology books as well as conclusions from several research studies speak to the necessity for specificity or clarity in the presentation of verbal reinforcement. In a discussion of reinforcement as feedback to learners, Biehler (1978) encouraged teachers to supply not only frequent and immediate but also detailed feedback when teaching most subjects to elementary school children or when teaching factual information to older students. In relationship to the studies reviewed concerning congruent praise and the relationship between verbal praise and intrinsic motivation, Stringer and Thomas (1981) concluded that "using feedback to describe the specific and the particular behavior or accomplishment keeps the praise from being vague, too general to be helpful or incongruent" (p. 11). Research since 1970 has begun to differentiate the effects of verbal reinforcers when used to affect behavior and when used to affect academic behaviors. Fish and White (1978) conducted a study to determine if task variables influenced the effects of verbal reinforcement. They examined student output on tasks that had been classified for levels of interest and performance feedback inherent in the tasks under reinforcement conditions of approval, disapproval, and neutrality. Teacher verbal reinforcement, both positive and negative, was found to effect student participation in terms of number of tasks completed. However, the authors concluded that accuracy on tasks "can only improve if students receive feedback in the form of precise knowledge of how to improve performance. The motivating power of verbal reinforcement and task interest are dependent on a necessary third variable, usable performance feedback" (p. 147). The benefits of reinforcement theory lay in the analysis of the behavior to be changed (Hunter 1980). Hunter found that teachers must be specific in identifying the

behavior to be changed and exact in defining the new behavior to be learned. She found that this analysis process led teachers and children to a clear understanding of what new behaviors were desired.

The previous references to specificity were seen by this researcher to be related to Shepherd's Targeted Verbal Reinforcements. His Targeted Verbal Reinforcement System was found to be unique in the organization and specificity it offered to the study of verbal reinforcement. It not only recognized the broad categories of acceptance, rejection and ignoring, but further differentiated statements as to whether they targeted the cognitive, affective, or behavioral domains of learning. The focus dimension of the Shepherd system permitted analysis of reinforcement distribution patterns in the classroom and analysis of the effects of reinforcement on individual children. Utilization of the Targeted Verbal Reinforcement System in training teachers provided Shepherd and his collegues with an organizational schema for the presentation of theory regarding verbal reinforcement, a map for guiding discrimination learning, and a tool for analyzing interaction patterns in the classroom as they related teacher verbal reinforcement performance to student participation and to student achievement.

CHAPTER III

RESEARCH DESIGN

The research design used in this study was a one-group, pretest-post test-post test design. Figure 2 illustates this design by specifying the dependent variables that were monitored through testing and the independent variables that constituted the treatment.

Pretest	Treatment	Post Test 1	Treatment	Post Test 2
1. Mean achievement scores on comprehension and command 2. Mean complexity scores on comprehension and command 3. Proportions of subjects attaining criterion for mastery on: a. Achievement of comprehension and command b. Complexity for comprehension and command	Training phase 1 and 2 1. Presentation of theory and description of teaching behavior 2. Demonstration and modeling	Same as pretest	Training phase 3 and 4 3. Practice 4. Feedback	Same as pretest

Note: Dependent Variables: Achievement and Complexity measures of comprehension and command. Independent Variables: Training Phases

Figure 2. The research design used in this study.

Limitations of this Design

The discussion which follows presents the possible limitations an experimenter must consider when selecting the one-group, pretest-post test design for a research study. Van Dalen (1966) explained that the one-group pretest-post test design made it difficult for an experimenter to ascertain whether the differences between the scores on the tests were produced by the treatment or some other factors such as selection, mortality, history, maturation, pretesting, statistical regression, instrument variables, or the interaction among factors.

When the same subjects took the pretest and subsequent tests, selection and mortality were controlled, but if some subjects were dropped from the experiment, the mortality factor may have produced the difference in results. The pretest was considered a possible limitation to the extent that it provided practice or motivation that enabled subjects to do better on subsequent post tests. If subjects were selected on the basis of extreme scores, this decision introduced statistical regression as a possible factor accounting for differences in scores. Taking measures from different types of records or tests has also been found to account for differences. The length of time between tests and the duration of the experiment has been found to influence the extent to which history and maturation may interact with treatment to explain differences in test results.

Van Dalen further explained that this design was suitable when the independent variable was likely to produce a drastic effect, when the interval between testing periods was brief, and when the dependent variable was not apt to change unless a deliberate effort was made to bring about a change. Assumptions were made and precautions were taken during the present study to control for the potential threats to internal validity presented by this particular research design.

Offsetting the Limitations

The assumption was made that student teachers could not achieve comprehension or command of TVRs simply by retaking the test several times. Participants in the study received no feedback on their test performances, and the specific content of the test was not used for instructional purposes.

Joyce et al. (1983) hypothesized that nearly 9 out of 10 trainees acquire skill in a teaching behavior after completing the four training phases, if that training has been well conceived and delivered. Introducing a test prior to instruction and at an intermediate time prior to completion of training was assumed to have no marked effect on the results occurring at the completion of Training Phase 4.

A matter of concern for this study was whether or not the administration of a pretest was a variable interacting with training to account for some student teachers being able to demonstrate achievement of comprehension or command at the completion of Training Phase 2. Training for achievement of comprehension during Training Phases 1 and 2 was intense and explicit. In contrast to this intense training, any influence the taking of a pretest might have carried was assumed to be minimal. Joyce et al. (1983) did not consider that the types of activities selected or designed for Training Phases 1 and 2 had a direct impact on the achievement of command. Without such training, any growth made toward achievement of command was assumed to be due more likely to the relationship between achievement of comprehension and command rather than due to the taking of a pretest.

The pretest controlled for the intervening variables of prior knowledge of and skill with TVRs. Since the student teachers were instructed and tested as one unit, any potential effect of test sensitivity was assumed to have effected

all persons randomly. The same test was used repeatedly, thus eliminating instrument variables as a possible limitation.

The test was designed in a manner to allow student teachers to respond without using special or technical terminology. Therefore, persons taking the test were assumed to respond in ways that reflected their conceptualization of and skill with TVRs at any given time. The test accommodated growth in comprehension and command by accepting a range of behaviors in response to the test items.

The proximity of the tests reduced the number and effects of intervening variables that could account for growth besides the training. Pretesting occurred on Day 1 of the study prior to any instruction on TVRs. Post Test 1 occurred two calendar days later on the 3rd day of instruction following nearly 7 hours of instruction on TVRs. Post Test 2 was administered nine calendar days later. Of these nine days, four were instructional days comprised of nearly 11 hours of instruction on TVRs.

This research design was selected because of the manner in which it enabled the researcher to investigate the effects of training phases on the achievement of growth expectations. The pretest established the entry level of performance for subjects in the study. The effects of training phases were measured in terms of the differences between the group mean scores obtained on the pretest and subsequent post tests.

The purpose of two post tests was to analyze the differential effects of training phases. Significant changes in mean scores from Pretest to Post Test 1 could likely be attributed to the intervening training experienced during Training Phases 1 and 2. Significant changes in mean scores from Post Test 1 and Post Test 2 could likely be attributed to the effects of the intervening

training experienced during Training Phases 3 and 4. Patterns of change could be examined for evidence to support the acceptance or rejection of the thesis that particular training phases impact differently the achievement of growth expectations for comprehension and the achievement of growth expectations for command.

SELECTION OF SUBJECTS

Seventy-one undergraduate students were enrolled in student teaching and a curriculum and instruction course during the final semester of the elementary teacher education program at the University of Oklahoma in the spring of 1984. Forty of these student teachers became the subjects for this study.

Eleven of the 71 student teachers were selected out of the group using a table of random numbers. These 11 student teachers received additional training in TVRs and in group leadership skills. This training enabled them to provide a leadership service to their peers during the clinic sessions of Training Phases 3 and 4 wherein student teachers practiced their skills.

The data on 20 additional student teachers were incomplete and dropped or were not used because these student teachers were absent on one or more days of instruction. Absenteeism resulted from an infectuous virus that swept through the school communities in which these 20 persons were serving as student teachers.

INSTRUMENT

A written, competency based, criterion referenced test was developed for this study. The test consisted of two parts: Subtest A measured the subjects'

performances on comprehension of TVRs, while Subtest B measured performances of subjects on command of TVRs. (See Appendix B for a copy of the subtests.)

A written test was chosen for this study because of certain advantages it offered for measuring command. They were as follows:

(a) An instructional transcript permitted the researcher to test for all selected forms of TVRs in one setting.

(b) The instructional event contained in the transcript was the same for all subjects tested.

(c) The test designer controlled for appropriate actions displayed and for the content of the instruction.

(d) Having the dialogue of an instructional event in writing allowed each subject to encode the messages and actions displayed in the transcript at an individual pace.

(e) Having subjects record their responses reduced the likelihood of miscoding responses by the observer/evaluator.

Subtest A

Comprehension of TVRs was assumed when subjects achieved the following growth expectation: Given a random assortment of 64 teacher-response statements and six teacher-intent statements, student teachers will select, with 90% accuracy, four teacher-response statements for each teacher-intent statement that match the target specified in the teacher-intent statement. A teacher-response statement was a verbal statement that a teacher might make in response to student participation. A teacher-intent statement was a written reinforcement plan that a teacher might establish in order to affect student learning and/or student participation in a desired way.

In Subtest A each teacher-intent and -response statement had been designed to reflect a particular combination of attributes, such that, for each teacher-intent statement there existed a unique set of five response statements that were TVRs, and at least five distractors that were plausible responses to the intent statement, but were not TVRs. Directions told student teachers to select four response statements for each teacher-intent statement that would most enable the teacher to fulfill his/her intent and to indicate their choices under the appropriate teacher-intent statement.

Subtest B

Command of TVRs was assumed when subjects achieved the following growth expectation: Given a transcript of an instructional event from which intention-directed reinforcement statements have been deleted, and instructed to generate teacher-response statements consistent with given teacher-intent statements, student teachers will generate appropriate TVR statements at appropriate intervals in the transcript with 75% accuracy. An intention-directed response statement was a verbal reinforcement statement that shared the same attributes as those specified in the teacher-intent statement. In Subtest B, student teachers responded to a transcript of an instructional lesson having three parts and three teacher-intent statements, one for each part. Directions told them to identify instances in the lesson when the teacher had an opportunity but did not make a response that could have helped fulfill the intentions. The directions also told student teachers to generate response statements that would be intention-directed and to write those statements into the transcript at appropriate intervals.

Scoring the Test

The test was scored to obtain two measures: (a) a measure for achievement of growth expectations for comprehension and command; and (b) a measure for complexity, the ability to manage the three variables of TVRs. A complexity measure was obtained from both subtests. A criterion level for mastery was established for both achievement and complexity.

Obtaining Achievement Scores

The achievement score for Subtest A was obtained by totaling the points awarded to each response statement placed under the six teacher-intent statements. Each response statement selected had a possible value range of 0 to 3 points. One point was awarded for each accurate attribute of polarity, area, and focus contained within the selected response statement. An attribute was accurate when it matched the attribute specified in the teacher-intent statement. A statement was awarded a zero-point value if it was not a reinforcement statement. An example of a non-reinforcement statement was a question or a direction. The total possible achievement score for comprehension was 72.

The achievement score for Subtest B was obtained by totaling the points awarded to each interval in the transcript. Each interval had a possible value of -4, 0, 1, 2, 3, or 4 points depending on whether or not the subject generated a response statement for that interval. An interval with nothing written into it was awarded zero points. An interval designated by the scoring key as an intention-directed opportunity interval, into which a subject had written a response statement, was scored in this manner: one point for recognizing an intention-directed opportunity; and one point for each accurate attribute of

polarity, area, and focus contained within the written statement. Such an interval was awarded from 1 to 4 points. An interval was awarded -4 points if it was not designated by the scoring key as an intention-directed opportunity interval and the subject indicated that it was an opportunity. Such an action was interpreted as evidence that the subject was operating consistent with comprehension or awareness growth expectations. The total possible achievement score for command was 76.

Obtaining Complexity Scores

A complexity score, as defined for this study, was a reflection of the ability of subjects to manage the three variables of TVRs; polarity, area, and focus. Each response statement a subject selected in Subtest A and each statement a subject generated for a designated intention-directed opportunity interval in Subtest B was scored for complexity. A non-reinforcement statement received a zero-point value.

It was possible to obtain up to three points for each statement to be scored. One point was awarded for each variable used whether or not the attributes of those variables were accurate. For example, one point was awarded for area if the content of the statement specified an attribute of area, whether that attribute was affective, behavioral, or cognitive. The total possible score for complexity on Subtest A, measuring comprehension, was 72. On Subtest B, measuring command, the total possible complexity score was 57.

Determining Mastery

Subjects attained criterion for mastery on achievement of comprehension when they obtained a raw score of at least 65. This score was chosen by

determining the score a subject would obtain if 90% of all the selected response statements had a 3-point value.

Criterion for mastery on achievement of command was attained when the total raw score obtained was equivalent to or higher than a score obtained when 75% of the intention-directed opportunity intervals were awarded a 4-point value. There were 19 intervals designated as opportunities for intention-directed responses. Therefore, the raw scores of subjects who attained the 75% criterion for mastery on achievement of command ranged from 57 to 76.

Subjects attained criterion for mastery of complexity on the comprehension subtest when the total raw score was equivalent to or higher than a score obtained when 90% of the statements scored were awarded a 3-point value for complexity (65 or above). Criterion for mastery of complexity on the command subtest was attained when the obtained total raw score was equivalent to or higher than a score obtained when 75% of the statements scored were awarded a 3-point value for complexity (43 or above).

