VISUAL SUPPORT VERSUS MEMORY SUPPORT FEEDBACK ON QUESTIONING TECHNIQUES IN SUPERVISING STUDENT TEACHERS

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CHAPTER I

INTRODUCTION

Nature and Statement of the Problem

There is a growing body of evidence which indicates that teacher questioning has an influence on pupil-thinking, social-emotional climate of the classroom, and pupil mastery of subject matter material. Research is needed to determine how more desirable questioning practices can be developed. Thus, student teachers need to be made aware of the kinds of questions which stimulate productive thinking on the part of the learner.

This experimental study was designed to investigate the influence of feedback information on questioning techniques developed by student teachers. The university supervisor held conferences with each student in two randomly assigned groups in order to appraise the various patterns of questioning used. One group used video tape for feedback, the other depended on memory. This study consisted of eighteen female student teachers majoring in Elementary Education, assigned in the fall semester, 1971, for student teaching in grades three to six in the Stillwater, Oklahoma, Public Schools. All student teachers who applied for placement in grades three to six were used in the study, making a total of eighteen. The student teachers were placed in four elementary schools.

In essence this research focused on answers to the following questions: What kinds of questions do preservice teachers ask? Does the pattern of questioning change as a result of feedback information following a lesson? Will video feedback have more influence on questioning patterns than memory feedback?

Purpose of the Study

The major purpose of this study was to assess student teacher behavior through evaluative feedback with respect to questioning techniques in the teaching of social studies. The investigator attempted to ascertain if feedback support through video tapes affected greater change in student teachers' questioning techniques than memory feedback support.

Hypotheses

The purpose for the study led to the development of four hypotheses to be tested. The .05 level of significance was selected for the testing of all hypotheses.

Ho_1. There is no significant difference in numbers of questions between the video group and the memory group within each category of questions asked by student teachers on the pre and post tapes.

Ho_2. There is no significant difference between the questioning patterns of student teachers receiving video feedback support and those receiving memory feedback support from the university supervisor on either pre or post tapes.

Ho_3. There is no significant difference in the number of questions asked between initial and final scores in any category of

questions by student teachers receiving either video or memory feedback.

Ho_4. There is no significant difference between the video feedback and the memory feedback student teacher groups on pre and post tapes with respect to traditional and inquiry oriented questioning patterns.

Theoretical Background

The importance of the question in setting the stage for learning has been recognized for generations past by great teachers of method. A truism for educators is that questions play an important role in teaching. Aschner (1961) commented that from Socrates on, the classroom teacher probably devotes more time and thought to asking questions than anybody. He charged question asking as being one of the basic ways by which the teacher stimulates student thinking and learning and referred to the teacher as "a professional question maker."

Duke (1971) considered one of the primary responsibilities of any teacher to be fostering all varieties of careful thinking in students. He further stated that he thought it could be done in a variety of ways, but the most important device was the classroom question. He stressed the importance of questioning in the teaching-learning-process by recognizing the difference between an excellent teacher and a marginal one by the manner in which questions were framed, asked, and followed through. Wellington and Wellington (1962) stressed teaching as the process through which the teacher guides the pupils so that they ask questions.

Questions are as effective as the manner in which they are used. The entire purpose of questioning is often defeated by teachers who have not learned how to use or when to use the method. (Weaver and Cenci, 1960). Colvin (1919) after observing beginning teachers, generalized that "the character of the questions asked more than anything else determines the nature and value of teaching." (Colvin, 1919; p. 266).

Bossing (1942) concluded that the first stimulus to the mental life of the child is the question, whether it be silently or vocally expressed, and that it remains the major mainspring to mental activity throughout life. Loughlin (1961) stated that effective questioning is effective teaching. In agreement with Loughlin was Klebaner (1964) who reported that the carefully thought out question when used effectively is vital to achieving the purposes of education. Klebaner also felt that the purpose of the question should be identified by the teacher and realized by the pupil. He insisted that pupils be made aware of the types of answers which different kinds of questions demand.

Taba, Levine and Elzy (1964) demonstrated that the thoughts elicited from children were closely related to the nature of the questions asked. They concluded that questions which teachers ask set the limits within which students can operate and also the expectations regarding the level of cognitive operations. Therefore the child's level and nature of thought are limited because questions dictate both what the students are to think about and how they are to go about it. Some questions lead students to the lowest form of cognitive thinking which deals with memorization.

The ability to ask questions is an area in teacher education which shows neglect, both in classroom teaching and empirical investigation. (Ward, 1969). Attention should be given to the practical application of the questioning process in the classroom.

Clarification of Terminology

A number of terms are used in this study which should be defined for clarity of reading. These definitions and clarifications of terms will be applicable throughout this study:

Feedback is knowledge of results of performance on questioning strategy.

Video feedback is a procedure wherein the university supervisor and the student teacher viewed the playback of a lesson and discussed coded questioning patterns.

Memory feedback is a procedure through which the university supervisor and the student teacher discussed coded questioning patterns and the student teacher recalled the lesson from memory.

Rhetorical questions are those questions for which the teacher supplies an answer.

Informational questions are those questions which call for facts read, heard, or discussed in class.

Leading questions prescribe a desired approach to developing an answer.

Probing questions are open-ended questions which structure the activity of student inquity but do not indicate the nature or approach to the answer.

Traditional-oriented questions are those referred to as rhetorical and informational. (Appendix A, Guide for Analysis of Teaching: Questioning).

Inquiry-oriented questions are those referred to as leading and probing.

Video group was nine randomly assigned pre-service elementary teachers who received video feedback and reviewed their coded questioning patterns simultaneously.

Memory group was nine randomly assigned pre-service elementary teachers who did not receive video feedback but saw only a coded sheet of their questioning patterns.

