TUTORING, OBSERVATION, MICROTEACHING AND AUDIO-VIDEO TAPE FEEDBACK AS A MEANS TO PROMOTE HIGHER LEVEL QUESTIONS ASKED BY PROSPECTIVE ELEMENTARY SCHOOL TEACHERS

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CHAPTER I

THE NATURE OF THE PROBLEM

Introduction

The early teachers, such as Socrates, employed questioning to encourage students to formulate their own ideas and to verify the student's understanding of information which had been presented. Questioning as an instructional technique has been valued for many years (Landou, 1899; Monroe and Carter, 1923; Young, 1853). Dewey (1933) viewed thinking itself as questioning.

More recent works have also identified questioning as an important skill to be developed by the classroom teacher (Sanders, 1966; Bell, 1968). The ability to ask higher level questions is one skill the prospective teacher could utilize to stimulate thinking in the classroom. Classroom questions should require students not only to recall information but to make inferences, generalize and predict. The ability to use questions and skill in asking specific types of questions could be developed during the preservice training of the teacher.

A number of studies have shown that preservice and inservice teachers lack the ability to utilize questioning effectively (Clegg, Farley and Curran, 1967; Davis and Tinsley, 1967; Floyd, 1960; Moyer, 1965).

While the teacher is usually an active participant in the classroom interaction, the quality of his or her responses is often less

than the teacher trainer or supervisor and the teaching situation demand (Balzer, 1968). In response to this need to improve the preservice and inservice teachers' use of questioning a variety of instructional procedures has been tested. These procedures have included the use of verbal instruction, written materials, microteaching, individual and group conferences, self-analysis, interaction analysis, feedback from another teacher or supervisor, modeling, cueing, and combinations of these techniques.

The Problem

If questioning is an important skill to be developed in prospective teachers then which instructional procedure would be the most effective to use in developing this skill? The purpose of this study was to assess the effectiveness of three common instructional procedures (observation, tutoring, and microteaching) to develop questioning skills in prospective elementary school teachers. A subproblem was to determine if audio-video tape feedback during tutoring and microteaching would effect the level of questions asked by prospective elementary school teachers in the classroom.

Hypotheses

This study was designed to test the following null hypotheses:

1. Subjects who are randomly assigned to the observation tutoring, microteaching and control groups; who are classified as high or low achievers; and who are influenced by the interaction between treatments (observation, tutoring, microteaching, control) and levels (high or low achievers) will not differ significantly in the number of

cognitive-memory, convergent, divergent, evaluative, higher level or total questions asked while teaching a mini-lesson.

2. Subjects who are randomly assigned to tutoring or micro-teaching; who are classified as high or low achievers; who are given feedback or no feedback; and who are influenced by the interaction between treatments (tutoring, microteaching), levels (high or low achievers) and feedback or no feedback will not differ significantly in the number of cognitive-memory, convergent, divergent, evaluative, higher level or total questions asked while teaching a mini-lesson.

Need for the Study

Considerable attention has been devoted to microteaching as an effective preservice experience (Allen and Ryan, 1969; Allen and Clark, 1967; Cooper, 1967, Meier, 1968; Kallenbach, 1969; Bush, 1966; and Fortune, 1967) but conclusive empirical research clearly indicating the superiority of microteaching over the preservice experiences, such as tutoring and observation as they relate to levels of questions asked while teaching is not apparent in the literature. If tutoring or observation would be found to be as effective in developing the questioning skills of preservice teachers as microteaching then these techniques could be further utilized in the teacher training program. In addition, tutoring could provide a service to the school by helping individual students while observation demands less time from the classroom teacher.

If the kinds of thinking that students engage in depends upon the kinds of questions teachers ask (Gallagher and Aschner, 1968), then teachers need to be provided with opportunities to acquire skill in

asking questions. Therefore, a study to compare microteaching to the preservice experiences of tutoring and observation is a worthwhile contribution to the professional literature.

Allen, McDonald, and Orme (1966) found feedback effective while Borg, Kallenbach, Morris and Friebel (1969); Claus, (1968); and Young (1968) found feedback not significant in changing teacher behavior. The importance of audio-video tape feedback in improving skill in questioning requires further study.

Clarification of the usefulness of audio-video tape feedback in combination with tutoring and microteaching could help teacher training institutions determine the procedures to utilize in developing the questioning skills of preservice teachers.

Limitations of the Study

The external validity of this study is limited in that the results cannot be generalized beyond the population from which the sample was drawn (one hundred prospective elementary school teachers enrolled in History of Education).

Assumptions

1. The verbal behavior of the teacher in the classroom is important as a means of transmitting information and promoting learning.

2. The kinds of questions elementary teachers ask influence the outcomes of elementary teaching.

3. Questioning is a skill that can be developed, to a degree limited by individual differences, through practice and instruction.

4. The classification system developed can be used effectively for

categorizing teachers' questions.

5. An instructional sequence can be devised that will enable preservice teachers to develop skill in questioning.

6. The judges chosen can assess the questions asked by the teacher in the categories developed.

7. The time allotted in the study is an adequate amount of time for significant improvement of some questioning skills.

8. Random assignment of subjects to groups would distribute all other variables not controlled, such as groups being taught and lesson chosen.

9. The audio tapes used were transcribed by the stenographer correctly.

Definition of Terms

1. The History of Education Class -- The History of Education class refers to all students enrolled in the course History of Education at Oklahoma State University during the second semester of the 1970-71 school year.

2. Prospective Elementary School Teacher -- A prospective elementary school teacher is a student enrolled in the elementary education program who has not had his student teaching experience.

3. Symbolic Model on Questioning -- A symbolic model on questioning is defined as a written instruction paper on levels of questioning which includes the definition of each level, examples, and criteria for each level of questioning used in the study.[1]

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[1]See Appendix A, Page 86.

4. Control Group -- The control group refers to the subjects who studied the symbolic model (see Appendix A) on questioning and were given no other treatment before the post-test measure (teaching a mini-lesson).

5. Observation Group -- The observation group was composed of subjects who studied the symbolic model on questioning, and attended two fifty-minute class periods during which they were instructed to focus their attention on the level of questions asked by the teacher.

6. Tutoring Group -- The tutoring group is defined as the subjects who studied the symbolic model on questioning and helped one to three children in three fifteen-minute meetings with problems chosen by the classroom teacher.

7. Microteaching Group -- The microteaching group is defined as the subjects who studied the symbolic model on questioning and taught a lesson of five minutes on a topic of their choice three different times to three different groups of four or five children.

8. High Achievers -- A high achiever is defined as any subject who received a score of twenty-two or above on the test requiring classification of questioning according to a symbolic model. This group also included two subjects randomly selected from those with a midpoint score of twenty-one in order to divide the sample into two equal groups of forty-eight subjects each.

9. Low Achievers -- A low achiever is defined as any subject who received a score less than twenty-one on the test requiring classification of questioning according to a symbolic model. This group also included four subjects randomly selected from those with a midpoint score of twenty-one in order to divide the sample into two equal groups

of forty-eight.

10. Audio-Video Tape Feedback -- Audio-video tape feedback refers to the process of recording both the audio and video activity and having the subjects observe the playback.

11. Cognitive-Memory Questions -- Cognitive-memory questions are questions that require only the lowest level of thought on the part of the student. Cognitive-memory questions demand recall, memory, recognition, description of previous obtained factual knowledge, or observation. These questions call for predictable responses and often demand one word answers from the respondent.

12. Convergent Questions -- Convergent questions are questions that demand putting facts together in order to obtain "one right answer." The child is required to know certain facts and, using his own words, to explain concepts and describe their interrelationships, solve problems, or make comparisons. The respondent must utilize higher than cognitive-memory levels of thinking in order to state or explain the relationships present.

13. Divergent Questions -- Divergent questions refer to questions that not only provide the student with a new situation, but also allow for more than one possible right answer. These are questions that permit originality by the child as evidenced in the hypotheses he makes and in the way he uses his knowledge to solve new problems. Divergent questions are those that permit predicting, hypothesizing, and/or inferring. Divergent questions require the child to utilize a higher than cognitive-memory level of thought in that they call for an organization of elements into new patterns that were not clearly recognized previously.

14. Evaluative Questions -- Evaluative questions refer to questions that require the child to judge, value, choose or defend. The questions may be narrow or broad. They cause the respondent to organize his knowledge, formulate an opinion and thereby take a self-directed position. In order to make a judgment the respondent must use evidence. He must make judgments of good or bad, right or wrong, according to standards that either he designates or someone else has established.

15. Higher Level Questions -- Higher level questions refer to the questions that are convergent, divergent and evaluative.

16. Mini-lesson -- A mini-lesson is defined as a lesson taught by all subjects on a topic of their choice to a class of fifteen to thirty students in grades kindergarten through sixth at a public elementary school for approximately ten minutes.

17. Panel of Judges -- Panel of judges refers to three individuals trained in classifying questions.

Organization of the Study

The problem, hypotheses, limitations and definitions for this study are presented in Chapter I.

Chapter II reviews the literature supporting the nature of the problem and the design of the research.

In Chapter III, the procedures employed in obtaining and analyzing the data are described. The results of the investigation are summarized in Chapter IV and the implications of the findings for further research in teacher education are presented in Chapter V.

CHAPTER II

REVIEW OF LITERATURE

Introduction

> The art of questioning is probably the most ancient pedagogical method. The dialogues of Socrates and dialectics of Plato have often been considered the epitome of intellectual discourse, and have been used throughout history as a model for all teachers...
>
> (Clegg and others, 1969, p. 1)

Questioning as a method of teaching received less attention after the decline of the Scholastic tradition which rested heavily upon faith and authority and the perfection of logical syllogisms. However, educators' interest in questioning has continued throughout the years. Over half a century ago, in his influential report on classroom practices, Rice (1893) commented on the teacher's frequent use of "recitation" as a means of accomplishing educational goals.

The changing interest by educators in the use of questions as a teaching strategy is reflected in methods textbooks. Textbooks written in the last century and the early part of the 1900's contain descriptions of the use of questions in teaching (Burton, 1929; Douglass, 1926; Lancelot, 1929; Strayer, 1912; White, 1886; Odell, 1924). Blosser (1970) reported there was a decrease in emphasis on questioning during the 1940's and 1950's. Textbooks by Risk (1958) and Schorling (1949) are cited as examples of publications which did include sections designed to assist the preservice teacher develop and understand the

importance of questioning skills.

The recent interest in inquiry or discovery oriented approaches to teaching has resulted in a renewed emphasis on questioning (Clegg and others, 1969). The growing trend in education seems to be to focus upon the problem solving facets of teaching, the development of creativity in the child, the critical thinking skills, to mention but a few of the areas receiving increased emphasis. It is readily apparent that the act of questioning by the teacher plays a vital role in the implementation of these as goals in the classroom (Page, 1969).

Today most educators recognize the question as an important instrument in classroom practice and believe that questioning plays a vital role in learning. One of the most common teaching techniques is the use of the question (Manson and Clegg, 1970). The heart of teaching-learning science by discovery is in questions properly asked and answers to them properly used (Carin, 1970). Amidst the existing controversy among social studies educators regarding the implication of the new social studies, there is agreement on one point; questioning remains a vital part of instruction (Olmo, 1970).

Contributors to professional publications commonly attach great importance to the use of questions as a teaching technique; teachers in classrooms commonly devote an important portion of the day to question-centered discussions. Estimates are that from two-thirds to four-fifths of the typical school day is taken up with questioning activities. Recent research indicates that some elementary teachers average nearly three and one-half questions per minute (Floyd, 1960).

As with other teaching activities, it is the quality of the questioning that should receive emphasis and there is a great deal of

evidence to show that effective use of questions presents a real dilemma to teachers (Cunningham, 1968). To use questions effectively as a teaching device, well-developed techniques are needed; yet few teachers have experienced instruction in either the theory or the art of questioning. Most teachers have developed their question-asking techniques through a series of trial-and-error experiences in the classroom (Morgan and Schreiber, 1969). The benefits to learning that can be derived from the effective usage of questioning demand attention to this aspect of the teaching-learning environment.

In teacher training programs it would seem logical to focus on the act of questioning since it is one of the very basic and primary techniques used by the teacher to foster, encourage, and evaluate learning (Pate, 1969). Preservice teachers should have the opportunity to understand the functions of different types of questions, to learn how to develop and incorporate effective questions into the plan for a lesson, and to develop skill in the use of questions within the classroom. Although the most desirable means of providing these experiences for the beginning teacher has not been identified, some studies have shown that changes in the questioning ability of teachers can be made when attention is given to this aspect of teaching (Cunningham, 1968).

Importance of Questioning

The relationship between the teacher's use of questioning and the achievement of the goals of the classroom has been reported by a number of researchers. In recent years, considerable attention has been focused on teacher behaviors and their relationship to student achievement (Ladd and Anderson, 1970). Examinations of the teachers'

questioning techniques have yielded information concerning the influence of the teacher's questions on the quantity and quality of the student's response and the level of student thought which these questions appear to generate (Aschner, 1961; Bellack and Davitz, 1963).

Hunkins (1968) experimented with the effects of higher level questions on student achievement. The relationship between questioning and inquiry in the science classroom has been found to be a direct one (Scott, 1966, Schreiber, 1967). Gallagher (1965) has shown that the high frequency of cognitive memory questions asked by teachers results in a correspondingly high proportion of convergent responses, limiting sharply the likelihood of divergent or creative activity on the part of students.

The main purpose of a study conducted by Ladd and Anderson (1970) was to investigate the potential effect of the teachers' inquiry level (inferred from the question asking behavior of the teacher) on student achievement. Questions were asked concerning the effect of teacher questioning behavior on the student's ability to score high on a test which would (a) contain only low inquiry questions, (b) contain only high inquiry questions, and (c) contain both high and low inquiry questions. The researchers found that the teachers' questioning behavior strongly influenced student achievement. The students of high inquiry teachers performed significantly better on tests which contained either or both types of questions.