Test Content Validity

Test content validity was established by using a panel of three persons who were experts in the use of the Targeted Verbal Reinforcement System. Panel members responded to five validity questions on a draft of the test. The questions were:

(a) Was the design of this test an adequate design for measuring comprehension and command growth expectations as defined for this study?

(b) Were the directions specific and clear?

(c) Was the transcript in Subtest B a reasonable simulation of a classroom instructional event?

(d) Did the teacher-intent statements in Subtests A and B and the teacher-response statements in Subtest A clearly reflect the attributes of polarity, area, and focus for which they were designed?

(e) In the transcript of Subtest B, did the student responses that were designed to signal an intention-directed opportunity interval clearly signal the opportunity? Did any other student responses signal an intention-directed opportunity?

The three panelists responded independently to the test in two ways:

(a) In Subtest A they coded each teacher-intent and -response statement for attributes of polarity, area, and focus.

(b) In Subtest B they coded each teacher-intent statement, identified each intention-directed opportunity interval, and in each such interval wrote the codes for all acceptable responses.

The test designer then compared the panelists' codes to a scoring key which noted the desired codes for each statement and interval. A conference was held with each panelist to discuss discrepent codes and other concerns related to content validity. In the process, recommendations were made for revision to make the test more valid. All final revisions were shared with the panelists. At that time the panelists concurred that the test satisfactorily met their standards for content validity.

Test Reliability

The split-half method used to determine test reliability was applied to Subtest A and to Subtest B. The two subtests were treated independently because of design differences. The reliability coefficient of each subtest was estimated from the Spearman-Brown formula for estimating reliability from two comparable halves of a test.

Three strategies for splitting each subtest into halves were considered. One strategy was the random distribution of items based on the assumption that all items are of equal difficulty. This strategy was rejected because items within each subtest varied in difficulty and a randomized distribution would not necessarily have resulted in an equal distribution of items that varied in level of difficulty.

The second strategy considered was a distribution of items based on level of difficulty. This method was applied to both subtests. By determining the proportion of subjects who scored less than the highest number of possible points for each item, the items were rank ordered from least difficult to most difficult and numbered. The sums of odd numbered items made up one variable and the sums of even numbered items made up the second variable. For Subtest A, the resulting simple correlation coefficient of .41 was corrected by the Spearman-Brown formula yielding a correlation coefficient of .58 for the whole subtest. For Subtest B, the resulting simple correlation coefficient of .68 was corrected by the Spearman-Brown formula yielding a correlation coefficient of .81 for the whole subtest.

The third strategy considered and used for both subtests was a distribution of items based on a conceptual scheme. In each subtest the items were examined and grouped for conceptual similarity and then distributed so that approximately the same number of similar items appeared in each half of each subtest. For Subtest A one variable was made up of the sums of 3 items, A, D, and E. The second variable was made up of the sums of the remaining 3 items, B, C,and F. As a result, the halves were conceptually equivalent in the attributes of TVRs represented. The resulting simple correlation coefficient of .32 was corrected by the Spearman-Brown formula yielding a correlation coefficient of .48 for the whole subtest.

For Subtest B, each variable was comprised of an equal number of items from each of the following groups:

Group 1 Intervals which followed a teacher statement and for which the appropriate response was no response.

Group 2 Intervals which followed a student participation and for which the appropriate response was no response.

Group 3-7 Intervals which followed a student participation and for which the appropriate response was:

(Gp. 3) rejection of the cognitive action of an individual,

(Gp. 4) acceptance of the cognitive action of an individual,

(Gp. 5) acceptance of the affective action of an individual,

(Gp. 6) acceptance of the behavior or conduct of a group,

and (Gp. 7) rejection of the behavior or conduct of a group.

The resulting simple correlation coefficient of .63 was corrected by the Spearman-Brown formula yielding a correlation coefficient of .77 for the whole subtest.

The two split-half reliability tests conducted on each subtest yielded comparable results for that subtest. The reliability coefficients of .58 and .48 for Subtest A were moderate test-retest reliabilities which averaged .53. The reliability coefficients of .81 and .77 for Subtest B were moderately high test-retest reliabilities averaging .79. These correlation coefficients were satisfactory for competency based, criterion tests which tend to be characterized by restricted ranges of variability.

TRAINING PROCEDURES

The subjects in this study participated in training experiences intended to move them systematically through a continuum of growth expectations from

awareness through command. The curriculum and instruction course which student teachers were enrolled in during their field experience was the instructional setting for this study. Approximately 18 hours distributed across seven instructional days were devoted to instruction on and practice with TVRs. The student teachers met for instruction in a large group setting, though occasionally they were divided into small work groups or worked independently on monitored practice activities. They were instructed by two University of Oklahoma faculty members. One was a professor of elementary education and one was an instructor in the elementary education department. Both instructors had been trained in the Targeted Verbal Reinforcement System, had taught the system previously to at least three groups of preservice or inservice teachers, and had had extended practice in interpreting, categorizing, and coding reinforcement statements in live situations. The two instructors team-planned and team-taught the course.

Behavioral objectives were written for each training phase to express the intended growth expectations and to guide the selection and/or design of appropriate training activities. While no attempt was made to measure the effects of training on awareness, behavioral objectives were written and activities were conducted that focused on awareness in Training Phase 1. Objectives and activities designed for Training Phase 2 focused on comprehension. The measurement of comprehension at the end of Training Phase 2 reflected the combined effects of Training Phase 1 (presentation of reinforcement theory and description of TVRs) and Training Phase 2 (the demonstration and modeling of TVRs). Training Phases 3 and 4 (practice and feedback) were interlocked in that every practice session was followed by structured feedback either from peers, the instructors, or through self-analysis. Consequently, the measurement of command at the end of Training Phase 4 reflected the combined effects

of practice and feedback training as well as the effects of prior learning from Training Phases 1 and 2. The following outline illustrates the perceived relationships among training phases, growth expectations, and training activities. TO stands for terminal objective and EO stands for enabling objective. TO 1 and its related EO's were specified for the accomplishment of awareness. TO 2 and its related EO's were specified for the accomplishment of comprehension. TO 3 and its related EO's were specified for the accomplishment of command.

Training Directed Toward Awareness and the Achievement of the Comprehension Growth Expectation: Training Phases 1 and 2

Training Objectives

TO 1 Having been presented with a theory of verbal reinforcement which highlights the relationships among reinforcement, teacher initiation, and student participation, and a tool for collecting classroom observation data, student teachers will demonstrate awareness by orally citing examples of verbal reinforcement statements from their observations, and by relating those to the situations in which they were used.

EO 1.1 When engaged in a range of verbal interactions in the instructional setting, student teachers will identify the subset of verbal reinforcement statements being expressed.

EO 1.2 After being instructed in the use of selective verbatim, a data collection tool, student teachers will record: (a) 3 live classroom events in which they observe verbal reinforcement statements made by the teacher, and (b) a description of the situations in which the reinforcement statements were used.

TO 2 Given a random assortment of 64 teacher-response statements and six teacher-intent statements, student teachers will demonstrate comprehension at a 90% accuracy level by selecting four teacher-response statements for each teacher-intent statement that match the target specified in the teacher-intent statement.

EO 2.1 When presented with two sets of reinforcement statements which differ in one or two attributes, student teachers will identify the attributes of polarity, area, and focus in which the sets differ.

EO 2.2 When presented with labeled verbal reinforcement statements, student teachers will identify the components within each statement that justify the label.

EO 2.3 When presented with unlabeled verbal reinforcement statements, student teachers will identify those statements which are targeted and non-targeted, and justify their decisions in terms of the attributes of polarity, area, and focus.

EO 2.4 Given a system for categorizing verbal reinforcement statements, student teachers will apply the system to data collected from live teaching demonstrations and label each statement correctly.

Training Activities

Training Phase 1 - Theory Presentation and Description of Targeted Verbal Reinforcement

Activity 1 *(TO 1) (30 min.) (Day 1). A lecture presentation was given which established TVR responses to student participation as a significant teacher action in the cycle of classroom instructional events comprised of teacher initiation, student participation, and teacher response. Drawing on generalizations from reinforcement theory and Deci's (1975) research discussing the function of verbal reinforcement in motivation, a rationale was structured and presented to the student teachers which established TVRs as a keystone to shaping, reshaping and/or maintaining desired student participation.

Activity 2 (EO 1.1) (30 min.) (Day 1). The student teachers were engaged by one instructor in a discussion of the lecture presentation which occurred in Actvity 1. They were each given flags and instructed to raise their flags each time they recognized that the instructor was reinforcing their participation. The second instructor monitored the flag raising and periodically focused the student teachers' attention on the appropriateness or inappropriateness of the flag raising which occurred. This instructor cued, verified, corrected, and/or explained the first instructor's usage of verbal reinforcement.

*Note: A parenthetical notation like (TO 1) or (EO 1.2) indicates which objective this activity was designed to support. A notation like (30 min.) represents the time interval that was required to complete this activity. A notaton like (Day 1) indicates on which instructional day this activity occurred.

Activity 3 (EO 1.2) (45 min.) (Day 1). The student teachers were directed to make arrangements with their cooperating teachers to conduct three 15-minute observations for the purpose of recording teachers' verbal reinforcement statements. Student teachers were directed to use the selective verbatim (Acheson & Gall, 1980, chap. 6) observation tool. In this manner, for each observation the student teachers recorded for 15 consecutive minutes exactly what the teachers said each time they attempted to reinforce student participation. The student teachers also wrote brief descriptions of each situation which they observed.

Activity 4 (EO 2.1) (35 min.) (Day 2). Through an inquiry activity, student teachers invented the variables of the Targeted Verbal Reinforcement System: polarity, area, and focus. By analyzing prepared sets of positive and negative exemplars of TVR statements, student teachers were led systematically to recognize the different attributes of polarity, area, and focus. They also used the attributes to create (invent) definitions of polarity, area, and focus. Then the instructor presented a completed table of the Targeted Verbal Reinforcement System.

Activity 5 (EO 2.2) (10 min.) (Day 2). Student teachers were presented with labeled examples of verbal reinforcement statements. That is, they were told if a statement was accepting, rejecting, or ignoring; if the statement was directed to a group, an individual, or the direction was questionable; and, if the content of the statement was cognitive, affective, behavioral, or unknown. The student teachers identified the components of each statement which justified the given labels.

Training Phase 2 - Demonstration and Modeling

Activity 1 (EO 2.3) (10 min.) (Day 2). Student teachers were presented with codes for the Targeted Verbal Reinforcement System. Then student teachers practiced assigning codes to the reinforcement statements they had previously analyzed for the attributes of polarity, area, and focus (Training Phase 1, Activity 4).

Activity 2 (EO 2.3) (45 min.) (Day 2). Student teachers were presented with a practice sheet containing 25 unlabeled examples of verbal reinforcement statements. The student teachers coded the first five statements without assistance, then the instructors listed the appropriate codes and clarified any discrepencies between the instructors' codes and those of the student teachers. Next, the practice sheet was completed by the student teachers as they worked independently. The instructors listed the appropriate codes for the remaining examples, and student teachers discussed with their peers any discrepencies between the listed codes and their codes. Finally, any discrepencies which student teachers were unable to reconcile among themselves were brought before the group and resolved by the instructors.

Activity 3 (EO 2.3) *(Homework) (Day 2). Student teachers were assigned the task of coding the verbal reinforcement statements of the classroom teachers whom they had observed (Training Phase 1, Activity 3). They were also asked to memorize the codes for the Targeted Verbal Reinforcement System.

*Note: The parenthetical notation of (Homework) is used to indicate that this activity was completed outside of the instructional setting and that the lapse time for this activity is unknown.

Activity 4 (EO 2.3) (40 min.) (Day 3). Verification of the coding on the homework assignment occurred in this manner. The instructor announced a code for a category of verbal reinforcement statements, such as 5bi (acceptance of the behavior of an individual). The student teachers presented statements from their observations which they thought matched the code and belonged to that category. The instructor accepted or rejected their statements and explained why. This sequence was repeated until each category had been discussed. Then student teachers identified the most frequent category of verbal reinforcement statements used in each situation observed. A discussion followed which highlighted the differences which existed among situations for any one classroom teacher in terms of the frequency distribution of verbal reinforcement categories.

Activity 5 (EO 2.4) (30 min.) (Day 3). Student teachers were organized into groups of five. Within each group, each student teacher, in turn, followed this procedure: first, generated a cue for participation; second, attended to the participation; and third, attempted to generate a targeted verbal statement which reinforced the participation. For each set of these three actions, the group members agreed upon the appropriate code for the verbal reinforcement statement generated. One student teacher in each group was identified as the recorder. The recorder kept a running list of the codes for the verbal reinforcement statements generated within the group. This list was used by the group to monitor the variety of verbal reinforcement statements generated and to help the group assess its ability to generate statements which were targeted. The instructors monitored the groups' progress, modeled appropriate actions for the task, and verbally reinforced the actions of individuals and groups.

Activity 6 (EO 2.4) (1 hr. 35 min.) (Day 3). One instructor conducted a 30-minute demonstration lesson using the group leaders as students. The second instructor prepared the remaining student teachers for making structured observations of verbal reinforcement, collected observation data, and guided the student teachers in verifying, organizing, displaying, and interpreting observation data. The student teachers who were not participating in the demonstration lesson collected observation data on the verbal reinforcement statements made by the demonstration instructor. All student teachers participated in the verification of data, and in the organization, display, and interpretation of the verified data.