Assumptions

For the purposes of this study the following assumptions were posited:

1. That education is a process of changing the behavior patterns of human beings.
2. That student teacher candidates had been exposed to essentially similar academic, methodological and philosophical backgrounds of preparation.
3. That student teachers would respond to the study willingly and without feeling appreciable personal threat.
4. That the kinds of questions being asked by student teachers during their student teaching experience could be determined by the results of tests used in the study.

Scope and Limitations of the Study

The limitations involved in the study may be influencing factors.

1. The sample consisted of a random selection of pre-service teachers assigned to the upper and intermediate grades (3-6) in one school system from one university's elementary education enrollment during the fall of 1971. Therefore, the data and conclusions contained in this study are intended to apply only to the groups participating directly in the study.
2. The study was limited by the fact that the students did not participate in identical school organizational patterns during their student teaching experiences.
3. The study is limited to the varying extent of student teacher effectiveness and willingness to cooperate throughout the duration of the study.
4. The limited span of time may influence the degree to which the hypotheses under question could be adequately tested.
5. The study utilized no control group which had instruction in questioning without feedback.

Significance of the Study

This study is significant in that it can make a contribution in assessing the quality and productivity of instruction with respect to questioning strategies that students are exposed to in methods classes. It could serve as a guide for instruction in future preservice programs.

CHAPTER II

RELATED RESEARCH AND PERTINENT LITERATURE

This study investigated the behavior of student teachers in relation to questioning techniques used in the teaching of social studies. Feedback support by means of videotape and supervisory conferences versus memory support were used as comparative treatments. Reviewed in this section are studies in three related areas of research: (1) questions and questioning, (2) questions as they relate to the teaching act, and (3) studies to improve teacher questioning behaviors.

Questions and Questioning

The first scientific study of classroom questions was done over fifty years ago by Romiett Stevens (Hunkins, 1968). This research provided evidence that teachers of both English and social studies not only did most of the talking, but that the talk consisted mainly of questions. Memory type questions were dominant as the study indicated.

Teacher questioning has increased with interest in recent years. Floyd (1960) studied the oral questioning activity of selected primary school teachers, and found that about 70 percent of the oral expressions were delivered by the teacher and that 93 percent of all questions asked were teacher-originated.

In the 1960's attention was directed to the cognitive emphases of student teachers' and pupils' questions (Clegg, 1967; Davis and Tinsley, 1967). Considerable progress was made in the analysis of cognitive operations (Bloom, 1956; Guilford, 1956) and "memory" and "knowledge" came to be seen more adequately as essential and prerequisite to thinking. Davis and Tinsley (1967) developed a rating scale, Teacher-Pupil Question Inventory (TPQI). The inventory had nine categories, seven of which were adopted from Bloom's Taxonomy and measured the range of cognitive objectives manifested by the questions of 44 student teachers in secondary school social studies. Trained observers were used to record the cognitive emphases of the questions asked by student teachers and pupils. Inspection of the inventory list following the observations revealed that memory was the dominant type of question employed by both teachers and pupils. Davis and Tinsley recommended that (1) more attention be given to different cognitive objectives in social studies classrooms and (2) that increased specific understanding of questioning and its purposes and improved questioning skills be included in teacher education programs.

Clegg (1967) studied questioning skills at the elementary level and utilized a modified form of the TPQI with six student teachers to record their cognitive behavior level. Only six categories, each representative of a level in Bloom's hierarchy, were included in the modified TPQI. Clegg concluded from results obtained that a complete range of cognitive levels in the questions asked by the student teachers existed. In this study only twenty-seven per cent of the questions asked were classified as memory questions. Further analysis indicated

that significant differences existed between the level of questions of the six student teachers.

Numerous articles, speeches, and books have praised the merits of the question as a device for effective teaching. De Garmo (1911) asserted that excellent questioning was excellent teaching. He grouped questions by type as a guide for teachers. Other early advocates of the effective use of questions in the classroom were Hall and Hall (1916). To these contributors teaching was the stimulation of thinking to be achieved by the employment of thought-provoking questions. (Hunkins, 1968).

Loughlin (1961) agreed with De Garmo, when he stated that "effective questioning is effective teaching." (Loughlin, 1961; p. 481). Loughlin listed the following as guides to questioning: (1) involve total class when distributing questions, (2) keep a balance between factual and thought provoking questions, (3) utilize simple and exacting questions, (4) encourage responses, and (5) stimulate critical thinking by asking "To what extent? How? Why? Compare?"

Ruth Klebaner (1964) concluded that questioning is not an innate talent, but, rather a skill which can be developed through study, thought, and continuous self-evaluation. She reported questioning as being able to accomplish twin objectives: the immediate one for which questions are asked, and the long-range one of developing children's inclination and ability to acquire knowledge independently. Carner (1963) stressed that before teachers could frame effective questions they must first be cognizant of the types of thinking required.

The Teaching Act

Several investigations involving verbal interaction in the classroom have produced evidence concerning the influence of teacher questions in general areas of the instructional program: questions and questioning, student thinking, social-emotional climate of the classroom, and the mastery of subject matter information. (Aschner, 1959; Aschner and Gallagher, 1961; Smith and Meus, 1962; Taba and Elzy, 1964; Bellack, 1966). Aschner (1959) for example, studied logical aspects of teaching. Findings from this study indicated that the manner in which teachers addressed questions, the ways questions were worded, occasions upon which they were asked, and the frequency of asking them were all accompanied by correspondingly different kinds of pupil behaviors.

Prior to 1964, only Taba had proposed specific teaching strategies employing questions to develop thinking. Questions, she affirmed, can be utilized as transition devices from one level of thought to another. Strategies utilizing questions emphasizing specific facts first and then proceeding to higher-level questions seemed to produce an effective and persistent raising of thought to higher levels. On the basis of this idea, Taba (1966) and her co-workers (1964) developed a system of teacher training centered around questioning strategies. These questioning strategies were viewed as techniques which teachers could use to develop their students' abilities in forming concepts, explaining cause-and-effect relationships, and exploring implications.

