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ABSTRACT

This is the sixth study in a project designed to find more effective and efficient ways of using micro-teaching and video recording in programs of vocational teacher education. In this field test of the feasibility and potential applicability of four related feedback and analysis techniques used in an inservice teacher education program for instructors in a technical institute, 28 instructors were assigned to four feedback and analysis groups: (1) self-review, (2) fellow instructor review, (3) student review, and (4) teacher-educator review. Also the study focused on three research questions which were concerned with differences in the effectiveness and feasibility of the feedback techniques and with differences in attitudes toward inservice experience. Analysis of the data revealed no statistically significant differences among the four variations on the instructors' teaching performance. All four techniques were found to be effective and feasible for inservice programs of teacher education in the technical institute setting. (Author/JS)

Research and Development Series No. 60

Assessment of Micro-Teaching and Video Recording in Vocational and Technical Teacher Education: Phase VI--

Feedback Techniques for Inservice Technical Teacher Education

The Center for Vocational and Technical Education
The Ohio State University, 1900 Kenny Road, Columbus, Ohio 43210

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RESEARCH AND DEVELOPMENT SERIES NO. 60

ASSESSMENT OF MICRO-TEACHING AND VIDEO RECORDING IN VOCATIONAL AND TECHNICAL TEACHER EDUCATION: PHASE VI--

FEEDBACK TECHNIQUES FOR INSERVICE TECHNICAL TEACHER EDUCATION

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PREFACE

The Center has been engaged in a series of studies in the project "Assessment of Micro-Teaching and Video Recording in Vocational and Technical Education" to find more effective and efficient ways of using these two techniques in programs of vocational teacher education. This report describes the sixth of the series, a field test of the feasibility and potential applicability of four feedback and analysis techniques used in conjunction with micro-teaching and video recording in an inservice teacher education program for instructors in a technical institute. It is hoped that vocational and technical teacher educators and researchers will find the results of the study useful and interesting.

The study was conducted by The Center through cooperation with the Columbus Technical Institute, Columbus, Ohio. We are indebted to Clinton E. Tatsch, President of the Institute; Harold M. Nestor, Executive Vice-president; and Russell W. Jordan, Director of Education; for their cooperation and assistance in the organization and operation of the field test.

We wish to acknowledge the following persons from The Center for their services in completing the study: Dr. Calvin J. Cotrell, principal investigator; Dr. Charles R. Doty, associate investigator; James L. Hoerner, graduate research associate; and Fred W. Harrington, graduate research associate and coordinator of the study.

Appreciation for the assistance of the following reviewers is also acknowledged: Dr. David Bjorkquist, Associate Professor, Practical Arts and Vocational and Technical Education, University of Missouri; Dr. Frederick K. T. Tom, Professor, Agricultural Education, Cornell University; and Dr. Warren N. Suzuki, Research and Development Specialist, The Center for Vocational and Technical Education, The Ohio State University.

Robert E. Taylor
Director
The Center for Vocational
and Technical Education

FOREWORD

The series of studies in the project, "Assessment of Micro-Teaching and Video Recording in Vocational and Technical Teacher Education," were feasibility tests and demonstration and field tests conducted in collaboration with several vocational teacher education institutions and post-secondary technical institutes. This report presents the results of the sixth study in the series, which was conducted during the Spring of 1969. The investigators believe that those who are interested in developing and testing feedback techniques for teacher education will find these reports helpful.

We wish to acknowledge the outstanding cooperation of the staff at the Columbus Technical Institute, who served as instructors or fellow instructors, and the students at the Institute who volunteered to participate in the study. We are indebted to Dr. Ivan E. Valentine, from The Center for Vocational and Technical Education, who served as the teacher educator in the study.

Recognition is due also to the members of the panel of judges, Willis Bauer and Leon Linton, assistant supervisors of the Division of Vocational Education, State Department of Vocational Education, State Department of Education, Columbus, Ohio, for their valuable assistance in rating the videotaped teaching sessions.

The investigators are most appreciative of the encouragement and administrative support of this effort provided by the director of The Center, Dr. Robert E. Taylor; the coordinator for project utilization and training, Dr. Aaron J. Miller; and the coordinator of research, Dr. Edward J. Morrison. The assistance of a consultant, Dr. Dorothy C. Ferguson, in manuscript revision and synthesis of reviews, is gratefully acknowledged. We also appreciate the assistance of the many supporting personnel of The Center and particularly the editorial director, John Meyer, and his staff.

Calvin J. Cotrell
Charles R. Doty
Fred W. Harrington

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SUMMARY

In view of the need for effective and efficient teacher education programs for personnel in technical education, this study was designed to test and compare the feasibility and potential applicability of four methods of feedback and analysis in conjunction with micro-teaching and video recording in an inservice teacher education program for instructors in a technical institute.

Twenty-eight instructors at Columbus Technical Institute were randomly selected and assigned to the four feedback and analysis groups: self-review, fellow instructor-review, student-review, and teacher educator-review. The study focused on three research questions which were concerned with differences in the effectiveness and feasibility of the feedback techniques and with differences in attitudes toward the inservice experience.

The study was based on a pretest/posttest control-group design and included three data-gathering instruments: two critique forms and an opinionnaire. A panel of judges' ratings on the critique forms of the instructors' first and last teaching sessions were analyzed through a "t" test and tests of analysis of variance and covariance; opinionnaire data were compared by computing chi-square tests.

There were no statistically significant differences found in the effectiveness of the four variations of feedback and analysis techniques on the instructors' teaching performance. The four feedback and analysis techniques were found to be effective and feasible for inservice programs of teacher education in the technical institute setting. The instructors who participated in the self-review group held significantly positive attitudes toward their experiences, and the fellow instructor-review group was generally negative in attitude.

Recommendations were made to incorporate the various feedback and analysis techniques in an inservice teacher education program designed with modifications based on the needs and capabilities of the particular technical institute and the instructors involved.

