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Statistical analysis of the videotape recorder as a feedback device used to train teacher interns produced four conclusions: that videotape feedback to teacher interns did not produce behavioral changes significantly different from those teacher interns who did not receive feedback; that the addition of inputs such as critique and type scripts did not produce behavioral changes significantly different from those teacher interns who received video-audio feedback; that the time interval between treatment sessions did not produce significantly different behavioral changes between teacher interns' initial status and their final status; and that the interaction of treatments and time interval did not produce significant differences between the groups' means. Twenty-five Teacher Corps interns were placed in five groups and were videotaped three times in 20-minute sessions. Each group was given different treatment: video feedback only; video-audio feedback; audio feedback only; video-audio feedback including critique and type script; and no feedback. All of the videotape recordings were coded with the Flanders Verbal Interaction Analysis System by two independent coders. The statistical analysis was accomplished by using a 3x5 Type I Lindquist Analysis of Variance Design. (MM)

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U.S. DEPARTMENT OF
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U.S. DEPARTMENT OF
HEALTH, EDUCATION, AND WELFARE

Office of Education
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THE PROBLEM AND RESEARCH DESIGN

I. BACKGROUND OF THE STUDY

The improving and updating of teacher education programs have been frequent topical subjects in professional education literature. The use of a new and promising technological development, the portable videotape recorder, has been helping professional educators to achieve improvements in the preservice preparation of teachers. Research has shown that videotapes can be used for a variety of purposes in teacher education. The subject of this research study involved the use of videotapes in a preservice teacher education program.

Since the 1930's when Gesell developed the wire screen technique for observing classrooms[1], many methods have been employed to capture a teaching performance to give feedback to the teacher and supervisor during a critique. Some of these methods used for feedback have been audiotape recordings, 35 mm. time lapse photographs, kinescopes, and motion picture films.[2]

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[1]Arnold Gesell, "The One-Way-Vision Screen in Visual Education," Progressive Education, 13:419-21, October 1936.

[2]Dwight W. Allen and David B. Young, "Television Recordings: A New Dimension in Teacher Education," (paper read at the Micro Teaching Clinic, Stanford University, November 1967), p. 1.

In 1962 a new technological device, the videotape recorder, was reaching the operative phase of research and development.[3] In February 1963, according to Allen, the first video recorder delivered to a customer was put into use at Stanford University's experimental education program supported by the Ford Foundation.[4]

During the five-year period from the first use of videotapes in teacher education to the implementation of the research project described in this study, technological improvements in the videotape recorder were substantial. The portability of the video recorder had been increased to the degree that it was then possible to transport with ease a complete videotape unit from the university to the public school classroom and work with teacher-interns during student teaching.

II. STATEMENT OF THE PROBLEM

The purpose of this study was to investigate the use of the videotape recorder as a feedback device for teacher-interns.

Specifically, the study attempted to answer the following questions:

1. Was there any significant measurable change in teacher-interns' behavior after the teacher-interns viewed themselves in a videotaped teaching situation?

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[3] Ibid.

[4] Ibid.

2. Did the effect of the additional inputs of critique and type script complement videotape feedback to produce behavioral change in teacher-interns?

These two questions generated four sub-questions around which this study was designed.

1. Did teacher-interns who did not view their own videotape experience behavioral changes as much as or more than teacher-interns who viewed their own videotapes?

2. Did teacher-interns who received only video feedback while observing their own tapes experience behavioral changes as much as or more than teacher-interns who received video-audio feedback while observing their own tapes?

3. Did teacher-interns who received only audio feedback while listening to their own tapes experience behavioral changes as much as or more than teacher-interns who received video-audio feedback?

4. Did teacher-interns who received only video-audio feedback experience behavioral changes as much as or more than teacher-interns who received video-audio feedback plus a critique plus a type script?

III. NEED FOR THE STUDY

Private industry spends millions of dollars each year on the research and development of technological products for their own use that can also be used by educators to increase their capacity for making educational theory operational in the classroom. If teacher education is to keep pace in this technological era, it must continually conduct experimental research on the new media and their application in an education setting.

With the advent of the portable videotape recorder in 1963, the possibilities of extending the research on the uses of low cost television in the field were greatly enhanced. At the time of the writing of this study, the literature revealed very little in the way of reported substantive research on the use of the videotape recorder with teacher-interns in the public school classroom.