The demonstration lesson was divided into three 10-minute segments. During each segment the student teachers collected data on one or more variables of verbal reinforcement statements using the Verbal Reinforcement Observation Instrument (see Appendix D). During segment one, the student teachers collected data only on the polarity variable. They coded each observed verbal reinforcement statement as accepting, rejecting, or ignoring. During segment 2, the student teachers collected data on the polarity and area variables. For the area variable, they coded the content of each observed verbal reinforcement statement as affective, behavioral, cognitive, or questionable. During segment 3, the student teachers collected data on the polarity, area, and focus variables. For the focus variable, they coded each observed verbal reinforcement statement as directed to a specified individual, directed to a specified group, or unidentified.

Before each demonstration segment, the second instructor stated the objective to be reached during that segment, modeled verbal reinforcement statements like those which might be observed, and illustrated the procedure for coding and recording data. During each demonstration segment this same

instructor collected data using two tools, selective verbatim and the Verbal Reinforcement Observation Instrument. Following each 10-minute demonstration segment the second instructor performed these actions:

(a) Recited verbal reinforcement statements observed in the sequence that they occurred and told how they were coded,

(b) Obtained a frequency count on each of the attributes of verbal reinforcement statements being observed,

(c) Displayed the organized data in chart form, and

(d) Guided the student teachers through interpretation of the data by making descriptive statements and by asking questions of the student teachers that led them to make descriptive statements about the data.

Training Directed Toward Achievement of the Command Growth Expectation: Training Phases 3 and 4, Practice and Feedback

Training Objectives

TO 3 Given a transcript of an instructional event from which intention-directed reinforcement statements have been deleted, and instructed to generate teacher-response statements consistent with given teacher-intent statements, student teachers will generate appropriate TVR statements at appropriate intervals in the transcript with 75% accuracy.

EO 3.1 Student teachers will plan, execute, and record three instructional lessons in which the focus of reinforcement in one event is on affect, in another event on behavior, and in another on cognition.

EO 3.2 After participating in several demonstration events and when given a guide outlining the process, student teachers will self-analyze their verbal reinforcement patterns and evaluate their performances during single teaching episodes.

EO 3.3 Student teachers will plan and execute peer teaching events during which they will practice generating at appropriate opportunities TVR statements which are consistent with their statements of intent.

EO 3.4 By participating in peer teaching and structured feedback events, student teachers will (a) collect observation data; (b) analyze observation data to identify patterns of reinforcement; (c) make statements which describe the patterns observed and relationships noted among verbal reinforcement, student participation and achievement of the lesson objective; and (d) evaluate teaching performance based upon stated intentions.

EO 3.5 For two classroom instructional assignments involving verbal interactions among student teachers and students, student teachers will designate reinforcement intentions which match intended learner outcomes, execute the assignments, and self-analyze the results.

Training Activities

Training Phases 3 and 4 - Practice and Feedback

Training activities for Training Phase 3, practice, and Training Phase 4, feedback, were designed so that feedback always followed practice. While practice and feedback were recognized as two separate sets of actions, the

practice of utilizing TVR statements in realistic and simulated situations provided the content for feedback sessions. Therefore, each of the training activities conducted for purposes of moving student teachers toward achievement of the command growth expectation contained both a practice component and a feedback component.

Activity 1 (EO 3.1 and 3.2) (50 min.) (Day 3). Through a three step process, the instructors modeled a procedure for conducting a self-analysis of one's own patterns of verbal reinforcement statements.

Step 1: creating a statement of intent. Included in a statement of intent were (a) behavioral objective(s) that indicated what students were expected to achieve in the lesson to be taught, (b) a reinforcement plan that specified by code the TVR intentions of the teacher, and (c) examples of verbal reinforcement statements that matched the code(s) and that were appropriate to the intended lesson objective(s). Such a statement of intent was created for a demonstration lesson prepared for step 2 of the process being modeled.

Step 2: teaching and recording the lesson. Student teachers were told that for self-analysis purposes they would tape record their lessons. For purposes of modeling the process, however, one instructor and the student teachers who did not participate in the demonstration lesson recorded the verbal reinforcement statements observed during the teaching demonstration using the selective verbatim tool.

Step 3: analyzing and evaluating the teacher's performance. Time was given for the observers to code the verbal reinforcement statements which they observed. The instructor who participated in the observation verified the coding of observed verbal reinforcement statements. Under this instructor's guidance, the data were organized, displayed, and interpreted in the manner

described in Activity 6 (Training Phase 2). By comparing the performance and intentions of the demonstration instructor, it was possible to evaluate the instructor's ability to execute the stated reinforcement plan.

Activity 2 (EO 3.1 and 3.2) *(In-classroom assignment) (Day 3). The student teachers were required to plan three lessons, each approximately 15 minutes in length. These lessons were conducted and recorded in the student teachers' assigned classrooms. One lesson required that student teachers focus on an affective objective for students and execute an affective TVR plan. Another lesson required that student teachers focus on a behavioral objective for students and execute a behavioral TVR plan. The third lesson required that student teachers focus on a cognitive objective for students and execute a cognitive TVR plan.

To complete the assignment, student teachers coded and analyzed their data and evaluated their performances. Instructors provided student teachers with a Reinforcement Practice Document Guide (see Appendix E) which illustrated the format they were to use to document their fulfillment of the assignment. This guide followed the format used in modeling the self-analysis process described in Activity 1 (Training Phases 3 and 4).

Activity 3 (EO 3.3) (50 min.) (Day 4). The student teachers were seated at tables accommodating four to five persons. Three student teachers from each table were designated to write on a specified chalkboard an objective

*Note: The parenthetical notation of (In-classroom assignment) is used to indicate that this activity was executed in the student teachers' assigned classrooms. Completion of the assignment also required the use of personal time outside the classroom and the instructional setting. The time interval for this activity varied among student teachers.

from one of the lessons thay had taught for Activity 2 (Training Phases 3 and 4). One person listed an affective objective; the second person listed a behavioral objective; the third person listed a cognitive objective. Each set of objectives was listed on a different chalkboard.

While the objectives were being written on the chalkboards, the remaining student teachers analyzed each objective based on given criteria for appropriateness, clarity, and specificity, and made notes about those objectives which did not meet the criteria. An objective met the criterion for appropriateness if it communicated the intent for the set of objectives in which it was placed. For example, if the objective were listed on the chalkboard designated for affective objectives, then students for whom the objective was written were expected to perform in affective ways. An objective met the criterion for clarity if two or three student teachers could explain the objective in similar terms. An objective met the criterion for specificity if it described specific conditions, specific student actions, and specific means for measurement.

The instructors led a discussion to confirm the criteria using three or four objectives listed on each chalkboard. The objectives were rewritten as necesssary to satisfy the criteria for appropriateness, clarity, and specificity.

Activity 4 (EO 3.3) (2 hrs.) (Day 4). Student teachers were assigned to one of 10 task groups. Each task group was assigned one affective, one behavioral, and one cognitive objective. Then the instructors guided the student teachers through a 3-step process to create a list of TVR statements for each assigned objective. The process was repeated three times, once for affective objectives, once for behavioral objectives, and once for cognitive objectives.

Step 1: Using controlled brainstorming, each person in each task group in turn suggested a TVR statement that would be consistent with the objective.

These statements were recorded by all persons in the task group. No discussion took place at this time.

Step 2: Each TVR statement suggested was clarified among the group members so that each person in the task group, if asked, could explain how it was appropriate to the objective and how it was targeted. Statements were refined and rewritten as necessary.

Step 3: Each statement that was processed through Step 2 was recorded on chart paper and displayed for sharing with the class.

While the task groups worked, the instructors circulated among the groups to clarify directions and to reinforce on-task behaviors of task group members. A time for browsing was allotted during the lunch break so that student teachers could benefit from the work of all task groups.

Activity 5 (EO 3.3 and 3.4) (1 hr.) (Day 4). The student teachers were divided into two groups. Each group contained five or six of the group leaders who participated in the demonstration teaching events with the instructors. All other student teachers in each group participated as observers. Each instructor conducted a walk-through demonstration lesson. The instructors selected a teaching model comprised of several distinct phases. In this case the Concept Attainment Model of Teaching was selected (Weil & Joyce, 1978). For each phase of the teaching model the following sequence of actions occurred:

(1) The instructor stated the student objective, described the teaching procedure, and designated the intended reinforcement plan to the observers.

(2) The instructor engaged the observers in generating possible TVR statements that would be appropriate to the student objective and to the teaching procedure being used.

(3) One phase of the lesson was executed while the observers collected selective verbatim samples of the instructor's verbal reinforcement statements.

(4) The observers gave the instructor feedback. The instructor described what he/she recalled and asked for confirmation. The observers cited specific examples of the verbal reinforcement statements observed. All student teachers participated in describing the effects they observed TVRs' having on individual student participation and on the accomplishment of the stated student objective.

Activity 6 (EO 3.3) (20 min.) (Day 4). The instructors discussed with student teachers the elements of an instructional plan for teaching a lesson. These elements included the content to be taught, behavioral objectives, information to be presented, directions to be given, student activities, questions to guide learning, materials needed, amount of time available, use of physical space, the sequence of events, and a reinforcement plan. Student teachers were directed to develop a plan for teaching a 15-minute lesson to three of their peers and to consider each of the elements previously discussed in developing the teaching plan. They were also directed to prepare a statement of intent card which identified three components of the lesson plan: (a) behavioral objective(s), (b) a Targeted Verbal Reinforcement plan, and (c) examples of TVR statements which could be anticipated.

Activity 7 (EO 3.3 and 3.4) (20 min.) (Day 5). Student teachers were given an orientation to a TVR peer teaching clinic. The orientation provided information about purpose, roles, functions, organization and management. The instructor introduced a new observation instrument (See Appendix F) and explained its use, both in terms of collecting data and identifying relationships among the use of TVRs, student participation, and achievement of the student objective.

Student teachers studied and discussed a handout which specified the purposes of the clinic, the procedures to be followed, the time schedule, and included an illustration of how to use the new instrument. (See Appendix F for the handout.) Earlier in the course the student teachers had participated in a similar clinic for the purpose of practicing and receiving feedback on their use of question types. For that event more time was taken to develop the concept of a clinic. (See Appendix G for a handout that was used for the question type clinic in the development of the clinic concept.)

Activity 8 (EO 3.3 and 3.4) (3 hrs. 50 min.) (Day 5). All student teachers participated in six cycles of peer teaching and structured feedback during a peer teaching clinic. Each cycle consisted of preparation for a teaching event, the teaching of a 15-minute lesson, analysis of the collected observation data, and evaluation of the lesson. The time interval for each cycle ranged from 35 to 45 minutes, the first cycles requiring more time and the last cycles requiring less time.

Eleven of the student teachers acted as group leaders. In the role of group leader, their responsibilities were (a) to provide organization, (b) to designate the rotation of roles, (c) to monitor time, (d) to prepare the observers, (e) to guide the observers through analysis and sharing of the data, (f) to assist all group members in noting relationships and evaluating the lesson, and (g) to keep all group members on task.

The remaining student teachers rotated among the roles of peer teacher, observer, and student. Each student teacher taught one lesson, formally observed two lessons, and participated in the analysis and evaluation of six lessons. During the cycles the instructors moved from group to group assisting group leaders and group members in whatever ways were deemed necessary.

Activity 9 (EO 3.5) (45 min.) (Day 5). The instructors presented to the student teachers a completed observation data sheet that had been designed to engage the student teachers in an analysis of a simulated teaching event. The data sheet was constructed in a manner that would illustrate certain possible relationships among verbal reinforcement, question types, student participation, and the lesson objective. The instructors guided the student teachers in organizing and displaying the data so that these relationships became evident. Then a discussion followed which focused on these relationships and on ways a teacher could use this information to guide future teaching behaviors.

Activity 10 (EO 3.5) (30 min.) (Day 5). The instructor presented a lecture focusing on the balance between reinforcement theory and practice. Lecture topics included the relative power of different attributes of verbal reinforcement statements when applied in different situations, and schedules of reinforcement.

Activity 11 (EO 3.5) (In-classroom asssignment). The student teachers identified two situations in the classroom during which they had opportunities to practice matching verbal reinforcement intention with performance. Prior to engaging in each situation they formulated a reinforcement plan and wrote it down. Shortly after each situation passed, the student teachers made notations recalling as much of their verbal reinforcement performance behavior as possible. Then the student teachers compared their performances with their intentions, noted the discrepencies, if any, and made a plan for future action. A written report was made of the outcomes of this process and presented to the instructors.

Activity 12 (TO 3) (30 min.) (Day 7). Student teachers discussed their reflections on experiences with TVRs. Topics for discussion included insights, inferences, relationships, questions, concerns, and doubts. Throughout the discussion the instructors focused the student teachers' attention on the

relationships between teacher intent and performance, and supplemented the experiences of the student teachers with their own experiences and experiences reported to them by other teachers.

CHAPTER IV

PRESENTATION AND ANALYSIS OF THE DATA

This chapter is organized around the three basic questions set out by the hypotheses. Since one basic question dealt with achievement, all achievement data regarding comprehension and command are presented together. The second basic question dealt with complexity, so all complexity data are presented together. The third basic question dealt with hierarchy, and all the data related to that question are presented together.

Due to illness among participants in the curriculum and instruction course, the size of the anticipated pool of subjects was reduced . This consequence raised concern about the effect that the loss of potential subjects had upon the representation of individual differences among the remaining subjects. The first section of this chapter describes the actions taken to deal with this concern and presents the results. The remaining sections of this chapter describe the analysis procedures used to test each set of hypotheses and present the results.