Teachers' Questioning Behaviors

Claus (1969) conducted research to define a central teaching skill which stimulates pupil inquiring behavior within the context of student-teacher dialogue and to prepare beginning teachers to use the skill of questioning. Teachers were taught to increase their use of higher-order questions by a procedure which involved showing a video-tape model of a teacher using questioning skills and by providing verbal cues on the various types of higher-order questions occurring during demonstrations.

Berliner and others (1967) found micro-teaching procedures using perceptual or symbolic models with secondary teacher candidates productive in raising the use of higher-order questions. Jayne (1945) reported two studies in 1940, that made use of recording equipment. His studies were attempts of relating various measures of learning and recall to a large number of potentially significant teacher behaviors; however, the results were inconclusive and sometimes contradictory due to a number of methodological problems.

Hoetker and Ahlbrand (1968) observed over one hundred student teachers and found the most common fault to be that of failing to give the child enough time to perceive thought relations after the question was asked by the teacher. When immediate answers were not given, the teacher would interrupt by meaningless remarks, repeat the question, answer it herself, or pass the question on to another pupil. A number of studies investigating teacher behavior and effects of feedback treatment were made during the 1960's. Taba (1966) and Parsons and Shaftel (1967) found that experienced teachers changed their classroom questioning behaviors following special intervention

programs. Aubertine (1967) found that some type of feedback was necessary in order to change the behavior of teacher trainees. Findings were that trainees who were provided video feedback and an opportunity to practice correcting their "mistakes" from previous teaching acts performed better at the .01 level of confidence on subsequent demonstrations than a control group which received neither feedback nor the opportunity to practice. Acheson (1964) tested the effects on selected behaviors of teachers in training who observed their own teaching via videotape during supervisory conferences. The study was a T V feedback versus no T V feedback design for three groups which received indirect supervision, direct supervision, and no supervision. The two criterion measurements were teacher monologue in terms of percent of time and the frequency of teacher-pupil interaction episodes. Television feedback combined with supervisory conferences, either direct or indirect, produced significantly greater changes in the selected behaviors than supervisory conferences without television.

Adair and Kyle designed a study (1969) to assess the effects of three types of feedback-evaluation procedures (two of which involved the use of video tape) in changing the question-asking behavior of inservice teachers. Three randomly formed groups of sixth grade teachers participated in the three-stage study, with each group using one of the following feedback procedures: (1) standard observation practice (teacher-supervisor conference following classroom observation by supervisor); (2) self-analysis of videotaped teaching session; and (3) directed self-analysis (supervisor-assisted) of a videotaped teaching session. Among the findings of the study (which focused on two or four types of questions used in analysis of question-asking

behavior) are (1) that the two video tape-based procedures appeared equally effective and were more effective than standard observation procedures in reducing the percentage of rhetorical questions asked by teachers and (2) that each of the three procedures was effective in increasing the percentage of probing questions asked.

More recent studies of the 1970's, Konetski (1970); Belland and others (1971); Morse and Davis (1970); Rogers and Davis (1970) and Ward (1970) have continued investigations of questioning techniques and teacher behavior. For example, Ward (1970) involved 78 experienced elementary school teachers in grades one through six in a study. Each teacher was randomly assigned to one of four evaluation-treatment groups and one of two time-treatment groups. The results of this investigation indicated that differences existed between evaluative treatment groups and effectiveness of the treatment depended upon the amount of time in which subjects utilized the evaluative procedures.

Results of former studies indicate that some type of feedback is necessary in order to change behavior of teacher trainees. There is also evidence that video-tape-based procedures are more effective as a means of reducing the percentage of rhetorical questions asked by the teacher than observation procedures. When a student sees himself in the questioning situation on video, he is more aware of his strengths and weaknesses than if they were enumerated by an observer. The present study attempted to test the foregoing premises by means of video tapes using four major categories of questions; namely, rhetorical, informational, leading and probing.

CHAPTER III

PROCEDURE

The Sample

This study consisted of eighteen female student teachers majoring in Elementary Education. They were assigned in the fall semester, 1971, for student teaching in grades three through six in the Stillwater, Oklahoma, Public Schools. All student teachers who applied for placement in grades three through six were used in the study, making a total of eighteen.

Subject Orientation and Training Procedure

Each subject in the population was randomly assigned to one of two treatment groups, one of which used videotape as a means of feedback and evaluation, the other of which relied on memory or recall for evaluation feedback.

All subjects attended an orientation workshop where they were informed of the general purpose of the study. Schedule A, Questioning Strategies, of the Self-Evaluation Instrument, (discussed later in this chapter) was presented to each subject and a review of the booklet's design was then given, followed by a question and answer period.

This workshop was held before the pre-tape lessons which were to serve as pre-test data for the study. Subjects were asked to tape a twenty minute discussion-type social studies lesson of their choice.

A sheet of specific instructions was distributed to each subject including an outline of lesson procedures, dates for taping lessons, and dates for conferences. Emphasis was placed on self improvement in using a questioning strategy. The remaining part of the workshop was turned over to the Media Aides Specialist for Stillwater Public Schools. He used this time to orient the investigator and student teachers to the portable videotape recorder, playback equipment and the operational uses of each, and remained with the group during a training session where student teachers were allowed to make and view informal playbacks of themselves to gain expertise in operating the equipment. Each of the four schools was adequately equipped with video-taping facilities and a media aide was available for assisting the student teacher in videotaping the lesson.