ASSESSMENT OF MICRO-TEACHING AND VIDEO RECORDING IN VOCATIONAL AND TECHNICAL TEACHER EDUCATION: PHASE VI--

FEEDBACK TECHNIQUES FOR INSERVICE TECHNICAL TEACHER EDUCATION

CHAPTER I

BACKGROUND OF THE STUDY

Teacher education is an issue of prime concern to technical ducators. A California study of technical education stressed he importance of teacher training, academic training, and indus- rial experience (Wood, 1959). A similar publication advocated he learning of efficient and effective teaching methods as a eneral technical teacher requirement (Emerson, 1962). The writers f *Technical Education*, a British publication (1964), emphasized hat the quality of teaching in technical education was equally mportant to the quantity of material taught. In speaking of the mportance of pedagogy to the technical teacher, Henninger (1959) tated that the desired attributes of a technical institute faculty ere of two types: 1) knowledge and subject matter of technologies nd 2) performance of the teaching function. Though the combina- ion was desired, if forced to choose, Henninger added, institu- ions would prefer a candidate with industrial experience, hoping o provide the pedagogy on the job.

Providing this inservice training in the most effective and fficient manner is, then, a concern for technical educators. ecent innovations such as micro-teaching and video recording are ossible sound solutions. Allen (1967) described micro-teaching s a new framework for inservice education, the advantage being ts ability to provide teachers, in a short time, with information bout their teaching and to act as a means of changing teachers' erceptions about their teaching behavior.

HE SERIES OF STUDIES

The Center for Vocational and Technical Education has been ngaged in a series of studies to assess the use of micro-teaching nd video recording in programs of vocational teacher education. ive previous studies were conducted to test the feasibility of ideo recording as a feedback device in teacher education and in- luded variations on micro-teaching, learner populations, and valuation instruments. Sixth in the series, the present study rew upon the techniques, instruments, and outcomes of the prior tudies and was designed as a field test of these innovations in post-secondary technical institute.

PURPOSE OF THE STUDY

In view of the need for effective and efficient teacher education programs for personnel in technical education, the study was designed to test and compare the feasibility and potential applicability of four methods of feedback and analysis in conjunction with micro-teaching and video recording in an inservice teacher education program for instructors in a technical institute. Specifically, the study was concerned with video feedback and the following four variations in techniques of analysis: self-review, fellow instructor-review, student-review, and teacher educator-review.

RESEARCH QUESTIONS

The following three questions were formulated for investigation:

1. Are there any differences in the effectiveness of the four variations of feedback and analysis techniques--self-review, fellow instructor-review, student-review, and teacher educator-review--on the instructors' teaching performance?

2. How will the instructors involved in each of the four variations of feedback and analysis techniques differ in attitudes and opinions regarding their experiences?

3. To what degree will the four variations of feedback and analysis techniques be feasible, in terms of improvement of teaching skills and practicality of operation, for a program of inservice teacher education in a post-secondary technical institute?

REVIEW OF RELATED LITERATURE

Inherent in the framework of micro-teaching and video recording for teacher education is the concept of evaluating or providing immediate feedback for each teaching session. There are a number of techniques which have been developed for use within the feedback dimension. Allen and Ryan (1969) described the expanded possibilities of micro-teaching in that feedback from any one of several sources--supervisor, colleague, self, or student--can be quickly translated into practice when the teacher reteaches the practice lesson.

A survey of the research on techniques of feedback revealed a number of studies in general elementary and secondary teacher education which incorporated some of these forms of feedback and

analysis, with and without the use of video recording. A Stanford University study on micro-teaching without video recording used students to rate the total teaching performance and concluded that student ratings were more stable than other types of evaluations (Allen, 1967). Another study used students to do the rating and to develop the rating form, considering students a reliable source for evaluating a teacher's instructional effectiveness since they are direct and daily participants in the act of learning and have had a good deal of exposure to varying degrees of teacher competence (Aubertine, 1964).

Tuckman and Oliver (1968) conducted a vocational teacher education study of the effectiveness on teaching performance of student and supervisor feedback, without video recording. They found that the group which received only student feedback did significantly better than the group receiving no feedback at all. The group which received only supervisor feedback, however, did significantly poorer than the no-feedback group; and teachers in the group receiving both types of feedback did only as well as the group receiving student feedback. In contrast, Pinney and Miltz (1968), in a study of supervisor feedback with video recording, reported that the supervisors were found to increase their ability to change subsequent recorded teacher behavior.

Working with student teachers and supervisor feedback, Joyce (1967) concluded that although students and teachers could lead feedback sessions without negative effects on content, the supervisors actually needed extensive training in order to provide adequate feedback.

Another study which employed the self feedback technique found no significant change with self-feedback alone, more change when self-feedback was reinforced by the experimenter, and even greater change when the reinforcement included response cues (McDonald, *et al.*, 1966).

The Far West Laboratory for Educational Research and Development has developed a minicourse teacher training program, employing micro-teaching, video recording, and instructional and model illustrations (Borg, 1968). Borg advocates self rather than supervisor feedback in the minicourse model because it does not restrict the use of the program to school districts with highly trained supervisory personnel. In a report on the degree of practice and feedback used with the minicourse program, it was concluded that the groups that completed the entire program produced more and greater behavioral changes than did the groups for which some part of the program had been omitted (Borg, *et al.*, 1968).

CHAPTER II

PROCEDURES IN THE STUDY

At the time the study was being planned, the administration and staff at the Columbus Technical Institute were interested in developing an inservice training program for their instructors. It was decided to take this opportunity for a realistic setting and a mutually beneficial endeavor by designing and conducting the study in cooperation with the staff of that institution. Therefore, the study took place at Columbus Technical Institute as part of a program of inservice teacher education during a six-week period in early Spring 1969.

PARTICIPANTS IN THE STUDY

The participants in the study included instructors and students at Columbus Technical Institute and staff members at The Center for Vocational and Technical Education.

Instructors. From the teaching staff at the Institute, 28 instructors were randomly selected and assigned to one of the four feedback and analysis groups. (Information on the instructors' years of teaching and industrial experience, along with degrees earned, may be found in Appendix A.)

Fellow instructors. Selected from the Columbus Technical Institute teaching staff, seven additional instructors served as reviewers of the micro-teaching sessions in the fellow instructor-review feedback and analysis group. (See Appendix A for background information on the fellow instructors.)

Students. Members of the Columbus Technical Institute student body volunteered to serve as students in the micro-teaching sessions. Four students were assigned to each session and were rotated so that each instructor taught a different group for each lesson.

Teacher educators. A staff member at The Center for Vocational and Technical Education participated in the study as the reviewer of the micro-teaching sessions in the teacher educator-review feedback and analysis group. The teacher educator's professional background included several years of local and state leadership experience in technical education.