SUBJECTS

The description of the selection of subjects presented in Chapter III established that the 40 subjects in this study were a subset of an intact group of 71 student teachers. Statistical tests were run to determine whether or not the subjects of this study and the student teachers who were excluded from the study differed in significant ways.

A two-tailed t-test to determine the difference between independent means with unequal Ns was applied to three sources of data and evaluated at the .05 level of significance. One source of data was pretest scores for

achievement of comprehension. A second source was pretest scores for achievement of command, and the third source was grade point averages recorded for student teachers at the end of the term preceding student teaching. Table 1 summarizes the results.

The resulting t-scores (.33, .33, .27) for all three sets of data were within the range for accepting the null hypotheses of no significant differences between the means. These results can be interpreted to mean that the two groups of student teachers did not differ on the measures taken.

Table 1

Summary of t-tests for Independent Means Comparing Subjects and Student Teachers Excluded from the Study

Source	X	Y	df[a]	t	t_{crit}[b]
Achievement/Comprehension	57.46	56.85	59.49	.33	2.00
Achievement/Command	5.96	5.23	63.10	.33	2.00
Grade Point Averages	3.23	3.21	67.92	.27	1.99

Note. X = the group whose data was excluded; Y = the subjects of the study

[a] N_x for the first two sources was 28; the N_x for the third source was 31. The N_y for all three sources was 40.

[b] $p < .05$

TESTING THE HYPOTHESES

Hypotheses Regarding the Differences in Means on Measures of Achievement of Comprehension and Command

Null hypotheses 1, 2, 5, 6, and 18 referred to the comparisons of means obtained from measures of achievement on comprehension and command growth expectations. In summary, these hypotheses stated that there would be no significant differences among Pretest, Post Test 1, and Post Test 2 mean achievement scores on either comprehension or command. The obtained means and standard deviations for each subtest are shown in Table 2.

Table 2

Means and Standard Deviations Obtained on Repeated Measures of Achievement

Subtests A and B		Pretest	Post Test 1	Post Test 2
A. Comprehension	$\bar{X}$	56.85	64.08	67.90
	SD	7.73	6.09	5.06
B. Command	$\bar{Y}$	5.23	31.20	38.85
	SD	9.90	14.06	14.78

Comparison of the means across trials revealed an increase in mean scores from Pretest to Post Test 1 to Post Test 2 on each growth expectation. An

analysis of variance test for repeated measures was applied to the means obtained for achievement on each of the two subtests in order to determine whether or not the observed increase was representative of a statictically reliable improvement. The results of these ANOVAs are reported in Table 3. A check on the significance of the obtained Fs confirmed that the observed increase in means across trials was not a chance occurrence, thus supporting the rejection of hypothesis 18 regarding measures of achievement. The result for comprehension was $F(2,78) = 46.48$, $p < .01$. The result for command was $F(2,78) = 90.82$, $p < .01$. Inspection of the variances also confirmed that although some subjects consistently did better than others without regard to trial (Ss / Interaction T x Ss), the differences among subjects were not greater than the differences among trials (Ss / T).

Table 3

Summary of Analysis of Variance for Repeated Measures on Achievement

Source	Sum of Squares	df	Mean Squares	F	F_{crit}
Achievement of Comprehension (Subtest A)					
Trials T	2519.12	2	1259.56	46.48	4.88**
Subjects Ss	2661.92	39	68.25	2.52	1.84**
Interaction TxSs	2113.55	78	27.10		
Total	7294.59				
			$\frac{Ss}{T}$ =	.05	19.47

Achievement of Command (Subtest B)					
Trials T	24851.52	2	12425.76	90.82	4.88**
Subjects Ss	9376.66	39	240.43	1.75	1.54*
Interaction T x Ss	10671.81	78	136.82		
Total	44899.99				
			$\frac{Ss}{T}$ =	.02	19.47

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

Testing of null hypotheses 1, 2, 5, and 6 was approached using a two-tailed t-test for dependent means. The results shown in Table 4 led to the rejection of each hypothesis.

Table 4

Summary of t-tests for Dependent Means Comparing Measures of Achievement

Source	df	t	Significance
Achievement of Comprehension			
Subtest A Pre - PT 1	39	5.48	p <.01
Subtest A PT 1 - PT 2	39	4.89	p <.01

Achievement of Command			
Subtest B Pre - PT 1	39	12.18	$p < .01$
Subtest B PT 1 - PT 2	39	2.53	$p < .05$

Note. Pre = Pretest; PT = Post Test

$t_{crit}{}^{\alpha}.05 = 2.023$;

Hypotheses Regarding the Differences in the Proportions of Subjects Who Reached Criterion for Mastery on Achievement

Null hypotheses 3, 4, 7, 8, and 19 referred to the proportions of subjects who reached criterion for mastery on measures of achievement of comprehension and command growth expectations. In summary, these hypotheses stated that there would be no significant differences among Pretest, Post Test 1, and Post Test 2 results in terms of the proportion of subjects who reached criterion for mastery. A two-tailed t-test for the difference between proportions for correlated data was used to test these hypotheses. Table 5 presents the data and the results.

Table 5

Summary of t-tests for Differences Between Proportions on Measures of Achievement

Source	N	p	r	t	Significance
Achievement of Comprehension					
Pretest Subtest A	6	.15			
P T 1 Subtest A	23	.575	.29	-5.31	$p < .01$
P T 1 Subtest A	23	.575			
P T 2 Subtest A	34	.85	.62	-4.58	$p < .01$
Achievement of Command					
Pretest Subtest B	0	0			
P T 1 Subtest B	0	0	.41	0	NS
P T 1 Subtest B	0	0			
P T 2 Subtest B	3	.075	.12	-1.875	NS

Note: P T = Post Test; N = number of subjects; p = proportion; r = correlation coefficient;

$t_{crit} \propto .05 = 2.023$

On the basis of the t-tests performed on the obtained proportions, hypotheses 3 and 4 were rejected. The proportion of subjects who attained criterion for mastery on the measure of achievement of comprehension on Post Test 1 was significantly different from the proportion who attained criterion on the Pretest {$t(39) = -5.31$, $p < .01$}. The proportion who attained criterion on Post Test 2 was significantly different from the proportion who attained criterion on Post Test 1 {$t(39) = -4.58$, $p < .01$}. Hypotheses 7 and 8 were accepted. There was no significant difference between the proportions of subjects who attained criterion for mastery on the measure of achievement of command between the Pretest and Post Test 1, and neither was a significant difference found between the proportions for Post Test 1 and Post Test 2. Hypothesis 19 comparing differences between proportions on the Pretest and Post Test 2 was rejected for comprehension, but accepted for command.

Hypotheses Regarding the Differences Between Means on Measures of Complexity

Null hypotheses 9, 10, 13, 15, and 18 referred to the comparisons of means obtained from measures of complexity on Subtests A and B. In summary, these hypotheses stated that there would be no significant differences among Pretest, Post Test 1, and Post Test 2 mean complexity scores on either comprehension or command subtests. The obtained means and standard deviations for complexity from each subtest are shown in Table 6.

Table 6

Means and Standard Deviations Obtained on Repeated Measures of Complexity

Source		Pretest	Post Test 1	Post Test 2
Subtest A	$\bar{X}$	61.70	67.20	69.38
	SD	6.97	4.77	4.00
Subtest B	$\bar{Y}$	5.83	31.10	34.43
	SD	7.01	12.28	9.07

Comparison of the means across trials showed an increase in means from Pretest to Post Test 1 to Post Test 2 on each subtest. An analysis of variance test for repeated measures was applied to the means obtained for complexity on each subtest in order to determine whether or not the observed increase was representative of a statistically reliable improvement. The results of these ANOVAs are reported in Table 7.

Table 7

Summary of Analysis of Variance for Repeated Measures on Complexity

Source	Sum of Squares	df	Mean Squares	F	F_{crit}
		Subtest A - Comprehension			
Trials T	1251.82	2	625.91	28.14	4.88*
Subjects Ss	1667.32	39	42.75	1.92	1.84*
Interaction T x Ss	1734.85	78	22.24		
Total	4653.99				
			$\frac{Ss}{T}$ =	.07	19.47
		Subtest B - Command			
Trials T	19571.22	2	9785.61	139.93	4.88*
Subjects Ss	5556.37	38	142.47	2.04	1.84*
Interaction T x Ss	5454.78	78	69.93		
Total	30582.37				
			$\frac{Ss}{T}$ =	.01	19.47

*$p < .01$.

A check on the significance of the obtained Fs confirmed that the observed increase in means across trials was not a chance occurrence, thus supporting

the rejection of hypothesis 18 regarding measures of complexity. The result for comrehension was $F(2,78) = 28.14$, $p < .01$. The result for command was $F(2,78) = 139.93$, $p < .01$. Inspection of the variances also confirmed that although some subjects consistently did better than others without regard to trial (Ss / Interaction T x Ss), the differences among subjects were not greater than the differences among trials (Ss / T).

Testing of null hypotheses 9, 10, 13, and 14 was approached using a two-tailed t-test for dependent means. The results shown in Table 8 led to the rejection of each hypothesis 9, 10, and 13. The differences between the Pretest and Post Test 1 means and between Post Test 1 and Post Test 2 means on measures of complexity from Subtest A were real differences. The same was true for the differences between the Pretest and Post Test 1 means on measures of complexity from Subtest B. However the difference between Post Test 1 and Post Test 2 means on Subtest B could not be said to be significantly different from 0. Therefore, hypothesis 14 was accepted.

Table 8

Summary of t-tests for Dependent Means Comparing Complexity Means

Source	df	t	Significance
Management of Complexity on Subtest A			
Pre - PT 1	39	4.69	$p < .01$
PT 1 - PT 2	39	3.00	$p < .01$

Management of Complexity on Subtest B

Pre - PT 1	39	14.69	$p < .01$
PT 1 - PT 2	39	1.61	NS

Note. Pre = Pretest; PT = Post Test

$t_{crit}{}^{\alpha}.05 = 2.023$

Hypotheses Regarding the Differences in the Proportions of Subjects Who Reached Criterion for Mastery on Complexity

Null hypotheses 11, 12, 15, 16, and 19 referred to the proportions of subjects who reached criterion for mastery on measures of complexity on each subtest. In summary, these hypotheses stated that there would be no significant differences among Pretest, Post Test 1, and Post Test 2 results in terms of the proportion of subjects who reached criterion for mastery on measures of complexity. A two-tailed t-test for the difference between proportions for correlated data was used to test these hypotheses. Table 9 presents the data and the results.

Table 9

Summary of t-tests for Differences Between Proportions on Measures of Complexity

Source	N	p	r	t	Significance
Management of Complexity on Subtest A					
Pretest	18	.45			
Post Test 1	30	.75	.24	-3.33	$p < .01$
Post Test 1	30	.75			
Post Test 2	35	.875	.46	-2.08	$p < .05$
Management of Complexity on Subtest B					
Pretest	0	0			
Post Test 1	7	.175	.47	-2.92	$p < .01$
Post Test 1	7	.175			
Post Test 2	6	.15	.28	.42	NS

Note: N = number of subjects; p = proportion; r = correlation coefficient;

$t_{crit}{}^{\alpha .05} = 2.021$

On the basis of the t-tests performed on the obtained proportions, hypotheses 11, 12, and 15 were rejected. The proportion of subjects who attained criterion for mastery of complexity on Post Test 1 of Subtest A was significantly different from the proportion who attained criterion on the Pretest of Subtest A {$t(39) = -3.33$, $p < .01$}. The proportion who attained criterion on Post Test 2 of Subtest A was significantly different from the proportion in Post Test 1 {$t(39) = -2.08$, $p < .05$}. The proportion who attained criterion on Post Test 1 of Subtest B was significantly different from the proportion who attained criterion on the Pretest of Subtest B {$t(39) = -2.92$, $p < .01$}. Hypotheses 16 was accepted. There was no significant difference between the proportions of subjects who attained criterion for mastery of complexity between Post Test 1 and Post Test 2 of Subtest B. Hypothesis 19 comparing the differences between proportions obtained from the Pretest and Post Test 2 was rejected for both subtests.

Relating Complexity and Achievement

Correlation coefficients obtained by comparing sets of scores on achievement and complexity confirmed that the relationship between complexity and achievement for each testing event was positive and substantial. Table 10 lists the obtained correlation coefficients for each comparison that was made.

Table 10

Results of Correlation Measures on Paired Sets of Achievement and Complexity Scores

Source	SD	r
Subtest A Pretest - Achievement	7.73	
Subtest A Pretest - Complexity	6.97	.85
Subtest A Post Test 1 - Achievement	6.09	
Subtest A Post Test 1 - Complexity	4.77	.83
Subtest A Post Test 2 - Achievement	5.06	
Subtest A Post Test 2 - Complexity	4.00	.98
Subtest B Pretest - Achievement	9.90	
Subtest B Pretest - Complexity	7.01	.88
Subtest B Post Test 1 - Achievement	14.06	
Subtest B Post Test 1 - Complexity	12.28	.88
Subtest B Post Test 2 - Achievement	14.78	
Subtest B Post Test 2 - Complexity	9.07	.88

Hypothesis 17

Hypothesis 17 stated that the patterns of student teachers depicting the order of attainment of criterion for mastery of achievement of comprehension and command would not be significantly different from each other. Two of four classes of pattern pairs emerged that were expected and one class was created to accommodate unexpected emergent pattern pairs.

