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AUTHOR	Adair, Charles H.; Kyle, Allan R.
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ABSTRACT

The research study reported in this monograph was designed 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. Among the tables and exhibits included in the appendix are several guides used by teachers and supervisors in observing and analyzing questioning behavior. (ES)

EFFECTS OF FEEDBACK ON TEACHER BEHAVIOR

An Exploration into the Use of Videotaping in Teacher Education Programs

by

Charles H. Adair
Allan R. Kyle

Southeastern Education Laboratory
Atlanta, Georgia

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PREFACE

The application of technological inventions to education has much potential for the improvement of teaching. The research study reported in this monograph was concerned with an application of technology – videotaping – to improve classroom instruction. Specifically, the study was designed to assess the effects of videotape feedback to teachers as a means of changing question-asking behavior of teachers.

The three procedures used in the analysis and modification of teacher behavior were the following: a teacher-supervisor conference following classroom observation by the supervisor, self-analysis of a videotaped teaching session, and supervisor-assisted (directed) self-analysis of a videotaped teaching session. Three randomly formed groups of teachers participated in the study with each group using only one procedure.

The findings of the study suggest that videotape feedback of a teacher's classroom instruction is an effective way to change some aspects of teacher behavior. Teachers who used videotapes in self-analysis decreased significantly the percentage of rhetorical questions that they asked while increasing the percentage of probing questions. Teachers who used the teacher-supervisor conference procedure increased the percentage of probing questions that they asked but continued to use approximately the same percentage of rhetorical questions.

According to the evidence of this study, the self-analysis procedure and supervisor-assisted (directed) self-analysis procedure appear to be equally effective in teacher behavior modification. This finding suggests that properly structured self-analysis can be an effective procedure in changing teacher behavior.

This study provides evidence that technology may be employed effectively to improve the instructional process. Efforts to explore the array of potential applications of technology to education should be continued in the interest of improving the classroom learning of pupils.

Kenneth W. Tidwell
Executive Director
Southeastern Education Laboratory

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THE PROBLEM

This project examines the problem of providing adequate feedback and evaluation information to teachers to facilitate the development of desirable teaching behavior.

Typically, the teacher behavior evaluation is provided through infrequent teacher conferences with supervisors or personal efforts of individual teachers to reconstruct their actions in classroom situations. Usually, the nature of the supervisor's evaluation is left to the discretion of the supervisor who observes, records, and reports on performance to the teacher. The utilization of this procedure requires that the teacher see himself as someone else sees him and relate another's perceptions and judgments to his own. The difficulties associated with this technique include a heavy reliance on individual frames of reference, communication requiring a high order of psychological skill, and the stimulation of defensiveness by the teacher. Individual evaluation by the teacher has an inherent weakness in that it requires the reconstruction of his performance during a specific period of time without assuring that all relevant details will be remembered.

Current methods of providing evaluative feedback to teachers on their performance have one or more of the following limitations:

1. They inadequately control the defensive reactions of the communicator and communicatee.
2. They require a teacher to visualize his own performance from a word description of how he behaved as his behavior was perceived by another person.
3. They do not begin with the same perception of specifically what was done, why and how it was done, and what the effects were.

An adequate feedback-evaluation system should possess the following characteristics to the greatest possible extent:

1. It should reproduce the teaching performance completely and reliably.
2. It should be objective.
3. It should provide immediate feedback.

The use of videotape recording procedures has the three characteristics of an adequate feedback system listed above when employed immediately after a teaching sequence is recorded. It has two additional advantages. The teacher can observe his own performance as another sees him; and, a common information base (the videotaped session) can be used when a supervisor talks to the teacher about the teaching performance.

OBJECTIVES

This project involved the application of the videotape recording technique in the feedback-evaluation and modification of teacher performance. This made it possible to capitalize on the desirable characteristics that this technique possesses as a feedback mechanism. Specific objectives of the project were to obtain preliminary data on the following questions:

1. Does the more comprehensive and dramatic feedback provided by videotaping produce more significant change in question-asking behavior of teachers than standard techniques?
2. Does a teacher modify his teaching behavior as well when individually evaluating his own performance as when he is assisted in the evaluation by a supervisor?

Based on these objectives, the following hypotheses were generated and tested:

1. Teachers who use videotape recordings to analyze their classroom question-asking behavior will not change the percentage of rhetorical questions that they ask significantly more than teachers who use standard observation procedures.
2. Teachers who use videotape recordings to analyze their classroom question-asking behavior will not change the percentage of probing questions that they ask significantly more than teachers who use standard observation procedures.

An additional hypothesis of interest in the study is that groups of teachers who use videotape recordings to analyze their classroom question-asking behavior will not change the number of questions that they ask significantly more than groups who use standard observation procedures. Because of the lack of uniformity in the content of classroom presentations by the teachers in the study, the analysis related to this hypothesis was limited to an inspection of the data based on the number of questions that were asked by the teacher.

PROCEDURE

Rationale

Much research has been done in the area of interaction analysis involving teacher and student behavior.[1] Although these efforts are sound and productive, they demonstrate few applications in the use of interaction analysis as a tool in in-service teacher education programs. This study represents an attempt to apply interaction analysis in such a program.

The following assumptions were made with respect to the procedures employed in this study:

1. A number of teacher behavior patterns are consistently found in effective teaching in any subject matter area.
2. Desirable teaching behavior can be developed through systematic observation of effective behavior patterns.
3. Subject matter has little influence on good questioning techniques.
4. Grade level of instruction has little effect on questioning techniques but does imply variation in the complexity of responses.
5. There will be considerable initial insecurity among the teachers taking part in the study.

The technique of posing questions in classroom instruction was used as the "vehicle" to generate data on the questions composing the objectives of the proposal. The study was limited to a single component of teacher behavior in order to focus attention on an important, specific feature of teaching and to assess the effects of videotaping as a medium for changing teaching behavior.

The Sample

The population from which the sample was selected consisted of all the teachers in grades 6-12 in Central High School and Magnolia High School of Thomas County, Georgia, who volunteered to take part in the experiment. Fifteen teachers from each school were selected at random and assigned to three treatment groups. This resulted in three experimental groups with ten teachers in each group. Assignment of teachers to the three groups was made randomly, without knowledge of the educational preparation or experience of the teachers or the subjects taught by the teachers.

Treatments

Three fifteen-minute videotape recordings were made of each teacher during separate lecture-discussion instructional sessions. The second and

[1] See Anita Simon and E. Gil Boyer (eds.), *Mirror for Behavior: An Anthology of Classroom Observation Instruments* (Philadelphia: Research for Better Schools, Inc., and the Center for the Study of Teaching, Temple University, 1967), Vols. 1-5, and Arno A. Bellack *et al.*, *The Language of the Classroom* (New York: Teachers College Press, 1966). The five volumes edited by Simon and Boyer provide a comprehensive collection of classroom observation techniques.

third videotapes for each teacher were made at two-week intervals following the initial videotaping session. No effort was made by the investigators to structure the content of the presentations of the teachers. The teacher was the only individual who knew the background, objectives, teaching strategies, and relationship of any single instructional session to the overall instructional plan. The videotaped sessions represented only a small portion of the total instructional efforts of the teachers.

Each treatment was composed of two phases. The first phase consisted of the analysis of the first videotaped session of each teacher using the prescribed methods of teacher behavior analysis which focused on types of questions that were asked. The second phase was the analysis of the teacher's performance on the second videotape.

The data for evaluating the effects of the methods of teaching behavior analysis were provided by the first and third videotapes of each teacher. The first videotape provided the initial observation on the questioning behavior of teachers. The third videotape provided the follow-up data needed to determine changes in teachers' questioning behavior that might be attributed to the methods which were employed in the treatments.