Gallagher (1965) in cooperation with Aschner and other developed an analysis system for examining the quality of thinking expressed in the oral behavior of teachers and pupils. The major categories of teachers' questions used were cognitive-memory, convergent thinking,

evaluative thinking, divergent thinking, and routine. They studied the relationship between the thinking level called for by the teachers' questions and that actually given in the pupils' answers. Cognitive-memory and convergent thinking occurred frequently while evaluative and divergent thinking occurred rarely in the interaction between teachers and academically talented pupils at the junior high level.

Since the classroom interaction is dominated by the teacher his or her verbal behavior is an important aspect of the learning environment. Flanders (1965) reported that in most classrooms 70 percent of the verbalizations can be attributed to the teacher. Balzer (1968) found that biology teachers dominated the verbal activity in their classrooms approximately 60 percent of the time. In the typical classroom, questions asked by the teacher far exceed the number asked by the students. In Floyd's (1960) study of primary teachers, the ratio of teacher questions to pupil questions was as high as 95 to 5 in some classrooms. Bellack and Davitz (1963) concluded that a major activity of teachers consisted of asking questions and reacting to questions.

The relationship between the teacher's use of questioning as a teaching strategy and pupil development has been summarized by Simon and Boyer (1967). They concluded that the way in which a teacher uses questions will make a difference in the pupil's intellectual growth. The teacher who asks only data recall (cognitive-memory) will have a different impact on pupils than one who encourages pupils to process data in a variety of ways. The latter skill is rapidly becoming more important for individuals in an era of expanding knowledge.

Since questioning is vital to meaningful learning, prospective teachers should have the opportunity to develop those skills and

abilities that result in the most effective use of questions and questioning techniques (Cunningham, 1968).

Use of Questioning by Teachers

Although many have attached importance to questioning because of the benefits to learning that can be derived from its effective usage, the ineffective use of questions and questioning techniques has been described in a number of studies of classroom teaching practices.

One of the earliest studies on the use of questions was reported by Stevens (1912). She found there was a large range in the number of questions asked by secondary teachers and concluded that most teachers failed to ask "good" questions. Stevens attributed the poor use of questioning to five possible causes: (1) lack of clearly defined purposes of instruction, (2) failure to appreciate the function of the question as a medium of instruction, (3) dominance of the textbook, (4) the feeling of indifference to the methods of recitation in colleges and training schools for teachers, and (5) the almost total neglect of supervision of instruction in secondary schools.

Corey's (1940) description of classroom questioning practices suggested that the types of questions asked by teachers were inadequate. His work indicated that the majority of questions asked in the classroom were asked by teachers and that frequently the teacher did not wait for a response or answered his own question. Less than one-fourth of the questions compiled from teacher observation required a higher level response. The need for the development of questioning skills in preservice and classroom teachers was supported by his findings.

Smith and Meux (1960) focused on questions or the opening phase of

episodes in their study of the logical operations of teaching. They found the kinds of questions used most frequently by secondary teachers in all content areas could be categorized as describing, designating, and explaining. Seldom used were those that could be described as defining, reporting, substituting, evaluating, opining, classifying, comparing and contrasting questions. Floyd (1960) found teachers dominated classroom activity often asking questions which demanded specific facts. Memory questions constituted over one-half of the questions utilized by the elementary teachers.

After comparing three teachers who appeared to ask critical thinking questions and three who did not, Kleinman (1965) concluded that the kinds of questions teachers ask are fairly stable for that teacher, teachers who ask more critical thinking questions tend to ask fewer questions, and the teacher who asks more critical thinking questions also asks more neutral, clarifying and associative questions and fewer rhetorical or factual questions. Teachers who did not ask critical thinking questions used a higher percentage of questions requiring simple recall and memorization-limiting responses. Teachers in this latter group limited student responses rather than stimulating thinking.

Clegg, Farley, and Curran (1967) found that student teachers asked a wide range of questions with slightly more than one-fourth (26.8%) of the total at the knowledge level. Knowledge and comprehension (levels I and II) accounted for over one-half (54 percent) of the questions asked by the student teachers in their study.

Moyer (1965) included six items in his analysis of classroom questions: (1) type, (2) structural form, (3) function, (4) relationship between structure and function, (5) teacher development and

utilization of questions, and (6) teacher awareness of the questioning process. In analyzing the questions asked in fourteen science lessons he found no questions which stimulated an evaluative response on the part of the students. Two-fifths of the questions asked required students to respond in ways requiring little or no mental effort. Almost three-fourths required a minimum of thinking. Teachers appeared to accept many inadequate responses and seemed unprepared to develop and effectively utilize the questioning process in their teaching.

Clements (1965) found that teachers did not wait for pupil responses. The responses of pupils in the first through seventh grades and college age were found not to vary much in length. One-fourth of the questions asked by the teachers were not answered.

Limited understanding of the value of questioning in the teaching-learning process may be one factor in the inadequate use of this skill by teachers. Pate and Bremer (1967) found that most of the teachers they interviewed used questions to determine the effectiveness of their teaching. Other reasons given for asking questions were: to diagnose pupils' learning difficulties, to check pupils' ability to recall facts, to meet individual needs, and to determine grades. In general, the teachers asked questions requiring short answers and did not encourage the student to generalize or make inferences.

Davis and Tinsley (1967) used the seven categories of Sanders' taxonomy of questions (memory, translation, interpretation, application, analysis, synthesis and evaluation) and added two others: affectivity and procedure. In their study of secondary social studies student teachers, Davis and Tinsley found that the most frequently asked questions by teachers were memory, interpretation, and procedural.

Evaluation, synthesis, analysis, application, affectivity, and translation question were asked infrequently. The investigators concluded that specific understandings and skills of classroom questioning and the purposes of questions need major attention in the preservice and in-service education of teachers.

Schreiber (1967) found that the most prevalent type of question asked by elementary teachers during social studies lessons was that of factual recall. She also reported that the type of lesson being taught (introductory, developmental, or review) influenced the types of questions the teacher asked in the classroom. During the developmental lesson an increase was noted in the use of questions calling for defining and clarifying information as well as drawing for conclusions. In the review lesson an increase was noted in the use of questions that call for 1) arranging information in sequential order, 2) giving descriptions and 3) making comparisons for identifying the main part of important segments of material. Questions posed in the social studies classroom for over a half a century have been recognized as emphasizing memory as the most important cognitive operation (Adams, 1964; Barr, 1929).

Barnes (1969) divided teachers' questions into factual questions, reasoning questions, "open" questions not calling for reasoning, and social questions. The subcategories of reasoning were "closed" reasoning, "open" reasoning, and observation. The results of his investigation of the questioning behavior of teachers of all subject areas in English secondary comprehensive schools were that factual questions were used much more often than reasoning questions, and that "open" questions with or without reasoning were used infrequently.

The purpose of a research project conducted by Pate (1969) was to analyze the act of questioning in order to discover possible patterns of inquiry exhibited by elementary teachers. Each teacher taped three fifteen minute discussions; one early in the first semester, one at midsemester, and one near the end of the second semester. Analysis of the tapes revealed: (1) that the individual teacher does exhibit a pattern in the kinds of questions asked over a one-year period; (2) that there is no apparent general pattern exhibited by all teachers; (3) that there are some specific patterns exhibited by many teachers which are consistent throughout the year, such as opening discussion with a convergent question and using a divergent question at midpoint; and (4) that teachers used the inquiry for student opinion as their primary divergent activity. The teachers as a group used over one-half of their questions for rote recall activities.

Hunter (1969) found that teachers have a tendency, even if they begin with a divergent, convergent or evaluative question to narrow the question if it is not immediately answered, so that it becomes a cognitive-memory inquiry. Since a high percentage of questions are initially cognitive memory almost all questions asked require recall on the part of the student. In her study about ninety-five percent of all questions asked were in this category.

Studies designed to describe the types of questions asked by teachers have resulted in a number of classification systems for questions. Systems reported by Amidon (1969), Carner (1963), Frankel (1966), Gallagher and Aschner (1968), Shrable and Minnis (1969), Simon and Boyer (1967), Hunter (1969), Morse and Davis (1970), and Farley (1968) were among those developed. Bloom's Taxonomy of Educational

Objectives (1956) and Sander's (1966) modification of the Taxonomy form the basis for many of the classification systems. These attempts provide tools for the teacher and the teacher trainer to utilize in examining and developing questioning behaviors.

These reports of the ineffective use of questions in the classroom could lead to the assumption that questioning is a skill that the teacher either does or does not possess and that it is a skill that is not subject to development through training and experience. However, Stanford University (Allen, 1966) and others (Berliner, 1969; Koran, 1969, Farley and Clegg, 1969) have demonstrated that questioning is an ability that can be acquired.

Attempts to Improve Questioning Skills

Researchers have been interested in devising methods for improving teachers' questioning skills (Blosser, 1970). Attempts to change the questioning behavior of both preservice and inservice teachers have been reported by a number of investigators. The procedures utilized to effect the desired change in teachers' behaviors have included the use of supervision, modeling, microteaching, feedback, classroom participation, instruction, self-evaluation, and combinations of these and other methods. The effectiveness of some of these attempts is described in the following pages. Studies using similar methods are grouped, however, most include the use of two or more approaches.

Instruction

The effects of training in the use of interaction analysis on the verbal inquiry skills of preservice science teachers was studied by

Masla (1968). The subjects were divided into high and low competency groups based on their scores on the Elementary Teacher's Science Inventory and then randomly assigned to an experimental and control group. The experimental group received intensive training in interaction analysis. Students from each group were randomly selected to teach science lessons to elementary school children. The lessons were recorded and analyzed and the investigator concluded that the experimental group asked a significantly greater proportion of open-ended questions. The level of competency in science processes as measured by the ETSI did not appear to be related to the verbal inquiry behavior of the subjects.

There have been a number of attempts to change the questioning techniques of science teachers. One study reported by Cunningham (1968) was designed to change the question-phrasing practices of preservice elementary teachers enrolled in science methods courses. He attempted to develop their ability to ask high level questions of the divergent-thinking category as defined by Gallagher and Aschner. Students were tested before and after seven periods of instruction on question-phrasing. The questions asked by each were analyzed by a panel of judges. There was a significant decrease in the number of cognitive-memory questions asked and a significant increase in the number of divergent-thinking questions. Cunningham (1968) found no significant change in the number of convergent thinking or evaluative questions asked.

The instructional program devised by Schreiber (1967) to change teachers' question-asking practices consisted of four one-hour sessions held at the end of the school day on subsequent days of the week.

During the after school sessions the teachers were given guidelines for effective questioning and analyzed social studies materials to determine the types of questions appropriate for the social studies content.

The teachers devised their own classification system rather than using one presented by the investigator. The teachers were observed and taped during three types of lessons: introductory, developmental, and review--both before and after the instructional program. A panel of judges analyzed the tapes using a five item question classification scale devised by the investigator. Instruction in questioning decreased the percentage of factual recall questions asked by the inservice elementary teachers.

The development of questioning skills in interns was the focus of an instructional program conducted by Cross (1968). Intern teachers in English preplanned high-level questions to use during discussion lessons. The study revealed some possible side-effects of training to improve questioning skills. The interns frequently did not wait for student response or use student response in facilitating discussion. Cross concluded that the interns were able to preplan high-level questions but were unable to execute the questions in the classroom and had over-reacted against the use of fact-recall questions as a result of the training.

Taba (1966) found that experienced teachers trained in a special questioning strategy asked more higher order questions than did untrained teachers. One attempt to change the number of divergent and evaluative questions asked by preservice secondary science teachers was conducted by Konetski (1969). Students were pretested to determine the proportion of divergent and evaluative questions they asked while

teaching a short lesson. An equal number of high-ranking and low-ranking subjects were randomly assigned to the experimental and control groups. The experimental group was provided with a programmed instructional booklet designed to improve their questioning. The control group received only a handout on questioning. Both groups had individual conferences with an instructor to discuss the use of divergent and evaluative questions.

Students from both groups taught two additional short science lessons which were recorded and analyzed. On the basis of the analysis, Konetski (1969) concluded that the instruction provided for the experimental group significantly and positively affected the number and proportion of divergent and evaluative questions and also significantly and negatively affected the total number of questions asked. The student-instructor conferences were more effective in improving questioning skills in conjunction with the programmed instruction.

A self-instruction procedure was reported by Crump (1969) as effective in reducing the percentage of convergent type questions and increasing the number of divergent oral and written questions employed by intermediate grade social studies teachers. Pre- and post-test construction and teaching tapes were analyzed. The procedure also reduced the total number of questions asked. The programmed text, Self-Instruction in the Art of Questioning, communicated a skill to teachers without direction from an instructor.

Bloom's Taxonomy and Modifications

Farley (1968) used instruction in applying Sanders' modification of Bloom's Taxonomy to improve the level of questions asked by student

teachers grades one through three. The control group utilized Flanders' Interaction Analysis. The student teachers in the experimental group listened to recordings of their teaching and evaluated their behavior using the modified Taxonomy. The tapes were then evaluated by the cooperating teachers and three additional raters. Tape recordings from the third, fifth, and seventh weeks were analyzed. The student teachers in the experimental group asked a larger percentage of higher level questions than the control group, however the level of questioning seldom was above the "interpretation" level. The improvement in questioning skill occurred during the first three weeks of the experiment.