Medley and Mitzel have stated, "Although the ultimate success of teacher education must be measured in terms of pupil learning, a valid intermediate objective of teacher education is to get teachers to exhibit certain prescribed behaviors while they teach."[5] The purposes of this investigation focused on this kind of intermediate objective.

McDonald has defined a communicative act as one in which information is transmitted from an information source to a human recipient.[6] The developers of a paradigm through which a communicative act can be analyzed, Laswell[7] and

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[5] D. M. Medley and Harold E. Mitzel, "Measuring Classroom Behavior By Systematic Observation," Handbook of Research on Teaching (N. L. Gage, ed., Chicago: Rand McNally and Company, 1963), p. 249.

[6] F. J. McDonald, "Motivation and the Communication Process," Audio-Visual Communication Review, 9:57-67, 1961.

[7] H. D. Laswell, "The Structure and Function of Communication and Society," Mass Communication (Wilbur Schramm, ed., Urbana: University of Illinois Press, 1949), p. 143.

Hovland[8], have described five major points of reference germane to communicative processes: (1) who, (2) says what, (3) in what channel, (4) to whom, and (5) with what effects. Lumsdaine has shown the efficacy of using audio-visual equipment to increase the capacity of the transmitting channel by determining that cognitive perceptions generated from hearing and seeing may be more likely to produce desired responses than cognitive perceptions generated from seeing or hearing alone.[9]

It would follow then that video recording's main potential is to provide teacher-interns with immediate feedback, allowing the intern to observe his own behavior introspectively.

The need for this study was to determine whether or not visual and auditory cues from videotapes increased the capacity of the transmitting channel (feedback to a teacher-intern observing his own behavior) to produce behavioral changes.

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[8]C. I. Hovland, "Yale Studies on Communication and Persuasion," Readings in the Social Psychology of Education (W. W. Charters, Jr. and N. L. Gage, eds., Boston: Allyn and Bacon, Inc., 1963), pp. 195-211.

[9]Arthur A. Lumsdaine, "Audio-Visual Research in the United States Air Force," Audio-Visual Communication Review, 2:76-90, 1961.

IV. DEFINITION OF TERMS

The following selected list of terms was chosen to assist readers to understand better the intent of this study.

Teacher-Intern. Members of the University of Houston's Teacher Corps program comprised the sample used for this study. Teacher Corps interns were persons recruited into the education profession who had earned a baccalaureate degree and were in a graduate degree program preparing to work with disadvantaged students.

Behavioral Change. The degree of change in selected verbal teacher behavior from one teaching situation to two subsequent teaching situations was used as the connotation to be applied to this term whenever it was used.

ID Ratio. The quantitative criterion used to measure change in teacher-interns' behavior was a ratio of a teacher's indirect verbal behavior to a combination of his indirect and direct verbal behavior (See FIGURE 8).

Interaction Analysis. The Flanders Verbal Interaction Analysis System (FVIAS) is a procedural technique used to quantify the verbal behavior of teachers and students. When using this system, observers classified verbal behavior in the classroom into ten category designations.

Matrix. A ten row by ten column matrix was used to enter sequences of numbers which represented coded classroom behavior. The use of a matrix made possible the quantification of observed classroom behavior and yielded several data indices which were used for statistical treatment.

Master Teacher. Teacher Corps team leaders were experienced teachers who possessed a masters degree and who had a minimum of five years of teaching experience with the disadvantaged child.

Feedback. The process of allowing a teacher-intern to see or hear his videotaped lesson immediately following the teaching situation was the meaning ascribed to this term whenever it was used in the study.

V. LIMITATIONS OF THE STUDY

Elements which limited the scope and findings reported in this study included the following: (1) limitation of the sample, (2) limitation of the instrument, (3) limitation of the statistical procedure, (4) limitation of coder reliability, and (5) limitation of subject-matter taught by the teacher-interns.