The teachers' performances during the first two videotaped sessions were analyzed by the teachers, supervisors, and/or project staff (See Appendix *B*, Exhibits 1-5). The third videotape session of each teacher was analyzed by the project staff. The three methods of analyzing the first two videotaped performances constituted the treatments and are described below.

The videotape of each teacher in Group I was viewed by the supervisor as soon as it was completed. The supervisor tabulated the teacher's questions in four categories: rhetorical, information recall, leading, and probing. This tabulation was followed immediately by a standard supervisory conference involving the teacher and the supervisor. They discussed ways of improving the teaching behavior exhibited during the videotaped session by focusing specifically on one teaching behavior: questioning techniques. This method was identified as the *standard observation procedure.*

Each participant in Group II viewed and analyzed his own videotaped performance. He followed a set of written instructions which specified that he analyze only his questioning behavior. The supervisor did not assist in the analysis of the videotapes. His only function was to play back the videotape at the participant's request. This method was called the *self-analysis procedure.*

Each Group III participant performed the same tasks as the participants in Group II. In addition, the supervisor assisted in performing the tasks by clarifying any questions of the participant and by providing some verbal instructions. The analysis focused on observing and recording questioning behavior. This method was identified as the *guided analysis procedure.*

Each group of teachers completed a set of programmed tasks in analyzing Tape 1 and Tape 2. The tasks, identified as Schedule A and Schedule B (Appendix *B*, Exhibits 1-5), consisted of a series of assignments designed to provide a sequential development of the participant's perception of the use of questions for improving classroom interaction. The members of each treatment group completed the same tasks under the conditions prescribed for the particular treatment. To insure consistency in the post-recording conferences for Group I and Group III, protocols were prepared which contained the verbal instructions to be used by the supervisor who conducted the conference.

Each videotape from the third recording session was analyzed by the project staff. An independent analysis was made by an assistant. The observations were accepted as conclusive if a high correlation (Pearson r=.93) existed. If the independent observation did not agree sufficiently, a second analysis was made. The convenient use of videotape records made observation systematic to the point of relative ease in reaching agreement between observers. This was followed by a comparison of questioning behavior on the first and third tapes.

Implementation

The project implementation began on January 9, 1967, with a general meeting involving the participating personnel from the Thomas County, Georgia, school system. Those in attendance included: Mr. Ed Cone, Superintendent of Schools, Thomas County, Georgia; Mr. Junior Jones, Principal, Magnolia High School; Mrs. Ursula Singletary and Mrs. Gladyes Chappelle, Curriculum Directors of the Thomas County School System; twenty-seven of the thirty teachers who were participants in the project; four non-participating teachers from Central High School who were interested in the project; and Mr. Allan R. Kyle, project co-investigator.

The general procedures and administrative details of the project were discussed at the January meeting. In order to avoid influencing the participants from whom the data were to be collected, care was exercised to avoid any reference to the specific objectives of the project and the methods used with each group. The investigator emphasized that the findings would be used for analytical purposes and *not* for evaluation of the teachers. The Superintendent of Schools concurred on this point. It was felt that this position should be emphasized in order to obtain maximum participation by the teachers.

The videotaping schedule was arranged to record teaching sessions at Magnolia High School on Tuesday and Thursday and at Central High School on Monday, Wednesday, and Friday. Arrangements were made at each

school to provide time for the conference immediately following the videotaping sessions. All teachers were videotaped in each cycle before the next cycle began. There were several unavoidable disruptions in the schedule during the period of time that the ninety sessions were being videotaped. Flexibility in scheduling and the excellent cooperation of administrators and participants insured that the overall time schedule and the proper sequence of taping were maintained. (See Appendix *B*, Exhibit 6, for the schedule.) The collection of data began on January 25, 1967, and was completed on March 10, 1967.

Experimental Design and Criterion Measures

A Lindquist simple-randomized design was employed in the analysis of the data relating to the experimental hypotheses.[2] The simple-randomized design is a model for analyzing data in experimental studies involving a random sample of subjects who are assigned to each treatment. In this study there were three groups of subjects, one group being assigned to each of the three treatments.

The criterion measures for hypotheses 1 and 2 were the differences in percentages of rhetorical and probing questions respectively on Tapes 1 and 3 (See Appendix *A*, Table 7, for the raw data percentages). The criterion measure for the related hypothesis was the number of questions that each group of teachers asked on Tapes 1 and 3 (See Appendix *A*, Table 8, for the data on the number of questions asked by the groups of teachers).

Since Hypotheses 1 and 2 related only to rhetorical and probing questions, no analysis was performed involving the percentages of information recall and leading questions. The total number of all types of questions asked by each teacher on Tapes 1 and 3 was inspected in connection with the related hypothesis concerning the number of questions asked.

All statistical tests of significance were made with a level of significance of .05.

[2]E. F. Lindquist, *Design and Analysis of Experiments in Psychology and Education* (Boston: Houghton Mifflin Company, 1953), pp. 47-107.

ANALYSIS

Table I presents the three treatment group mean percentage differences on Tapes 1 and 3 for rhetorical and probing questions. The data reveal an overall decrease in the percentage of rhetorical questions and an increase in the percentage of probing questions.

TABLE 1

GROUP MEANS ON DIFFERENCES IN PERCENTAGES OF RHETORICAL QUESTIONS AND PROBING QUESTIONS FOR TAPE 1 AND TAPE 3

Rhetorical Questions		Probing Questions
.7	Group I	17.3
–7.3	Group II	19.5
–7.5	Group III	18.2
–4.7	Total	18.3

The analysis of variance for rhetorical questions and probing questions is presented in Tables 2 and 3.

TABLE 2

ANALYSIS OF VARIANCE FOR RHETORICAL QUESTIONS

Source of variance	df	ss	ms	F	Sig.
Treatments	2	437.60	218.80	3.38	$p<.05$
Within-groups	27	1748.70	64.77		
Total	29	2186.30			

$F_{.95}(2,27)=3.35$

TABLE 3

ANALYSIS OF VARIANCE FOR PROBING QUESTIONS

Source of variance	df	ss	ms	F	Sig.
Treatments	2	24.47	12.24	.87	ns
Within-groups	27	3812.20	141.19		
Total	29	3836.67			

$F_{.95}(2,27)=3.35$

Since the analysis of variance for group means on rhetorical questions revealed a significant difference among the means, three t-tests were employed to compare the means of pairs of groups. The results are presented in Table 4.

TABLE 4

COMPARISON OF GROUP MEANS FOR RHETORICAL QUESTIONS

	df	t	Sig.
Group I and Group II	18	1.98	ns
Group I and Group III	18	2.21	$p<.05$
Group II and Group III	18	.07	ns

$t_{.975}(df=18)=2.10$

$t_{.025}(df=18)=-2.10$

A t-test was used with each group mean to determine which means differed significantly from O, i.e., which groups had a significant change in percentage of questions. The analysis is presented in Table 5.

TABLE 5

ANALYSIS OF GROUP MEANS TO DETERMINE SIGNIFICANCE OF CHANGE

	Rhetorical Questions			Probing Questions		
	df	t	Sig.	dt	t	Sig.
Group I	9	.21	ns	9	3.58	$p<.01$
Group II	9	−3.06	$p<.05$	9	5.54	$p<.01$
Group III	9	−4.26	$p<.01$	9	5.76	$p<.01$

$t_{.975}(df=9)=2.26$ $\quad$ $t_{.995}(df=9)=3.25$

$t_{.025}(df=9)=-2.26$ $\quad$ $t_{.005}(df=9)=-3.25$

Table 6 presents the total number of questions asked by each group of teachers as recorded on and observed from Tape 1 and Tape 3.