One attempt to devise a method for improving teachers' questioning skills was made by Clegg, Farley, and Curran (1967). The researchers attempted to design a procedure for training teachers to recognize the different levels of cognitive behavior and to develop classroom learning procedures which would require all levels of cognitive behavior. Six student teachers were presented with Bloom's Taxonomy in a methods course prior to student teaching placement. The student teachers and their cooperating teacher were tested prior to and at the end of the student teaching experience. The investigators found no significant difference in the level of discrimination of classroom questions by student teachers and by cooperating teachers. The instrument utilized may not have been sensitive to the differences under study.

A study was undertaken by Farley and Clegg (1969) to determine if student teachers who received instruction in the use of Bloom's Taxonomy would operate within the classroom at a higher cognitive level than a control group who received equal time instruction using a placebo-type treatment and if there would be a difference in the

percentage of above-memory questions asked by teachers who had training in the use of the taxonomy and those who had no training. During eight weekly sessions the experimental group received instruction on the taxonomy while the control group discussed Flander's system of interaction analysis. Tapes made by the subjects during the third, fifth, and seventh week of student teaching were analyzed utilizing the Teacher Pupil Question Inventory. Student teachers who had training in the use of the taxonomy achieved a higher level of cognitive classroom behavior than student teacher who had no instruction in the taxonomy. The trained student teachers utilized a lower percentage of memory questions and higher percentage of above-memory questions. Elementary school student teachers who came to understand cognitive levels of questions, according to the Bloom (1956) system, subsequently asked more higher order questions (Rogers, 1969).

Conferences and Self-Evaluation

Supervisory conferences were found by Mittelstadt (1969) to be effective in facilitating changes in the questioning behavior of student teachers. As student teachers encountered their questioning behavior following their teaching episodes a decreasing dependency upon specific types of questions was noted in their questioning behavior. A trend from the use of reflective and analytical questions toward the expansive and applicative domain was observed. The Mittelstadt Inquiry Observer Scale was used to record the student teacher's questioning behavior and to report the behavior to the student following supervisor-student teacher conference.

Houston (1938) used individual and group conferences and

self-evaluation techniques to improve the questioning skills of eleven junior high school teachers. Pre- and post-testing indicated that the teachers had made improvement in their questioning behavior. Konetski (1969) also found conferences effective when used with programmed instruction.

The relationship between teacher questions and a series of supervisory conferences designed to modify those questions from recall and recognition to higher levels of comprehension was investigated by Trosky (1971). Five third-grade teachers were randomly selected to participate in the study, and their progress was recorded through individual case-study reports. The first two conferences were intended to make teachers aware of types of questions and levels of comprehension and the final conference gave teachers an opportunity to analyze changes in their behavior. Tapes of classroom reading lessons were made previous to each conference for use in the conference. As a result of the conferences four of the teachers made modifications in their behavior, decreasing the number of recognition questions. Two teachers made the changes at the end of the first conference and the others by the end of the second. The fifth teacher, who did not actually make changes, indicated an understanding of how to do so after the self-analysis conference. Trosky (1971) suggested that supervisory conferences could be helpful in improving the questioning techniques of in-service teachers.

The effectiveness of self-analysis as a method of improving questioning ability was reported by Parsons and Shaftel (1967). Upper elementary teachers were video-taped during three lessons. After the first video-taping the teacher determined the number and type of

questions which he or she had used. Over three-fourths of the questions were rhetorical or classified as information-recall. Nine percent were classified as leading and two percent as probing. The second tape was made one week later and analyzed using the same classification system. The teachers were able to decrease the percentage of rhetorical and information-recall questions and increase the proportion of leading questions. The percentage of probing questions increased to nine percent. The number of probing questions did not increase in the third taping. Parsons and Shaftel (1967) concluded that the teachers were able to improve the quality of the questions used through self-analysis.

Modeling

Koran (1971) designed a study to examine the effects of a written or a film-mediated model on the acquisition of the teaching skill of asking observation-classification questions by preservice teachers. The subjects in the written model group read a written transcript of the sound track of a film-mediated model in which the behaviors to be acquired were capitalized or underlined for highlighting. Those in the film-mediated model group observed the actual filmed performance of another person who displayed the behaviors to be acquired. A third group received placebo materials unrelated to the model.

For the pretest all subjects were given a kit of materials and asked to generate in writing the observation-classification questions that could be asked about the material. A similar procedure was used for the post-test. The treatment and post-test were repeated. Both modes of training appeared to be effective in developing the questioning skill, however, the need for further study of the effects of both

training procedures was indicated.

Koran (1969) compared the effectiveness of a procedure utilizing verbal instruction with one utilizing a video-taped model. Preservice elementary teachers were divided into three groups; one group received no treatment. One group participated in four hours of instruction during which they reviewed the materials from "Science: A Process Approach." The second group viewed a fourteen minute video tape of a teacher conducting a science lesson with four elementary school children; the teacher's observation and classification questions were highlighted. The preservice subjects were asked to generate questions in written form under simulated conditions. The questions asked by each group were compared. Koran (1969) found the students who had viewed the videotaped model scored significantly higher on questioning than did the group receiving no instruction and the group receiving verbal instruction.

An additional study by Koran (1970) compared the effectiveness of a self-rating procedure with the use of a film-mediated model in improving subjects' ability to formulate observation-classification questions. The two groups of subjects were given a set of materials prior to treatment and asked to generate in writing the observation-classification questions that could be asked about the material. A video-tape model of a teacher teaching a science lesson to four first graders using Science: A Process Approach materials was presented to one group. The teacher model used a wide range of observation-classification questions. The other group rated their pre-test performance using a rater-protocol as a guide. The first post-test was followed by a repeat of the treatment and the post-test and a retention

test two weeks after the completion of the two treatments. The two groups did not differ significantly in their ability to formulate observation-classification questions after the treatment and at the end of the two-week retention period.

Cornell (1969) attempted to change the question-asking behavior of experienced, inservice teachers. The experimental group was exposed to an audio-taped model sequence prior to teaching a ten minute micro-teaching lesson on two different occasions. The control group also taught the ten minute lessons but was not exposed to the model tape. The questions asked by both groups were classified into the six major categories of Bloom's Taxonomy. Over two-thirds of the questions asked were categorized as knowledge or comprehension questions. Exposure to models did not significantly effect the question-asking behavior of the subjects.

Orme (1966) investigated six modeling protocols using a micro-teaching format with interns in the Stanford Secondary Teacher Education Program. Interns taught three five minute lessons, each one to a different group of five pupils. Between teaching sessions, the interns received training on probing via a different modeling protocol. The six modeling protocols investigated were: (1) studying written materials (symbolic modeling) and viewing one's own performance alone; (2) studying written materials and viewing one's own performance with a supervisor who reinforced the desired behavior, identified salient cues to which the desired behavior should be attached, and suggested alternative forms of the desired behavior; (3) viewing a video-taped model of the specific teaching behavior (perceptual modeling) and viewing one's own performance alone; (4) receiving discrimination training and

reinforcement as described above while viewing one's own performance and viewing the perceptual model alone; (5) viewing one's own performance alone and a perceptual model with a supervisor who provided discrimination training based on the salient cues in the modeled performance; (6) viewing both one's own performance and the modeled performance with the supervisor providing discrimination training as described above.

The date reveal that the latter training protocol is more effective than any of the others in producing the desired teacher behaviors; probing protocol 5 was more effective than protocol 2 or 1; protocol 3 was more effective than protocol 1.

Training methods designed to promote higher-order questioning were investigated by Berliner (1969). He designed a procedure to sensitize the teacher trainee to the effects of questioning on his students and to provide practice in forming and using questions that elicit complex cognitive activity. Subjects were exposed to perceptual models (videotapes) and symbolic models (transcripts of a model's behavior). In addition, the effects of exposure to models using only higher order questions and those using both higher order and lower order questions were studied. The effect of practice in teaching model and original lessons was also investigated.

Berliner (1969) concluded that training can significantly increase the number of higher-order questions asked by teacher trainees during a five-minute teaching session. All experimental groups showed significant training effects. The perceptual model did not appear to be any more effective in increasing the number of higher order questions than the written model. Practice in teaching model lessons was more effective than practice in teaching original lessons in producing a greater

number of higher-order questions; however, this skill did not transfer to teaching a new lesson. The training done with a model presenting only higher order questions resulted in the subjects using the skill to a greater extent in a new teaching situation than if the model had presented a mix of higher order and lower order questions. All subjects had the opportunity to record, practice, view with automated feedback provided their own performance.

Microteaching

The effectiveness of microteaching in improving the teaching ability of undergraduate secondary teacher education candidates was reported by Davis and Smoot (1969). Students given the opportunity to microteach, receive feedback, and reteach exhibited changed behaviors and an increased variety in their verbal teaching. The experimental group significantly differed from the control group in use of divergent questions, probing, and ratio of divergent to convergent questions, as well as on most of the other variables on the Laboratory Observation Schedule and Record. Although the experience occurred over a brief period of time and the amount of feedback was minimal the subjects in the experimental group improved in several aspects of their questioning behavior.

Morse and Davis (1970) reported on the success of Teacher Laboratory Instruction in changing the questioning behaviors of beginning teacher candidates. One group of subjects using a specifically prepared Teaching Laboratory manual, evaluation forms, and listening guide were presented with questioning strategy concepts and participated in a microteaching cycle. The subjects taught a lesson, evaluated and

discussed it, and then retaught the lesson. The control group was presented with questioning strategy concepts and Bloom's "Taxonomy"; an educational game called "Questionize"; and taught a microteaching lesson. The final audio-tapes of all subjects were analyzed using the Questioning Strategies Observation System. The Teaching Learning treatment was more effective in influencing candidates (1) to ask more questions of a cognitive rather than affective or procedural nature and (2) to react to pupils' responses to questions in a more positive (accepting, supporting) manner. The two groups did not differ significantly in the analysis of question quantity and cognitive quality. Kallenbach and Gall (1969) found microteaching no more successful than classroom participation in producing effective teachers, however, less time and effort was required in achieving the desired changes through the use of microteaching.

Blosser (1970) investigated the effectiveness of an instructional procedure designed to develop skill in questioning. She also attempted to determine if skill developed during the instructional sequence would transfer to the student teaching experience and the relationship between selected personality factors and the development of questioning skill. The group of subjects taught micro classes, one group served as pupils in a micro class, and two groups served as the controls. Questioning appeared to be a skill that could be developed through instruction and practice by the secondary science preservice teachers. The development of questioning skill did not appear to be limited by intelligence, sex, personality type, or educational set.

The Far West Laboratory for Educational Research and Development has developed minicourses including microteaching to improve questioning

behavior. Preservice teachers participating in student teaching were involved in the field testing of the materials. Borg, Kallenback, Morris, and Friebel (1969) reported the effectiveness of Minicourse 1 in changing student teacher behavior and the effects of the micro-teaching format and use of videotape feedback within this model. Feedback and practice in the microteaching format were manipulated with four groups of student teachers while a fifth group served as a control. The minicourse with all or only part of its features did not appear to be effective in increasing the use of higher cognitive questions. On this aspect and others, treatment groups that did not receive videotape feedback and did not practice in the microteaching format were not significantly different than groups that did.

Minicourse 3 designed by the Far West Laboratory for Educational Research and Development emphasized the use of higher cognitive questions at the secondary level. The questions were broken down specifically into categories of comprehension, analysis, and evaluation. Teachers involved in the field testing of Minicourse 3 viewed a film model and studied printed materials; prepared and taught a lesson; evaluated their own teaching using objective self-evaluation forms; revised the lesson, retaught it, and analyzed their performance a second time. Analysis of the data from the pre- and post-tests indicated that the teachers decreased the use of fact questions by 50 percent, however, the number of comprehension, analysis and evaluation questions remained about the same. It appeared the teachers were not simply asking more higher cognitive questions, but were trying to get better student responses. The average length of student responses increased as did the percentage of student talk (Langer, 1969).

Feedback and Cueing

Claus (1968) investigated the use of cueing procedures in modeling and feedback treatments on the acquisition of teaching behaviors. She hypothesized that providing cues from an experimenter on the desired behavior during modeling and feedback treatments would increase the frequency of a teacher's higher-order questioning behavior. All of the elementary intern teachers viewed videotaped models displaying higher order questioning, practiced matching the model behaviors in a videotaped microteaching sessions, then viewed the playback of their own performance.

One of the four experimental groups received no cues in either the modeling or feedback conditions; one received cues only in feedback conditions, one group only in model conditions, and one group received cues in both training conditions. An eight-category system was used to analyze the questions asked by the subjects during the post-test teaching session. The most effective treatment was found to be modeling with cues. The feedback treatments produced no significant effects. Observational learning with cues was more effective than feedback, with or without cueing, in producing desired behavior change.

Gall and co-workers (1971) compared the effects of audiotape versus videotape feedback in microteaching situation. Teachers were randomly assigned to one of three groups: audiotape feedback, videotape feedback or control. The teachers in the feedback groups participated in an instructional sequence on microteaching procedures which involved about 13 hours of instruction. Teachers were asked to conduct tutoring sessions before and after the training sequence. The results

indicated that videotape and audiotape feedback were generally equally effective in producing gains in several tutoring skills including the teacher's use of diagnostic questions.

All of the studies reviewed by Berliner (1969) indicated that the video playback of a teacher's performance is an effective feedback procedure and, if combined with supervisory aid, is even more effective in developing specific teaching skills. Contrary to other information about human learning, the time lapse between videotaping and review with a supervisor did not dilute the power of the feedback process in modifying teacher behavior. It appears:

> ...videotape playback reinstates the trainee's performance for him. The whole experience of viewing oneself on the videotape is quite different from receiving information from a second person about one's performance. (McDonald & Allen, 1967, p. 153)

Viewing one's own performance with a supervisor to reinforce and identify effective techniques appears to be a valuable method of acquiring complex teaching behaviors such as questioning.

Berliner (1969) reported the results of a study designed to answer questions about the importance of models and supervision in using microteaching to develop this particular teaching skill. Subjects, while receiving six different treatment combinations, completed three microteaching sessions.