Collection of Data

The two groups of student teachers were videotaped three times during the last five weeks of their actual student teaching experience, including the pre-taping. Prior to this time the students had been alternating between methods seminars and classroom practices for a period of eight weeks. The videotaping was made of a student teacher and her class during approximately twenty minutes of informal discussion over a social studies problem or lesson. The first tape (referred to as the pre-tape throughout the discussion of the study) was made during the first week of the five-week period. The second tape served in an instructional capacity in questioning techniques. The third tape rendered post-test information for the study. In the video group the student and supervising teacher viewed each of the

twenty minute tapes together; the supervising teacher and an independent coder (a neutral person) had precoded the tapes for questioning techniques before the conference. The supervising teacher alerted the student teacher during the conference to look for various question patterns used. The student and supervisor, viewing the tapes together, located deficiencies in questioning techniques used and examined alternatives to improve the defects. The students in the memory group met individually for an equal amount of time with the supervising teacher and during that time the university supervisor gave the student teachers evaluative feedback from their lessons. The supervising teacher and an independent coder had coded the lesson prior to the conference (Appendix B). The supervisor and the student teacher did not view the taped lesson during the conference. The supervisor pointed out question patterns appearing on the student's coded sheet. Students were allowed to record the coded information in their own booklets for future reference if they chose.

Every student teacher received feedback information during the week that followed each taping session and prior to the next tape to be made. Video playback and evaluative feedback information for the video students was usually given in the Media Room of each building. The memory group received information there also or in an equally private place. The university supervisor did not sit in the classroom at anytime during a taping session.

In many instances student teachers were able to tape one another's lessons, as they had been directed by the Media Specialist from the Stillwater Public Schools during an inservice workshop on how to

use the video equipment. When media aides were available, they taped the student's lessons for them.

Only the video group students viewed their videotaped lessons. The memory group students' tapes were placed on file and a scheduled time was afforded them after the study was completed to view any or all of their taped lessons. The same opportunity was extended to students in the video group for the last taped lesson. Each of the tapes in the video group had been reused each time thereby erasing their first and second lessons. A new tape was used each time for the memory group since each of their tapes were placed on file to be viewed by them at the end of the study. The study began on November 5, 1971, and lasted for approximately five to six weeks, ending on December 22, 1971.

Observer Reliability

Each tape made was analyzed independently by at least two observers. The observers established coder reliability by practicing on several previously made micro-teaching tapes that were made available to them. The observers viewed these tapes together and discussed the four categories of questions that would be used in the study. They each used the Guided Self Analysis Booklet for learning the definitions and characterizations of each of the categories of questions, then they practiced coding the micro-tapes. The observers analyzed the students' tapes independently and when differences occurred, they called in a third experienced observer to participate in a jury to review the tape and make a decision as to what type question was being asked. Observer reliability was estimated by Scott's Coefficient.

Scott's method is unaffected by low frequencies, can be adapted to percent figures, and is more sensitive at higher levels of reliability. Scott calls his coefficient "pi" and it is determined by the formula below:

$$\text{Formula 1.} \quad \pi = \frac{P_o - P_e}{1 - P_e}$$

P_o is the proportion of agreement between observations made of the same tape by different observers and P_e is the proportion of agreement expected by chance which is found by squaring the proportion of tallies in each category and summing these over-all categories.

$$\text{Formula 2.} \quad P_e = \sum_{i=1}^{k} p_i^2$$

In Formula Two, there are k categories and p_i is the proportion of tallies falling into each category. In Formula One, "pi" can be expressed in words as the amount that two observers exceed chance agreement divided by the amount that perfect agreement exceeds chance. (Scott, 1955).

A total number of fifty-four tapes were observed and coded in this study. Both of the coders rated the entire set of tapes. Total agreement ($\pi = 1.00$) was reported for the rating on thirty-two of the tapes by the two coders. Of the twenty-two remaining tapes where some disagreement in recording occurred, the lowest reliability coefficient obtained was 0.89. The average reliability coefficient on the twenty-two tapes was 0.95 (Appendix E). These values were interpreted as indicating a high degree of reliability in the categorization of questions recorded on the tapes.

The Self-Evaluation Instrument

Schedule A, Questioning Strategies, a self-evaluation instrument developed by Dr. Theodore Parsons of the School of Education in Berkeley, California, was used in the study. Schedule A is one of six booklets included in the program, Teaching for Inquiry, a Guided Self Analysis System for Professional Development. Provision is made in the instrument for the viewer to categorically record types of questions asked in the videotape playback. Simple arithmetical computation allows subjects to evaluate differences between playbacks.

The self-evaluation instrument is based upon the following objectives: (Adapted from Ward, 1970)

A. To structure the teacher's observation of his questioning-skill ability as demonstrated by a videotape recording of his teaching performance, by focusing his attention on specific types of teacher behaviors which are intended to stimulate specific types of cognitive activities and pupil responses.

B. To provide an instrument which will enable the teacher to identify, code, record, and count the number of each type of teacher-posed question asked.

C. To direct the teacher's computation of the proportion of each type of question in the total performance and consequently, provide him with a basis for a quantitative analysis of the observed data.

Schedule A, question categories, relate to current theories of learning, principally those of David Ausubel and Robert Gagné. (Parsons, 1971).

Methods of Analysis

Various nonparametric statistical tests were utilized in the study. Nonparametric techniques were used because of the many advantages proposed by Siegel (1956): (1) most nonparametric tests apply to data in an ordinal scale, and some apply also to data in a nominal scale; (2) nonparametric techniques are typically easy to compute; (3) small sample sizes can be utilized and they do not assume that a sample is drawn from a normally distributed population.

The Mann-Whitney U test, described by Siegel (1956, pp. 116-127), was utilized to test for differences between the video and memory group on question categories in the several tape periods. Siegel (1956, p. 116) depicts the Mann-Whitney U test as one of the most powerful of the nonparametric tests. This test assumes independence of observations and requires numerical data capable of being ranked. Two reasons for its relatively frequent use are that the technique applies to small samples (as well as large ones) and that group sizes may be unequal.