TABLE 6

CHANGE IN TOTAL NUMBER OF QUESTIONS ASKED BY TEACHERS ON TAPE 1 AND TAPE 3

	Tape 1	Tape 3	Difference
Group I	274	262	−12
Group II	258	207	−51
Group III	259	184	−75
Total	791	653	−138

FINDINGS

The analysis of the data reveals the following findings relative to the hypotheses.

Hypothesis 1

1. The analysis of variance reveals significantly different means among the three treatment groups. The mean percentage changes were .7 (Group I), –7.3 (Group II), and –7.5 (Group III).
2. The t-tests comparing group means show that the means for Group I and Group III differ significantly. The difference in means for Group I and Group II approach significance.
3. The t-tests concerning significance of change for individual groups show that Group II and Group III had significant decreases in the percentage of rhetorical questions from Tape 1 to Tape 3. Group I had a slight increase in percentage of rhetorical questions.
4. The results of the data analysis suggest that teachers who viewed their own teaching performance on videotape for the purpose of analysis and behavior modification were more effective in reducing the percentage of rhetorical questions than teachers who used standard observation procedures.

Hypothesis 2

1. The analysis of variance reveals no significant differences among the three treatment group means. The group means were 17.3 (Group I), 19.5 (Group II), and 18.2 (Group III). Since the means were not significantly different, paired comparisons of groups were inappropriate.
2. The analysis of change in percentages for the three groups shows that each group had a significant increase in the percentage of probing questions from Tape 1 to Tape 3.
3. The data analysis indicates that each of the feedback-evaluation procedures was effective in increasing the percentage of probing questions that teachers asked in teaching performances.

Related Hypothesis

An inspection of the data on the total number of questions asked by the three groups on Tape 1 and Tape 3 reveals a decrease for each group. Group III had the largest decrease while Group I had the smallest decrease. Although no statistical test was made concerning the decrease in number of questions asked by the teacher, the data suggest that under proper control of the content of instruction the hypothesis might be rejected.

CONCLUSIONS

1. Does the more comprehensive and dramatic feedback provided by videotaping produce more significant change in teaching behavior than standard techniques?

Analysis of the data in this study indicates that feedback provided by videotape produces significant change in some aspects of question-asking behavior in classroom instruction. The methods involving videotapes appeared to reduce the percentage of rhetorical questions that teachers asked while no significant differences were observed with respect to the percentage of probing questions. In addition to modification in question-asking behavior, other changes were observed in clothing, sensitivity, alertness, and enthusiasm. The increased opportunity for student expression resulting from the efforts of teachers to reduce the quantity of their own talk was impressive.

2. Can a teacher modify his teaching behavior as well when individually evaluating his own performance as when he is assisted in the evaluation?

The evidence that was collected in this study does not favor either self-analysis or directed analysis for changing teaching behavior as the methods were defined in this project. The amount and type of assistance given to the teachers who use the directed analysis approach might be crucial variables in determining the effectiveness of this method. Further research is needed to explore this area of interest.

Some of the teachers who were in the self-analysis group expressed the opinion that they would prefer directed analysis if they had a choice (See Appendix *B*, Exhibit 7). Until further evidence is available, the choice of the two procedures might be left to each teacher.

In addition to the specific evaluation of the study, the general reaction of the participants was obtained by using a questionnaire (Appendix *B*, Exhibit 8). The reactions of the teachers were generally favorable to the study (See Appendix *B*, Exhibit 9). Only one of the 28 post-investigation questionnaire respondents did not indicate a willingness to participate in additional experimental studies. The response reflected a positive change in the attitudes of teachers at the beginning of the study which ranged from much suspicion to high acceptance (See Appendix *B*, Exhibit 9).

Interaction analysis is a complex of many observations and reactions which benefit those who study themselves. While the particular aspect of interaction that was the center of focus in this study was limited to the

questioning process, it should be noted that a plethora of ideas and emotions serves to move a teacher toward idealized, rational behavior while teaching. Videotaping of teacher performance may be one means of assisting teachers in the employment of more rational and effective teaching behaviors. Videotaping is not an end in itself. Its value is realized only when its utility as a feedback system is recognized.

APPENDIX A

TABLES

TABLE 7

DATA ON TYPES OF QUESTIONS ON TAPE 1 AND TAPE 3
(Percentages)

		Tape 1				Tape 3				Comparison			
	Subject	1	2	3	4	1	2	3	4	1	2	3	4
Group I	1	12	54	24	10	6	36	40	18	− 6	−18	+16	+ 8
	2	18	46	23	13	15	5	30	50	− 3	−41	+ 7	+37
	3	0	56	30	14	20	40	20	20	+20	−16	−10	+ 6
	4	12	51	33	4	20	49	20	11	+ 8	− 2	−13	+ 7
	5	15	44	26	15	4	48	28	20	−11	+ 4	+ 2	+ 5
	6	0	41	41	18	0	13	24	62	0	−28	−17	+44
	7	21	39	30	9	7	21	41	31	−14	−18	+11	+22
	8	8	52	32	8	5	71	14	10	− 3	+19	−18	+ 2
	9	9	46	33	12	17	46	25	22	+ 8	0	− 8	+10
	10	0	35	54	11	8	18	31	43	+ 8	−17	−23	+32
TOTAL		9	45	32	14	10	34	28	28	+ 1	−11	− 4	+14
Group II	11	13	40	40	7	8	40	26	26	− 5	0	−14	+19
	12	16	16	56	12	8	25	25	42	− 8	+ 9	−31	+30
	13	20	54	26	0	6	67	12	15	−14	+13	−14	+15
	14	8	61	31	0	6	31	25	38	− 2	−30	− 6	+38
	15	20	48	27	5	25	33	25	17	+ 5	−15	− 2	+12
	16	19	32	37	13	0	82	9	9	−19	+50	−18	− 4
	17	13	34	40	13	6	33	35	33	− 7	− 1	− 5	+20
	18	4	18	66	12	5	35	23	37	+ 1	+17	−43	+20
	19	22	33	33	12	6	33	28	33	−16	0	− 5	+21
	20	18	41	35	6	10	35	30	25	− 8	− 6	− 5	+19
TOTAL		16	38	38	8	8	40	24	28	− 8	+ 2	−14	+20
Group III	21	13	30	44	13	5	40	15	40	− 8	+10	−29	+27
	22	10	47	33	10	7	33	20	40	− 3	−14	−13	+30
	23	8	52	32	8	8	37	22	33	0	−15	−10	+25
	24	12	27	43	18	10	37	24	29	− 2	+10	−19	+11
	25	18	40	30	12	7	30	30	33	−11	−10	0	+21
	26	18	41	35	6	10	35	30	25	− 8	− 6	− 5	+19
	27	15	25	35	25	0	54	15	31	−15	+29	−20	+ 6
	28	14	52	34	0	10	52	19	19	− 4	0	−15	+19
	29	14	38	35	13	7	40	23	30	− 7	+ 2	−12	+17
	30	23	32	27	18	6	38	31	25	−17	+ 6	+ 4	+ 7
TOTAL		14	14	35	13	7	40	23	30	− 7	+ 2	−12	+17

TABLE 8

GROUP RAW DATA ON NUMBER OF QUESTIONS FOR TAPE 1 AND TAPE 3

	Type of Question				
Tape 1	**Rhetorical**	**Recall**	**Leading**	**Probing**	**Total**
Group I	28	122	86	38	274
Group II	41	98	97	22	258
Group III	35	96	89	39	259

	Type of Question				
Tape 3	**Rhetorical**	**Recall**	**Leading**	**Probing**	**Total**
Group I	26	88	74	74	262
Group II	15	83	51	58	207
Group III	13	72	43	56	184

APPENDIX B

EXHIBITS

EXHIBIT 1

STANDARD OBSERVATION PROCEDURE: SCHEDULE A (FOR TEACHERS)

Introduction

This is a guide to aid teachers in analysis of classroom activity. You are requested to complete a series of tasks which will enable you to focus your attention on the analysis of your questioning procedures as they apply to attaining desired learning outcomes. Please complete these tasks in the sequence in which they are presented.