> The presence or absence of someone in a supervisory role providing discrimination training and reinforcement did seem to be an important variable in the acquisition of skill in probing. p. 31

Subjects viewing their teaching with an experimenter present showed more improvement in use of probing as a teaching technique. Perceptual

models were found to be more effective than symbolic models and maximum feedback more effective than minimal feedback.

Other Methods

McCortin (1969) attempted to reward teachers wearing earphones with a tone whenever they asked questions above the knowledge level. After three weeks the two subjects were using higher level questions.

Rowe (1969) reported that training teachers to wait longer for a student response after a question also resulted in teachers exhibiting more flexibility in the kinds of questions they asked.

Gagnon (1965) concluded that as teachers attempted to ask more clarifying questions they appeared to tell less and involve the students in classroom interaction to a greater degree.

Guszak (1971) found that teaching skills acquired while tutoring one child in reading were not transferred to student teaching and actual teaching situations.

The effects of the use of specific elementary school science programs on teacher behavior has been studied by a number of investigators. Studies by Moon (1969), Kondo (1969), Wilson (1969), and Bruce (1969) all suggest that the teacher's use of questions in the classroom is improved by utilizing the Science Curriculum Improvement Study materials. Hunter (1969) compared a group of teachers who had received special training in the use of one of the newer elementary school science approaches with a group that had not. She found no significant difference in the amount of questioning behavior of the two groups. It appears that changes in curriculum content will not necessarily improve the teacher's use of questions in the classroom.

Although interest in questioning as a teaching skill has varied over the years there has been renewed interest in this aspect of the teacher's behavior as a result of the emphasis on process-oriented education. Instruction designed to promote higher-level thinking by students requires skillful question-asking by the teacher who continues to be the most powerful verbal influence in the classroom. A number of studies indicate that the specific understandings and skills in classroom questioning are lacking in most teachers.

The need to focus on teaching behaviors such as questioning has been recognized by teacher educators. Instructional procedures employing a variety of methods have generally been successful in affecting some change in the questioning behavior of preservice and inservice teachers. However, further comparisons of the effectiveness of these methods and the development of new instructional procedures is necessary if teacher educators are to provide the experiences which will most effectively train prospective teachers in the skill of questioning.

CHAPTER III

METHOD

Introduction

The purpose of the study was to determine the effect of observation, tutoring and microteaching on the questioning skills of preservice elementary school teachers. The study utilized two factorial designs: (1) a four by two treatments-by-levels with treatments being observation, tutoring, microteaching and control and levels being high achievement and low achievement in cognitive recognition of categories of questions; (2) a two by two by two three-factor design, with independent variables of tutoring versus microteaching, high versus low achievement, and feedback versus no feedback. The dependent variable in both designs was number of questions asked.

The study was designed to test the following null hypotheses:

1. Subjects who are randomly assigned to observation, tutoring, microteaching and control groups; who are classified as high or low achievers; and who are influenced by the interaction between treatments (observation, tutoring, microteaching, control) and levels (high or low achievers) will not differ significantly in the number of cognitive-memory, convergent, divergent, evaluative, higher level or toal questions asked while teaching a mini-lesson.

2. Subjects who are randomly assigned to tutoring or microteaching; who are classified as high or low achievers; who are given

feedback; and who are influenced by the interaction between treatments (tutoring or microteaching), levels (high or low achievers) and feedback or no feedback will not differ significantly in the number of cognitive-memory, covergent, divergent, evaluative, higher level or total questions asked while teaching a mini-lesson.

Selection and Assignment of Subjects

This study was conducted on the campus of Oklahoma State University and at Skyline Elementary School in Stillwater, Oklahoma. The subjects included all those junior and senior elementary education majors who were enrolled in the course History of Education at Oklahoma State University during Spring Semester 1971. The pool of subjects included one hundred students. Four were eliminated, however, because they had prior teaching experience. A total of ninety-six subjects were included in the study.

Subjects were given one week to read a symbolic model (see Appendix A) and to complete a thirty-three item examination on which they were asked to classify questions according to the Gallagher and Aschner Scheme (1956).[1] The subjects submitted the exam to the instructor on the last class period of the week. The subjects' scores ranged from fourteen to thirty-three correct. The median score was twenty-one. Using the scores, the subjects were classified as either high or low achievers in their ability to categorize questions according to the Gallagher and Aschner Scheme (1956).

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[1] See Appendix A, pages 77-85.

The subjects' scores were rank ordered with identical scores listed randomly. The forty-eight subjects who categorized the highest number of questions correctly (see Appendix A) were classified as high achievers. Correspondingly, the forty-eight subjects obtaining the lowest scores were classified as low achievers. Each high achiever was randomly assigned to one of the four treatment groups (observation, tutoring, microteaching, or control). A table of random numbers was utilized. In the same manner each low achiever was randomly assigned to one of the four treatment groups. This procedure resulted in the formation of eight experimental cells of twelve subjects each.

The twelve subjects assigned to tutoring-high achievers were further randomly assigned to audio-video feedback or no audio-video feedback. In the same manner subjects assigned to tutoring-low achievers, microteaching-high achievers and microteaching-low achievers were randomly assigned to the audio-video feedback or no audio-video feedback groups. This procedure resulted in the formation of eight experimental cells of six subjects each within the tutoring and microteaching groups. Figure 1 is a diagram of the design.

Subjects who had been eliminated from the study because of prior teaching experience (N = 4) were also assigned to the four treatment groups and participated in all phases of the study. However, the transcripts of their mini-lessons were not included in the analysis but were used to achieve interjudge reliability.

The subjects were told by the instructor of the course, History of Education, that they were to use four class hours to complete a field experience at Skyline Elementary School. They were told that because of the size of the class and the limitations in the size of the elementary

school each subject would not have the same experience. All subjects were assigned to teach a mini-lesson on the topic of their choice to a class of fifteen to thirty children.

Control		Observation		Tutoring				Microteaching			
High	Low	High	Low	High		Low		High		Low	
				F	No F	F	No F	F	No F	F	No F
S 1	S 13	S 25	S 37	S 49	S 55	S 61	S 67	S 73	S 79	S 85	S 91
S 12	S 24	S 36	S 48	S 54	S 60	S 66	S 72	S 78	S 84	S 90	S 96

Figure 1. Diagram of the Design Utilized in the Study

The subjects completed an information sheet to determine time of day and grade level preferred.[2] Each subject was sent a letter with instructions for his participation. Different instruction sheets specific to their assignment were given to each of the four groups.[3] Each subject was contacted by telephone in order to clarify the instructions.

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[2]See Appendix B, page 86.

[3]See Appendixes C-G, pages 103-111.

Training of Subjects and Collection of Data

As the culminating, data producing activity for the research, all subjects in the study taught a mini-lesson on a topic of their choice to an elementary class of fifteen to thirty students within a three week period, (April 6 - April 26). An audio tape was prepared from each mini-lesson and the tape was left in the school office immediately after the lesson was taught. The time of the lessons ranged from eight to twenty-two minutes. Prior to this experience, each subject was exposed to one of the treatments outlined below.

The research prepared a questionnaire for each treatment group which was part of the instructional procedure for that group (Appendixes H-J). Each questionnaire was designed to help the subjects focus on the types of questions asked. The subjects in the observation group listed and classified examples of the questions asked by the teacher they observed, then reworded each of the cognitive-memory examples to a higher level. The subjects in the tutoring and microteaching groups listed and classified the questions that they asked while teaching, then reworded the cognitive-memory questions to a higher level.

The subjects in the observation group observed an elementary classroom for fifty minutes and completed the questionnaire[4] during the observation period. The subjects were instructed to observe the same teacher's classroom for a second fifty-minute period, complete an identical questionnaire and return it to the elementary school office.

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[4] See Appendix H, page 109.

The subjects were not allowed to observe both classrooms on the same day.

The subjects assigned to the tutoring group tutored from one to three children in three fifteen minute sessions. Each session was completed on a different day. The subjects tutored one or more children on a subject determined by the child or children and the classroom teacher. Six of the high achievers in the tutoring group were randomly assigned to receive audio-video feedback and six received no audio-video feedback.

The subjects receiving audio-video tape feedback tutored in the studio for fifteen minutes and immediately completed the first part of the questionnaire[5] as they viewed their tutoring session. The subjects were allowed to complete the classification part of the questionnaire outside of the school and return it to the school office before their next tutoring session. The subjects participated in two additional tutoring sessions, each fifteen minutes in length with the same child or children.

The subjects in the tutoring-no audio-video tape feedback group also participated in three fifteen minute tutoring sessions. They tutored in one of the classrooms rather than in the studio however. They completed the questionnaire as did the subjects in the audio-video feedback group.

The subjects assigned to the microteaching group taught three five-minute lessons to four or five children. The subjects used the same lesson each time with three different groups of children on different

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[5]See Appendix I, page 115.

days.

Half of the subjects in both the high and low achiever micro-teaching groups were randomly assigned to receive audio-video tape feedback. The other half received no feedback. This division produced two groups of twelve subjects each with both groups containing equal numbers (6) of high and low achievers.

The subjects receiving audio-video tape feedback microtaught in the school studio for a five minute period and immediately afterwards completed the questionnaire[6] while viewing their microteaching lesson. The questionnaire was returned to the office before the next micro-teaching session. The subjects completed two additional microteaching lessons, each five minutes in length with different children.

The subjects not receiving audio-video tape feedback in the micro-teaching group received the same treatment as the subjects with feed-back, however, the lessons were taught in a classroom rather than in the studio.

The characteristics of each of the unique subgroups of subjects are presented in Figure 2. The figure also shows the sequence of activities for each subgroup.

The participation experience for all subjects was completed within a three-week period. The mini-lesson tapes were transcribed and veri-fied by the researcher randomly selecting eight tapes and comparing the tapes and transcripts.

The three judges, all Professors of Education trained in question-ing, were paid to classify the questions on the transcribed tapes

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[6] See Appendix J, page 117.

GROUP	PHASE I	PHASE II	PHASE III
Control-High Achievers	Exercise on level of questioning	No Treatment	Mini-lesson taught to a group of students
Control-Low Achievers	"	No Treatment	
Observation-High Achievers	"	Two fifty-minute observation periods	"
Observation-Low Achievers	"	Two fifty-minute observation periods	"
Tutoring-High Achievers and Feedback	"	Three fifteen-minute tutoring sessions with immediate feedback	"
Tutoring-Low Achievers and Feedback	"	"	"
Tutoring-High Achievers and No Feedback	"	Three fifteen-minute tutoring sessions with no feedback	"
Tutoring-Low Achievers and No Feedback	"	"	"
Microteaching High Achievers and Feedback		Three five-minute microteaching sessions with immediate feedback	"
Microteaching Low Achievers and Feedback	"	"	"
Microteaching High Achievers and no Feedback	"	Three five-minute microteaching sessions with no feedback	"
Microteaching Low Achievers and No Feedback	"	"	"

Figure 2. Diagram of the Procedure Utilized in the Study

according to the Gallagher and Aschner Scale (Appendix A). The judges were given the symbolic model (Appendix A) to read. After reading the symbolic model the judges were given two transcribed tapes of subjects that were not included in the study. The judges categorized the questions according to the information in the symbolic model. After completing the transcribed tapes the judges were encouraged to compare results and to discuss questions on which they disagreed. The judges were asked to repeat the procedure on a third transcribed tape without discussion. An interjudge reliability check of 0.90 was achieved utilizing the intraclass correlation formula developed by Robert L. Ebel (1951). The transcribed tapes of the subjects were then randomly assigned to the three judges for evaluation.

Statistical Analysis

The population was divided into four treatment groups. The control and observation groups were divided into high achievers and low achievers. The tutoring and microteaching groups were divided into high achievers and low achievers with the high achievers being subdivided into feedback and no feedback and the low achievers also being subdivided into feedback and no feedback. Each treatment cell contained twenty-four subjects while each high achiever and low achiever group contained twelve subjects with six of the subjects receiving feedback and the remaining six subjects receiving no feedback. A four by two factorial analysis of variance (treatment-by-levels) was used to analyze the data generated by the study. In addition, a two by two by two factorial analysis of variance was performed on the data of the forty-eight subjects in the tutoring and microteaching treatments.

Duncan's multiple range test (1955) was utilized to discriminate between the specific means that were significant in the analysis of variance tests.

In addition to the analysis of variance on the dependent variable, Ebel's intraclass correlation formula (1951) was used to determine interjudge reliability.

The summarized data and results of the analytical procedures are presented in the next chapter.

CHAPTER IV

RESULTS

Instrument Analysis

The initial phase of this study involved the identification of subjects who were high or low achievers on cognitive recognition of categories of questions. Equal groups of subjects (high and low achievers) were randomly assigned to control, observation, tutoring or microteaching treatment groups. The subjects in the tutoring and microteaching groups were further randomly assigned to receive feedback or no feedback. Each subject taught a mini-lesson to produce the data for study of the dependent variable.

The lesson was audio-taped and a stenographer transcribed the questions that the subjects asked. The questions were classified by three judges. Each judge was randomly assigned thirty-two transcriptions to analyze. The interjudge reliability was 0.90 utilizing the intraclass correlation formula developed by Ebel (1951). The number of questions asked ranged as follows: (1) cognitive-memory, 0 to 87 (2) convergent, 0 to 34 (3) divergent, 0 to 27 (4) evaluative, 0 to 25 (5) higher level, 0 to 45 (6) total number, 1 to 108.

Since equal cell frequencies were analyzed and analysis of variance was utilized, homogeneity was assumed (Dayton, 1969; Hsu and Feldt, 1969; Boneau, 1970). The number of cognitive-memory, convergent, divergent, evaluative, and higher level questions and the total number

of questions asked were analyzed utilizing a four by two factorial and a two by two by two three-factor analysis of variance designs.