The chi-square test was employed in a two by four classification treatments by categories to test for significant differences between the questioning patterns of both groups receiving feedback support from the university supervisor on pre and post tapes. Chi-square was also utilized to make a within groups analysis. The chi-square tests for significant differences among distributions which may not be related to a normal distribution and compares an observed frequency distribution with any hypothetical distribution of "expected" frequencies. The primary characteristics of chi-square are that it

applies easily to varied sample sizes and it utilized nominal data. This test can be utilized with only one group divided into several categories (as few as two) or with many groups containing many categories. The measures employed, however, must be all of the same type. The data are generally presented in a contingency table which show the observed frequencies and, usually, the expected frequencies.

The Wilcoxon matched-pairs signed-ranks test was utilized to test for differences in the number of questions asked between initial and final scores in any category of questions by student teachers receiving either video or memory feedback. The Wilcoxon matched-pairs signed-ranks test is the most appropriate test for two related samples. (Siegel, 1956). It tests relative magnitude of differences as well as direction and requires numerical data which indicates the degree of difference between a pair of counterpart measures.

Fisher exact probability was used to test for differences in frequency of traditional-oriented and inquiry-oriented questions by both groups for pre and post tapes. Fisher exact probability is another nonparametric test to determine whether two groups differ in the proportions with which they fall into two categories. The test is guided by three assumptions: (1) the samples are relatively small, (2) there is a different distribution in the two groups, and (3) the marginal sums of the table of data are constant. (Siegel, 1956, pp. 96-104.)

CHAPTER IV

DATA ANALYSIS AND RESULTS

The purpose of this study was to determine if student teacher behavior related to questioning techniques in the teaching of social studies could be effected through evaluative feedback by means of videotape and supervisory conferences. The design of the study provided for analysis of data from comparative situations: (1) evaluative feedback through the use of videotape and supervisory conferences and (2) evaluative feedback by means of student teacher and supervisor recall and conferences. The following tests were used to measure the data: Mann-Whitney U test was used to compare within categories of pre and post tapes; chi-square was used to compare questioning patterns of the video group and the memory group; Wilcoxon matched-pairs signed-ranks was utilized in comparing frequency of questions asked for both groups on pre and post tapes; and the Fisher's exact probability test was used in comparing question categories between the groups on frequency of questions asked on both pre and post tapes.

The structure of this chapter will follow the arrangement of the hypotheses. The results which answer each of the hypotheses will in turn be presented following the statement of the hypothesis itself.

Results

Hypothesis 1: There is no significant difference in numbers of questions between the video group and the memory group within each category of questions asked by student teachers on the pre and post tapes.

In order to examine this first hypothesis a Mann-Whitney U test was utilized. The analysis showing the values of U for the Mann-Whitney test on comparison of video and memory groups on question categories in the several tape periods and having N equal to 9 for both groups (Table I) revealed that a significant difference existed in only one instance and this was in the leading question category on the pre-tapes. The comparison of rank values showed that the video group asked a significantly greater number of leading questions than the memory group.

TABLE I

VALUES OF U FOR MANN-WHITNEY TEST ON COMPARISON OF VIDEO AND MEMORY GROUPS ON QUESTION CATEGORIES IN THE SEVERAL TAPE PERIODS. N=9 FOR BOTH GROUPS.

Question Categories	U Values		
	Pre-Tapes	2nd Tapes	Post-Tapes
Rhetorical	38	34	39
Informational	34	23	40
Leading	12*	33	34
Probing	39	33	33

*Significant at .01.

Hypothesis 2: There is no significant difference between the questioning patterns of student teachers receiving video feedback support and those receiving memory feedback support from the university supervisor on either pre or post tapes.

The analysis of data using the chi-square test showing comparisons of question categories for each group on the pre-tapes (Table II) produced a value of 27.22 which is significant beyond the .001 level. This significance indicated that the memory group and the video group were not utilizing the same questioning patterns in the pre-tapes. The video group was asking a disproportionately greater number of leading questions than expected while the memory group was asking a disproportionately smaller number of leading questions than expected. These data tend to support the significance found in the Mann-Whitney U test results.

TABLE II

CHI-SQUARE COMPARISONS OF QUESTION CATEGORIES FOR EACH GROUP ON PRE-TAPES

Question Categories	Video Group Frequencies		Memory Group Frequencies	
	Actual	Expected	Actual	Expected
Rhetorical	228	219	208	217
Informational	378	407	429	400
Leading	52	33	13	32
Probing	75	73	70	72
Totals	733		720	

Chi-square = 27.22; $p < .001$.

The chi-square analysis of question categories for each group on the post-tapes is given in Table III. The X^2 value of 5.27 obtained in the analysis was not significant.

TABLE III

CHI-SQUARE COMPARISONS OF QUESTION CATEGORIES FOR EACH GROUP ON POST-TAPES

Question Categories	Video Group Frequencies		Memory Group Frequencies	
	Actual	Expected	Actual	Expected
Rhetorical	31	34	39	36
Informational	210	214	224	220
Leading	14	18	24	20
Probing	127	114	104	117
Totals	382		391	

Chi-square = 5.27; $p > .20$; n.s.

Chi-square was utilized to make a within groups analysis. Table IV shows the results of analysis of comparisons of question categories between pre and post tapes for the video group. Video pre-post data produced a value of 137.622 ($p < .001$).

TABLE IV

CHI-SQUARE COMPARISONS OF QUESTION CATEGORIES BETWEEN PRE AND POST TAPES FOR THE VIDEO GROUP

Question Categories	Pre-Tapes Frequencies		Post-Tapes Frequencies	
	Actual	Expected	Actual	Expected
Rhetorical	228	170	31	89
Informational	378	387	210	201
Leading	52	43	14	23
Probing	75	133	127	69
Totals	733		382	

Chi-square = 137.622; $p < .001$.