As you work through the series of tasks, we would like you to discuss each step with the university supervisor. Through discussion, you may be able to understand these tasks better and to clarify your own responses to them.

Task I

Task I of this procedure consists of the development of a written outline. Please outline briefly your answer to the following questions.

A. What learning outcomes do you want your students to develop through this course? (Interpret "learning outcomes" to include skills and understandings.)

B. What learning outcomes were you seeking to develop through the lesson recorded on the videotape?

Task II

At this time we are concerned only with one teaching technique – QUESTIONING. We have identified four major categories of questions used by teachers. We would like you to understand these categories, because we want you to use them as the basis for discussion of the lesson.

Guide for Analysis of Teaching:
QUESTIONING

Type of Question	Example
RHETORICAL QUESTIONS	
a. Questions for which the teacher supplies the answer b. Questions for which the teacher does not expect (or demand) an answer	"What is the ultimate force a nation can employ in diplomatic relations with other nations?" (Pause) Teacher continues,
c. Questions used to restructure, redirect, or refocus lesson	"I'm sure that you are thinking of military force . . ."
INFORMATION RECALL QUESTIONS	
a. Questions calling for facts read, heard, discussed in class, etc. b. Who, what, where, when, how much, how many, etc.	"Who was the first president of the United States?"
LEADING QUESTIONS	
a. Questions looking for the right answer b. Questions which contain the right answer c. Questions which clearly suggest what the right answer is to be d. Questions which prescribe a desired approach to developing an 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?"
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 of the United Kingdom into the Common Market?"
b. Open-ended questions which structure the activity of student inquiry but do not indicate nature or approach to answer	
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'?"

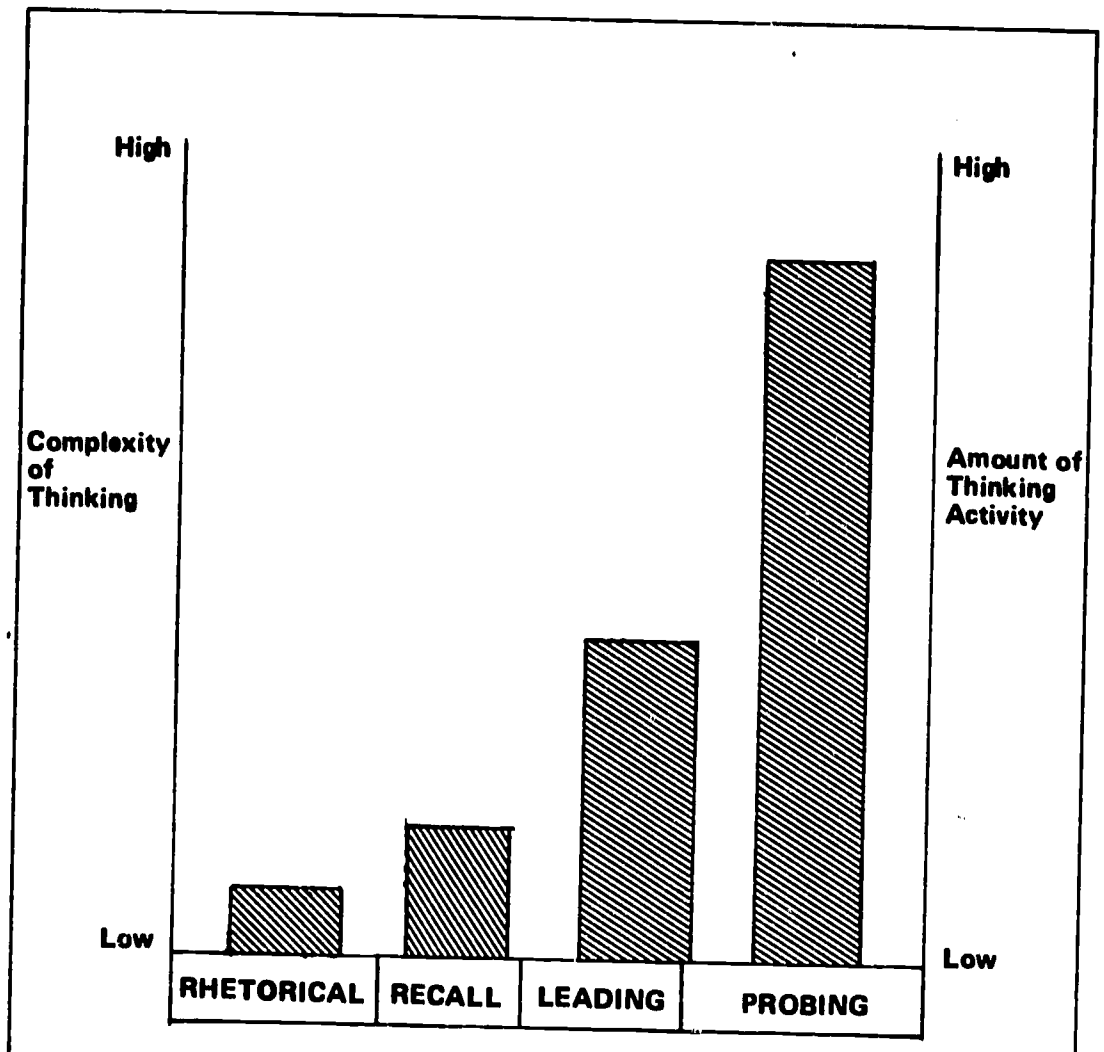

FIGURE 1

Relation Between Type of Teacher-Posed Question and Type of Thinking Demanded of Students

This graph represents the complexity of thinking associated with each type of question and the relative amount of thinking activity which the student must do to give a satisfactory response to each type of question. Rhetorical questions, for example, require little or no thinking activity and the intellectual task is simple. Probing questions, on the other hand, require more complex reasoning and thus involve the student in a greater amount of thinking activity.

Task III

During the observed lesson, the supervisor identified each teacher-posed question, made a decision as to which of the four categories it fit best, and made a tally mark in the appropriate box of the frequency table at the bottom of the following page. Your task is to add the tally marks and complete the table.

Types of questions to be identified:

1. **Rhetorical Questions**
   a. Questions for which teacher supplies answer
   b. Questions for which teacher does not expect (or demand) answer
   c. Questions used to restructure, redirect, or refocus lesson

2. **Information Recall Questions**
   a. Questions calling for facts read, heard, discussed in class, etc.
   b. Who, what, where, when, how much, how many, etc.