In addition, an Instructional Improvement Committee, composed of one instructor from each feedback and analysis group, the coordinator of the study from The Center, and the director of education at the Columbus Technical Institute, was formed to coordinate the operation of the program. The committee was involved in the selection and assignment of the students and fellow instructors in the study and served as a liaison between the staffs at the Institute and at The Center.

FEEDBACK AND ANALYSIS GROUPS

The treatment groups in the study varied according to the feedback and analysis technique used to evaluate teaching performance. The four groups were:

Self-Review--instructor viewed the replay of his videotaped micro-teaching lesson by himself and used the critique form to analyze the lesson and suggest possible improvements.

Fellow Instructor-Review--fellow instructor viewed the replay of the videotaped micro-teaching lesson with the instructor and they jointly analyzed the lesson, using the critique form and suggesting possible improvements.

Student-Review--students viewed the replay of the videotaped micro-teaching lesson with the instructor and they jointly analyzed the lesson, using the critique form and suggesting possible improvements.

Teacher Educator-Review--teacher-educator viewed the replay of the videotaped micro-teaching lesson with the instructor and they jointly analyzed the lesson, using the critique form and making suggestions for improvements.

EXPERIMENTAL DESIGN

The study was based on a pretest/posttest control-group design (Campbell and Stanley, 1963). The 28 instructors who participated in the study were randomly selected and divided into the four groups by a stratified random assignment based upon years of experience and formal education (See Appendix A). Each of the four groups was randomly assigned to a feedback and analysis technique (See Figure 1). The fourth technique (teacher educator-review) represented the conventional feedback approach and served as the control group in the study.

R	O_1	X_1	O_2
R	O_3	X_2	O_4
R	O_5	X_3	O_6
R	O_7	X_4	O_8

R = randomization of groups to techniques.

O_1, O_3, O_5, and O_7 = the pretest, consisting of evaluation of the initial videotaped micro-teaching lesson taught by each instructor.

X_1, X_2, X_3, and X_4 = the four feedback and analysis techniques.

O_2, O_4, O_6, and O_8 = the posttest, consisting of evaluation of the final videotaped micro-teaching lesson taught by each instructor.

Figure 1. Experimental Design

CONDUCT OF THE STUDY

Through orientation meetings with each feedback and analysis group, the coordinator of the study explained the program to the instructors. Instructors were supplied with a handbook which explained their roles in the program and included schedules and other assignments. The study was conducted at the Columbus Technical Institute, utilizing two rooms equipped with a chalkboard, a podium, four chairs, and a Shibaden SV-700 (1/2 inch) video recording system. The recorders were used to tape and play back the micro-teaching lessons and to play the instructional and model videotapes. All the instructors learned how to use and operated the equipment themselves. Two of the 28 instructors selected for the study were unable to complete all phases and were not included in the data collection.

Each instructor taught 10 micro-teaching lessons on topics from his own subject area. Each lesson was five minutes long and was a complete lesson in that it contained an introduction, presentation, application, and evaluation. A full micro-teaching session required approximately 50 minutes for the five-minute micro-teaching lesson, playing back the videotape of the lesson, reviewing and analyzing the lesson with the critique form, and viewing ensuing instructional or model videotapes.

The instructional and model videotapes chosen for use in the study by the Instructional Improvement Committee concentrated on two of the teaching skills involved in a complete lesson: introducing a lesson and oral questioning. The critique forms, one for each of the two teaching skills, had been developed and tested in earlier studies in this series (See Appendix B). The two instructional videotapes explained the teaching skill, provided examples of teaching behaviors, and explained each item on the appropriate critique form. The seven model videotapes used in the study also provided additional examples of each teaching skill.

In keeping with the experimental design of the study, the first and last of the micro-teaching lessons served as the pretests and posttests, respectively. In the second through the fifth lessons, the instructors practiced the first teaching skill, introducing a lesson. Lessons six through nine concentrated on the second skill, oral questioning. Figure 2 presents the plan of operation of the 10 micro-teaching sessions.

MICRO-TEACHING SESSION	OPERATION
First	Plan Lesson 1...Teach (Pretest) View Skill One Instructional Tape--Introducing a Lesson
Second	Plan Lesson 2...Teach...Video Review and Analysis...View Model Tape 1
Third	Replan Lesson 2...Reteach...Video Review and Analysis...View Model Tape 2
Fourth	Plan Lesson 3...Teach...Video Review and Analysis...View Model Tape 3
Fifth	Replan Lesson 3...Reteach...Video Review and Analysis...View Skill Two Instructional Tape--Oral Questioning
Sixth	Plan Lesson 4...Teach...Video Review and Analysis...View Model Tape 4
Seventh	Replan Lesson 4...Reteach...Video Review and Analysis...View Model Tape 5
Eighth	Plan Lesson 5...Teach...Video Review and Analysis...View Model Tape 6

Continued

Ninth	Replan Lesson 5...Reteach...Video Review and Analysis...View Model Tape 7
Tenth	Plan Lesson 6...Teach (Posttest)

Figure 2. Plan of Operation for 10 Micro-Teaching Sessions

Measurement Instruments. Three measuring instruments were used to collect the data for the study, the two critique forms and an opinionnaire.

Designed to measure the teacher's ability in the teaching skills (introducing a lesson and oral questioning), each critique form contained 11 questions and included ratings on whether the teacher did or did not accomplish each task and on the degree of accomplishment. The scores on the two scales ranged from 0-1 on the accomplished scale (0 = did not accomplish, 1 = did accomplish) and 0-5 on the degree of accomplishment scale (0 = did not accomplish, 1 = very poor, 2 = poor, 3 = average, 4 = good, 5 = excellent). Consequently, the raw scores used in the statistical analyses had a range of 0-11 on the accomplished scale and 0-55 on the degree of accomplishment scale.

The instructors, fellow instructors, students, and teacher educator used the critique forms. In addition, an independent two-member panel of judges used the forms to rate the videotape recordings of each instructor's first and tenth (last) micro-teaching lessons to provide the pretest and posttest data.

At the end of the study, each instructor was asked to complete the opinionnnaire (See Appendix C). The 14-item instrument was designed to provide the instructors with the opportunity to evaluate their experiences in the program.