Patterns that represented attainment of mastery of comprehension prior to the attainment of mastery of command were classified as Pre-condition patterns. In order to be classified as a pre-condition pattern the subject had to demonstrate mastery of achievement of comprehension on one test and each succeeding test thereafter. Also mastery of achievement of command had to occur at least one test later than the test at which mastery of achievement of comprehension was first demonstrated. Obtained patterns that were classified as Pre-condition patterns are shown below. The 0 represents non-mastery and 1 represents mastery. The first numeral in each pattern represents the condition of mastery on the Pretest. The second numeral represents the condition of mastery on Post Test 1, and the third numeral represents the condition of mastery on Post Test 2.

Pre-condition patterns

	1	2	3	4	5	6	7
Comprehension	1 1 1	1 1 1	1 1 1	1 1 1	0 1 1	0 1 1	0 1 1
Command	0 0 0	0 0 1	0 1 1	0 1 0	0 0 0	0 0 1	0 1 0

Pattern 7 was classified as a Pre-condition pattern because mastery of achievement of command was not maintained through Post Test 2.

Examples of two classifications of patterns that were anticipated in the study did not surface. One expected classification was Concomitant patterns

which would show that mastery of achievement of comprehension and command occurred at the same time. The other anticipated classification was Incompatible patterns. These would show that mastery of achievement of command preceded mastery of achievement of comprehension.

One classification was created to accommodate emergent patterns that did not fit the predetermined classifications. This set of patterns was classified as Questionable. The essential characteristic of these patterns was that mastery of achievement was not maintained over successive trials.

Questionable Patterns

	1	2	3	4	5	6	7
Comprehension	1 1 0	1 0 1	1 0 1	1 0 0	0 1 0	0 0 1	0 0 1
Command	0 0 0	0 0 0	0 1 0	0 0 0	0 0 1	0 1 0	0 0 0

An additional pattern that was classified as questionable was characterized by non-mastery on all repeated measures. The pattern was 0 0 0 for both comprehension and command.

The criterion for rejecting hypothesis 17 established that 95% of the obtained patterns must represent pre-condition and concomitant patterns. Only 57.5 percent of the obtained patterns satisfied this condition, so hypothesis 17 had to be accepted based on the preassigned criteria. Since the 95% criteria was an arbitrarily selected high percentage, a post hoc analysis was done using a Chi-square to test the significance of the differences between the obtained patterns and the patterns that would be expected to emerge by chance. Sixty-four permutations of patterns were generated which represented all possible permutations for pattern pairs having three slots and two variables for each slot. Each of these pattern pairs were classified as either pre-condition,

concomitant, incompatible, or questionable pattern pairs. The frequency of each type of pattern pair was determined and then proportions were calculated that indicated what proportion of the 64 pattern pairs was represented by each classification. These proportions were used to determine the expected frequency of pattern pairs for each classification in a set of 40 pattern pairs.

The results of the Chi-square test, displayed in Table 11, led to the rejection of a hypothesis of no difference between the obtained and expected frequencies $\{\chi^2\ (3, N = 40) = 38.69, p < .001\}$. The patterns that were obtained were significantly different from a distribution of pattern pairs that would be obtained by chance, but this in itself did not answer the question of whether comprehension and command growth expectations were hierarchically related.

Table 11

Summary of Chi-square Test Applied to Patterns of Mastery

Source	Obtained	Expected	χ^2
Pre-condition Patterns	23	8	38.69*
Concomitant Patterns	0	1	
Incompatible Patterns	0	8	
Questionable Patterns	17	23	

*$p < .001$ with df = 3; $\chi^2_{crit} \propto .05 = 7.82$

Interpretations and conclusions regarding the data presented and analyzed in this chapter will follow in Chapter V.

CHAPTER V

SUMMARY, DISCUSSION OF FINDINGS, CONCLUSIONS, AND RECOMMENDATIONS

SUMMARY

The purpose of this study was to contribute to an understanding of the relationships among training components and levels of impact in the preparation of preservice teachers. For this study training components were ordered and structured into phases of training. Levels of impact were translated into performance behaviors and treated as growth expectations. The problem under investigation was to describe, through a study of effects, the impact of combined training phases on the abilities of student teachers to manage the complexity of Targeted Verbal Reinforcements and to demonstrate achievement of comprehension and command growth expectations regarding Targeted Verbal Reinforcements.

Subjects were 40 undergraduate students at the University of Oklahoma who were enrolled in student teaching in the elementary school and a corequisite course in curriculum and instruction. The curriculum and instruction course was the instructional setting for the training. The study was conducted within 12 calendar days. Approximately 18 hours of instruction on targeted verbal reinforcements occurred throughout 7 days.

The research design for the study was a one-group pretest-post test-post test design. Data were obtained from the responses of subjects to a written, competency based, criterion referenced test designed specifically for this study. The following 5-step sequence describes the implementation of this design.

Step 1: Subjects were pretested on the dependent variables to obtain achievement and complexity scores. Achievement scores on the Pretest expressed the entry level of performance on comprehension and command growth expectations. The complexity scores expressed the entry level of ability to manage the variables of TVRs.

Step 2: Subjects were engaged in Training Phases 1 and 2. Training Phase 1 consisted of activities to present reinforcement theory, to describe TVRs, and to anchor reinforcement theory to an instructional system. Training Phase 2 consisted of demonstration, modeling, and recognition activities. The training activities of Training Phases 1 and 2 were expressly selected and/or designed to promote achievement of awareness and comprehension growth expectations.

Step 3: Post Test 1 was administered. This same test was administered in Step 1. Achievement and complexity scores were again obtained. Post Test 1 scores reflected the gains or losses made during the first training intervention interval.

Step 4: Subjects were engaged in Training Phases 3 and 4. Training Phase 3 consisted of activities through which subjects practiced generating TVR statements in a variety of situations. Training Phase 4 consisted of feedback activities through which subjects gave and received feedback on their own or their peers' performances. The training activities of Training Phases 3 and 4 were expressly selected and/or designed to promote achievement of the command growth expectation.

Step 5: Post Test 2 was administered. This same test was administered in Step 1 and again in Step 3. Achievement and complexity scores were again obtained. Post Test 2 scores reflected the gains and losses made by subjects during the second training intervention interval.

The data from the pretest and each subsequent post test were organized and analyzed to answer four basic questions about the effects of training phases on the accomplishment of growth expectations. The first question dealt with achievement. What effect did training phases have on student teachers' abilities to achieve the training objectives? The training objectives were stated as growth expectations for comprehension and command of TVRs. The second question dealt with complexity. What effect did training phases have on the abilities of student teachers to manage the complexity of TVRs? In this study complexity management was a measure of the student teachers' abilities to recognize and use the three variables of TVRs. The third question dealt with mastery. Was the training of sufficient power to enable subjects to demonstrate mastery of comprehension and command growth expectations? A 90% criterion for mastery was established for comprehension and a 75% criterion for mastery was set for command. The fourth question dealt with sequence of growth expectations. Did attainment of comprehension necessarily precede the attainment of command? Patterns depicting the order of attainment of mastery were constructed for all subjects to deal with this question.

Three approaches were taken to respond to the forestated questions. One approach was a comparison of group mean scores obtained from each administration of the test. This approach was taken to determine if an increase in achievement resulted from the intervention of training and to analyze the distribution of effects across training phases. The second and third approach were related to mastery. The proportions of subjects who had attained mastery at the time each test was administered were compared. These comparisons helped to differentiate the effects of the combined training phases on achievement and complexity and to relate combined training phases to mastery. Patterns

depicting the order of attainment of mastery were used to explore the idea of a hierarchical relationship within the continuum of growth expectations.

DISCUSSION OF THE FINDINGS

Subjects as a Subset of Participants

Seventy-one student teachers were enrolled in the curriculum and instruction course which served as the instructional setting for this study. However, due to absenteeism, the data on 40 student teachers were used to test the hypotheses and to investigate the research questions posed for this study.

The loss of data on 31 potential subjects raised concern about the intervention of mortality as a factor influencing the differences between group mean scores. This concern led to a comparison of the two subgroups using entry level grade point averages and scores from the pretest designed for this study. Grade point averages were available for all 71 student teachers. The scores of 68 student teachers were available from the pretest. The scores from a two-tailed t-test of independent means with unequal N's confirmed that the two subgroups were not significantly different on any of the measures taken. Therefore, it is likely that the performances of both subgroups on growth expectations for comprehension and command would have been similar had all the student teachers participated throughout the study. Conclusions drawn from this study may apply to all of the elementary student teachers at the University of Oklahoma during the spring semester, 1984.

Effects of Training Phases on Achievement

The research questions about achievement were as follows:

What was the relationship between achievement of growth expectations and training phases?

a. Were gains made in achievement of growth expectations for comprehension and command after four training phases significantly different from gains made after two training phases as reflected by mean scores?

b. Was the training provided during Training Phases 1 and 2 sufficient to enable student teachers to demonstrate mastery of the established growth expectation for comprehension?

c. Did the training provided during Training Phases 1 and 2 effect performance on the growth expectation established for command?

d. Was the additional training provided through Training Phases 3 and 4 sufficient to enable student teachers to demonstrate mastery of the growth expectation established for command?

e. Did the training provided during Training Phases 3 and 4 effect performance on the growth expectation established for comprehension?

Achievement growth expectations were established for comprehension and command of TVRs. The comprehension growth expectation required subjects to recognize specified examples of TVRs. The command growth expectation required subjects to create TVRs at appropriate intervals in a transcribed teaching situation. Training Phases 1 and 2 were designed specifically to facilitate achievement of awareness and comprehension while Training Phases 3 and 4 were designed specifically to facilitate achievement of command.

It was anticipated that if the main effects of Training Phases I and 2 were on achievement of comprehension, then the differences in comprehension mean scores between the Pretest and Post Test 1 would be significant, while the differences in comprehension mean scores between Post Test 1 and Post Test 2 would not be significant even though they may be higher. It was also anticipated that if the main effects of Training Phases 3 and 4 were on achievement of command, then the differences in command mean scores between the Pretest and Post Test 1 would not be significant while the differences in command mean scores between Post Test 1 and Post Test 2 would be significant.

Null hypotheses of no significant differences among means were tested at the .05 level of significance. The results from the ANOVAs for repeated measures performed on Pretest, Post Test 1, and Post Test 2 data indicated that significant growth in achievement had been made on both subtests between the Pretest and Post Test 2. Through the same ANOVAs, differences among individuals were discounted as the factor to explain the increases in scores even though apparently some subjects consistently did better than other subjects. The combination of the results of the ANOVAs supported the assumption that training made the difference.

In order to investigate whether or not the effects of training were equally distributed across training intervention intervals, which would support the null hypotheses, two-tailed t-tests for differences between correlated means were conducted. The results of these tests indicated that significant growth in achievement occurred through both training intervention intervals on both growth expectations. Subjects as a group made significant growth in achievement after Training Phases 1 and 2 and again after Training Phases 3 and 4. This

meant that the null hypotheses could be rejected, but that the anticipated results regarding main effects were not upheld.

The most unexpected result was the amount of the increase in mean scores from Pretest to Post Test 1 on the command subtest. Subjects made a mean gain of approximately 26 points as compared with a mean gain of approximately 8 points between Post Test 1 and Post Test 2.

In response to research questions (a), (c), and (e) regarding achievement, three conclusions seemed apparent.

(1) All four training phases might be necessary for subjects to accomplish the intended training outcomes. This conclusion was supported by the fact that the scores of subjects after four training phases were significantly higher than the scores of subjects following two training phases for both comprehension and command growth expectations.

(2) Training provided during Training Phases 1 and 2 positively effected performance on the growth expectation for command. The sharp increase in command scores on Post Test 1 supported this conclusion.

One possible explanation for the positive effect of Training Phases 1 and 2 upon achievement of command was related to the transfer principle of similarity of stimulus elements between two tasks. In both subtests the subjects' responses were prompted by a teacher-intent statement. One teacher-intent statement from the comprehension subtest was "The teacher intends to use response statements to increase the frequency of an individual pupil being willing to express his/her feelings about events." A similar teacher-intent statement from the command subtest was "In this part of the lesson the teacher wants the children to recall their feelings while they were under the principal's

guard. She planned to reinforce the feelings each child expressed." Another similarity of elements that pervaded both training intervention events was the principle that every time a student participated in response to some teacher initiation there was an opportunity for the teacher to respond and that this response could have been a verbal reinforcement statement. Application of this principle of reinforcement was required in the command subtest. An analysis of errors on Subtest B revealed that subjects increased their ability to recognize intention-directed opportunities from 24% recognition on the Pretest to 71% recognition on Post Test 1.

(3) Training Phases 3 and 4 positively effected performance on achievement of the growth expectation for comprehension. This conclusion was supported by the significant difference between Post Test 1 and Post Test 2 achievement mean scores on the comprehension subtest.

Training Phase 3 activities were created to give subjects the opportunity to have guided practice in the appiication of TVRs. The application practice may have been the aspect of Training Phases 3 and 4 which influenced the rise in comprehension scores. However, another plausible explanation was related to the additional recognition practice that subjects received in Training Phase 4. When coding observation data for feedback purposes, subjects had to analyze and code verbal reinforcement statements using the attributes of TVRs.

The remaining two research questions regarding achievement dealt with the power of the training to effect mastery. T-tests on the proportions of subjects who attained mastery helped to respond to these questions.

Null hypotheses of no significant differences among proportions were tested at the .05 level of significance using a two-tailed t-test for the difference

between correlated proportions. The results from Subtest A, comprehension, indicated that a significantly higher proportion of subjects attained mastery of the comprehension growth expectation on Post Test 1 and on Post Test 2. The number who demonstrated mastery after Training Phases 1 and 2 increased from 6 on the pretest to 23 on Post Test 1. Comprehension training amounted to seven hours of training over two consecutive days. This time factor combined with the results of the ANOVAs, which attributed growth in achievement to training, strongly suggested that 19 subjects attained mastery of achievement of comprehension as a result of theory and concept training.