3. **Leading Questions**
   a. Questions looking for "right answer"
   b. Questions which contain the answer
   c. Questions which clearly suggest what the answer is to be
   d. Questions which prescribe a desired approach to developing an answer

4. **Probing Questions**
   a. Open-ended questions which broaden field of consideration for student inquiry
   b. Open-ended questions which structure the activity of student inquiry but do not indicate nature or approach to answer
   c. Open-ended questions which invite exploration of relationships

Type of Question	Observed Frequency of Incidence	
	Tally Marks	Totals
1. Rhetorical		
2. Information Recall		
3. Leading		
4. Probing		
	Total Number of All Questions	

Task IV

As a basis for understanding the significance of the frequency chart, we would like you to express the total frequency tally for each type of question as a percentage of the total number of questions asked. Read the following example and then complete columns A and B of the table below.

$$\frac{\text{Number of Information Recall Questions}}{\text{Total Number of All Questions}} = \text{Percent Information Recall Questions}$$

Table A

Relative Percentages of Questions

Type of Question	*Column A* Observed Number of Questions	*Column B* Percent of Questions Observed	*Column C* Percent of Questions Desired
Rhetorical			
Information Recall			
Leading			
Probing			
Totals		100	100

Task V

Look at column B of Table A. Note the relative percentages of types of teacher-posed questions observed by the university supervisor.

Refer again to Figure I (under Task II, p. 20) of this exhibit. Note again the kind of thinking that each type of question requires.

Write a short statement or outline summarizing the kinds of thinking demanded of students in the lesson observed. What kinds of thinking (or intellectual activities) were most heavily emphasized during the lesson?

Task VI

Refer to your outline of the learning outcomes which you have in mind for this course (Task I). Look at Figure I (under Task II, p. 20) of this exhibit. Consider again the kinds of thinking which you asked students to do in the observed lesson.

Now – consider the kinds of questions (i.e., kind of thinking) that you *should* be asking of your students in order to achieve more effectively your stated learning outcomes. Express the results of your consideration by filling in column C of Table A (Task IV). Enter the relative percentages of questions that you think you should be asking in order to develop more complex thinking in your students.

Keep these desired percentage figures in mind when preparing and teaching your next lessons. Remember the relationship between the kinds of questions asked by the teacher and the kind of thinking demanded of students.

Note: Schedule B for the Standard Observation Procedure instructed the teachers in Group I to repeat Tasks III-VI of Schedule A in analyzing their second videotape.

EXHIBIT 2

STANDARD OBSERVATION PROCEDURE: SUPERVISOR'S VERBAL INSTRUCTIONS FOR SCHEDULE A, EXHIBIT 1

Task I

So that we can better understand your use of questioning techniques in the observed lesson, we would like to know something about the learning outcomes that you have in mind for your students. Would you complete Task I for us? Before you write the outline we would like you to discuss with us the points that you have in mind. Through discussion you may be able to clarify them. We have provided a scratch pad so that you can keep track of the points you wish to include in your outline.

Task II

Task II involves a bit of reading. We would like you to read the instructions for Task II carefully, as they explain the frame of reference used in this observational procedure.

****

Do you have any questions about any of these instructions?

Task III

Task III presents the information gathered by the university supervisor in his observation of your questioning techniques. Review this carefully.

Task IV

Before we talk about the lesson, we would like you to do a little arithmetic. It will be easier to discuss the meaning of the frequency chart that you have just made if we convert the raw numbers into percentages. Would you please read the next instructions and then fill out columns A and B of the table? For the moment, let's disregard column C.

Task V

Task V is similar to Task I in that we would like you to develop an outline. Before you write the outline we would like you to discuss with us the points that you have in mind. By doing so you may be able to clarify your thinking. Use the scratch sheet to keep track of the points you wish to include in your outline.

Task VI

Task VI requires you to develop a desirable percentage distribution of types of questions used in teaching. Follow the written directions in thinking through the task and then write your proposed percent figures on a scratch sheet. We would like to discuss the figures and your reasoning before you enter them into column C, Table A.

Note: Verbal instructions for Schedule B of the Standard Observation Procedure included the verbal instructions pertaining to Tasks III-VI of Schedule A.

EXHIBIT 3

GUIDED SELF-ANALYSIS: SCHEDULE A

Introduction

This is a guide to aid teachers in self-analysis of videotaped classroom activity. You are requested to complete a series of tasks which will enable you to focus your attention on the analysis of your questioning procedures as they apply to attaining desired learning outcomes. Please complete these tasks in the sequence in which they are presented.

Although the university supervisor is in the room with you, his only task in this procedure is to operate the electronic equipment used.

Task I

Task I of this procedure consists of the development of a written outline. Please outline briefly your answers to the following questions.

A. What learning outcomes do you want your students to develop through this course? (Interpret "learning outcomes" to include skills and understandings.)

B. What learning outcomes were you seeking to develop through the lesson observed by the university supervisor?

Task II

At this time we are concerned with only one teaching technique – QUESTIONING. We have identified four major categories of questions used by teachers. We would like you to understand these categories, because we want you to use them as the basis for viewing the videotape.

Guide for Analysis of Teaching: QUESTIONING

Type of Question	Example
RHETORICAL QUESTIONS	
a. Questions for which the teacher supplies answer b. Questions for which the teacher does not expect (or demand) an answer c. Questions used to redirect, restructure, or refocus lesson	"What is the ultimate force a nation can employ in diplomatic relations with other nations?" (Pause) Teacher continues, "I'm sure that you are thinking of military force . . ."
INFORMATION RECALL QUESTIONS	
a. Questions calling for facts read, heard, discussed in class, etc. b. Who, what, where, when, how much, how many, etc.	"Who was the first president of the United States?"
LEADING QUESTIONS	
a. Questions looking for the right answer b. Questions which contain the right answer c. Questions which clearly suggest what the right answer is to be d. Questions which prescribe a desirable approach to developing an answer	"We have determined that need for access to transportation routes was an important consideration in the location of colonial settlements. What other kinds of things influenced people in deciding where they would live?"
PROBING QUESTIONS	
a. Open-ended questions which broaden field of consideration for student inquiry b. Open-ended questions which structure the activity of student inquiry but do not indicate nature or approach to answer c. Open-ended questions which invite explorations of relationships	"What conclusions can we draw from the recent decision of France not to permit the entry of the United Kingdom into the European Common Market?" "What arguments can be supplied for or against the statement that 'the present civil rights struggle is a class issue rather than a racial issue'?"