Panel Rating Procedures. A two-member panel of judges was selected to evaluate the videotapes of each instructor's first and last micro-teaching lessons. Both judges had teacher education and supervisory experience in vocational education and held a master's degree. An orientation session was conducted to familiarize the judges with the study and the use of the critique forms in order to achieve high inter-rater reliability. The panel viewed, analyzed, and discussed videotapes of micro-teaching lessons similar to those performed in the study. Once the two judges' ratings consistently agreed with one another and with those of previous raters, they judged the videotaped lessons in the study. To eliminate possible bias in ratings by the panel, the videotapes were played in random order so that the judges were unaware of whether the tapes were recordings of first or last micro-teaching lessons.

Winer's one-way analysis of variance was used to test inter-rater reliability between the two judges' ratings for both the first and last micro-teaching lessons (Winer, 1962). The inter-rater reliability correlation coefficients for the pretest and posttest ratings (the videotapes of the first and last micro-teaching lessons) for the "introducing a lesson" skill were .94 and .89 on the accomplished scale and .93 and .83 on the degree of accomplishment scale, respectively. For the "oral questioning" skill, the inter-rater reliability correlation coefficients on the pretest and posttest ratings were .98 and .97 on the accomplished scale and .98 and .95 on the degree of accomplishment scale, respectively (See Appendix D, Table 1).

PROCEDURES FOR DATA ANALYSIS

The data for testing the null hypotheses posed by the three research questions (p. 4) were collected from the panel of judges' ratings on the two critique forms and from the instructors' responses on the opinionnaire. To determine differences in the effect on the instructors' teaching performances of each of the four feedback and analysis techniques, the panel's ratings on the accomplished and degree of accomplishment scales for each of the two teaching skills and for the combined ratings on the two skills were compared. Tests of analysis of variance and covariance were computed, using the BMDO7V and BMDO4V Biomedical Computer Programs (Dixon, 1968). Decisions of whether or not to reject the null hypotheses were made at the .05 level of significance.

Comparison of the four feedback and analysis groups on the responses to the opinionnaire were made by tallying "yes" and "no" responses and computing chi-square tests (Siegel, 1956).

In addition, a paired "t" test was calculated on the pretest and posttest teaching performance ratings to determine the feasibility of each of the four feedback and analysis techniques (Golhar, 1968).

CHAPTER III
RESULTS OF THE STUDY

The results of the data collection and analysis are presented in this chapter. Included are the findings relative to the effects of each of the four feedback and analysis techniques--self, fellow instructor, student, and teacher educator--on the instructors' teaching performance; the attitudes of the instructors regarding their experiences; and the feasibility and practicality of each of the feedback techniques for a post-secondary technical institute.

EFFECTS ON TEACHING PERFORMANCE

The first research question in the study, which dealt with the differences in the effectiveness of each of the four feedback techniques on the instructors' teaching performances, was stated as a null hypothesis and tested by means of analyses of variance and covariance. An analysis of variance/multiple range test was first computed on the pretest data--the panel's ratings on the critique forms of the instructors' first videotaped micro-teaching lessons--to insure that the pretest data fell within the limits of variance required for the subsequent analyses of covariance. The test was computed on the pretest mean raw scores of both scales, accomplished and degree of accomplishment, for each of the teaching skills and for combined mean raw scores on the two skills (Dixon, 1967). Since no significant differences were found among the four feedback and analysis groups, the pretest data were considered suitable as covariates for the analyses of covariance (See Appendix D, Tables 2 and 3).

A series of six analyses of covariance were performed on the posttest data with the pretest as the covariate to determine if there were any differences among the four feedback and analysis groups on the accomplished and degree of accomplishment scales on the two critique forms. No significant differences in effectiveness on teaching performance were found to exist among the four feedback and analysis groups on either of the scales (See Appendix D, Tables 4 and 5).

ATTITUDES TOWARD THE EXPERIENCE

The second research question in the study, which concerned the differences in the instructors' attitudes toward their experiences, was stated in null hypothesis form and tested by means of chi-square analyses. The source of the data was the opinionnaire completed by the instructors at the end of the 10 micro-teaching sessions. The opinionnaire returns for the groups were as follows: self-review group, five out of six; fellow instructor-review group, three out of six; and student-review and teacher educator-review groups, four out of seven. The 14-item opinionnaire contained 25 yes/no responses; these were tallied and analyzed to determine if the four groups differed in their attitudes toward their experiences.

Chi-square computations of yes/no responses for all respondents revealed that significant differences existed in only the self-review and fellow instructor-review groups. A closer inspection of the group yes/no responses indicated that the self-review group had significantly more "yes" responses and the fellow instructor-review group had significantly more "no" responses (See Appendix D, Table 6).

FEASIBILITY OF THE FEEDBACK TECHNIQUES

Decisions about the feasibility and practicality of the four feedback and analysis techniques for inservice teacher education programs in a post-secondary technical institute were based on the results of the analyses made for the first two research questions and the results of an analysis of gain from pretest to posttest in teaching performance ratings.

The third research question, then, was stated in null hypothesis form and tested by means of a paired "t" test computed on the mean raw scores on the degree of accomplishment scales of the two critique forms. Only the scores on the degree of accomplishment scale were used because this scale incorporated both sets of scores in that if an instructor had not accomplished the particular task, there would have been no degree of accomplishment to measure (See Appendix B). The results of the "t" test indicated that significant gain in scores on teaching performance occurred for the self-review group when the scores on both critique forms were combined, for the fellow instructor-review group on the critique form for oral questioning and when the scores were combined, and for the teacher educator-review group on the oral-questioning critique form and when the scores were combined (See Appendix D, Table 7). In addition, a comparison of the mean raw scores for each group for each teaching skill, as reported in Table 7, showed that all four groups experienced some gain in teaching performance ratings in both teaching skills.

To complete the analysis of the data and arrive at conclusions about feasibility and practicality, the instructors' comments and responses on the opinionnaires were closely evaluated to determine how the groups felt about and reacted to the different items on the form. The self-review group, which registered significantly more positive reactions on the total form, had generally positive feelings about future use of video recording techniques in their teaching, the value of videotape feedback, volunteering for the workshop, participating in future inservice programs, and serving on committees to organize and operate such programs; and they felt that their experiences had caused change in their teaching. The group unanimously reported that the five-minute micro-teaching session was impractical because it was too short, and they generally did not recommend the self-review feedback and analysis technique for future inservice programs.