Limitation of the sample. This study was based on a research design using a sample of twenty-five teacher-interns during the spring semester of 1968. The sample varied heterogenously on such common variables as sex, age, and experience. Other factors which contributed to the sample's diversity were differences in the type of institution of higher education from which the teacher-intern earned his baccalaureate degree, differences of geographic origin, differences in academic preparation, and differences in local school assignment. Elements common to the sample were the successful completion of an eight-week Teacher Corps preservice program, the successful completion of twelve graduate hours in education, and the successful completion of five months of teaching in a school whose student population could best be described as educationally and culturally disadvantaged.

Limitation of the instrument. The instrument used in this study to code the verbal behavior of the teacher-interns was the Flanders Verbal Interaction Analysis System (FVIAS). Coding classroom behavior using the FVIAS limited the observer

to recording only the verbal behavior that could be defined as one of the ten category designations of the system.

Limitation of time between groups. Five five-member groups were randomly selected for this study. Each group was randomly assigned an experimental treatment to be administered by this researcher. Administering the treatments to the experimental groups averaged fifteen days per group. Treatment of the first group began in February 1968. The fifth group's treatment began in the middle of May 1968.

Limitation of the statistical procedure. The statistical technique used to test the null hypotheses in this study was a 3x5 Type I Lindquist Analysis of Variance Design.

Limitation of coder reliability. Whenever two independent raters record an observation, the importance of any inference is limited by the degree of agreement between the two raters. Two independent coders were therefore used to code the teacher-interns' tapes. A Scott Index coefficient of reliability of .85 or higher was needed to justify the inferences made from the data analyzation.[10]

Limitation of the subject-matter taught. A majority of the interns taught remedial reading or some type of English language arts content. There were, however, some interns who

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[10]Ned A. Flanders, Teacher Influence, Pupil Attitudes, and Achievement, United States Department of Health, Education and Welfare, Office of Education, Cooperative Research Monograph No. 12 (Washington: Government Printing Office, 1965), p. 28.

taught social studies and science. It was not possible to control the type of instruction given by all interns.

The foregoing limitations serve to suffice as benchmarks against which data inferences can be judged.

VI. RESEARCH DESIGN

The research design used in this study incorporated the use of five five-member groups upon which experimental variables were manipulated.

A table of random numbers was used to randomly assign teacher-interns to a group. The same selection technique was used to assign experimental treatments to the groups. Each member of each group was videotaped three times. Taping sessions lasted twenty minutes each.

The control group's members were taped and coded with Flanders Verbal Interaction Analysis System (FVIAS). This group did not receive any feedback.

Members of Experimental Group One were taped and coded with the FVIAS. This group received immediate video feedback only.

Members of Experimental Group Two were taped and coded with the FVIAS. This group received immediate video-audio feedback.

Experimental Group Three members were taped and coded with the FVIAS. This group received immediate audio feedback only.

Experimental Group Four members were taped and coded with the FVIAS. This group received immediate video-audio feedback plus a critique plus a type script mailed to them prior to their subsequent tape session.

CHAPTER II

SUMMARY OF RELATED RESEARCH AND SELECTED LITERATURE

I. INTRODUCTION

The purposes of this chapter were to report, comment upon, and summarize the substantive research which was germane to the problem of this study. A secondary purpose of this chapter was to document selected publications which were representative of the general type of articles on videotape that appeared in professional education literature.

In addition to the University of Houston Inter-Library Loan Service, the literature reviewed in this chapter were obtained from the following sources: (1) Dissertation Abstracts, (2) Education Index, (3) Data Access To Reference Information: Xerox (DATRIX), (4) Phi Delta Kappa's School Research Information Service (SRIS), (5) Education Resources Information Center (ERIC), (6) University Microfilms, Inc., and (7) Government Printing Office.

II. REVIEW OF LITERATURE

Current Use

One journal article was used to explicate the current use of videotape in teacher education programs because it synthesized in a general overview information related to videotape usage that was found to be only partially reported in other articles.