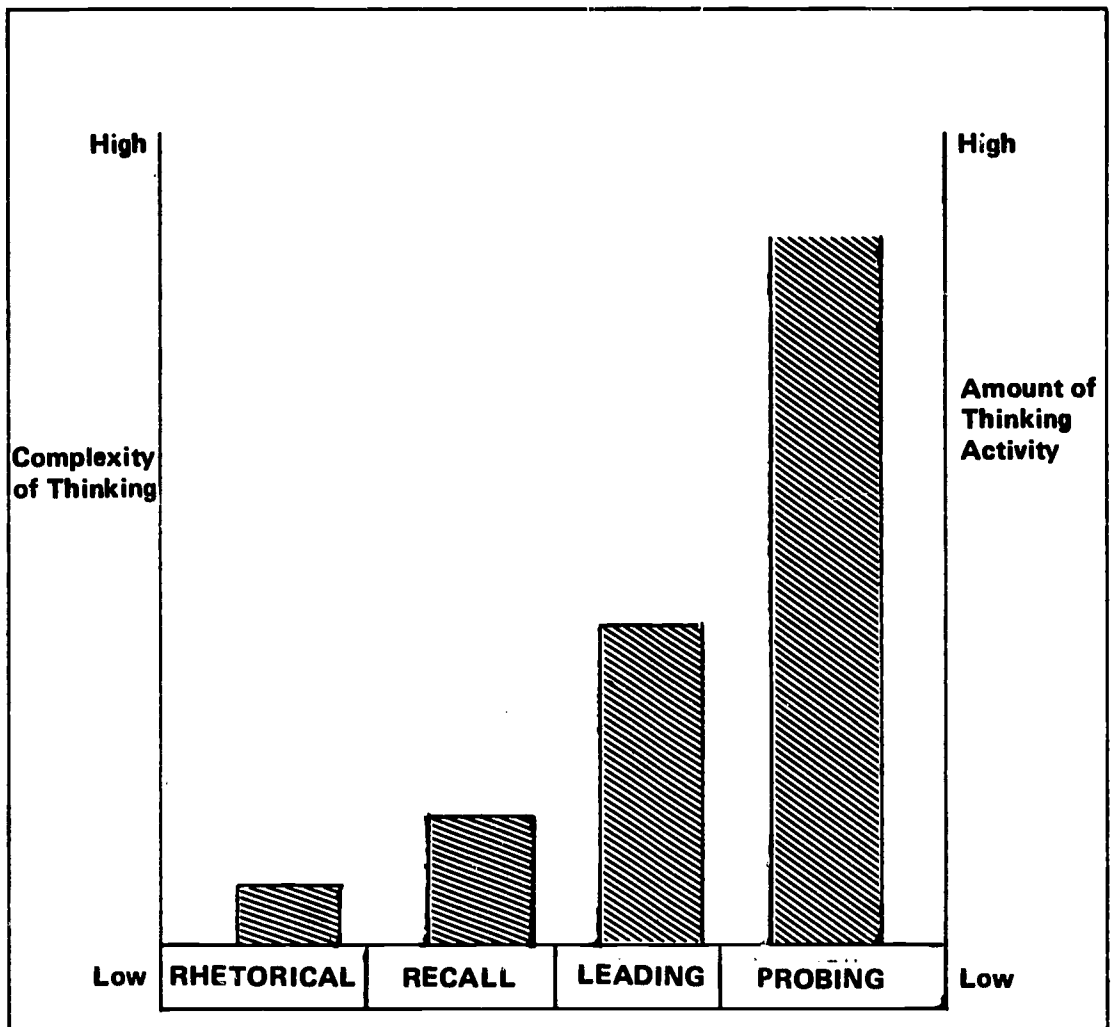

FIGURE 1

Relation Between Type of Teacher-Posed Question and Type of Thinking Demanded of Students

This graph represents the complexity of thinking associated with each type of question and the relative amount of thinking activity which the student must do to give a satisfactory response to each type of question. Rhetorical questions, for example, require little or no thinking activity and the intellectual task is simple. Probing questions, on the other hand, require more complex reasoning and thus involve the student in a greater amount of thinking activity.

Task III

Task III requires you to analyze the videotape made in your classroom. At this time we will play the tape for you. While you are viewing the tape, try to identify each of the teacher-posed questions. Decide which of the four categories best fits each question and make a tally mark in the appropriate box of the frequency chart presented below. Your task is to view the videotape and tally the teacher-posed questions on the chart. Types of questions to be identified:

1. **Rhetorical Questions**
   a. Questions for which teacher supplies answer
   b. Questions for which teacher does not expect (or demand) answer
   c. Questions used to restructure, redirect, or refocus lesson

2. **Information Recall Questions**
   a. Questions calling for facts read, heard, discussed in class, etc.
   b. Who, what, where, when, how much, etc.

3. **Leading Questions**
   a. Questions looking for "right answer"
   b. Questions which contain the answer
   c. Questions which clearly suggest what the answer is to be
   d. Questions which prescribe a desired approach to developing an answer

4. **Probing Questions**
   a. Open-ended questions which broaden field of consideration for student inquiry
   b. Open-ended questions which structure the *activity* of student inquiry but do not indicate nature or approach to answer
   c. Open-ended questions which invite exploration of relationships

Type of Question	Observed Frequency of Incidence	
	Tally Marks	Totals
1. Rhetorical		
2. Information Recall		
3. Leading		
4. Probing		
	Total Number of All Questions	

Task IV

As a basis for understanding the significance of the frequency chart, we would like you to express the total frequency tally for each type of question as a percentage of the total number of questions asked. Read the following example and then complete columns A and B of the table below.

$$\frac{\text{Number of Information Recall Questions}}{\text{Total Number of All Questions}} = \text{Percent Information Recall Questions}$$

Table A

Relative Percentages of Questions

Type of Question	*Column A* Observed Number of Questions	*Column B* Percent of Questions Desired	*Column C* Percent of Questions Observed
Rhetorical			
Information Recall			
Leading			
Probing			
Totals		100	100

Task V

Look at column B of Table A. Note the relative percentages of types of teacher-posed questions observed from the tape.

Refer again to Figure I (under Task II, p.27). Note again the type of thinking which each type of question requires.

Write a short statement or outline summarizing the kinds of thinking demanded of students in the lesson recorded on the videotape. What kind of thinking (or intellectual activity) was most heavily emphasized during the lesson?

Task VI

Refer to your outline of the learning outcomes which you have in mind for this course (Task I). Look again at Figure I (under Task II, p.27). Think again about the kinds of thinking which you asked students to do in the taped lesson.

Now – consider the kinds of questions (i.e., kind of thinking) that you *should* be asking of your students in order to achieve more effectively your stated learning

outcomes. Express the results of your consideration by filling in column C of Table A (Task IV). Enter the relative percentages of questions that you think you should be asking in order to develop more complex thinking in your students.

Keep these desired percentage figures in mind when preparing and teaching your next lesson. Remember the relationship between the kinds of questions asked by the teacher and the kind of thinking demanded of students.

Note: Schedule B for the Guided Self-Analysis Procedure instructed the teachers in Group II to repeat Tasks III-VI of Schedule A in analyzing their second videotape.

EXHIBIT 4

DIRECTED ANALYSIS: SCHEDULE A

Introduction

This is a guide to aid teachers in self-analysis of videotaped classroom activity. You are requested to complete a series of tasks which will enable you to focus your attention on the analysis of your questioning procedures as they apply to attaining desired learning outcomes. Please complete these tasks in the sequence in which they are presented.

As you work through the series of tasks, we would like you to discuss each step with the university supervisor. Through discussion you may be able to understand these tasks better and to clarify your own responses to them.

Task I

Task I of this procedure consists of the development of a written outline. Please outline briefly your answers to the following questions.

A. What learning outcomes do you want your students to develop through this course? (Interpret "learning outcomes" to include skills and understandings.)

B. What learning outcomes were you seeking to develop through the lesson recorded on the videotape?

Task II

At this time we are concerned with only one teaching technique – QUESTIONING. We have identified four major categories of questions used by teachers. We would like you to understand these categories, because we want you to use them as the basis for viewing the videotape.

Guide for Analysis of Teaching: QUESTIONING

Type of Question	Example
RHETORICAL QUESTIONS	
a. Questions for which the teacher supplies answer b. Questions for which the teacher does not expect (or demand) answer c. Questions used to restructure, redirect, or refocus lesson	"What is the ultimate force a nation can employ in diplomatic relations with other nation?" (Pause) Teacher continues, "I'm sure that you are thinking of military force . . ."
INFORMATION RECALL QUESTIONS	
a. Questions calling for facts read, heard, discussed in class, etc. b. Who, what, where, when, how much, how many, etc.	"Who was the first president of the United States?"
LEADING QUESTIONS	
a. Questions looking for the right answer b. Questions which contain the right answer c. Questions which clearly suggest what the right answer is to be d. Questions which prescribe a desired approach to developing an 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?"
PROBING QUESTIONS	
a. Open-ended questions which broaden field of consideration for student inquiry b. Open-ended questions which structure the activity of student inquiry but do not indicate nature or approach to answer c. Open-ended questions which invite explorations of relationships	"What conclusions can we draw from the recent decision of France not to permit the entry of the United Kingdom into the European Common Market?" "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'?"