The fellow instructor-review group, which had a significantly more negative reaction to the experience, generally indicated that their students were responsive to their micro-teaching lessons. This group also did not like the five-minute time limit, did not want to participate in future inservice programs or serve on committees, did not find the seven model videotapes valuable, and did not recommend the fellow instructor-review feedback and analysis technique for future inservice programs.

The student-review group, which had a generally mixed reaction to the experience, indicated that they favored the use of video recording equipment in their teaching and would participate in future inservice programs and serve on committees. They found the orientation session and the handbook of value and felt their students were responsive in the sessions. This group unanimously agreed that the five-minute micro-teaching session was too short; they also indicated that the instructional and model videotapes and the playback of their own teaching sessions were not valuable to them.

The teacher educator-review group, which also had a mixed reaction to the experience, tended to agree on four of the issues. They had positive attitudes toward the orientation session and handbook, the responsiveness of their students, and the playback of their teaching sessions. They did not find the instructional and model videotapes useful in their teaching.

In a look at the reactions from the combined groups on individual items, the four feedback and analysis groups generally had favorable attitudes toward the students' responsiveness and the adequacy of the orientation session and handbook and toward participating in similar future programs. Both the five-minute time limit and the instructional and model videotapes received generally unfavorable responses from the respondents. From the comments made it was noted that the quality of the reproductions

of the instructional and model videotapes was a serious deterrent to effective utilization. On all other items, reaction was mixed.

SUMMARY OF MAJOR FINDINGS

1. No significant differences were found among the four feedback and analysis techniques in terms of their effectiveness on the instructors' teaching performance ratings.

2. Differences in opinions and attitudes regarding their experiences were found among the four feedback and analysis groups. The self-review group held generally positive attitudes toward the program, and the fellow instructor-review group was generally negative in attitude.

3. All four groups experienced some gain in teaching performance ratings in both teaching skills. However, significant gain in the degree of accomplishment ratings of teaching performance occurred on the oral-questioning critique form for the fellow instructor-review group and the teacher educator-review group.

CHAPTER IV

CONCLUSIONS AND RECOMMENDATIONS

As part of the series of studies conducted at The Center for Vocational and Technical Education to assess micro-teaching and video recording in vocational and technical teacher education, the study reported here was designed as a field test, at Columbus Technical Institute, to determine the feasibility and potential applicability of the four feedback and analysis techniques in conjunction with micro-teaching and video recording in an inservice teacher education program for post-secondary instructors.

The following conclusions and recommendations were based upon the results of the data gathering and statistical analyses and the insight and reactions of those who conducted the study.

CONCLUSIONS

1. Although there were no significant differences in the performance of the teachers experiencing the four feedback and analysis techniques, each was an effective and feasible method of improving selected teaching skills in the inservice teacher education program for the cooperating technical institute.

2. The type of feedback and analysis technique employed tended to affect the instructors' attitudes toward their inservice educational experiences.

3. The reproductions of the videotapes used in the inservice program were not of sufficiently high technical quality to serve as models for the instructors of the cooperating technical institute.

RECOMMENDATIONS

1. An inservice teacher education program should be continued at Columbus Technical Institute. This program should include the use of micro-teaching and video recording, with modifications determined by the Institute's individual needs and capabilities.

2. Participants in the teacher education program should have the opportunity to choose and experiment with the available feedback and analysis techniques to determine which provide comfortable and effective means of improving teaching skills.

3. Intensive training in the concepts of micro-teaching and video feedback should precede the use of these techniques in an inservice program.

4. High quality instructional and model videotapes should be obtained for the program, along with adequate video recording equipment and facilities.

5. Personnel serving in the fellow instructor's role should be selected from the ranks of inservice program participants who would tend to have sensitivity to the feelings of their peers.

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GLOSSARY OF TERMS

Complete lesson. An act of teaching incorporating the four steps of instruction: introduction, presentation, application, and evaluation.

Instructor. In the context of this study, a member of the teaching staff at Columbus Technical Institute who participated in the study as a teacher or served as a reviewer of a colleague's micro-teaching lessons.

Micro-teaching. A scaled-down teaching session, five to 10 minutes of teaching to four or five students, in which the teacher participates in the full sequence of the micro-teaching cycle: plan, teach, critique (feedback), replan, reteach, critique.

Skill of introducing a lesson. Setting the stage for student participation in the activity which is to follow by inspiring the student to want to accomplish the objectives of the lesson.

Skill of oral questioning. The effective use of questioning by the instructor to increase student freedom of action, afford more opportunities for expression of student ideas, and make the student less dependent on the instructor.

Video feedback. The procedure used in the study which involved preparing videotape recordings of all micro-teaching lessons to provide opportunities for all reviewers to view a replay of the teaching session during the critique and analysis portion of the micro-teaching cycle and to evaluate change in teaching performance.

APPENDIX A
DATA ON INSTRUCTORS AND FELLOW INSTRUCTORS

DATA ON INSTRUCTORS AND FELLOW INSTRUCTORS

Subject Taught	Degrees Earned	Years of Teaching Experience	Years of Industrial Experience
Self-Review Feedback Group			
Mathematics	B.S.	1	0
Physics	B.S.	1	10
Aviation & Communications	B.A.	32	5
Business Data Processing	B.Sc., M.Sc.	1	9
Food Processing	B.S., M.S.	5	12
Business Data Processing	Assoc.	3	2 1/2
Aviation	F.A.A. Certificate	3	13
Fellow Instructor-Review Feedback Group			
Business Management	B.Sc.	4	29
Food Service	B.A.	1	2
Civil Engineering	B.S.	3	30
Horticulture	B.S., M.A.	3	5
Mechanical & Metallurgical Engineering	B.A., H.Sc.	12	16
Business Data Processing	Assoc.	10	5
Aviation	F.A.A. Certificate	1	15
Student-Review Feedback Group			
Mechanical Engineering	Assoc.	5	16
Electronics Engineering	None	8	8
Communication Skills	B.S.	5	13
Architectural Drafting	B.S.	3	16
Physics	B.A.	1	22
Wholesale Mid-Management	B.S., M.A.	6	16
Chemical Engineering	B.Sc., M.S.	4	3
Teacher Educator-Review Feedback Group			
Business Management	B.F.A.	1	11
Aviation	F.A.A. Certificate	2 1/2	13
Mathematics	B.S.	5	22
Consumer Finance Mid-Management	B.S.	1	14
Business Management	B.S.	4	2
Printing Mid-Management	B.S., M.S.	3	1
Chemical Engineering	B.S.	6	6