Memory pre-post data, as shown in Table V, produced a chi-square value of 102.12 ($p < .001$). Differences in both groups were significant; however, the greater significance was indicated within the video group. This agrees with the result obtained from analysis by the Wilcoxon techniques described following hypothesis three.

TABLE V

CHI-SQUARE COMPARISONS OF QUESTION CATEGORIES BETWEEN PRE AND POST TAPES FOR THE MEMORY GROUP

Question Categories	Pre-Tapes Frequencies		Post-Tapes Frequencies	
	Actual	Expected	Actual	Expected
Rhetorical	208	160	39	87
Informational	429	423	224	230
Leading	13	24	24	13
Probing	70	113	104	61
Totals	720		391	

Chi-square = 102.12; $p < .001$.

Hypothesis 3: There are no significant differences in the number of questions asked between initial and final scores in any category of questions by student teachers receiving either video or memory feedback.

A Wilcoxon matched-pairs, signed-ranks test was used to examine hypothesis three. The results are presented in Table VI, and reveal that both groups had a significant decrease in rhetorical type questions. In the other question categories the memory group showed a significant decrease in informational type questions and the video group showed a significant decrease in leading type questions; however, the video group had an inordinate number of leading questions on the

pre-tapes in comparison to the memory group. (Appendixes C and D). The video group showed a significant increase in probing questions.

As a check of interim progress the Wilcoxon matched-pairs, signed-ranks test was utilized in comparing pre-tape to second tape. The results of this comparison were almost the same as revealed by the pre to post tape analysis except that the video group showed no significant differences in leading and probing questions. Likewise a similar comparison was made between results of the second and post tapes in which instance no significant differences were found for any of the comparisons of the question categories.

TABLE VI

WILCOXON MATCHED-PAIRS SIGNED-RANKS TEST SHOWING THE COMPARISON BY TWO GROUPS OF FREQUENCY OF QUESTION CATEGORIES FOR PRE AND POST TAPES

Question Category	Video		Memory	
	Level of Significance	Difference	Level of Significance	Difference
Rhetorical	.01	Decrease	.01	Decrease
Informational	n.s.	Decrease	.05	Decrease
Leading	.01	Decrease	n.s.	Increase
Probing	.05	Increase	n.s.	Increase

Hypothesis 4: There is no significant difference between the video feedback and the memory feedback student teacher groups on pre and post tapes with respect to traditional and inquiry oriented questioning patterns.

The Fisher exact probability test was used in comparing the frequency of questions asked between the two groups on both pre and post tapes. The data, as presented in Table VII, show essentially no difference in the questioning patterns between the video and the memory groups. Both groups were oriented toward traditional type questions, and asked greater numbers of rhetorical and informational type questions or traditionally-oriented questions than they did inquiry-oriented questions. The Fisher exact probability value of .50 was not significant. Even though the groups were still comparable but not significantly different at the post tape, a shift was evidenced showing greater numbers of students asking more inquiry-oriented questions over traditional-oriented questions. The Fisher exact probability value of .10 on the post tapes was not significant.

TABLE VII

DATA FOR FISHER'S EXACT PROBABILITY ON COMPARISON OF FREQUENCY OF QUESTIONS ASKED FOR PRE AND POST TAPES FOR BOTH GROUPS

	Traditional-Oriented Questions	Inquiry-Oriented Questions
Pre-Tapes*		
Video Group	8	1
Memory Group	9	0
Post-Tapes**		
Video Group	7	2
Memory Group	6	3

*Probability = .50; n.s. **Probability = .10; n.s.

Summary

The results of the analysis of the data were presented in the chapter and arranged in the order of the hypotheses tested in the study. The analysis for the first hypothesis examined differences between the video group and the memory group on each of the four categories of questions for both pre and post tapes. A significant difference was found in only one instance; the video group asked a significantly larger number of leading questions than the memory group on the pre-tapes.

The second hypothesis was tested by comparing the questioning patterns of the two groups on both pre and post tapes. In this instance, a significant difference was found in the questioning patterns of the two groups only on the pre-tapes.

The test of the third hypothesis was based on a comparison of the pre and post tapes on the numbers of questions asked by each group in each question category. The video group showed significant decreases in rhetorical and leading questions and a significant increase in probing questions. The memory group showed significant decreases in rhetorical and informational questions.

The fourth hypothesis dealt with a comparison of the two groups on both pre and post tapes with respect to traditional-oriented and inquiry-oriented questioning patterns. No significant differences were found on either set of tapes.

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary

This investigation was implemented to determine if student teacher behavior related to questioning techniques in the teaching of social studies could be effected through evaluative feedback by means of videotape and supervisory conferences. The design of the study provided for analysis of data from comparative situations.

The subjects for this study consisted of eighteen female student teachers majoring in Elementary Education. The students were assigned in the fall semester, 1971, for student teaching in grades three to six in the Stillwater, Oklahoma, Public Schools. Each subject in the sample population was randomly assigned to one of two treatment groups, one of which used videotape as a means of feedback and evaluation, the other relied on memory or recall for evaluation feedback. Each subject in both groups made three different videotapes during the duration of the study. Each tape was then coded for question types asked by the student teachers. The first and last tapes were used as pre and post tapes for the study.

Four hypotheses were presented. They were concerned with the category of questions asked by students in the two groups and if there would be significant differences in the questioning patterns

used by the groups after they had received evaluative feedback in two methods.

Conclusions

Hypothesis One was rejected for this reason: There was a significant difference between the video group and the memory group in the leading category of questions asked by student teachers on the pre-tapes. The comparison of rank values showed that the video group asked a significantly greater number of leading questions than the memory group.