Eleven additional subjects demonstrated mastery of comprehension following practice and feedback training. The significance of this increase added strength to the attribution of increased comprehension to the intervention of Training Phases 3 and 4. Six subjects did not attain mastery of the comprehension growth expectation even after participation in 4 phases of training.

Concerning mastery of the command growth expectation, the following results were obtained. Only 3 subjects attained mastery of command which was demonstrated following practice and feedback training (Phases 3 and 4). This number was statistically insignificant. As was mentioned in the discussion of achievement of command, the mean scores reflected significant increases in achievement during both training intervention intervals. The results of the ANOVAs strongly suggested that these increases were attributable to treatment, indicating that subjects were moving toward mastery of the command growth expectation.

In response to research questions (b) and (d) regarding mastery of comprehension and command growth expectations the following conclusions seemed apparent:

(1) Training Phases 1 and 2 were sufficient to enable subjects to attain mastery of comprehension. This conclusion was supported by the percentage of subjects who attained mastery at the completion of Training Phase 2 and by a conjecture. The conjecture, prompted by the noted relationship between feedback training and concept training, was that extended recognition practice during Training Phases 1 and 2 would increase the percentage of subjects who could master comprehension before entering Training Phases 3 and 4.

(2) The additional training provided by Training Phases 3 and 4, as designed, was insufficient to enable a significant percentage of subjects to attain mastery of command. The 3 subjects who did attain mastery was a small enough number to suggest that individual differences did intervene for these three subjects.

Effects of Training Phases on Complexity

The research questions about complexity were as follows:

What was the relationship between training phases experienced and management of the complexity of the behavior to be learned?

a. Did student teachers demonstrate increased ability to manage the variables of TVRs as they experienced the different phases of training?

b. Did demonstration of complexity management under training conditions aimed at the comprehension growth expectation differ from

demonstration of complexity management under training conditions aimed at the command growth expectation?

Complexity of a teaching behavior was assumed to influence the pace and degree of difficulty a student teacher had in moving along the continuum of growth expectations. For this study complexity was defined as the number of variables within TVRs that had to be managed by the subjects. Three variables had to be managed: polarity, area, and focus.

The same instrument used to measure achievement was used to measure complexity management. The difference in using the test for complexity measurement was in the scoring. Achievement scores were based on accuracy while complexity scores were based on use of variables. For example, if the variable of focus were used, as evidenced by focus content in the response statements selected or generated, subjects were awarded one point for complexity even if the recipient of the reinforcement were an individual when it should have been a group.

It was anticipated that accuracy would increase to the extent that variables were managed. Correlation tests run on complexity and achievement scores for each subtest at each testing period confirmed that the two sets of scores were positively correlated. The correlations ranged from .83 to .98.

Null hypotheses of no significant differences among means were tested at the .05 level of significance. The results of the ANOVAs for repeated measures were the same for complexity as they were for achievement. Significant increases in complexity management on comprehension and command subtests were obtained through training. Two-tailed t-tests for differences between correlated means were conducted to analyze the distribution of effects. The results of these tests showed that significant growth in complexity occurred through both training

intervention intervals only on the comprehension subtest. This much was consistent with the anticipated results. On the command subtest, the main effects of training for complexity occurred during Training Phases 1 and 2. Complexity mean scores obtained on Post Test 1 and 2 from the command subtest were not significantly different. Since the achievement scores obtained for command on Subtest B indicated a significant increase in achievement, the lack of significant increase in complexity scores could indicate that subjects became more accurate in generating content for the attributes of TVR for those variables which they used.

Mastery of complexity on the comprehension subtest was demonstrated by 30 subjects at the completion of Training Phases 1 and 2 which was an actual increase of 15 subjects. Practice and feedback training resulted in 5 additional subjects attaining criterion for mastery. Both increases resulted in significantly higher proportions for the group of subjects.

Mastery of complexity on the command subtest was demonstrated by only 7 subjects. Even though this increase was significant, these 7 subjects attained criterion for mastery after completion of Training Phases 1 and 2, and one of them was unable to demonstrate maintainence of mastery through Training Phases 3 and 4. This observation made a striking comparison with the performance of subjects on complexity measures on the comprehension subtest.

In response to the research questions regarding complexity management the following conclusions seemed apparent:

(1) Demonstration of complexity management differed under the two training intervention conditions. In terms of comprehension, subjects demonstrated an increase in complexity management through both

training intervention intervals, but for command, subjects did not progress significantly beyond the level of management attained at the completion of Training Phases 1 and 2.

(2) Under conditions requiring demonstration of comprehension, subjects' performances on complexity management exceeded their performances on achievement. Under conditions requiring demonstration of command, however, subjects seemed to use fewer variables, but used them with greater accuracy.

Order of Growth Expectations

The research questions about order of growth expectations were as follows: Was the sequence of growth expectations representative of an accumulative hierarchy?

Did student teachers consistently attain criterion for mastery of the comprehension growth expectation before they attained criterion for mastery of the command growth expectation?

A comparison of the patterns established by subjects indicating order of attainment of mastery of comprehension and command growth expectations confirmed that 57.5% of the obtained patterns were like those which would be expected if mastery of comprehension necessarily preceded mastery of command. No patterns were obtained to indicate that mastery of command necessarily preceded mastery of comprehension nor that mastery occurred at the same time for both growth expectations.

A 95% criterion had been set for rejection of the hypothesis of no difference among the existing patterns. This criterion was selected because the population criterion was unknown and because 95% was a stringent criterion.

Since the population criterion was unknown, the 95% criterion could have been unreasonably high. Therefore, a Chi-square test was applied to the data to see if the obtained frequency distribution differed from a distribution that could be expected to emerge by chance. The chance distribution was based on the identified categories of obtained pattern pairs. The results of this test confirmed that the obtained patterns of mastery attainment were significantly different from those which could have emerged by chance. This significant difference between obtained and expected frequencies of pattern pairs was not sufficient in itself to claim that the order of comprehension followed by command was an accumulative hierarchy in the continuum of growth expectations. The fact that no concomitant or incompatible patterns emerged, plus the results of an error analysis of subjects' performances on the command subtest lent additional support to the possibility of a hierarchical relationship. The error analysis results are discussed in the following paragraphs.

Analysis of Errors

An analysis of errors was conducted on Post Tests 1 and 2 of Subtest B to gain greater understanding of the factors operating on the achievement of command. Success on the command subtest required subjects to be able to: (a) translate the teacher-intent statement into attributes, (b) recognize when a student-response cued a teacher-reinforcement-response that was intention-directed, (c) generate reinforcement statements, and (d) manage all three variables of TVR with accuracy.

Recognition of intention-directed opportunities increased from Post Test 1 to Post Test 2 by only 2%. Even though subjects generated response statements

for more intention-directed opportunities on Post Test 1 than they had on the Pretest, they also wrote responses in 88 intervals that were not intention-directed. This observation suggested that the large increase from Pretest to Post Test 1 could have been due to overgeneralization of the principle that every student response presented an opportunity for reinforcement. On Post Test 2 subjects were apparently becoming more discriminating. Their responses to identified non-intention-directed opportunities reduced from 88 to 57.

The task of generating TVR statements was apparently much more difficult than that of recognizing TVRs. The increased difficulty was suggested by the low accuracy rate at which subjects performed on Post Test 1 and 2 of the command subtest. On Post Test 1 subjects operated with 38% accuracy on statements generated for recognized intention-directed opportunities and increased to only 52% accuracy on Post Test 2. On Post Test 2 for comprehension when generation of statements was not required, subjects operated at 96% accuracy.

One possible explanation for lack of anticipated gain in achievement on the command growth expectation rested with the transfer principle related to degree of effectiveness of the original learning. Gagne (1970) found that performance on tasks of higher complexity was facilitated by acquisition of capabilities which were relevant prior learning sets. Hunter (1979) recognized failure to master prerequisite tasks as being a deterrent in the learning of the higher order related tasks in that this failure prolonged the new learning. Perhaps subjects in the present study were unable to grow in command because they had not been released from the task of comprehending. To check this hypothesis the errors on Post Test 2 of subjects who had mastered comprehension on Post Test 1 were compared with the errors of subjects who had not demonstrated mastery.

The mastery group correctly recognized 87% of the intention-directed opportunities with 59% accuracy, while the non-mastery group recognized 67% of the intention-directed opportunities with 42% accuracy. The mastery group incorrectly identified 24 non-intention-directed intervals as intention -directed opportunities as compared with 33 for the non-mastery group. These significant differences strongly suggested that mastery of comprehension was prerequisite to mastery of command.

Other possible explanations for lack of anticipated gain on the command growth expectation were based upon a review of the instructional sequence. Perhaps:

(a) The training allowed for insufficient focus on the related elements in teacher-intent, student cueing, and teacher-response during Training Phases 3 and 4,

(b) Subjects were given an insufficient number of opportunities to practice generating TVR statements, or

(c) Subjects were given insufficient feedback related to intention-directed reinforcement and accuracy.

Another possibility was that the command subtest did not clearly discriminate among student teachers who had and had not mastered or made significant growth in achievement on the command growth expectation. Perhaps Subtest B was not an adequate test of command. Still another possibility was that motivation had diminished for working through this subtest a third time.

SUMMARY OF CONCLUSIONS

The following conclusions were drawn from this study of the effects of combined training phases on achievement of comprehension and command growth expectations.

1. Growth in achievement of comprehension and command growth expectations related to Targeted Verbal Reinforcements was positively affected by training.
2. Training Phases 1 and 2 had their primary impact on the comprehension region of the continuum of growth expectations.
3. The combination of theory presentation, concept instruction, demonstration, and modeling (Training Phases 1 and 2) facilitated command of Targeted Verbal Reinforcements.
4. The region of primary impact for Training Phases 3 and 4 was unclear in this study.
5. The combination of practice and feedback (Training Phases 3 and 4) facilitated command and comprehension of Targeted Verbal Reinforcements.
6. Management of the variables (complexity) of Targeted Verbal Reinforcement was positively related to accuracy in recognizing and applying Targeted Verbal Reinforcements (achievement).
7. Performance on complexity management under conditions requiring comprehension of Targeted Verbal Reinforcements seemed to be independent of performance on complexity management under conditions requiring command.
8. Mastery of comprehension was prerequisite to mastery of command.

9. The relationship among training phases and growth expectations established in this study, the results obtained on mastery of comprehension, and the results from the mastery-pattern analysis supported the speculation that the interaction among training phases and growth expectations occurred in a hierarchical order.

RECOMMENDATIONS FOR FURTHER STUDY

A follow-up retention and application study of the student teachers who participated in this study could address questions of transfer such as:

(a) To what extent and for what purposes do student teachers who have been trained in TVRs use them in the classroom?

(b) Was the training sufficient to enable student teachers to apply TVRs for intention-directed purposes which they define?

(c) Do student teachers who mastered the comprehension growth expectation differ in their application of TVRs from those student teachers who did not master comprehension?

The main effects of practice and feedback were unclear in this study, but it was clear that something more than theory and concept training was necessary for subjects to be able to apply TVRs in simulated teaching situations in the manner and to the degree that were expected. Perhaps additional research to separate and control the variables of practice and feedback is necessary to increase predictability of outcomes.

Another validity check could be made on the command subtest using classroom teachers as subjects. Responses to the subtest by teachers who apply TVRs in ways like the training was intended to promote could be compared

with the responses of classroom teachers who infrequently or indiscriminantly utilize TVRs. If this does not yield sufficient validity scores for the present instrument, then appropriate adjustments could be made before the instrument is used again.

The research literature on protocol materials suggested that video tape protocols may be superior to written transcript protocols and may be superior to live demonstrations for some purposes. The addition of video-taped protocols in Training Phases 1 and 2 for concept training and in Training Phases 3 and 4 for the study of the effects of TVRs could facilitate achievement of growth expectations beyond what was possible in the present study. A study could be made using the present training conditions as the control environment and setting up experimental environments wherein training is altered by the inclusion of video-taped protocols.

A study which would further address the question of whether or not mastery of comprehension was a necessary prerequisite for mastery of command might be set up in this manner. A control group could participate in training as it was designed for this study. One experimental group could participate in training which consisted of extended comprehension training and entry into command training only after 90% of the student teachers mastered comprehension. Training Phases 3 and 4 would be the same as for the control group. A second experimental group could participate in training which consisted of Training Phases 1 and 2 being like those of the control group and extended command training to include more practice opportunities with an increased focus on intention-directed TVRs. A third experimental group could participate in extended training for both comprehension and command.

Few studies reviewed for this investigation systematically tested the effects of different combinations of the training components on the same teaching skill. No studies were found through this review which established that different teaching skills were of equal difficulty to master or transfer. The studies by Joyce and others did seem to confirm that for the training of teaching models all five components of training were necessary to effect control of the teaching models. For teaching skills and practices that have been demonstrated to be significantly and positively related to student learning, such an exhaustive effort should be worthwhile.

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APPENDIX A

TARGETED VERBAL REINFORCEMENTS

TARGETED VERBAL REINFORCEMENTS

Reinforcements are teacher responses intended to increase (acceptance), decrease (rejection) or extinguish (ignore) individual and/or group actions. A reinforcement may be classified as a "targeted verbal reinforcement' if it contains clarity of: polarity, area, and focus. It should be noted that clarity does not include the codes: 13; u; Q.