Cyphert and Andrews have attempted to place the use of videotape in teacher education into a more proper perspective than the current practice of doing what others are doing at "Jones College." They have given the following definitive analysis of the current uses of videotape which showed that video recordings have been used to provide:

1. Observation material for a class or an individual student
2. Immediate private feedback for a student teacher or counselor trainee concerning his performance
3. Evaluation of performance by a supervisor and a trainee
4. Specific preplanned recorded lessons as a basis for methods course instruction
5. Situational materials to be used with simulation procedures or case study analysis
6. Feedback and supervisory analysis prior to immediate replication of performance
7. Both demonstration and feedback in developing specific teaching behaviors
8. Evaluation of teaching performance on a before-and-after or time lapse basis
9. Research analysis of teacher behavior, pupil behavior, or teacher-pupil interaction
10. Instructor-prepared materials for use with Closed Circuit Television, dial access, or film loop independent study activity.[11]

Numbers two, three, seven, and nine were closely associated to the problem of this study.

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[11]Frederick R. Cyphert and L. O. Andrews, "Using the Videotaper in Teacher Education," Audiovisual Instruction, 12:1067-9, December 1967.

Testimonial Reports

An analysis of the literature revealed that a majority of the reports on videotape usage could be classified as testimonial--articles describing how the videotape recorder is used in certain schools. The classification of these articles as testimonial journalism did not demean their value. The intent of these articles was to inform others in the education profession of the unique techniques utilized by the respective institutions. These articles were compiled for use in this chapter.

Ramey has reported the efficacy of using videotape for simulating case-studies to enhance the effectiveness of a workshop at Drexel Institute of Technology.[12] Aden reported that videotape usage at North Texas State University had expanded the scope of that institution's teacher education program by improving public relations between university and local school personnel.[13] The application of videotape as a student instructional tool in industrial arts education has been reported by Friedman.[14] Modern foreign language teachers have used videotape to present pronunciation drills, structure drills,

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[12]James W. Ramey, "Using Video Tape Simulation to Make a Workshop Work," Phi Delta Kappan, 49:525, May 1968.

[13]Robert C. Aden, "Public Relations: CCTV Side Effect," The Texas Outlook, 51:46, November 1967.

[14]Nathan L. Friedman, "Instant Playback in the Shop," Industrial Arts and Vocational Education, 57:34, January 1968.

mood changes, and techniques for dialogue presentation and adaptation.[15] Mobilab, an innovative program for teacher training, was an example of videotape usage in an inservice teacher program in Lane County, Oregon.[16] A general summary of videotape usage by Pensinger reported the use of videotape for adapting mass communication methods to individualized instruction.[17] Ingham has reported the design and use of a multimedia complex in the College of Education, University of Bridgeport.[18] Dettre, at the University of New Mexico, published accounts of a satisfactory summer-term general methods course in secondary education in which videotape recorded-simulated-teaching situations were presented to students.[19] Sister Michel at Marywood College has described the innovative use of a mobile TV-VTR unit which is driven to a school, is used to videotape a lesson, and is then

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[15] "Use of the Videotape Recorder in the Training of Modern Foreign Language Teachers," Audiovisual Instruction, 13:460, May 1968.

[16] Michael D. Dunne and Leroy D. Owens, "Videotape; Teacher In-Service Programs," The Instructor, 77:140-1, March 1968.

[17] Glen Pensinger, "Video Tape Recorders: The Versatile Middlemen," School Board Journal, 155:12, April 1968.

[18] George E. Ingham, "Teacher Preparation Through Multimedia Facilities," Audiovisual Instruction, 12:1054-6, December 1967.

[19] John R. Dettre, "Video Taping Simulated Teaching: A Tool in General Methods," Audiovisual Instruction, 12:693, September 1967.

returned for playback to a group of teacher education students.[20]

Business or Industrial Use

A review of the articles that were listed in the Business Index indicated an increased level of usage of videotape in fields outside of education. Two articles served to explicate this general videotape use in sales training. A new dimension for salesmen of the Microfilm Products Division of the 3M Company has been added because of videotape. The article reported that salesmen had given five minute pre-prepared sales demonstrations and then received video-audio feedback. Although a measuring instrument was not used, the differences in improved selling techniques in subsequent five minute demonstrations were highly noticeable.[21] The second article reported similar practices used by such corporate organizations as Pacific Northwest Life Insurance Co., Pacific Telephone and Telegraph Co., Pitman-Moore Division of the Dow Chemical Co., Olivetti-Underwood Corporation, and Burger Chef Systems, Inc.[22]

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[20]Sister M. Michel, "Teacher Training by Video Tape," Catholic School Journal, 65:30-2, May 1965.