These two designs were used to test each of the general hypotheses stated in Chapter 1. In the following presentation of results, grouped by hypotheses, in those instances in which significant differences were found, the specific hypothesis related to this difference is stated.

Hypothesis 1

> Subjects who are randomly assigned to the observation, tutoring, microteaching and control groups; who are classified as high or low achievers; and who are influenced by the interaction between treatments (observation, tutoring, microteaching, control) and levels (high or low achievers) will not differ significantly in the number of cognitive-memory, convergent, divergent, evaluative, higher level or total questions asked while teaching a mini-lesson.

The differences between the means of treatments (observation, tutoring, microteaching, control) levels (high or low achievers) and interaction of treatments and levels on the number of cognitive-memory questions asked while teaching a mini-lesson were not significant as summarized in Table I.

Hypothesis 1.1: Subjects who are randomly assigned to the observation, tutoring, microteaching and control groups will not differ significantly in the number of convergent questions asked while teaching a mini-lesson.

Table II indicates an F ratio of 2.9947 for treatments (control, observation, tutoring and microteaching). Rejection of the null hypothesis at the 0.05 level of confidence with 3 and 88 degrees of freedom requires an F ratio of 2.76. The null hypothesis was rejected.

TABLE I

ANALYSIS OF VARIANCE FOR THE NUMBER OF COGNITIVE-MEMORY QUESTIONS ASKED WHILE TEACHING A MINI-LESSON

Source	ms	df	F	p
Total	194.852	95		
Treatments (Control, observation, tutoring, microteaching)	102.625	3	0.5019	n.s.
Levels (high or low)	88.167	1	0.4312	n.s.
Treatments X Levels	40.250	3	0.1968	n.s.
Between	73.827	7		
Within (error)	204.479	88		

TABLE II

ANALYSIS OF VARIANCE FOR THE NUMBER OF CONVERGENT QUESTIONS ASKED WHILE TEACHING A MINI-LESSON

Source	ms	df	F	p
Total	28.978	95		
Treatments (Control, observation, tutoring, microteaching)	79.399	3	2.9947	<.05
Levels (high or low)	31.510	1	1.1678	n.s.
Treatments X Levels	36.260	3	1.3439	n.s.
Between	54.070	7		
Within (error)	26.982	88		

Subjects assigned to different groups did differ significantly in the number of convergent questions asked while teaching a mini-lesson.

Duncan's multiple-range test (1955) was utilized to discriminate between the specific means. The analysis is summarized in Table III. As noted on the table, the difference between the means of microteaching and control (4.3750) was significant. With 88 degrees of freedom at 0.05 level of confidence the difference between means must be 3.2436 to be significant. Subjects assigned to microteaching asked significantly more convergent questions than the subjects assigned to the control group. All other mean differences were not significant at the 0.05 level of confidence. Table of means are presented at the end of this section (pages 57-59) where it seemed most appropriate to discuss trends.

TABLE III

COMPARISONS AMONG TREATMENT MEANS FOR THE NUMBER OF CONVERGENT QUESTIONS ASKED WHILE TEACHING A MINI-LESSON

Treatments Compared	Difference Between Means	Least Significant Range	Significance
Observation vs. Control	1.5416	2.9786	Not Sig.
Tutoring vs. Control	2.2916	3.1376	Not Sig.
Microteaching vs. Control	4.3750	3.2436	Significant
Tutoring vs. Observation	0.7500	2.9786	Not Sig.
Microteaching vs. Tutoring	2.0834	2.9786	Not Sig.
Mircoteaching vs. Observation	2.8334	3.1376	Not Sig.

Hypothesis 1.2: Subjects who are randomly assigned to the observation, tutoring, microteaching and control groups will not differ significantly in the number of divergent questions asked while teaching a mini-lesson.

Table IV indicates an F ratio of 3.0021 for treatments (control, observation, tutoring and microteaching). Rejection of the null hypothesis at the 0.05 level of confidence with 3 and 88 degrees of freedom requires an F ratio of 2.76. The null hypothesis was rejected. Subjects assigned to different groups did differ significantly in the number of divergent questions asked while teaching a mini-lesson.

TABLE IV

ANALYSIS OF VARIANCE FOR THE NUMBER OF DIVERGENT QUESTIONS ASKED WHILE TEACHING A MINI-LESSON

Source	ms	df	F	p
Total	18.919	95		
Treatments (Control, observation, tutoring, microteaching)	53.806	3	3.0021	<.05
Levels (high or low)	12.042	1	0.6719	n.s.
Treatments X Levels	15.569	3	0.8687	n.s.
Between	31.452	7		
Within (error)	17.922	88		

Duncan's multiple-range test (1955) was utilized to discriminate between the specific means. The analysis is summarized in Table V. As noted in Table V, the difference between the means of microteaching and control (3.4583) was significant. With 88 degrees of freedom at 0.05 level of confidence the difference between means must be 3.3523 to be significant. Subjects assigned to microteaching asked significantly more divergent questions than subjects assigned to the control group.

TABLE V

COMPARISONS AMONG TREATMENT MEANS FOR THE NUMBER OF DIVERGENT QUESTIONS ASKED WHILE TEACHING A MINI-LESSON

Treatments Compared	Difference Between Means	Least Significant Range (0.05)	Significance
Observation vs. Control	1.2083	3.2227	Not Sig.
Tutoring vs. Control	1.0000	3.2227	Not Sig.
Microteaching vs. Control	3.4583	3.3523	Significant
Tutoring vs. Observation	2.2083	3.3523	Not Sig.
Microteaching vs. Tutoring	3.4583	3.4560	Significant
Microteaching vs. Observation	1.2500	3.2227	Not Sig.

The difference between means of microteaching and tutoring (3.4583) was significant. With 88 degrees of freedom at 0.05 level of confidence the difference between means must be 3.4560 to be significant. Subjects

assigned to microteaching asked significantly more divergent questions than subjects assigned to the tutoring group. All other mean differences were not significant at the 0.05 level of confidence.

The number of evaluative questions asked by the subjects while teaching a mini-lesson was not significantly different for the four treatment groups (observation, tutoring, microteaching, control) levels (high or low achievers) or interaction of treatments and levels as shown in Table VI.

TABLE VI

ANALYSIS OF VARIANCE FOR THE NUMBER OF EVALUATIVE QUESTIONS ASKED WHILE TEACHING A MINI-LESSON

Source	ms	df	F	p
Total	31.213	95		
Treatments (Control, observation, tutoring, microteaching)	17.288	3	0.5372	n.s.
Levels (high or low)	8.760	1	0.2722	n.s.
Treatments X Levels	24.122	3	0.7495	n.s.
Between	18.999	7		
Within (error)	32.185	88		

Hypothesis 1.3: Subjects who are randomly assigned to the observation, tutoring, microteaching and control groups will not differ

significantly in the number of higher level questions asked while teaching a mini-lesson.

Table VII indicates an F ratio of 3.2371 for treatments (control, observation, tutoring and microteaching). Rejection of the null hypothesis at the 0.05 level of confidence with 3 and 88 degrees of freedom requires an F ratio of 2.76. The null hypothesis was rejected. Subjects assigned to different groups did differ significantly in the number of higher level questions asked while teaching a mini-lesson.

TABLE VII

ANALYSIS OF VARIANCE FOR THE NUMBER OF HIGHER LEVEL QUESTIONS ASKED WHILE TEACHING A MINI-LESSON

Source	ms	df	F	p
Total	96.432	95		
Treatments (Control, observation, tutoring, microteaching)	288.625	3	3.2371	<.05
Levels (high or low)	26.042	1	0.2921	n.s.
Treatments X Levels	140.958	3	1.5809	n.s.
Between	187.827	7		
Within (error)	89.161	88		

Duncan's multiple-range test (1955) was utilized to discriminate between the specific means. The analysis is summarized in Table VIII.

As noted in the table, the difference between the means of microteaching and control (8.3750) was significant. With 88 degrees of freedom at 0.01 level of confidence the difference between means must be 7.7080 to be significant. Subjects assigned to microteaching asked significantly more higher level questions than subjects assigned to the control group. All other mean differences were not significant at the 0.05 level of confidence.

TABLE VIII

COMPARISONS AMONG TREATMENT MEANS FOR THE NUMBER OF HIGHER LEVEL QUESTIONS ASKED WHILE TEACHING A MINI-LESSON

Treatments Compared	Difference Between Means	Least Significant Range (0.05)	Significance
Observation vs. Control	4.4166	5.7039	Not sig.
Tutoring vs. Control	3.1250	5.4149	Not sig.
Microteaching vs. Control	8.3750	7.7080(0.01)	Significant
Tutoring vs. Observation	1.2916	5.4149	Not sig.
Microteaching vs. Observation	3.9584	5.4149	Not sig.
Microteaching vs. Tutoring	5.2500	5.7039	Not sig.

The differences between the means of treatments (observation, tutoring, microteaching, control) levels (high or low achievers) and interaction of treatments and levels on the total number of questions

asked by the subjects while teaching a mini-lesson were not significant as summarized in Table IX.

TABLE IX

ANALYSIS OF VARIANCE FOR THE TOTAL NUMBER OF QUESTIONS ASKED WHILE TEACHING A MINI-LESSON

Source	ms	df	F	p
Total	383.347	95		
Treatments (control, observation, tutoring, microteaching)	430.622	3	1.0914	n.s.
Levels (high or low)	19.260	1	0.0488	n.s.
Treatments X Levels	128.205	3	0.3249	n.s.
Between	242.249	7		
Within (error)	394.571	88		

Subjects assigned to the microteaching group asked significantly more convergent questions than the control group, more divergent questions than either the control or tutoring group and more higher level questions than the control group.

Those subjects who had experience with children in the elementary school prior to teaching a mini-lesson (observation, tutoring, microteaching) tended to ask more questions and higher level questions although not significantly in all cases. Those subjects assigned to

tutoring and microteaching asked a higher percentage of higher level questions (51%) than those assigned to the observation and control groups (40%) although the difference was not at a significant level. These and other trends are shown in the following table of means.

TABLE X

TABLE OF MEANS FOR THE NUMBER OF COGNITIVE-MEMORY QUESTIONS ASKED WHILE TEACHING A MINI-LESSON

Level	Control	Observation	Tutoring	Microteaching	Sum
High	14.9167	19.3333	15.6667	15.5000	16.3542
Low	15.6667	16.8333	10.4167	14.8333	14.4375
Sum	15.2917	18.0833	13.0417	15.1667	15.3958

TABLE XI

TABLE OF MEANS FOR THE NUMBER OF CONVERGENT QUESTIONS ASKED WHILE TEACHING A MINI-LESSON

Level	Control	Observation	Tutoring	Microteaching	Sum
High	2.1667	3.8333	3.5833	4.0000	3.3958
Low	1.6667	3.0833	4.8333	8.5833	4.5416
Sum	1.9167	3.4583	4.2083	6.2917	3.9688

TABLE XII

TABLE OF MEANS FOR THE NUMBER OF DIVERGENT QUESTIONS ASKED WHILE TEACHING A MINI-LESSON

Level	Control	Observation	Tutoring	Microteaching	Sum
High	3.4167	3.5000	1.2500	3.9167	3.0208
Low	0.5833	2.9167	0.7500	5.0000	2.3125
Sum	2.0000	3.2083	1.0000	4.4583	2.6667

TABLE XIII

TABLE OF MEANS FOR THE NUMBER OF EVALUATIVE QUESTIONS ASKED WHILE TEACHING A MINI-LESSON

Level	Control	Observation	Tutoring	Microteaching	Sum
High	5.9167	5.1667	6.1667	6.9833	6.0584
Low	3.8333	7.9167	7.2500	6.7500	6.4375
Sum	4.8750	6.5417	6.7083	6.8667	6.2479

TABLE XIV

TABLE OF MEANS FOR THE NUMBER OF HIGHER LEVEL QUESTIONS ASKED WHILE TEACHING A MINI-LESSON

Level	Control	Observation	Tutoring	Microteaching	Sum
High	11.5000	12.5000	11.0000	14.0000	12.2500
Low	6.0833	13.9167	12.8333	20.3333	13.2916
Sum	8.7917	13.2083	11.9167	17.1667	12.7708

TABLE XV

TABLE OF MEANS FOR THE TOTAL NUMBER OF QUESTIONS ASKED WHILE TEACHING A MINI-LESSON

Level	Control	Observation	Tutoring	Microteaching	Sum
High	26.4167	31.8333	26.7500	29.5000	28.6250
Low	21.7500	30.7500	23.2500	35.1667	27.7292
Sum	24.0834	31.2917	25.0000	32.3334	28.1771

Hypothesis 2

> Subjects who are randomly assigned to tutoring or microteaching; who are classified as high or low achievers; who are given feedback or no feedback; and who are influenced by the interaction between treatments (tutoring or microteaching), levels (high or low achievers) and feedback or no feedback will not differ significantly in the number of cognitive-memory, convergent, divergent, evaluative, higher level or total questions asked while teaching a mini-lesson.