		Codes
I.	Polarity	
	A. Acceptance--Teacher responses intended to increase the frequency of occurrence.	5
	B. Rejection--Teacher responses intended to decrease the frequency of occurrence.	6
	C. Withhold or Ignore--Teacher responses which neither accept nor reject the occurrence.	13*
II.	Area	
	A. Affective management--Teacher responses which stress the affective content or context of the occurrence.	a
	B. Behavior management--Teacher responses which stress the physical conduct or behavior of the occurrence.	b
	C. Cognitive management--Teacher responses which stress the cognitive content or context of the occurrence.	c
	D. Unidentified management--Teacher responses which do not identify/specify the affective, behavior, and/or cognitive content, conduct and/or context of the occurrence.	u*

III. Focus

A. Group--Teacher responses directed toward group (i.e., "This group is analyzing carefully." "This class is talking too frequently.")	G
B. Individual--Teacher responses directed toward individual (i.e., "I like the way Tom is synthesizing the problem." "Yes, Mike, your feeling that ... is reasonable." "No, 16 is not correct, Gene." "Bill, sit down.").	I
C. Questionable--Teacher responses not specifically directed toward either individual or group (i.e., "Those are good ideas." "Sit down." "There is too much talking." "I see good listeners.")	Q*

*The presence of codes: 13; u; Q indicates that the reinforcement is not targeted.

APPENDIX B

TARGETED VERBAL REINFORCEMENT PRETEST

SUBTEST A

MEASURING ACHIEVEMENT OF THE COMPREHENSION GROWTH EXPECTATION

SUBTEST B

MEASURING ACHIEVEMENT OF THE COMMAND GROWTH EXPECTATION

REINFORCEMENT PRETEST

Directions: Subtest A

Listed below are six (6) teacher-intent statements. On the following three pages is a list of possible teacher-response statements. For each teacher-intent statement below, select four (4) response statements from the following two pages that would be most helpful for enabling the teacher to fulfill his/her intent.

Write your 4 choices in the space provided below the appropriate teacher-intent statement. Write the number and the first three words of the response statement for each choice. Example: 22. Do you really

Teacher-Intent Statements

A. The teacher intends to use response statements to increase the frequency of an individual pupil being willing to express his/her feelings about events.

B. The teacher intends to use response statements to decrease the frequency of unwanted conduct from certain individuals in the classroom.

C. The teacher intends to use response statements to increase the frequency of each child showing understanding of the content of a lesson.

D. The teacher intends to use response statements to increase the frequency of a group of children conducting themselves in ways that he desires.

E. The teacher intends to use response statements to decrease the frequency of a child incorrectly or inappropriately using information he/she is learning.

F. The teacher intends to use response statements to decrease the frequency of a group of children inappropriately or incorrectly using the ideas they are learning from instruction.

Teacher-Response Statements

1. No, Charles, your example is not a regular polygon.

2. I like the way you read that paragraph so smoothly.

3. It's allright for you to feel disgruntled if you think my decision is unfair.

4. Sit down, Billy; I haven't dismissed you yet.

5. I really like the way group 2 is monitoring its noise level.

6. Thank you for participating, Tom.

7. Sandy, I really admire the manner in which you stated your sympathy to Mary.

8. Table 6, the ideas you submitted to the rules committee are not specific enough.

9. I really like the way you have taken ideas from each of these 2 models and made your own unique house for the future.

10. When you come back in from recess, you will have 5 more minutes to finish this assignment.

11. I'm tired of trying to read such sloppy papers.

12. Andy, it is encouraging to hear you indicating pride in yourself.

13. That's correct, Marcus; a snake is a reptile.

14. Lab group 3, it seems that you have neglected to consider the results of the second experiment when drawing up your conclusions.

15. Class, the librarian and I are very pleased that all of you have returned borrowed books to the library.

16. Jasper, you are not using what you know about evaporation in an effective way.

17. How do you feel about that, Melinda?

18. You are really becoming good at describing things.

19. We all agree, Marty, that your way of stating the definition of a rectangle is the most complete.

20. Don't call out the answer, Susan; I want you to raise your hand.

21. That's worth considering, Jennifer.

22. Do you really believe that, Erena?

23. April, you raised your hand this time; thank you.

24. I'm impressed by the logic you used to solve that problem, Steve.

25. I agree that you have a right to be angry, Kristina.

26. You have punctuated these sentences with periods, Betsy, but that is incorrect.

27. Cia, you have taken 10 minutes longer than necessary just to get your materials.

28. That is not appropriate.

29. Cindy's group finished this activity in 10 minutes; that is real progress.

30. This is really wonderful.

31. Class, the papers you wrote indicate that you cannot differentiate between the rules of commas in a series and the use of a semi-colon.

32. I want to see which group can come up with the best plan for displaying what we have learned about Hawaii.

33. I couldn't agree with you more, Tracy.

34. Erena, I can tell by your comments, that your attitude about the approach to this problem is positive.

35. Are you sure you mean highways, Mike?

36. You have succeeded in making the poster small enough and yet clear enough for our use, Frank.

37. The evidence you have to support your argument is very weak.

38. Members of the safety committee, in the section of your report on consequences items 3 - 5 do not meet the criteria for logical consequences.

39. Your idea to increase the heat is an excellent way to change one of the variables.

40. I'm so relieved that I can depend on you children who are on the animal care detail to keep our animals fed and watered.

41. You're conclusion is correct, Mike. Based on the evidence, anger would be a predictable reaction in Peter's situation.

42. Are you happy?

43. Don't guess the answer; apply the rule.

44. The order of events in your story and the way you have sequenced the pictures do not match.

45. Which group thinks you can portray the characters in a little mini-drama?

46. Thank you. That was hard to say.

47. Your frequent practice on expression is really improving the choral reading.

48. Very good, Kelley. Strange and familiar are examples of antonyms.

49. I like the way you are taking turns at the pencil sharpener.

50. Lab group 4, I really appreciate the neat way you put up the equipment.

51. Table 2, your comparison of the 2 characters in this story is well done.

52. Go back to the art table, Jim, and clean up your mess like I asked you to do.

53. Bill, it was unkind of you to make fun of Joe for saying he was afraid.

54. Seekers, the explanation you gave for why Mary made the decision not to go home does not, in myu judgment, fit the other facts in the story.

55. How many rules do you think we should have?

56. Thank you, Jim; it helps me to know when you are feeling frustrated.

57. Who can name 3 rules we follow on the playground?

58. Why do you think Mr. Wallace named the dog Kitty?

59. Who has an idea for how we can inform the parents of our plan?

60. According to the model, those are not cumulus clouds, Rhonda.

61. Turn to page 47 and begin reading.

62. I know I can depend on Danny's group to do a good job.

63. Lon, your answer indicates the number of bottles all together, but in this problem we are trying to solve for the number of cases of bottles.

64. You children at Station C are not following the steps listed on the chart.

REINFORCEMENT PRETEST

Setting the Stage: Subtest B

As a way of dealing with a disturbing incident involving her children in the lunchroom, the teacher planned a lesson. The lesson had 4 parts and in each part the teacher focused on a different aspect of the problem.

The dialogue below is a transcript of 3 parts of the lesson. Each part is labeled. A teacher-intent statement is provided for each part.

Directions:

Identify in each part of the lesson, instances when the teacher had an opportunity to make a response statement which would have helped fulfill her intent.

At each interval where an opportunity exists for the teacher to reach her intent, write in a statement that you think would have been the most powerful response statement the teacher could have made.

Part I The children will be led to recreate the incident. The teacher plans to reinforce verbally, each child who relates orally the sequence of some of the events in specific detail.

T: Children, yesterday afternoon I gave each of you 15 minutes to write down as much of what you could recall about what happened in the lunchroom that led to the principal taking action with you. Your notes are on your desk. Without talking, I want you to look at them again now, then put them inside your desk. (A few minutes pass.)

T: First children, I want us to try to list the things that happened in the order that they happened. I don't want to hear any comments like, "It's so-and-so's fault." The purpose here is to describe in specific detail what happened in what order. I will ask questions. If you want to answer, you will raise your hand and I will call on someone.

T: Who can recall what happened first? (Hands go up) Mike?

M: Well, first we went in the lunchroom like usual.

T: What does "like usual" mean to you, Valene?

V: Friday we lined up with the boys in the front and the girls in the back. Jack was at the head of the line and Mary was at the end. We stayed in a single line, except for Paul who kept switching places around Arthur. I could see that because I was the first girl in the line.

T: Jack or Mary, do you disagree so far with anything Valene has said?

(Paul interrupts and starts to talk. The teacher glares at him. He gets quiet and raises his hand. The teacher looks back toward Jack and Mary.)

J: That's what I remember. But also, Paul and Arthur kept laughing and pushing against others in the line. As the front-line monitor, I sent Paul to the end of the line before we got up to the counter.

(Paul still has his hand up.)

T: Thank you for keeping your hand up, Paul. What do you want to add?

P: That's true, what Valene and Jack said, but after I went to the end of the line, I didn't laugh or push anymore.

T: Would you agree with Paul's statement, Mary?

M: Yes.

T: Ok. Now you're in the lunch room and lined up at the counter. Can someone give me some details about what happened next? Christopher?

C: Everyone went to pieces.

T: Can anyone add any details to Christopher's statement? Jack?

J: Some of the guys were grumbling about the food 'cause most of us don't like the fish they make. I don't know who said what, but I heard things like, "Ugh!" and "Yuk!" and someone said, "Fish, pish; I'm no bloomin' shark; why don't they have something else to eat?" That started everyone laughing and the lady taking the tickets told us to be quiet.

T: What was happening among the girls? Andrea?

A: Nothing special that I noticed. We were talking some, but everyone just got their trays and went to the table.

(No other hands were up.)

T: After getting quiet and orderly, you all went through the lunch line. Laughing among the boys resulted in a reprimand from the ticket taker. Then everyone sat down at the table. Does that seem to be the order so far?

Class: Yes!

T: Now I think we're ready to recall the main event. Who wants to start? David?

D: I was sitting there kinda mindin' my own business and playin' with my food. I hate fish and I wasn't too hungry so I was spreadin' ketchup and fish sauce on it. Then Greg said, "Let's make a sandwich." So we put some lettuce and french fries on my piece of fish and his piece of fish on top.

(Greg is waving his hand furiously.)

T: Greg, what can you add?

G: Then Christopher said, "Hey, you guys, let's see if we can build a quintatruple decker" or something like that. Then I don't know, boy, it was just hands and ketchup and fries and sauce and salt and pepper and everything, everywhere!

(Without being called on, Cassie adds:)

C: Yea, and everyone was laughing and cheering, even the girls. And the next thing I knew, there was the principal.

T: Then the principal had you turn in your trays, clean the table and sit there with your heads on the table for the next half hour while two other groups of children came and left the lunch room.

Class: Yea!

Part II: In this part of the lesson the teacher wants the children to recall their feelings while they were under the principal's guard. She plans to reinforce the feelings each child expresses.

T: Now, children, I want you to put your heads down on your desk and try to feel again those feelings you had yesterday. As you think of a way to express your feeling raise your hand and I'll call on someone. (After several seconds, the teacher calls on Harold.)

H: I was embarrassed because I felt like a kindergartner.

T: Mary?

M: I was embarrassed, too. I wanted to cry.

T: Nancy?

N: I was mad because I hadn't done anything and yet I was being punished too.

T: Christopher?

C: I felt real little and I wanted to crawl under the table.

T: Greg?

G: I was kind of laughing, but I guess I was really scared, because it wasn't like laughing for fun. It was like what you do when you don't know what's going to happen next, but you know it's probably going to be bad.

T: Anyone have any different feelings? (No more hands went up.) I assume then that all of you shared one or more of the feelings that have been expressed or something like them. All of your feelings were legitimate, but none of them were pleasant.

Part III: In this part of the lesson the teacher puts the children in 4 groups. She plans to reinforce the groups for any behaviors that indicate how cooperative they are being. The cooperative skills the children have learned are: staying on task, listening to each other, asking for clarification, praising and getting agreement on suggestions to be presented to the class.

T: I am going to divide the class into 4 groups. In your groups you will brainstorm and discuss ideas we could use that would prevent such an incident from occurring again. Each group should be able to come up with one or two good suggestions. Each group is to select a leader and a recorder. The leader will keep the group on task because you will only have 10 minutes. The recorder will keep track of the ideas discussed and write on chart paper the suggestion(s) to be shared. I will be expecting all of you to practice your cooperative skills.

(Groups are established and the teacher monitors the groups.)

When watching Gail's group, the teacher notices that the children are taking turns and occasionally expanding on each others ideas. They are also praising each other for the ideas shared.

When watching Gene's group, the teacher notices that after 5 minutes the children have 6 ideas on the recorder's list and are trying to decide the merits or weaknesses of each. Several children are talking at the same time.

When watching Bette's group the teacher notices that 2 children are occupying the time and are arguing over who was at fault.

When watching Tom's group, the teacher notices that the group has narrowed their list down to one idea and are getting clarification on specific details to present to the class.

After 10 minutes the teacher calls the class back to order. While the recorders are putting information on chart paper, the other children are getting ready to go outside for recess.

APPENDIX C

RESEARCH DATA

The following scores are those of students who could not be included in the pool of data for the dissertation due to absenteeism or because they were group leaders during the training.