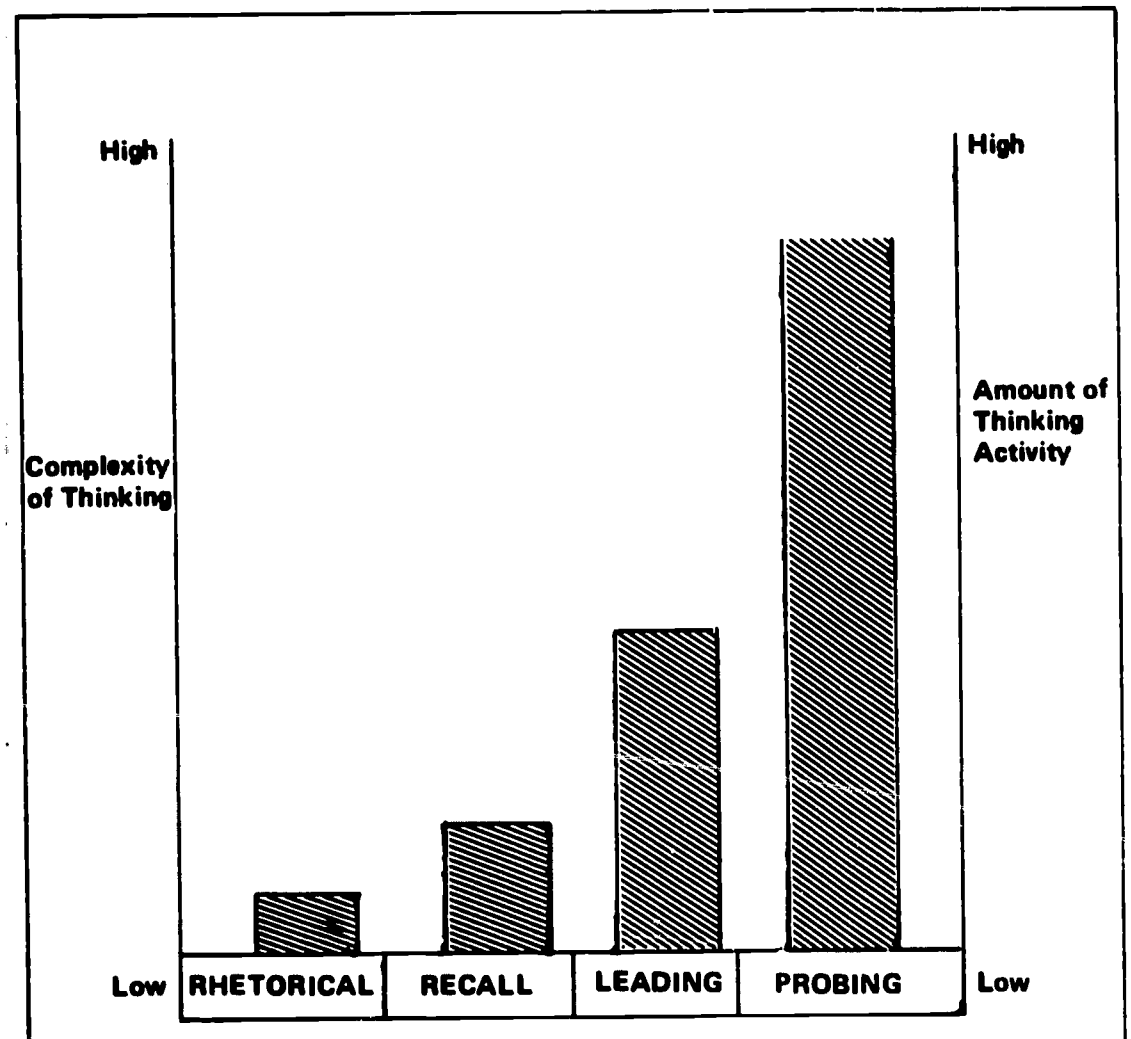

FIGURE 1

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Task III

Task III requires you to analyze the videotape made in your classroom. At this time we will play the tape for you. While you are viewing the tape, try to identify each of the teacher-posed questions. Decide which of the four categories best fits each question and make a tally mark in the appropriate box of the frequency chart presented below. Your task is to view the videotape and tally the teacher-posed questions on the chart. Types of questions to be identified:

1. **Rhetorical Questions**
   a. Questions for which teacher supplies answer
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2. **Information Recall Questions**
   a. Questions calling for facts read, heard, discussed in class, etc.
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3. **Leading Questions**
   a. Questions looking for "right answer"
   b. Questions which contain the answer
   c. Questions which clearly suggest what the answer is to be
   d. Questions which prescribe a desired approach to developing an answer

4. **Probing Questions**
   a. Open-ended questions which broaden field of consideration for student inquiry
   b. Open-ended questions which structure the *activity* of student inquiry but do not indicate nature or approach to answer
   c. Open-ended questions which invite exploration of relationships

Type of Question	Observed Frequency of Incidence	
	Tally Marks	Totals
1. Rhetorical		
2. Information Recall		
3. Leading		
4. Probing		
	Total Number of All Questions	

Task IV

As a basis for understanding the significance of the frequency chart, we would like you to express the total frequency tally for each type of question as a percentage of the total number of questions asked. Read the following example and then complete columns A and B of the table below.

$$\frac{\text{Number of Information Recall Questions}}{\text{Total Number of All Questions}} = \text{Percent Information Recall Questions}$$

Table A

Relative Percentages of Questions

Type of Question	*Column A* Observed Number of Questions	*Column B* Percent of Questions Desired	*Column C* Percent of Questions Observed
Rhetorical			
Information Recall			
Leading			
Probing			
Totals		100	100

Task V

Look at column B of Table A. Note the relative percentages of types of teacher-posed questions observed from the tape. Refer again to Figure I (under Task II, p.33). Note again the type of thinking which each type of question requires.

Write a short statement or outline summarizing the kinds of thinking demanded of students in the lesson recorded on the videotape. What kind of thinking (or intellectual activity) was most heavily emphasized during the lesson?

Task VI

Refer to your outline of the learning outcomes which you have in mind for this course (Task I). Look again at Figure I (under Task II, p.33). Think again about the kinds of thinking which you asked students to do in the videotaped lesson.

Now – consider the kinds of questions (i.e., kind of thinking) that you *should* be asking of your students in order to achieve more effectively your stated learning outcomes.

Express the results of your consideration by filling in column C of Table A (Task IV). Enter the relative percentages of questions that you think you should be asking in order to develop more complex thinking in your students.

Keep these desired percentage figures in mind when preparing and teaching your next lessons. Remember the relationship between the kinds of questions asked by the teacher and the kind of thinking demanded of students.

Note: Schedule B for the Directed Analysis Procedure instructed the teachers in Group III to repeat Tasks III-VI of Schedule A in analyzing their second videotape.

EXHIBIT 5

DIRECTED ANALYSIS
VERBAL INSTRUCTIONS: SCHEDULE A

Task I

So that we can better understand your use of questioning techniques in the videotaped lesson, we would like to know something about the learning outcomes that you have in mind for your students. Would you complete Task I for us? Before you write the outline we would like you to discuss with us the points that you have in mind. Through discussion you may be able to clarify them. We have provided a scratch pad so that you can keep track of the points you wish to include in your outline.

Task II

Task II involves a bit of reading. We would like you to read the instructions for Task II carefully, as they explain the frame of reference to be used in viewing the videotape.