There were no significant differences found in Hypothesis 2 except those in treatments already discussed in the four by two factorial analysis of variance. The differences between the means of feedback or no feedback, interaction of levels (high or low achievers) and feedback or no feedback, the interaction of treatments (observation, tutoring, microteaching, control) and feedback or no feedback and the interaction of treatments (observation, tutoring, microteaching, control), levels (high or low achievers) and feedback or no feedback on the dependent variables were not significant. (Tables XVI-XXI)

TABLE XVI

THREE FACTOR ANALYSIS OF VARIANCE FOR THE NUMBER OF COGNITIVE-MEMORY QUESTIONS ASKED WHILE TEACHING A MINI-LESSON

Source	ms	df	F	p
Total	123.542	47		
Treatments (Control, observation, tutoring, microteaching)	54.188	1	0.4094	n.s.
Level A (high or low)	105.021	1	0.7935	n.s.
Level B (feedback or no feedback)	247.521	1	1.8701	n.s.
Treatment X Level A	63.021	1	0.4762	n.s.
Treatment X Level B	7.521	1	0.0568	n.s.
Level A X Level B	35.021	1	0.2646	n.s.
Treatments X Level A X Level B	0.021	1	0.0002	n.s.
Between	73.188	7		
Within (error) m	132.354	40		

TABLE XVII

THREE FACTOR ANALYSIS OF VARIANCE FOR THE NUMBER OF CONVERGENT QUESTIONS ASKED WHILE TEACHING A MINI-LESSON

Source	ms	df	F	p
Total	44.362	47		
Treatments (Control, observation, tutoring, microteaching)	52.083	1	1.1887	n.s.
Level A (high or low)	102.083	1	2.3298	n.s.
Level B (Feedback or no feedback)	8.333	1	0.1902	n.s.
Treatments X Level A	33.333	1	0.7607	n.s.
Treatments X Level B	80.083	1	1.8200	n.s.
Level A X Level B	0.083	1	0.0019	n.s.
Treatments X Level A X Level B	56.333	1	1.2857	n.s.
Between	47.476	7		
Within (error)	43.817	40		

TABLE XVIII

THREE FACTOR ANALYSIS OF VARIANCE FOR THE NUMBER OF DIVERGENT QUESTIONS ASKED WHILE TEACHING A MINI-LESSON

Source	ms	df	F	p
Total	16.031	47		
Treatments (Control, observation, tutoring, microteaching)	143.521	1	9.7385	<.05
Level A (high or low)	1.021	1	.0693	n.s.
Level B (feedback or no feedback)	1.021	1	.0693	n.s.
Treatments X Level A	7.521	1	.5103	n.s.
Treatments X Level B	9.188	1	.6234	n.s.
Level A X Level B	1.688	1	.1145	n.s.
Treatments X Level A X Level B	.021	1	.0014	n.s.
Between	23.426	7		
Within (error)	14.738	40		

TABLE XIX

THREE FACTOR ANALYSIS OF VARIANCE FOR THE NUMBER OF EVALUATIVE QUESTIONS ASKED WHILE TEACHING A MINI-LESSON

Source	ms	df	F	p
Total	28.847	47		
Treatments (Control, observation, tutoring, microteaching)	1.021	1	.0310	n.s.
Level A (high or low)	9.188	1	.2791	n.s.
Level B (feedback or no feedback)	.021	1	.0006	n.s.
Treatments X Level A	.521	1	.0158	n.s.
Treatments X Level B	.021	1	.0006	n.s.
Level A X Level B	13.021	1	.3955	n.s.
Treatments X Level A X Level B	15.188	1	.4613	n.s.
Between	5.568	7		
Within (error)	32.921	40		

TABLE XX

THREE FACTOR ANALYSIS OF VARIANCE FOR THE NUMBER OF HIGHER LEVEL QUESTIONS ASKED WHILE TEACHING A MINI-LESSON

Source	ms	df	F	p
Total	105.190	47		
Treatments (Control, observation, tutoring, microteaching)	330.750	1	3.0933	<.05
Level A (high or low)	200.083	1	1.8712	n.s.
Level B (feedback or no feedback)	3.000	1	.0281	n.s.
Treatments X Level A	60.750	1	.5682	n.s.
Treatments X Level B	33.333	1	.3117	n.s.
Level A X Level B	27.000	1	.2525	n.s.
Treatments X Level A X Level B	12.000	1	.1122	n.s.
Between	95.274	7		
Within (error)	106.925	40		

TABLE XXI

THREE FACTOR ANALYSIS OF VARIANCE FOR THE TOTAL NUMBER OF QUESTIONS ASKED WHILE TEACHING A MINI-LESSON

Source	ms	df	F	p
Total	262.184	47		
Treatments (Control, observation, tutoring, microteaching)	645.333	1	2.3195	n.s.
Level A (high or low)	14.083	1	.0506	n.s.
Level B (feedback or no feedback)	200.083	1	.7192	n.s.
Treatments X Level A	252.083	1	.9061	n.s.
Treatments X Level B	70.083	1	.2519	n.s.
Level A X Level B	.333	1	.0012	n.s.
Treatments X Level A X Level B	12.000	1	.0431	n.s.
Between	170.571	7		
Within (error)	278.217	40		

Subjects assigned to audio-video tape feedback tended to ask more questions than subjects assigned to no audio-video tape feedback. This trend was apparent in the microteaching group and the high achievers although not at a significant level. Subjects classified as low achievers seemed to ask more questions with no audio-video tape feedback except at the cognitive-memory level. Subjects assigned to the microteaching group tended to ask more questions than those assigned to the tutoring group although the trend was not significant. These and other trends in the two by two by two factorial design are shown in the following tables of means.

TABLE XXII

THREE FACTOR TABLE OF MEANS FOR THE NUMBER OF COGNITIVE-MEMORY QUESTIONS ASKED WHILE TEACHING A MINI-LESSON

Level	Tutoring	Microteaching	High	Low	Sum
Feedback	14.9167	17.8333	17.0000	15.7500	16.3750
No Feedback	11.1667	12.5000	14.1667	9.5000	11.8333
Sum	13.0417	15.1667	15.5834	12.6250	14.1041

TABLE XXIII

THREE FACTOR TABLE OF MEANS FOR THE NUMBER OF CONVERGENT QUESTIONS ASKED WHILE TEACHING A MINI-LESSON

Level	Tutoring	Microteaching	High	Low	Sum
Feedback	2.5000	7.1667	3.4167	6.2500	4.8333
No Feedback	5.9167	5.4167	4.1667	7.1667	5.6667
Sum	4.2083	6.2917	3.7917	6.7084	5.2500

TABLE XXIV

THREE FACTOR TABLE OF MEANS FOR THE NUMBER OF DIVERGENT QUESTIONS ASKED WHILE TEACHING A MINI-LESSON

Level	Tutoring	Microteaching	High	Low	Sum
Feedback	1.5833	4.1667	2.9167	2.8333	2.8750
No Feedback	0.4167	4.7500	2.2500	2.9167	2.5833
Sum	1.0000	4.9167	2.5833	2.7500	2.7291

TABLE XXV

THREE FACTOR TABLE OF MEANS FOR THE NUMBER OF EVALUATIVE QUESTIONS ASKED WHILE TEACHING A MINI-LESSON

Level	Tutoring	Microteaching	High	Low	Sum
Feedback	6.7500	6.4167	6.6667	6.5000	6.5833
No Feedback	6.6667	6.4167	5.5833	7.5000	6.5417
Sum	6.7083	6.4167	6.1250	7.0000	6.5625

TABLE XXVI

THREE FACTOR TABLE OF MEANS FOR THE NUMBER OF HIGHER LEVEL QUESTIONS ASKED WHILE TEACHING A MINI-LESSON

Level	Tutoring	Microteaching	High	Low	Sum
Feedback	10.8333	17.7500	13.0000	15.5833	14.2917
No Feedback	13.0000	16.5833	12.0000	17.5833	14.7917
Sum	11.9167	17.1667	12.5000	16.5833	14.5417

TABLE XXVII

THREE FACTOR TABLE OF MEANS FOR THE TOTAL NUMBER OF QUESTIONS ASKED WHILE TEACHING A MINI-LESSON

Level	Tutoring	Microteaching	High	Low	Sum
Feedback	25.8333	35.5833	30.0833	31.3333	30.7083
No Feedback	24.1667	29.0833	26.1667	27.0833	26.6250
Sum	25.0000	32.3333	28.1250	29.2083	28.6667

Summary

The subjects of this study were classified as high or low achievers based on their score in cognitive recognition of categories of questions. Each group of subjects (high and low achievers) were randomly assigned to either control, observation, tutoring or microteaching groups. The subjects in the tutoring and microteaching groups were further randomly assigned to receive or not receive feedback. A four by two factorial analysis of variance (treatments-by-levels) was utilized to test null hypothesis I. In addition, a two by two by two factorial analysis of variance was utilized to test null hypothesis II. All comparisons were found to be non-significant except treatment groups (observation, tutoring, microteaching and control) did differ significantly in the number of convergent, divergent, and higher level questions asked while teaching a mini-lesson. The microteaching group asked significantly (0.05 level) more convergent, divergent and higher level questions than the control group. The microteaching group also asked significantly more divergent questions than the tutoring group.

CHAPTER V

CONCLUSIONS

Summary of Study

The purpose of the study was to determine the effect of observation, tutoring and microteaching on the questioning skills of preservice elementary school teachers. The study utilized two factorial designs: (1) a four by two treatments-by-levels with treatments being observation, tutoring, microteaching and control and levels being high achievement and low achievement in cognitive recognition of categories of questions; (2) a two by two by two three-factor design, with independent variables of tutoring versus microteaching, high versus low achievement, and feedback versus no feedback. The dependent variable in both designs was level of questioning.

The study was conducted on the campus of Oklahoma State University and at Skyline Elementary School in Stillwater, Oklahoma. The subjects included all those junior and senior elementary education majors who were enrolled in the course History of Education at Oklahoma State University during Spring Semester 1971. The pool of subjects included one hundred students.

The subjects were classified as either high or low achievers in their ability to categorize questions according to the Gallagher and Aschner Scheme (1956). An equal number of high and low achievers were randomly assigned to the four treatments (observation, tutoring,

microteaching and control). This procedure resulted in the formation of eight experimental cells of twelve subjects each. The twelve subjects assigned to tutoring-high achievers were further randomly assigned to audio-video feedback or no feedback. In the same manner subjects assigned to tutoring-low achievers, microteaching-high achievers and microteaching-low achievers were randomly assigned to the audio-video feedback or no feedback groups. This procedure resulted in the formation of eight experimental cells of six subjects each within the tutoring and microteaching groups.

The subjects in the control group taught a mini-lesson on a topic of their choice to a class of elementary children. The lesson was audio taped. The subjects in the observation group observed an elementary classroom and completed a questionnaire designed to focus their attention on the level of the teacher's questions. After completing a second observation and questionnaire the subjects in the observation group taught a mini-lesson which was taped.

The subjects in the tutoring group tutored a small group of children in three fifteen minute sessions; one half of the group, the tutoring-feedback group, viewed their tutoring on videotape and completed a questionnaire designed to help them focus on the level of the questions they asked. This group of subjects, as did all those in the study, taught a mini-lesson to a classroom of children at the end of the treatment period.

The subjects assigned to the microteaching group taught three five minute lessons to four or five children. One half of the subjects in the high achiever-microteaching group and one half of the subjects in the low achiever-microteaching group received feedback by viewing their

microteaching lesson after the taping. The other half of each group received no feedback.

The mini-lesson of each subject was audiotaped and the audiotape transcribed. One of the judges evaluated the tape and categorized the questions asked by the subject according to the Gallagher and Aschner Scheme.

A four by two factorial analysis of variance (treatments-by-levels) was used to analyze the data generated by the study. In addition a two by two by two factorial analysis of variance was performed on the data from the forty-eight subjects in the tutoring and microteaching groups.

All comparisons were found to be non-significant except treatment groups (observation, tutoring, microteaching and control) did differ significantly in the number of convergent, divergent and higher level questions asked while teaching a mini-lesson. The microteaching group asked significantly (0.05 level) more convergent, divergent and higher level questions than the control group. The microteaching group also asked significantly more divergent questions than the tutoring group.

Discussion of the Results

The number of questions asked by the subjects ranged from 0 to 87 cognitive-memory; 0 to 34 convergent; 0 to 27 divergent; and 0 to 25 evaluative. The mean number of cognitive-memory questions asked by all subjects was 15.40 compared with 3.97 convergent, 2.67 divergent, and 6.25 evaluative questions. For the control group who experienced only exposure to the Gallagher and Aschner Scheme the averages were 15.29, 1.92, 2.00, and 4.88 respectively.

There was not a significant difference between the treatments on the number of cognitive-memory questions asked although the treatments and in particular the observation guides were designed to decrease the number of cognitive-memory and increase the number of higher level questions. Studies reported by Cunningham (1968), Schreiber (1967), Farley and Clegg (1969) and others have suggested that the number or proportion of lower level questions (cognitive-memory) is reduced when an instructional procedure is applied to improve skill in questioning.

The value of microteaching in teacher training programs was supported by several findings of this study. The subjects assigned to the microteaching group asked significantly more convergent, divergent, and higher level (convergent, divergent, and evaluative) questions than subjects assigned to the control group. The microteaching group also asked significantly more divergent questions than the tutoring group. However, the total number of questions and the number of evaluative questions asked by the subjects while teaching a mini-lesson was not significantly different for the four treatment groups.

Although there are several reports of the success of microteaching in the literature (Davis and Smoot, 1969; Morse and Davis, 1970; Blosser, 1970) as well as less positive ones (Borg, Kallenbach, Morris, and Friebel, 1969) the investigator found no studies which compared the use of microteaching to tutoring experiences and classroom observation. The superiority of microteaching over no experience and tutoring experience in improving questioning skills gains some support by the findings of this investigation. The microteaching procedure was the only procedure which resulted in a difference which was statistically significant.

However, there was a tendency for all subjects who had some experience with children (observation, tutoring, and microteaching) to ask more questions and more higher level questions. If the subjects in the tutoring and observation groups had participated in these experiences for a longer length of time or in a different way a greater difference may have been observed. Also, it could be assumed that the teachers observed by the subjects modeled both cognitive-memory and higher levels of questions. According to Berliner (1969) observation of a model presenting only higher level questions is more effective in changing teacher behavior than a model presenting a mix of questions. Observation of a perfected film model may be more feasible than classroom observation in providing these conditions.