Hypothesis Two was rejected for this reason: There was a significant difference between the questioning patterns of student teachers receiving video feedback support and those receiving memory feedback support from the university supervisor on the pre-tape comparisons. The video group asked a disproportionately greater number of leading questions than expected while the memory group asked a disproportionately smaller number of leading questions than expected.

Hypothesis Three was rejected for the following reasons: There were significant differences in the number of questions asked between initial and final scores in categories of questions by student teachers receiving either video or memory feedback. Both groups had a significant decrease in rhetorical questions. The memory group showed a significant decrease in informational questions and the video group showed a significant decrease in leading questions. The video group showed a significant increase in probing questions. Significant differences then were found between pre and post tapes. When similar

comparisons were made between pre and second tapes and second and third tapes, no significant differences were found for any of the comparisons of the question categories.

A within groups analysis was made comparing question categories between pre and post tapes for the video group as well as for the memory group. Significant differences existed in both groups. Both groups were asking more questions on the pre-tapes than they were on the post-tapes.

Hypothesis Four was accepted and became tenable. The data showed essentially no difference in the question patterns between the video and the memory groups; however, a shift was evidenced showing greater numbers of students asking more inquiry-oriented questions over traditional-oriented questions by both groups. In essence, the two treatment procedures appeared equally effective in reducing the percentage of rhetorical questions asked by student teachers and each was effective in increasing the percentage of probing questions asked.

Results of this study have strong implications for preservice teacher education. As revealed by this investigation and reviews of the literature, teachers ask great numbers of memory and/or recall-type questions. The major concern of many researchers seems to be with more open-ended questions that would require children to exercise their thinking abilities. Student teachers should have opportunities to learn how to form leading and probing questions early in their instructional training. With the use of self-analysis through video tape feedback, questioning strategies can be markedly improved. Inservice teachers, who have access to self-analysis procedures and

video tapes, can also improve their questioning techniques if they give consideration to the results of this study.

Recommendations

The following recommendations are made:

1. An investigator could replicate the study with the following expansions:
   a. a comparative study with student teachers in a nine-week student teaching block with those in a lesser or longer time block.
   b. a control group participating in the study, but not receiving any feedback.
   c. inservice teachers in randomly selected schools and randomly assigned subjects to treatments.
2. A follow-up study during the second semester of the subjects' first year of teaching experience to compare their questioning patterns then with those during the study could be utilized.
3. A greater stress could be put on the importance of questioning strategies in methods classes for both preservice and inservice teachers.

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APPENDIXES

APPENDIX A

GUIDE FOR ANALYSIS OF TEACHING: QUESTIONING

GUIDE FOR ANALYSIS OF TEACHING: QUESTIONING*

Traditional-Oriented Questions	Examples
Rhetorical Questions	
a. Questions for which the teacher supplies answer.	"What is the ultimate force a nation can employ in diplomatic relations with other nations?" (Pause) Teacher continues,
b. Questions for which the teacher does not expect (or demand) answer.	"I'm sure that you are thinking of military force. . ."
c. Questions used to restructure, redirect, or refocus lesson.	
Informational Questions	
a. Questions calling for facts read, heard, discussed in class, etc.	"Who was the first president of the United States?"
b. Who, what, where, when, how much, how many, etc.	

Inquiry-Oriented Questions	Examples
Leading Questions	
a. Questions looking for the right answer.	"We have determined that need for access to transportation routes was an important consideration in the location of colonial settlement. What other kinds of things influenced people in deciding where they would live?"
b. Questions which contain the right answer.	
c. Questions which clearly suggest that the right answer is to be.	
d. Questions which prescribe a desired approach to developing an answer.	
Probing Questions	
a. Open-ended questions which broaden field of consideration for student inquiry.	"What conclusions can we draw from the recent decision of France not to permit the entry

b. Open-ended questions which structure the activity of student inquiry but do not indicate nature or approach to answer.	of the United Kingdom into the European Common Market?"
c. Open-ended questions which invite explorations of relationships.	"What arguments can be applied for or against the statement that 'the present civil rights struggle is a class issue rather than a racial issue'?"