Subject Taught	Degrees Earned	Years of Teaching Experience	Years of Industrial Experience
Fellow Instructors			
Architectural Drafting	B.A.	5	22
Business Management	B.S., M.Litt.	6	12
Retail Mid-Management	B.S., M.A.	7	10
Electronic Engineering	B.S.	5	22
Aviation	B.Ed., M.Ed.	4	0
Mathematics	B.S., M.Ed.	7	3
Mathematics	B.A.	4	22

APPENDIX B
CRITIQUE FORMS

INTRODUCING A LESSON

ORAL QUESTIONING

Instructor's Name _____ / Number

Date _____ / Teaching Session

Rater (Check one):

Teacher Educator ___ Self ___

Fellow Instructor ___ Student ___

Panel ___

INTRODUCING A LESSON
CRITIQUE FORM

The introduction phase of a lesson "sets the stage" for student participation in the activity which is to follow. The introduction should help inspire the student to want to accomplish the objectives of the lesson.

Use the following items to evaluate the lesson. If the teacher did not accomplish an item, place an X in the first column under "Did Not Accomplish." If the teacher did accomplish the item, place an X in the column which describes how well he "Accomplished" it.

	HOW WELL ACCOMPLISHED				
DID NOT ACCOMPLISH	VERY POOR	POOR	AVERAGE	GOOD	EXCELLENT

Did the teacher in the Introduction:

1. State specifically what the objective/s of the lesson were in terms of student behavior?
   (For example: Did the teacher tell the students that they would be able to write, speak, list, identify, compare, solve, construct, contrast, etc.?) — — — — — —

2. State why the objective/s were important in terms of student needs?
   (For example: Did the teacher state that the objective was important for the students to learn because of safety reasons, a future job, greater skill development, etc.?) — — — — — —

3. State how the students would proceed in accomplishing the objective/s of the lesson?
   (For example: Did the teacher state what the students were to do in order to learn the objectives of the lesson? Examples are: read certain material, practice using certain tools, solve certain problems, etc.) — — — — — —

	DID NOT ACCOMPLISH	HOW WELL ACCOMPLISHED				
		VERY POOR	POOR	AVERAGE	GOOD	EXCELLENT
4. State how the students would know when they had achieved the objective/s of the lesson? (For example: Did the students know what they should be able to do in order to prove that they had achieved the objective/s of the lesson?)	—	—	—	—	—	—
5. Give sufficient information concerning the lesson so that the students could interpret the objectives in their own terms? (For example: Were the objectives made clear enough that the students could state them without difficulty?)	—	—	—	—	—	—
6. Relate the lesson to the students' prior knowledge or experience? (For example: Did the teacher arouse curiosity and interest in the lesson by relating the lesson to the students' previous knowledge or past experience?)	—	—	—	—	—	—
7. React favorably toward students' questions, answers, and comments? (For example: Did the teacher give attention and consideration to students' questions, answers, and comments?)	—	—	—	—	—	—
8. Provide opportunity for student response and participation? (For example: Did the teacher provide opportunity for the students to ask questions, make comments, or participate in class activities?)	—	—	—	—	—	—

	DID NOT ACCOMPLISH	HOW WELL ACCOMPLISHED				
		VERY POOR	POOR	AVERAGE	GOOD	EXCELLENT
9. Help the students acquire an interest in the lesson? (For example: Did the students want to learn what was to be presented in the lesson?)	—	—	—	—	—	—
10. Express enthusiasm in the lesson? (For example: Did the teacher express enthusiasm by speech and physical gestures and give extra facts or stories concerning the nature or importance of the lesson, etc?)	—	—	—	—	—	—
11. Use instructional aids which helped make the lesson more interesting? (For example: Did the teacher use the chalkboard, charts, drawings, lists, maps, etc.?)	—	—	—	—	—	—

Comments: (What can the teacher do to improve the introduction of the lesson?)

Form developed by the staff of the project, Assessment of Micro-Teaching and Video Recording in Vocational and Technical Teacher Education, The Center for Vocational and Technical Education, The Ohio State University, and adapted for use by Columbus Technical Institute, Columbus, Ohio.

Instructor's Name _____ / Number

Date _____ / Teaching Session

Rater (Check one):

Teacher Educator ___ Self ___

Fellow Instructor ___ Student ___

Panel ___

ORAL QUESTIONING
CRITIQUE FORM

A question is an act or instance of asking. Questioning by the teacher promotes directed mental activity on the part of students and provides opportunity for them to be actively involved in the lesson. The question may be stated in words or may be simply an inquisitive facial expression or gesture. It requires some type of response on the part of the students: stating a fact, recalling a selected thought, making a comparison of two things, making a judgement, analyzing an attitude or appreciation, or directing thought.

The effective use of questioning by the teacher increases student freedom of action, affords more opportunities to express ideas, and makes him less dependent on the teacher.

Use the following items to evaluate the lesson. If the teacher did not accomplish an item, place an X in the first column under "Did Not Accomplish." If the teacher did accomplish the item, place an X in the column which describes how well he "Accomplished" it.

Did the teacher in the Lesson:	DID NOT ACCOMPLISH	HOW WELL ACCOMPLISHED				
		VERY POOR	POOR	AVERAGE	GOOD	EXCELLENT
1. Use questions to draw information from the students?						
2. Ask a question, pause to give the students time to think about the question, and then call on one of them?						
3. After calling on a student, provide an opportunity for him to think about the question before requiring his response? (Before answering the question himself or calling on someone else.)						