The use of feedback did not appear to significantly effect the number of questions asked by the subjects. Claus (1967) and Borg, Kallenbach, Morris, and Friebel (1969) also found feedback did not significantly affect the acquisition of questioning behaviors. However, Gall and coworkers (1971) reported audio and videotape feedback as effective in producing gains in use of diagnostic questions and video playback was an effective feedback procedure in a study by Berliner (1969).

The effectiveness of feedback as a procedure to improve questioning skill may be related to the strength of the treatment. In this study the feedback consisted of one observation of each videotape by the subject alone and his completion of a brief questionnaire. Berliner (1967) suggested that maximum feedback is necessary for significant change. In addition, the importance of the presence of a supervisor during feedback is supported by Claus' (1969) study of

cueing and Berliner's (1969) conclusion that review with a supervisor is a powerful tool for improving teacher behavior. It appears that if feedback is to affect significant change it must be extensive and may need to include supervision.

High achievers, those who scored highest on the classification exercise prior to treatment, did not differ significantly from low achievers in use of cognitive-memory, convergent, divergent, evaluative, higher level and total number of questions asked while teaching a mini-lesson. Cross (1968) has suggested that ability to recognize and plan higher levels of questions may not be reflected in classroom practice. Significance may have been observed if the two extremes of the population had been compared.

In general, the results of the study supports Cunninghams' (1968) conclusion that changes in the questioning ability of teachers can be made when attention is given to this aspect of teaching. Berliner (1969), Koran (1969), Farley and Clegg (1969), Allen (1966) and others also have demonstrated that questioning is an ability that can be acquired.

Recommendations and Need for Further Study

Microteaching appears to be the more effective method of improving the questioning skills of prospective elementary school teachers. However, tutoring and observation if utilized more extensively or in a different way than in this study may have the same potential. The negative as well as the positive changes which can result from any approach should be evaluated. If tutoring, observation, or micro-teaching are employed, careful study should be undertaken to determine

the procedure which will result in the desired changes. If feedback is included the literature, as well as the results of this study, suggests that the guidance of a supervisor or other person may be necessary. The teacher educator whose goal is to improve the pre-service teacher's performance in the classroom faces a challenge which requires serious attention to the methods that are to be utilized.

Further research in the effectiveness of microteaching, observation, and tutoring in developing questioning skills is needed. The ideal strength for each treatment should be determined. A control group which had not been exposed to an instructional scheme such as that of Gallagher and Aschner should be included. Some of the other variables such as the content of the mini-lesson, the number of minutes for the mini-lesson, and the students' performance on the questionnaire should be controlled. Investigations should also attempt to determine the effect of each of the treatments on other important variables, such as attitudes, and other teaching skills. In further research, reduction of the number of variables and treatments may result in more significant findings.

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APPENDIX A

LEVELS OF QUESTIONING

Trial Program

In recent years educational researchers have focused attention on the environment of the classroom in order to acquire a more naturalistic view of teaching. The reason for this change in focus has been the growing realization that an important step towards the improvement of instruction is the study of teacher behavior. The objectives of these studies has been the improvement of the methods and techniques of science instruction. These studies usually entail observation, description, and analysis of the verbal teacher-student interaction. The investigators are continually seeking to find which of the teacher's verbal behaviors most affects the learning of the pupil. Educators have shown increased interest in the relationship between teacher questioning and the amount of thinking that certain levels of questions may or may not promote. Many have advocated that the teacher can guide the thought processes of his students by carefully choosing the questions asked in classroom discussions.

Recently many science educators have advocated the processes of inquiry as effective entities through which the student may learn science. During this same time the emphasis of teaching science as a body of unyielding facts seems to have been replaced by an emphasis on teaching science as an active, ever broadening search, involving the student as an active participant in the processes of inquiry.

The relationship between questioning and inquiry has been found to be a very direct one. Many researchers have also reported a congruence between the level of teacher questions and students responses. With these findings as a foundation, efforts have been made to find ways and means to develop the teacher's capacity to ask higher level, inquiry provoking questions and to maintain this capacity once developed. In spite of these efforts the level of questions asked by teachers has not increased.

A possible explanation for this continual inability to ask higher level questions is that elementary teachers are not aware of the level of thought which their questions can and do elicit in their students.

The nature of this paper is to inform the prospective elementary teacher of the different levels of questioning and to provide practical experience in the identification and writing of questions at the various levels of thought advocated by Gallagher and Aschner (1956). Stated in performance terms the objective of this paper is: Given the four basic categories of the Gallagher and Aschner question Classification scheme the reader will be able to identify which level of cognitive thought is required by a question. Minimal acceptable performance will include proper classification of questions into all four of the categories.

Gallagher and Aschner's Classification Scheme

Many attempts have been made to formulate an instrument capable of accurately classifying the thought level required of the child by a teacher's question. One of these systems is that proposed by Gallagher and Aschner. These authors developed a four-category system designed

to suggest the various kinds of questions that elicit responses from the different "cognitive" thought levels. The categories identified are (1) cognitive-memory, (2) convergence, (3) divergence, and (4) evaluative thinking. These categories are arranged in a loosely connected hierarchy which permits the objective and accurate description of the level of thought that is required of the child to respond to the question. Basic to this scheme is the assumption that a question asked at a given level will elicit a response that can be identified with that same level. In other words, a cognitive-memory question (the lowest level) will cause a cognitive-memory response on the part of the child. The categories described by Gallagher and Aschner will be discussed in the following pages.

1. Cognitive-Memory Questions

The first category of the Gallagher and Aschner questions classification scheme is that of cognitive-memory. Questions placed in this category require only the lowest level of thought on the part of the student. Cognitive-memory questions demand recall, memory, recognition, description of previous obtained factual knowledge, or observation. These questions call for predictable responses and often demand one work answers of the respondee. Some cognitive-memory questions are listed below:

* "Did the color of the water change?"
* "What scientific principle is involved here?"
* "What is gravity?"
* "Is there a difference between the two balls?"
* "When I put the water on the paper what happened?"
* "Is this a thermometer?"
* "How many of you say the bubbles come from the boat?"
* "What kind of animal is this?"

Notice once again that all of the questions require a low level of thinking on the part of the student and that responses from all students would possess a great deal of similarity. In order to help you establish these criteria for cognitive-memory questions firmly in mind, look at the questions listed below and classify each as to whether it is a cognitive-memory question or not. After classifying EACH question read the lettered paragraph indicated at the right of each question.

* "What did you observe in this demonstration?"... (refer to paragrpha a.)

* "Bob, why does a duck have webbed feet?"... (refer to paragraph b.)

* "What do they call the mineral from which iron is made?"... (refer to paragraph c.)

a. If you classified this question as a cognitive-memory question you are correct. In this particular question the student is asked only to STATE what he has seen. If he were asked to explain or interpret what happened then it could no longer be correctly classified as cognitive-memory.

b. This question is not a cognitive-memory question. The key word that distinguishes it from a cognitive-memory question is "WHY." This word requires the respondee to carry on a higher level of thought than mere recall, recognition, or reporting. Instead the child is to explain the occurrence of something. To change this to a cognitive-memory question one could ask "Bob, does a duck have webbed feet?"

c. If you categorized this question as cognitive-memory using the criteria that it calls for factual information or

terminology you are correct. The child is only required to recall and NOT to explain, reason, or evaluate. All of the latter operations require higher levels of thought than does any of the cognitive-memory criteria. Please proceed to the next section entitled "Convergent Questions."

2. Convergent Questions

The second question category of the Gallagher and Aschner system is called convergent. This category includes more broad types of questions that demand putting facts together in order to obtain "ONE RIGHT ANSWER." The child is required to know certain facts and using his own words, to explain concepts and describe their interrelationships, solve problems, or make comparisons. The respondee must carry on higher levels of thinking in order to state or explain the relationships present. Examples of this kind of question include the following.

* "Why do the plants grow towards the light?"
* "What does the frog do?"
* "How do you explain the word force in your own words?"
* "Explain briefly in your own words what is meant by the word hypotheses?"
* "How is this picture like that one?"
* "How does a magnet affect the iron filings?"

The convergent question ranks higher in the level of thought required of the child. The questions, even though calling for one answer, still require an explanation or statement of the relationship of previously learned facts or concepts. Below you will find a list of questions. Classify EACH question as cognitive-memory, convergent, or neither. Following the classification of EACH question read the lettered paragraph indicated at the right of each question before

going on to the next.

* "What ways might you stop a forest fire?"...
  (refer to paragraph a.)

* "Why does the sun appear to move in the sky?"...
  (refer to paragraph b.)

* "What are the animals doing in this picture that they are not doing in the other picture?"...
  (refer to paragraph c.)

* "What is the name of the force that causes the iron filings to stick to the magnet?"...
  (refer to paragraph d.)

a. If you classified this question as cognitive-memory or convergent you are mistaken. The question does not ask the child to recall specific facts or to provide one correct answer as the result of relating different facts or concepts. Instead it asks the respondee for diverse answers. If you asked "what <u>way</u>" then it would meet the criteria for categorization as convergent.

b. This question should be placed in the convergent category. Instead of asking the child to recall a fact it calls on him to put together some concepts concerning the relationship of the sun and earth as well as the earth's rotation. Of course in classifying it as convergent we must assume that he has not previously learned the solution to this question.

c. If you categorized this question as convergent you are correct. This question calls for a comparison of two pictures and thus meets one of the criteria of the convergent category.

d. This question is properly classified as a cognitive-memory. It asks the child to identify, by name, the force involved. The child is not required to carry on any higher level of

thought other than factual recall. He has not been asked to explain, state, or compare in any fashion therefore this question does not meet the criteria of the convergent category. Proceed to section 3.

3. Divergent Questions

The divergent category contains those questions which not only provide the student with a new situation, but also allow for more than one possible right answer. These are questions that permit originality by the child as evidenced in the hypotheses he makes and in the way he uses his knowledge to solve new problems. Divergent questions are those that permit predicting, hypothesizing, and/or infering. Examples of these kinds of questions include the following:

* "What predictions can you make about what is going to happen to the marbles?"
* "What do you think would happen if the balls were of a different mass?"

* "If the fish did not have all these body parts, what sort of things might occur when he wanted to move about the fish bowl?"
* "Suppose you were trying to convince someone that air is real; how would you do it?"
* "Suppose you wanted to make a model of the fastest swimming fish in the world, what parts, if any, would appear differently on this fish? How would you describe him to me?"

As you can see the above questions encourage divergent or broad responses that are creative and imaginative. Divergent questions require the child to carry on a higher level of thought in that they call for an organization of elements into new patterns that were not previously recognized clearly. Below you will find a list of questions. Classify EACH question as cognitive-memory, convergent, divergent, or

neither. As you categorize each question read the lettered paragraph indicated at the right of each question BEFORE going on to the next.

* "Explain why the red ball did not float."...
  (refer to paragraph a.)

* "What are the ways that a fish might live if the water where he is presently living changes?"...
  (refer to paragraph b.)

* "What kind of animal is this?"...
  (refer to paragraph c.)

* "What is the best illustration of a predator?"...
  (refer to paragraph d.)

* "What would make this plant grow better?"...
  (refer to paragraph e.)

* "What are some ways we might group these buttons?"...
  (refer to paragraph f.)

a. This question is best categorized as a convergent type. The child is asked to offer ONE correct explanation for the event he observed. Eliminated was the possibility of more than one answer and also the mere reporting of his observations of the ball sinking. These criteria would have categorized the question as divergent and cognitive-memory respectively.

b. If you categorized this question as divergent you are correct. Notice that this question asks for WAYS that a fish MIGHT survive. These and other words such as "may," "could," "what if" are common in this category. These words allow a wide number and kind of responses using new combinations of elements.

c. Classification of this question as either convergent or divergent is an oversight. The question asks the student to NAME something. In other words carry on the lowest level of thought (recall). The child is not required to explain,

hypothesize or any of the other criteria that are indicative of the convergent or divergent categories. This question is best classified in the cognitive-memory category.

d. This question is best classified as NOT belonging to any of the three categories here-to-for discussed. It asks the student to make a judgment of the worth of something. Judgment has not been promoted as a criteria for any category thus far presented.

e. You are correct if you placed this question in the divergent category. This question is likely to produce many different responses from the children. It does not require factual recall or one right answer therefore allows the child to function at a higher level of thought than the cognitive-memory or convergent type would.

f. This question is of the divergent type. One would use the same criteria in accessing this question as those discussed in paragraph e. Proceed to section 4 of this paper.

4. Evaluative Questions

The fourth and final category is called evaluative. The evaluative question requires the child to judge, value, choose or defend. They may be narrow or broad. They cause the respondee to organize his knowledge, formulate an opinion and thereby take a self-directed position. In order to make a judgment the respondent has to use evidence. To use evidence he must use criteria. He makes judgment of good or bad, right or wrong according to standards that either he designates or to standards someone else has established.

(This is the highest level of questioning and involves all three of the other levels.) The following are some examples of these kinds of questions:

* "What makes this picture better than that one?"
* "Are the conclusions that John made about the experiment accurate? Why?"
* "Why do you say that this is the best order for arranging these objects?"

Below you will find a list of question fragments. Classify EACH fragment as belonging to one of the four categories previously discussed. After you classify ALL of the question fragments refer to paragraph a. below for a check of your categorization.

* "How do you feel about....?"
* "How many kinds of animals are...?"
* "What do you think about...?"
* "Do you agree...?"
* "In your opinion which is the best...?"

a. All of the above question fragments may be classified as evaluative. All of the other four require the student to integrate his ideas to form an opinion.