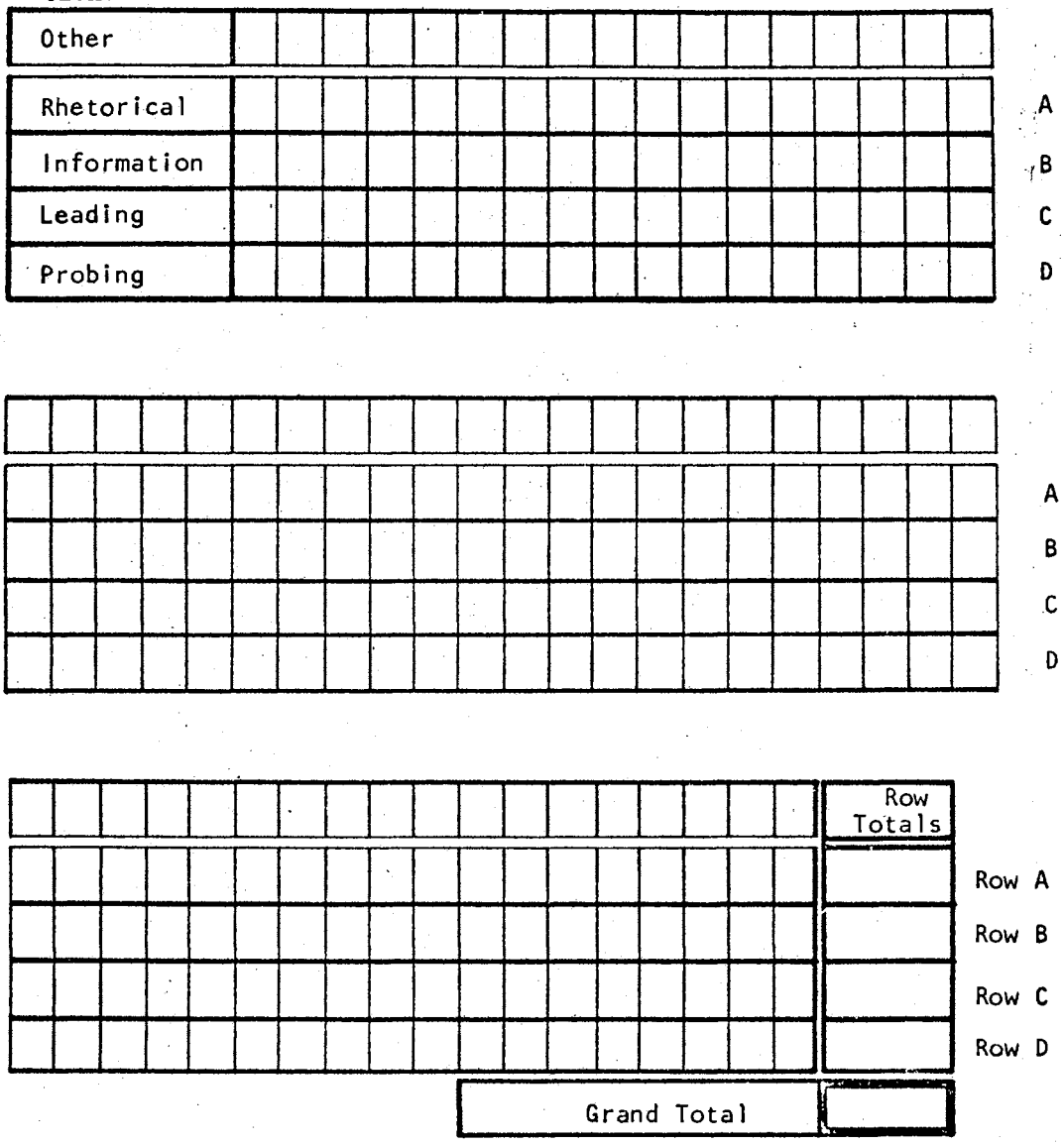
*from Adair and Allan (1969).

APPENDIX B

CODING SHEET

Coding Sheet

Classify each question and indicate whether it is Rhetorical, Information, Leading, Probing or Other by putting a dot in the appropriate box in the coding form. Other means questions not directly related to development of the ideas under consideration.



Look across each row and determine your total number of rhetorical questions, information questions, leading questions and probing questions. To determine your total number of lesson-related questions sum the row totals and enter the figure in the Grand Total box.

APPENDIX C

RAW DATA FROM PRE-TAPES, SECOND TAPES AND POST-TAPES FOR STUDENTS IN THE VIDEO GROUP

TABLE VIII

RAW DATA FROM PRE-TAPES, SECOND TAPES AND POST-TAPES FOR STUDENTS IN THE VIDEO GROUP

Student Teacher	Question Categories												Total Questions
	Rhetorical			Informational			Leading			Probing			
	Pre	2nd	Post	Pre	2nd	Post	Pre	2nd	Post	Pre	2nd	Post	
01	19	02	00	63	16	18	09	06	02	08	08	14	165
04	30	07	05	52	20	16	09	01	02	21	40	23	226
05	06	05	04	12	18	30	11	01	01	03	23	07	121
08	31	07	01	70	08	30	01	03	02	01	16	15	185
11	05	02	04	15	03	15	03	00	02	18	04	22	93
12	21	08	01	21	18	17	07	04	00	04	09	15	125
16	26	05	07	42	34	47	04	03	00	00	06	01	175
17	57	10	05	54	05	17	01	06	00	06	17	21	199
18	33	13	04	49	76	20	07	00	05	14	01	09	231
Total Questions	228	59	31	378	198	210	52	24	14	75	124	127	1520

APPENDIX D

RAW DATA FROM PRE-TAPES, SECOND TAPES AND POST-TAPES FOR STUDENTS IN THE MEMORY GROUP

TABLE IX

RAW DATA FROM PRE-TAPES, SECOND TAPES AND POST-TAPES FOR STUDENTS IN THE MEMORY GROUP

Student Teacher	Question Categories												Total Questions
	Rhetorical			Informational			Leading			Probing			
	Pre	2nd	Post	Pre	2nd	Post	Pre	2nd	Post	Pre	2nd	Post	
02	24	07	02	71	29	17	04	14	00	06	18	28	220
03	15	01	00	45	37	09	03	02	00	12	10	20	154
06	28	15	10	38	41	42	00	09	04	07	02	02	198
07	24	09	11	28	54	31	04	08	11	21	02	10	213
09	21	01	09	43	16	42	00	00	02	06	08	04	152
10	08	02	00	51	44	34	00	01	00	06	04	01	151
13	32	04	03	55	08	11	00	01	03	01	13	20	151
14	44	08	03	72	24	27	02	12	02	01	18	15	228
15	12	05	01	26	19	11	00	00	02	10	14	04	104
Total Questions	208	52	39	429	272	224	13	47	24	70	89	104	1571

APPENDIX E

TABLE OF INTERRATER RELIABILITIES ON TAPES WHERE DISAGREEMENT WAS OBSERVED

TABLE X

TABLE OF INTERRATER RELIABILITIES ON TAPES WHERE DISAGREEMENT WAS OBSERVED

Tapes	Reliability Coefficients
1	0.92
2	0.96
3	0.94
4	0.93
5	0.98
6	0.96
7	0.94
8	0.89
9	0.94
10	0.92
11	0.90
12	0.94
13	0.95
14	0.98
15	0.98
16	0.96
17	0.98
18	0.96
19	0.95
20	0.97
21	0.94
22	0.95
Average Reliability	0.95

VITA

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