	DID NOT ACCOMPLISH	HOW WELL ACCOMPLISHED				
		VERY POOR	POOR	AVERAGE	GOOD	EXCELLENT
4. Present the questions in an order that made sense to the students? (For example: Were the students able to follow the line of thought without getting lost?)	—	—	—	—	—	—
5. Make an effort to keep from repeating the students' answers? (For example: Did the teacher have the students repeat or clarify their own responses if they were not clear rather than automatically repeating the students' responses?)	—	—	—	—	—	—
6. Direct his questions so that each student was able to participate about as often as everyone else?	—	—	—	—	—	—
7. React favorably toward the students' answers to questions? (For example: Did the teacher give attention and consideration to the students' answers?)	—	—	—	—	—	—
8. Ask questions which required more than "yes" and "no" answers? (For example: Did the teacher ask questions which required the students to apply ideas, principles, or facts to new situations?)	—	—	—	—	—	—
9. Ask questions which the students could answer from their past experience?	—	—	—	—	—	—
10. Ask questions which were clear and short enough to remember?	—	—	—	—	—	—

	DID NOT ACCOMPLISH	HOW WELL ACCOMPLISHED				
		VERY POOR	POOR	AVERAGE	GOOD	EXCELLENT
11. Require the students to go beyond their first answers? (For example: Did the teacher encourage the students to expand an idea, back up ideas with facts and illustrations, bring other students into the discussion by getting them to respond too?)	—	—	—	—	—	—

Comments: (What can the teacher do to improve the use of questions in the lesson?)

Form developed by the staff of the project, Assessment of Micro-Teaching and Video Recording in Vocational and Technical Teacher Education, The Center for Vocational and Technical Education, The Ohio State University, and adapted for use by Columbus Technical Institute, Columbus, Ohio.

APPENDIX C
INSTRUCTOR OPINIONNAIRE

INSTRUCTOR OPINIONNAIRE

Please respond to the following questions by circling yes or no and explaining your answer. There are two blank pages at the back of the opinionnaire for additional comments.

1. If videotape recording equipment was readily available to you, would you record portions of your classroom or laboratory sessions?

   YES NO
   Why?

2. Do you consider the five-minute teaching session practical for practicing teaching skills?

   YES NO
   Why?

3. Were the playbacks of your teaching sessions of value in analyzing your teaching?

   YES NO
   Why?

4. The four different types of feedback used in this inservice program were:

   #1. self-analysis
   #2. analysis with the help of a fellow instructor
   #3. analysis with the help of the students
   #4. analysis with the help of a teacher educator.

   a. Would you recommend the type of feedback you received for a future inservice program at the Columbus Technical Institute?

      YES NO
      Why?

b. Would each of the four types of feedback work well with an inservice program at Columbus Technical Institute?

#1. YES NO Why?
#2. YES NO Why?
#3. YES NO Why?
#4. YES NO Why?

c. Which type of feedback do you feel is best for technical instructors?

Circle one: #1 #2 #3 #4

5. Is there any combination of micro-teaching and videotape recording that you feel would be practical for an inservice education program at Columbus Technical Institute?

YES NO
If yes, what is the combination?

6. Seven model tapes on introducing a lesson (following sessions 2, 3 and 4) and oral questioning techniques (following sessions 6, 7, 8 and 9) were included in this inservice program.

a. Did the model tapes on introducing a lesson encourage you to change your teaching?

YES NO
Why?

b. Did the model tapes on questioning encourage you to change your teaching?

YES NO
Why?

7. Two instructional tapes, one on introducing a lesson (following session 1) and one on oral questioning (following session 5), were included in this inservice program.

   a. Did the instructional tape on introducing a lesson encourage you to change your teaching?

      YES NO
      Why?

   b. Did the instructional tape on oral questioning encourage you to change your teaching method?

      YES NO
      Why?

8. Did you feel that the students were responsive to your presentation?

   YES NO
   Why?

9. Did the orientation session in which you received your handbook and schedule adequately explain the inservice program?

   YES NO
   Why?

10. Would you have volunteered to participate in these microteaching sessions if you had not been randomly selected for participation by the Columbus Technical Institute administration?

    YES NO
    Why?

11. Would you volunteer to participate in a similar but improved inservice program?

    YES NO
    Why?

12. Would you be willing to serve on an inservice education committee? (The type of role served by Larry Lance, Paul Hammond, Don Hartshorn, and Wes Wedell)

YES NO
Why?

13. Considering all the factors of this inservice program, has the inservice program caused you to change your teaching?

YES NO
If yes, what specific changes?

14. Did you find the following critique forms helpful in evaluating your teaching?

Introducing a lesson - YES NO Why?

Oral questioning techniques - YES NO Why?

Form developed by the staff of the project, Assessment of Micro-Teaching and Video Recording in Vocational and Technical Teacher Education, The Center for Vocational and Technical Education, The Ohio State University, and adapted for use by Columbus Technical Institute, Columbus, Ohio.

APPENDIX D
TABLES

TABLE 1
INTER-RATER RELIABILITY OF PANEL'S RATINGS

Scale on Critique Forms	Teaching Skill	First Lesson Pretest	Last Lesson Posttest
		r_k*	r_k
Accomplished	Introducing a Lesson	.94	.89
	Oral Questioning	.98	.97
Degree of Accomplishment	Introducing a Lesson	.93	.83
	Oral Questioning	.98	.95

*r_k = Reliability of the use of the mean panel ratings without adjustment for possible differences in panel members' frame of references.

TABLE 2

MEANS AND STANDARD DEVIATIONS OF RAW SCORES OF PANEL'S RATINGS ON CRITIQUE FORMS
PRETEST (FIRST TEACHING SESSION)
(Groups 1 and 2, N = 6; Groups 3 and 4, N = 7)

	Accomplished Scale[a]				Degree of Accomplishment Scale[b]			
	Group 1	Group 2	Group 3	Group 4	Group 1	Group 2	Group 3	Group 4
Skill 1-- Introducing a Lesson								
Means S.D.	3.750 2.505	3.083 1.320	4.071 2.730	2.357 .900	6.417 3.653	7.500 5.630	9.143 6.460	10.357 8.325
Skill 2-- Oral Questioning								
Means S.D.	3.833 4.782	3.583 5.181	5.786 4.636	2.929 4.694	11.250 15.349	9.917 14.630	16.786 13.577	8.286 14.056
Combined Scores on Skills 1 and 2								
Means S.D.	3.792 2.777	3.333 3.061	4.929 3.207	2.643 2.367	8.833 8.420	8.708 8.493	12.964 8.809	9.321 6.837