Self-Test

On the pages that follow, you will find a brief self-test by which you can check to see how proficient you have become in classifying questions into the four categories of the Gallagher and Aschner classification scheme. Answer all of the questions in the space provided and then check the correct answers on the back page of this paper.

For the programmer to have reached the stated objective (page 1) you can make only seven errors out of the 42 possible items. Turn to page ___ and begin.

Classify each of the questions listed below into the appropriate category of the Gallagher and Aschner scheme using the following symbols for each category:

CM...cognitive-memory
C...convergent
D...divergent
E...evaluative

1. How does the water act when we put it on newspaper? _____
2. Did the frog jump up and down? _____
3. Did the ball sink fast or slowly? _____
4. When the rock was thrown into the water did the ripples spread very far out into the pond? _____
5. What makes the water decide how big a wet spot it makes on the newspaper? _____
6. Does the shape of the stain on the newspaper change with different sized drops? _____
7. When we put two little drops very close together, what can we see happen? _____
8. Does the same thing happen with two big drops or one big drop and a little drop? _____
9. Do the drops on the newspaper move at all? _____
10. Do the drops on the waxpaper move at all? _____
11. How can we make them move? _____
12. Maybe we have to push them or would they move if we blew on them? _____
13. Where do you think the water will go and what causes it to do this? _____
14. What else can we do to cause the water to come out of the bottle? _____
15. What predictions can you make about what will happen? _____
16. What are some of your ideas about how we can get this water out of the bottle? _____
17. What do you notice about the movement of the air? _____

18. Why do you think that the air moves in the manner that it does? _____

19. What might be some other substances that we could put in the bottle in place of the water so that the air would not go to the top of the bottle? _____

20. In what way might the air bubbles be affected by the different substances? _____

21. Describe what you saw happen when the can was heated? _____

22. What is the explanation of the cause of the can being crumpled? _____

23. In your judgment what would happen if I cooled the glass rapidly? _____

24. What are some ways that scientists solve problems? _____

25. What are the causes for growth to occur in a plant? _____

26. What do you think is the best way to group these pictures? _____

27. How many of you have ever been cool after climbing out of a swimming pool? _____

28. Who is credited with the discovery of the cell? _____

29. Of all of the contributions that Louis Pasteur made to science, which do you think serves man best today? _____

30. What are some of the questions you can ask about this demonstration? _____

31. What are some things that you can do with this brick? _____

32. What do you think is the most important part in this machine? _____

33. What is your favorite ice cream? _____

Key for Levels of Questioning

1.	C--M	description
2.	C--M	recall
3.	C--M	recall
4.	C--M	recall
5.	C	requires know facts stated in own words
6.	C--M	recall-observation
7.	C--M	observation
8.	C--M	recall-observation
9.	C--M	observation
10.	C--M	observation
11.	D	no one correct answer
12.	E	requires a judgment
13.	D	allows for originality, permits predicting and hypothesizing
14.	D	hypothesizing
15.	D	definitely predicting
16.	D	allows for creativity
17.	C	observation described in own words
18.	E	requires respondee to organize knowledge and make a judgment
19.	D	permits originality-- no single right answer
20.	D	allows predicting and/or inferring
21.	C	requires respondee to phrase observation in own words
22.	D/C	hypothesize explain a concept
23.	E	self-directed position
24.	D	more than one correct answer
25.	C--M	own expression of a concept
26.	E	personal judgment
27.	C--M	
28.	C--M	one-word response
29.	E	personal value judgment
30.	D	originality
31.	D	
32.	E	judgment
33.	E	personal judgment

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APPENDIX B

ASSIGNMENT PREFERENCE

Name_____ Sex: M F Age_____

Address_____ Class_____

_____ Phone_____

1. Which grade level would you prefer to work with in the elementary school?

   1st choice _____

   2nd choice _____

   3rd choice _____

2. Circle ALL the possible time(s) and day(s) you would be available to be in the public schools of Stillwater.

Time	Days
9:15 - 10:15	M T W TH F
10:15 - 11:15	M T W TH F
11:15 - 12:15	M T W TH F
1:15 - 2:15	M T W TH F
2:15 - 3:15	M T W TH F

3. Would you need transportation to get to a school in Stillwater? _____

INSTRUCTIONS FOR MINI-LESSON

WHEN YOU ARRIVE AT SKYLINE SCHOOL PICK UP A TAPE AND TAPE RECORDER FROM THE TABLE TO THE LEFT OF THE DOOR OF THE MAIN OFFICE. CONTACT THE TEACHER TO WHOM YOU HAVE BEEN ASSIGNED. A DIAGRAM OF THE SCHOOL INDICATING THE LOCATION OF EACH OF THE TEACHERS WILL BE ON THE TABLE IN THE MAIN OFFICE. INTRODUCE YOURSELF TO THE TEACHER. HE OR SHE WILL BE EXPECTING YOU. PLEASE BE ON TIME.

WHEN YOU ARE READY TO TEACH THE TEN MINUTE LESSON BE SURE THAT THE TAPE RECORDER IS WORKING. PLACE THE MIKE NEAR ENOUGH FOR YOUR VOICE TO BE RECORDED. BEFORE THE LESSON BEGINS RECORD YOUR NAME ON THE TAPE. START THE TAPE RECORDER AND PRESENT THE LESSON. AFTER YOU HAVE FINISHED THE LESSON TURN OFF THE TAPE RECORDER AND RETURN THE TAPE AND TAPE RECORDER TO THE MAIN OFFICE. PLACE THE TAPE IN THE BOX MARKED FOR COMPLETED TAPES.

THE LESSON MAY BE ON ANY SUBJECT OF YOUR CHOICE. THE LESSON SHOULD BE PRESENTED TO THE ENTIRE GROUP OF CHILDREN.

IF YOU HAVE ANY QUESTIONS, CONTACT ME AT 377-3422.

INDIVIDUAL ASSIGNMENTS April 2, 1971

Dear _____

Your schedule for participation in Field Experience at Skyline School for the course History of Education is:

Experience:	Observation Microteaching Tutoring Feedback	April_____	Period_____	Teacher_____
Experience:	Observation Microteaching Tutoring Feedback	April_____	Period_____	Teacher_____
Experience:	Observation Microteaching Tutoring Feedback	April_____	Period_____	Teacher_____

In addition to the above, you will teach a ten-minute lesson on April _____, Period _____, with Teacher _____.

If you cannot get a ride or have other questions call me at 377-3422. An instruction sheet is enclosed. The teachers have been notified that you are coming and will expect you at the designated time. GOOD LUCK!

Don Schmalzried (Smallsreed)

INSTRUCTIONS FOR OBSERVING

WHEN YOU ARRIVE AT SKYLINE SCHOOL PICK UP AN OBSERVATION SHEET IN THE MAIN OFFICE. THE OBSERVATION SHEETS WILL BE IN A BASKET ON THE TABLE TO THE LEFT OF THE DOOR. FILL THE FORM IN AND RETURN IT TO THE OFFICE AFTER THE OBSERVATION SESSION. THE TEACHER THAT YOU ARE TO OBSERVE HAS BEEN NOTIFIED THAT YOU WILL BE OBSERVING AT YOUR ASSIGNED TIME. INTRODUCE YOURSELF TO THE TEACHER AND SHE/HE WILL INDICATE WHERE YOU ARE TO SIT.

A DIAGRAM OF THE SCHOOL INDICATING THE LOCATION OF EACH OF THE TEACHERS WILL BE AVAILABLE ON THE TABLE IN THE MAIN OFFICE. PLEASE USE THIS TO FIND THE ROOM TO WHICH YOU ARE ASSIGNED.

INSTRUCTIONS FOR TUTORING

WHEN YOU ARRIVE AT SKYLINE SCHOOL PICK UP A TUTORING SHEET FROM THE TABLE TO THE LEFT OF THE DOOR OF THE MAIN OFFICE. COMPLETE THE FORM AND RETURN IT TO THE OFFICE AFTER THE TUTORING SESSION HAS ENDED. CONTACT THE TEACHER TO WHOM YOU HAVE BEEN ASSIGNED. A DIAGRAM OF THE SCHOOL INDICATING THE LOCATION OF EACH OF THE TEACHERS WILL BE AVAILABLE ON THE TABLE IN THE MAIN OFFICE. PLEASE USE THIS TO FIND THE CORRECT ROOM.

THE TEACHER WILL ASSIGN YOU TO ONE OR TWO CHILDREN AND INDICATE AN ACTIVITY OR PROBLEM ON WHICH YOU ARE TO ASSIST THEM. IF YOUR ASSIGNMENT SHEET INDICATES THAT YOU ARE TO RECEIVE FEEDBACK ON YOUR TUTORING, BRING THE CHILDREN TO THE OFFICE STUDIO (AT THE BACK OF THE MAIN OFFICE) FOR THE TUTORING SESSION. IF YOU ARE NOT ASSIGNED TO HAVE FEEDBACK THE TEACHER WILL INDICATE A SUITABLE PLACE IN THE BUILDING FOR THE TUTORING SESSION.

INSTRUCTIONS FOR MICROTEACHING

ENTER SKYLINE SCHOOL ON THE EAST SIDE. OBTAIN A MICROTEACHING FORM FROM THE TABLE TO THE LEFT OF THE DOOR OF THE MAIN OFFICE.

CONTACT THE TEACHER TO WHOM YOU HAVE BEEN ASSIGNED. A DIAGRAM OF THE SCHOOL INDICATING THE LOCATION OF EACH OF THE TEACHERS WILL BE AVAILABLE ON THE TABLE IN THE MAIN OFFICE. PLEASE USE THIS TO FIND THE CORRECT ROOM.

THE TEACHER WILL INDICATE THE FIVE CHILDREN WHO WILL BE YOUR STUDENTS FOR THE MICROTEACHING SESSION. IF YOUR ASSIGNMENT SHEET INDICATES THAT YOU ARE TO RECEIVE FEEDBACK AFTER YOUR MICROTEACHING, BRING THE CHILDREN WITH YOU TO THE OFFICE STUDIO (TO THE REAR OF THE MAIN OFFICE). IF YOU ARE NOT TO RECEIVE FEEDBACK AFTER THE MICROTEACHING SESSION THE TEACHER WILL INDICATE A SUITABLE PLACE FOR THE LESSON.

THE PURPOSE OF MICROTEACHING IS TO CONCENTRATE ON IMPROVING A TEACHING SKILL. THE SKILL THAT YOU ARE TO CONCENTRATE ON DURING YOUR MICROTEACHING IS LEVEL OF QUESTIONING --- THAT IS, THE KINDS OF QUESTIONS YOU ASK WHILE TEACHING. THE LESSON SHOULD NOT BE MORE THAN FIVE MINUTES IN LENGTH AND MAY BE ON A SUBJECT OF YOUR CHOICE. YOU ARE TO TEACH THE SAME LESSON IN EACH OF THE THREE SESSIONS. ASK AS MANY DIVERGENT AND EVALUATIVE QUESTIONS AS SEEM APPROPRIATE. ATTEMPT TO REDUCE THE NUMBER OF CONGITIVE-MEMORY QUESTIONS.

AFTER THE MICROTEACHING SESSION, RETURN THE MICROTEACHING FORM TO THE TABLE IN THE MAIN OFFICE.

OBSERVATION DATA SHEET

Name_____

Date_____ Time_____

School_____ Grade observed_____

1. From your observations give examples of questions asked by the teacher.

   1.

   2.

   3.

   4.

   5.

   6.

   7.

   8.

   9.

   10.

2. Classify each of your example questions according to Gallagher and Aschner's Classification Scheme.

3. If your examples contain cognitive-memory questions, reword the question to a higher level.

4. Concentrate next time on how the teacher could ask higher level questions in the classroom.

TUTORING DATA SHEET

Name_____

Date_____ Time_____

School_____ Grade level of child_____

1. Give examples of questions you asked when you were tutoring the child.

   1.

   2.

   3.

   4.

   5.

   6.

   7.

   8.

   9.

   10.

2. Classify each of your example questions according to Gallagher and Aschner's Classification Scheme.

3. If your examples contain cognitive-memory questions, reword the question to a higher level.

4. Concentrate next time on asking higher level questions.

MICROTEACHING DATA SHEET

Name_____

Date_____ Time_____

School_____ Grade level of children_____

Title of lesson_____

1. Give examples of questions you asked when you were microteaching.

    1.

    2.

    3.

    4.

    5.

    6.

    7.

    8.

    9.

    10.

2. Classify each of your example questions according to Gallagher and Aschner's Classification Scheme.

3. If your examples contain cognitive-memory questions, reword the question to a higher level.

4. Concentrate next time on asking higher level questions.

VITA

Donald Reese Schmalzried

Candidate for the Degree of

Doctor of Education

Thesis: TUTORING, OBSERVATION, MICROTEACHING AND AUDIO-VIDEO TAPE FEEDBACK AS A MEANS TO PROMOTE HIGHER LEVEL QUESTIONS ASKED BY PROSPECTIVE ELEMENTARY SCHOOL TEACHERS

Major Field: Secondary Education

Biographical:

Personal Data: Born in Garden City, Kansas, June 7, 1939, the son of Mr. and Mrs. Carl D. Schmalzried.

Education: Graduated from Dighton High School, Dighton, Kansas, in May, 1957; attended Kansas University in 1957 and 1958; received the Bachelor of Science degree from Fort Hays Kansas State College in 1961, with a major in Chemistry; received the Master of Science degree from Kansas State College of Pittsburg in 1967, with a major in Physical Science; completed requirements for the Doctor of Education degree at Oklahoma State University in July 28, 1972.

Professional Experience: Nine years teaching experience teaching science and mathematics in grades seven through twelve, 1961-1970; research assistant, Title III, need assessment for the State of Oklahoma, 1971; assistant director of tutoring program in Manhattan, Kansas, 1969.