****

Do you have any questions about any of these instructions?

Task III

Now we would like you to view the videotape made in your classroom. Before we run the videotape we would like you to read the instructions for Task III, as they explain what you are to do while viewing the videotape. Do you have any questions about this task?

Task IV

Before we talk about the videotape, we would like you to do a little arithmetic. It will be easier to discuss the meaning of the frequency chart that you have just made if we convert the raw numbers into percentages. Would you please read the next instructions and then fill out columns A and B of Table A?

For the moment let's disregard column C.

Task V

Task V is similar to Task I in that we would like you to develop an outline. Before you write the outline we would like you to discuss with us the points that you have in mind. By doing so you may be able to clarify your thinking. Use the scratch sheet to keep track of the points you wish to include in your outline.

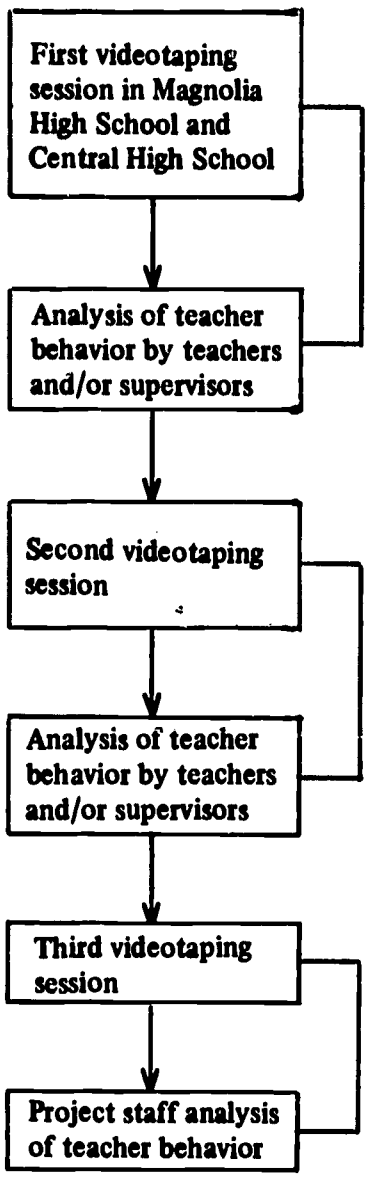
Task VI

Task VI requires you to develop a desirable percentage distribution of types of questions used in teaching. Follow the written directions in thinking through the task and then write your proposed percent figures on a scratch sheet. We would like to discuss the figures and your reasoning before you enter them into column C – Table A.

Note: Verbal instructions for Schedule B of the Directed Analysis Procedure included the verbal instructions pertaining to Tasks III-IV of Schedule A.

EXHIBIT 6

SCHEDULE AND SEQUENCE DIAGRAM



January 26 – February 9, 1967

February 9 – February 23, 1967

February 24 – March 10, 1967

EXHIBIT 7

SUMMARY OF REPORT TO THOMAS COUNTY GEA LOCAL MEETING

Program: Discussion of videotaping as a means of improving classroom teacher techniques, especially in the area of questioning procedures.

A teacher was chosen from each participating group and was asked for reactions to the experiment.

The following comments were noted:

Group I

Three teachers stated that they were disappointed when they found they were in this group. If done again they would rather be in Group III. One teacher stated that she felt it "put her on her toes" as nothing had done since she began teaching. She further stated that she had become more conscious of her daily plans and whether or not she had followed them. One teacher observed that the questioning technique had been completely overlooked by her as to importance and type, but she now saw that her questions were more varied. One teacher stated that she felt a great deal of tension and never felt completely relaxed with the camera in her room.

Group II

This teacher stated she accepted this experiment with great misgivings but was determined to carry through. After the first videotaping, she felt that she was more relaxed and knew that she had become more aware of many phases of teaching. The changes in awareness included:

1. More consciousness of students' image of teacher
2. Awareness of the importance of better planning for instruction
3. Consciousness of questioning technique and its importance
4. Awareness of student reaction and interaction.

She also felt that self-evaluation was a great strain. If she could have chosen a group, she felt she would have received more benefit from Group III.

Group III

A teacher in Group III stated that she:

Felt most benefitted by the guided analysis procedure
Felt little strain
Felt that she viewed the entire teaching process more clearly as a result of the behavioral analysis
Benefitted in various ways from actually seeing herself
Had improved her self-image.

Spontaneous

Comments when passing out questionnaire:

1. Wish we could start all over again.
2. Would have benefitted more from Group III.
3. Felt Group I benefitted least.
4. Felt it was greatest challenge and hardest one experience in teaching.
5. Wish we could see all videotapes of self at one sitting.
6. When will we have some evaluation?

Ursula H. Singletary
Curriculum Director
Thomas County Schools

EXHIBIT 8

SUMMARY OF RESPONSES TO QUESTIONNAIRE ON THOMAS COUNTY TEACHERS' SELF-ANALYSIS PROJECT

This questionnaire is designed to obtain reactions of participants to the videotape experiment conducted in Thomas County. Please be as objective as possible in responding to each question:

Check the group you were assigned to:

A. Standard observation procedure – did not see tapes.

B. Guided self-analysis.

C. Directed analysis.

Rate each question on the scale below:

	Ex.	Very Good	Ave.	Fair	Poor
1. Were instructions clear?	6	19	2	1	1
2. Were tasks clearly understood?	5	16	5	1	1
3. What were classroom reactions of students?	11	10	7	0	0
4. What were your reactions to the videotaping?	6	15	7	0	0
5. What reactions did you have to the post-videotape interviews?	5	7	5	1	0
6. Were tasks meaningful?	5	15	5	2	1
7. Were tasks helpful in developing questioning techniques?	5	16	4	0	3
8. Was time spent on project worthwhile?	9	15	2	0	2
9. Were relations with project staff satisfactory?	17	7	3	0	1
10. What are your overall conclusions about the project?	7	18	1	2	0

Would you volunteer again for further experimentation?

Yes 27 No 1

What areas of teaching behavior would be most helpful in increasing teaching effectiveness?

EXHIBIT 9

UNSOLICITED COMMENTS OF PARTICIPANTS IN THE THOMAS COUNTY TEACHERS' SELF-ANALYSIS PROJECT

Almost all educational innovations are greeted with assorted emotions which run the gamut from outright rejection – to cautious apprehension – to complete acceptance. These were the feelings of teachers at a school involved in the above-named project.

Initially, suspicion was the prevailing attitude. Teachers suspected some unprofessional plot was afoot. Typical comments were as follows:

1. What are "they" trying to prove?
2. Are "they" really interested in what they propose to do?
3. This is an invasion of academic privacy!
4. I'm not interested in participating in the project at all!
5. Unethical spying, I'd say!

After the first videotaping session, however, much of the suspicion and resistance began to subside. Typical comments were as follows:

1. Well, it wasn't so bad!
2. It (self-analysis) just might help to improve instruction.
3. I wasn't conscious of the number of ineffective questions I was asking!
4. I don't believe the project is of any value to me.
5. Oh, that presentation leaves much to be desired.

Before the final session, the suspicion had been dissipated. Most participants were of the opinion that self-analysis is a useful technique in attempting to improve instruction. Typical comments were as follows:

1. Today more than 50 percent of the questions I asked were of the probing kind.
2. I have a deeper understanding of the importance of asking the right kind of question in order to discover the depth of student understanding or the lack of it.
3. My questioning technique has improved tremendously.
4. It (the project) hasn't helped me one iota.

All-in-all, the concensus was that any tangible profit from the project was a positive change in attitude.