[a]The accomplished scale has a range of raw scores of 0-11.
[b]The degree of accomplishment scale has a range of raw scores of 0-55.
Group I - Self-Review
Group II - Fellow Instructor-Review
Group III - Student-Review
Group IV - Teacher Educator-Review

TABLE 3
ANALYSIS OF VARIANCE/MULTIPLE RANGE TEST
PANEL'S RATINGS ON CRITIQUE FORMS
PRETEST DATA
(N = 26)

	Accomplished Scale				Degree of Accomplishment Scale			
Skill 1-- Introducing a Lesson								
Source	S.S.	d.f.	M.S.	F*	S.S.	d.f.	M.S.	F*
Between Groups	11.884	3	3.961	.972	59.039	3	19.680	.486
Within Groups	89.655	22	4.075		891.423	22	40.519	
Skill 2-- Oral Questioning								
Between Groups	31.479	3	10.493	.453	282.838	3	94.280	.457
Within Groups	509.685	22	23.168		4539.440	22	206.338	
Skills 1 and 2-- Combined Scores								
Between Groups	19.238	3	6.413	.781	82.849	3	27.616	.419
Within Groups	180.707	22	8.214		1450.653	22	65.939	

*Significant at the .05 level if $\geq$ 3.07.

TABLE 4
MEANS, ADJUSTED MEANS, AND STANDARD ERROR OF MEAN RAW SCORES OF PANEL'S RATINGS ON CRITIQUE FORMS
POSTTEST (LAST TEACHING SESSION)
(Groups 1 and 2, N = 6; Groups 3 and 4, N = 7)

	Accomplished Scale[a]				Degree of Accomplishment Scale[b]			
	Group 1	Group 2	Group 3	Group 4	Group 1	Group 2	Group 3	Group 4
Skill 1--Introducing a Lesson								
Means	4.917	4.917	4.357	4.643	11.500	13.583	10.500	11.786
Adjusted Mean	5.006	4.871	4.512	4.451	11.610	13.635	10.463	11.684
S.E. of Adj. Mean	.776	.773	.730	.739	2.322	2.297	2.124	2.150
Skill 2--Oral Questioning								
Means	8.333	10.167	9.214	10.786	24.583	33.083	27.143	31.500
Adjusted Mean	8.363	10.229	8.986	10.935	24.656	33.408	26.169	32.133
S.E. of Adj. Mean	.912	.913	.861	.851	2.848	2.853	2.690	2.659

Continued

	Accomplished Scale[a]				Degree of Accomplishment Scale[b]			
	Group 1	Group 2	Group 3	Group 4	Group 1	Group 2	Group 3	Group 4
Combined Scores on Skills 1 and 2								
Means	6.625	7.542	6.786	7.714	18.042	22.542	18.821	21.643
Adjusted Mean	6.624	7.546	6.772	7.726	18.203	22.718	18.435	21.739
S.E. of Adj. Mean	.581	.582	.554	.549	1.962	1.964	1.848	1.814

[a]The accomplished scale has a range of raw scores of 0-11.
[b]The degree of accomplishment scale has a range of raw scores of 0-55.
Group I - Self-Review
Group II - Fellow Instructor-Review
Group III - Student-Review
Group IV - Teacher Educator-Review

TABLE 5
ANALYSIS OF COVARIANCE
PANEL'S RATINGS ON CRITIQUE FORMS
(N = 26)

	Accomplished Scale				Degree of Accomplishment Scale			
Skill 1--Introducing a Lesson								
Source	S.S.	d.f.	M.S.	F*	S.S.	d.f.	M.S.	F*
Between Groups	1.405	3	.468	.131	32.746	3	10.916	.347
Within Groups	74.969	21	3.570		660.548	21	31.455	
Skill 2--Oral Questioning								
Between Groups	25.981	3	8.660	1.738	345.152	3	115.051	2.365
Within Groups	104.660	21	4.984		1021.554	21	48.645	
Skills 1 and 2--Combined Scores								
Between Groups	5.538	3	1.846	.913	98.716	3	32.905	1.433
Within Groups	42.479	21	2.023		482.306	21	22.967	

*Significant at the .05 level if $\geq$ 3.07.

TABLE 6
CHI-SQUARE ANALYSIS
OPINIONNAIRE RESPONSES
(N = 16)

Feedback and Analysis Groups:	Responses			Chi-Square Value	d.f.
	Yes	No	Total		
I. (Self)	71	41	112	8.03*	1
II. (Fellow Instructor)	18	39	57	7.73*	1
III. (Student)	42	44	86	.84	1
IV. (Teacher Educator)	42	34	76	.67	1
Total	173	158	331	15.99**	3

*Significant at .05 level, table value of 3.84, with 1 degree of freedom.
**Significant at .05 level, table value of 7.82, with 3 degrees of freedom.

TABLE 7
PAIRED "t" TESTS
PANEL'S RATINGS ON CRITIQUE FORMS
DEGREE OF ACCOMPLISHMENT SCALE
(Groups 1 and 2, N = 6; Groups 3 and 4, N = 7)

Feedback Group	Skill 1--Introducing a Lesson				Skill 2--Oral Questioning				Combined Scores--Both Skills			
	Pretest Mean / S.D.	Post-test Mean / S.D.	t-Value	d.f.	Pretest Mean / S.D.	Post-test Mean / S.D.	t-Value	d.f.	Pretest Mean / S.D.	Post-test Mean / S.D.	t-Value	d.f.
Group I (Self)	6.42 / 3.33	11.50 / 3.86	2.03	5	11.25 / 14.01	24.58 / 11.75	2.14	5	8.83 / 7.69	18.04 / 5.85	2.63*	5
Group II (Fellow Instructor)	7.50 / 5.14	13.58 / 5.26	2.17	5	9.92 / 13.36	33.08 / 2.94	4.12*	5	8.71 / 7.75	22.54 / 3.97	5.10*	5
Group III (Student)	9.14 / 5.98	10.50 / 5.68	.34-	6	16.79 / 12.57	27.14 / 5.85	2.27	6	12.96 / 8.06	18.82 / 4.14	1.47	6
Group IV (Teacher Educator)	10.36 / 7.71	11.79 / 5.10	.47	6	8.29 / 13.01	31.50 / 3.01	4.70**	6	9.32 / 6.33	21.64 / 3.54	4.46**	6

*Significant at .05 level, table value of 2.57.
**Significant at .05 level, table value of 2.44.