TEST RESULTS

	(A) COMPREHENSION						(B) COMMAND					
	P 1		P 2		P 3		P 1		P 2		P 3	
	A	C	A	C	A	C	A	C	A	C	A	C
Absentees												
ST 1	49	62	58	62	-	-	-4	3	53	42	-	-
ST 6	55	61	55	64	66	69	0	0	13	15	21	14
ST 13	42	63	-	-	71	72	21	17	-	-	55	47
ST 14	-	-	58	63	72	72	-	-	24	25	42	41
ST 20	64	67	-	-	72	72	16	21	-	-	27	41
ST 29	-	-	60	66	68	72	-	-	16	11	47	45
ST 31	59	63	-	-	-	-	16	9	-	-	-	-
ST 34	65	65	72	72	71	71	9	6	27	40	41	33
ST 37	54	59	69	71	69	70	2	1	53	54	46	45
ST 41	60	65	70	70	72	72	4	3	57	57	63	50
ST 44	50	65	-	-	67	68	5	4	-	-	42	35
ST 50	60	66	60	65	69	69	13	11	32	30	0	0
ST 52	-	-	-	-	71	71	-	-	-	-	40	40
ST 56	65	68	69	71	72	72	0	0	29	33	44	36
ST 57	59	63	-	-	68	69	5	4	-	-	56	52
ST 60	50	57	-	-	71	71	0	0	-	-	27	25

ST 63	64	65	-	-	71	72	10	10	-	-	51	37
ST 64	56	57	61	61	72	72	5	4	19	20	49	37
ST 70	43	57	53	61	49	58	14	10	6	7	9	10

Did not follow directions on PT 2

ST 69	55	62	40	51	72	72	0	0	15	14	39	31

Group Leaders

ST 4	45	63	61	68	71	72	23	13	51	51	56	48
ST 11	64	70	-	-	71	72	5	4	-	-	49	42
ST 12	54	65	58	66	66	68	3	2	29	22	44	35
ST 15	64	67	69	71	66	67	-3	0	-3	3	30	27
ST 19	58	61	69	70	72	72	-4	0	38	32	8	3
ST 32	69	70	72	72	72	72	-1	2	48	49	59	54
ST 35	63	63	70	71	71	72	0	0	25	20	25	27
ST 40	53	67	70	72	72	72	-4	0	6	10	15	12
ST 49	55	59	62	66	71	72	27	26	45	51	45	32
ST 65	69	69	72	72	72	72	3	4	14	23	31	35
ST 71	65	66	65	66	67	68	2	0	33	28	39	29

The following scores are those of students who will be included in the data base for the dissertation.

TEST RESULTS

	(A) COMPREHENSION						(B) COMMAND					
	P 1		P 2		P 3		P 1		P 2		P 3	
	A	C	A	C	A	C	A	C	A	C	A	C
ST 2	51	56	50	55	66	68	0	0	20	22	39	35
ST 3	51	51	63	63	56	58	-3	00	19	21	35	29
ST 5	58	65	69	72	72	72	5	10	52	51	17	25
ST 7	41	43	64	65	69	70	3	8	25	27	34	39
ST 8	58	60	65	67	71	72	3	2	26	30	34	40
ST 9	60	64	60	60	66	69	3	4	13	18	42	33
ST 10	63	68	69	70	71	71	4	2	30	25	47	33
ST 16	46	54	70	70	69	69	27	30	46	57	36	40
ST 17	58	60	71	71	72	72	9	6	53	41	45	34
ST 18	53	56	50	62	55	61	3	4	19	20	35	37
ST 21	55	57	66	68	71	72	-4	0	29	29	55	42
ST 22	42	46	68	70	72	72	0	0	38	34	42	33
ST 23	54	68	62	66	56	60	-4	0	39	35	24	24
ST 24	61	66	58	62	57	60	-2	1	22	15	10	12
ST 25	45	53	71	71	71	72	-2	1	40	42	60	45
ST 26	66	70	71	72	69	72	25	17	44	35	48	38
ST 27	58	62	53	68	59	63	-12	5	15	33	9	27
ST 28	57	61	63	65	70	71	-2	10	42	44	18	26

ST 30	63	65	71	71	71	72	3	2	25	26	65	48
ST 33	60	66	66	67	63	66	8	9	36	31	53	40
ST 36	38	53	57	64	68	71	0	0	21	20	16	16
ST 38	68	71	67	72	70	72	8	7	35	29	46	39
ST 39	54	58	63	64	67	68	2	3	41	37	40	37
ST 42	60	63	67	71	71	72	5	5	55	46	39	38
ST 43	65	68	69	72	72	72	3	5	41	31	51	40
ST 45	61	61	68	72	70	72	-3	0	22	18	24	31
ST 46	64	68	68	68	72	72	23	15	43	39	58	45
ST 47	46	66	52	59	60	64	2	0	3	2	45	34
ST 48	48	54	65	69	71	71	4	6	16	19	48	37
ST 51	68	72	61	72	71	72	5	2	46	52	39	43
ST 53	60	63	71	72	72	72	11	9	22	24	55	42
ST 54	59	69	65	67	69	71	2	4	13	18	7	8
ST 55	61	64	66	69	67	69	-2	2	39	29	41	40
ST 58	68	71	69	72	70	72	-4	0	24	41	54	44
ST 59	54	57	56	57	71	72	3	3	13	21	42	33
ST 61	64	65	68	72	72	72	10	7	22	28	45	36
ST 62	56	65	61	66	68	69	9	6	9	14	43	34
ST 66	52	55	61	65	66	66	40	29	45	42	15	18
ST 67	66	69	57	58	71	72	5	5	52	53	49	43
ST 68	62	65	72	72	72	72	22	14	53	45	49	39

APPENDIX D

VERBAL REINFORCEMENT OBSERVATION INSTRUMENT

VERBAL REINFORCEMENT OBSERVATION INSTRUMENT

Codes:

Polarity	Area	Focus
5 - Acceptance	a - Affective	G - Group or Class
6 - Rejection	b - Behavioral	I - Individual
13 - Withhold or Ignore	c - Cognitive	Q - Questionable

Notes	5	6	13	Notes	5	6	13

APPENDIX E

REINFORCEMENT PRACTICE

DOCUMENT GUIDE

REINFORCEMENT PRACTICE

DOCUMENT GUIDE

STATEMENT OF INTENT:

Lesson 1: Affective Objective: Given pictures in which persons are exhibiting emotion or feeling, students will share instances when they have had similar feelings and talk about what it was like to have that feeling.

Reinforcement Plan: 5ai Ex: I agree with you, Sam; I have felt sad sometimes for the same reason.

Lesson 2: Behavioral Objective: Students will raise their hand to get my assistance during seat work time instead of leaving their seats to come where I am.

Reinforcement Plan: 5bi, 6bi
Ex: Tony, thank you for remembering to raise your hand so that I could come to you. Go back to your seat, Mary, and raise your hand.

Lesson 3: Cognitive Objective: Students will correctly solve subtraction problems requiring regrouping from tens to ones and be able to explain what they did.

Reinforcement Plan: 5ci, 6ci
Ex: That's correct, Bill. When you borrow one ten you have to add 10 ones to the digit in one's place. Joan, here is a time when you should have borowed.

OBSERVATION DATA: Provide a complete listing of codes for each verbal reinforcement statement used in the lesson. Each time a different code is listed, record exactly what was said at that time. Each time a code shows targeting on the focus variable, write the name to whom it applies.

Lesson 3:

5uq - good
5ci - You borrowed correctly in problem 2, Philip.
13
13
5cq - You have the right answer for problem 6.
5ci - Mary
5ui - Very good, Cia.
5uq
13
5ui - Cia
etc.

DATA DISPLAY: Summarize the data. List the names of the students who received a verbal reinforcement statement that was focused.

Lesson 3:

6 5uq
10 5ci (names)
4 5ui (names)
5 5cq
8 13

DATA INTERPRETATION: Write statements which describe your performance in the use of targeted verbal reinforcement statements.

Lesson 3:

I had contact with 10 children out of 18.
I had 33 opportunities for reinforcement. Of those, 10 were targeted verbal reinforcement statements given to 6 students.
All the targeted statements were cognitive.

SELF RATING: Rate yourself low, medium, or high in terms of the extent to which your performance matched your intentions. Justify your rating.

Lesson 3:

When I did target reinforcement it was toward cognition which matches the student objective, so that is in my favor. However, I only used about one-third of the opportunities available for targeting reinforcement, excluded 8 children from active participation in the lesson and limited targeted verbal reinforcement statements to 6 of the 10 students who were active participants. Therefore, I would rate myself low in terms of accomplishment of my statement of intent.

APPENDIX F

PEER TEACHING CLINIC

TARGETED VERBAL REINFORCEMENTS

PEER TEACHING CLINIC
TARGETED VERBAL REINFORCEMENTS

PURPOSES:

(1) To give each student teacher practice in reinforcing student participation through targeted verbal reinforcements;

(2) To give each student teacher practice in recording and analyzing data regarding usage of targeted verbal reinforcement and student participation.

PROCEDURES:

1. Preparation for the Teaching Event.

   A. Designate roles.
   B. Peer teacher gets ready to teach and students take positions
   C. Preparation of the observers.
      (1) Review of previously used data collection instrument and designation of which observer is to use it.
      (2) Clarification on the new data collection instrument and designation of which observer is to use it.

		ST	J	L	Group
1.	Yes, that's correct.				
2.	Good, John.				
3.	Do you agree, John?				
4.	I agree too.				
5.	Good example, Liz.				
6.	Stephanie, you are not listening.				
7.	etc.				

      (3) Peer teacher gives statement of intent card to group leader to be shared with observers.
      (4) Observers station themselves and prepare for observation.

2. Peer Teaching Lesson - 15 minutes.

3. Data Analysis

   a. Confirmation of data - match verbatum statements and code as you go.
   b. Look for and describe reinforcement patterns and student participation. Record in a data summary form.
   c. Share the data. Seek agreement on relationships, if any, between verbal reinforcement and student participation and between verbal reinforcement and some other aspect of the lesson. Involve all group members.

4. Evaluation of the Lesson

   On a scale ranging from low to medium to high, rate the peer teacher's lesson in terms of the degree to which the peer teacher's performance matched his/her intentions. Justify the evaluation using the data.

SCHEDULE OF THE CLINIC

8:15 - 8:30	Preparation for Clinic
8:30 - 8:35	Report to stations and get organized
8:35 - 9:20	Cycle 1
9:20 - 10:00	Cycle 2
10:00 - 10:15	Break
10:15 - 10:55	Cycle 3
10:55 - 11:30	Cycle 4
11:30 - 12:30	Lunch
12:30 - 1:05	Cycle 5
1:05 - 1:40	Cycle 6
1:40 - 2:00	Reconstitute room and Break

All student teachers are responsible for being on-task through each cycle, investing as much energy to the last cycle as to the first cycle.

APPENDIX G

PEER TEACHING CLINIC

QUESTION TYPES

PEER TEACHING CLINIC
QUESTION TYPES

PURPOSES:

(1) To give each student teacher practice in cueing participation through question types;
(2) To give each student teacher practice in recording and analyzing data regarding question type patterns and pupil participation.

CYCLES

A cycle consists of the preparation for observation, one peer-teaching event, and the analysis of the lesson taught.

There will be 4 cycles conducted on Wednesday and 2 cycles conducted on Thursday.

Each cycle is 40 minutes long.

TIMING AND SEQUENCE OF EVENTS IN EACH CYCLE

5 minutes: Preparation of teacher, students, and observers

15 minutes: Peer-teaching lesson

15 minutes: Analysis of data

5 minutes: Changing roles

ROLES AND RESPONSIBILITIES

During each cycle, each person in your group will fulfill one of these roles: peer teacher (1); student (3); observer (2); group leader (1).

Teacher - Get set up for teaching your lesson.
Share with the observers and the group leader what your intentions are regarding the use of question types.
Teach the lesson.
Observe and participate in the analysis procedure.

Students - Act as yourself for each teaching event in which you participate.
Observe the analysis procedure. Participate as invited.

Observers - Both observers write down the teacher's intention regarding the use of question types.

Observer 1 - records verbatum and in sequence, the questions used by the peer teacher, capturing enough of the question or question chain in order to code it for question type.

Observer 2 - records in a matrix the code of questions asked in the sequence they are asked and the distribution of participation. The following data record format is to be used.

	Cindy	Jeff	Mary
Q 1	S		
2		C	
3	V		
4		Sp	Sp
5			C

Following the lesson, the observers work with the group leader through an analysis of the data.

Data Analysis: This procedure consists of the following steps:

1. Confirmation of the data between the 2 observers - Agreement on exemplars of each question type.

2. Recognition of patterns of question types and student participation.

3. Agreement on observed relationships between question types and distribution of participation.

4. On a scale ranging from low to medium to high agree to what extent the peer teacher achieved his/her intention in regard to question types, and in regard to distribution of participation.

Group Leader - The group leader has been trained to prepare the observers for their functions, and to guide you through analysis and sharing of the data. He/she is also responsible for monitoring time, for the rotation of roles, and for providing organization to your group.

TIME SCHEDULE OF CLINIC

Wednesday		Thursday	
8:55 - 9:20	Clinic Preparation	12:30 - 1:10	Cycle 5
9:20 - 10:00	Cycle 1	1:10 - 1:50	Cycle 6
10:00 - 10:10	Break	1:50 - 2:10	Reconstitute Room
10:10 - 10:50	Cycle 2		
10:50 - 11:30	Cycle 3		
11:30 - 12:30	Lunch		
12:30 - 1:10	Cycle 4		
1:10 - 1:20	Reconstitute Room		

All student teachers are responsible for being on-task through each cycle. Each person has an obligation to his/her peers to give full measure in each role, in each cycle. It is very important, to each person teaching, to give as much energy to the last cycle as the first.