[21]"See For Yourself How You Perform," Sales Management, 97:107-8, pt. 2, September 15, 1966.

[22]"Instant Replay for Selling," The Journal of Business Education, 43:294, April 1968.

Substantive Research Reported in Journal Articles

The following research citations represented empirical research findings reported in various journals and in papers read at various conferences. These articles were included because of their relevance to this study.

Much of the early research utilizing the video recorder emanated from Stanford's use of microteaching in teacher education.[23] Allen and Fortune reported that in a TV feedback versus no feedback design, the trainees in the TV feedback-group had behavioral changes significant at the $p<.05$ level.[24]

The Research and Development Center in Teacher Education, The University of Texas, conducted research on students' openness to environmental feedback.[25] Openness to feedback was defined operationally in terms of categorized filmed teaching behavior, as increases in behaviors such as questioning and decreases in behaviors such as lecturing. Seventy-seven female elementary education majors were assigned to one control

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[23]Dwight W. Allen, "Micro-Teaching: A New Framework for Inservice Education" (a paper read at the Microteaching Clinic, Stanford University, November 1967), p. 1.

[24]Dwight W. Allen and Jimmie C. Fortune, "An Analysis of Microteaching: A New Procedure in Teacher Education" (a paper read at the Microteaching Clinic, Stanford University, November 1967), p. 8.

[25]Francis F. Fuller, Shirley L. Menaker, Robert F. Peck, and Oliver H. Brown, "Influence of Counseling and Film Feedback on Openness to Pupil Feedback in Elementary Teachers Filmed Behavior," The Proceedings, 75th Annual Convention, American Psychological Association, 1967, p. 359.

group and three experimental groups. Each student was tested and filmed before treatment and approximately eighteen months later after student teaching. The film was a fifteen minute, 8 mm. sound film which sampled approximately one hour of each student's teaching in a public elementary school class. Three experimental conditions were imposed: test interpretation counseling (TN), film feedback-test interpretation (FF), and psychological placement-film feedback-test interpretation (PP). To determine whether or not students' behavior had changed, pre- and post-films were quantified using the FVIAS.[26] The behavior of the total group of 77 teachers changed from first to final filming. They lectured less ($F=8.493$, $p<.005$), accepted pupils' ideas more ($F=4.737$, $p<.03$), corrected more ($F=5.122$, $p<.02$), and asked more questions ($F=36.793$, $p<.0000001$). In general, teachers' behavior became more indirect ($F=20.612$, $p<.0001$). Pre-post change differences between experimentals and controls were in the expected direction, but differences were not significant.[27] Increasing the variance between the three imposed treatments might have increased the power of the treatments to produce significant changes in the groups.

Stroller, Lesser, and Freedman postulated and tested the hypothesis that kinescope recordings (prepared in advance)

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[26] Ibid.

[27] Ibid., p. 360.

provided a more effective medium of observation than closed-circuit television and that TV observation was in turn more effective than the traditional procedure of direct observation in the elementary classroom.[28] The experiment utilized the Kinescope Observational Procedure (K), the TV Observational Procedure (TV), and the Direct Observational Procedure (DO). To determine the relative effectiveness of the three observational conditions, two dependent variables were employed upon a sample of 288 female college juniors: information about methods of teaching and ability to analyze and evaluate an observed elementary school lesson. "Information" was measured through an objective examination and "critical evaluation" was measured through an essay examination.[29] Results showed that the objective measure of information about methods of teaching failed to confirm the hypothesis at the $p > .05$ level. The essay examination assessing ability to evaluate an observed classroom lesson critically revealed strong confirmation of the hypothesis at the $p < .05$ level.[30]

Schueler and Gold conducted research at Hunter College on the use of kinescopes for supervising student teachers. Their research design included the following: (1) supervision

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[28]Nathan Stroller, Gerald S. Lesser, and Philip I. Freedman, "A Comparison of Methods of Observation in Preservice Teacher Training," AV Communication Review, 12:177, Summer 1964.

[29]Ibid., p. 186.

[30]Ibid., p. 194.

via personal visitation (O)--the control condition; (2) supervision via the use of kinescopes alone (K); and (3) supervision via a combination of in-person visitation and kinescope recordings (OK). The second and third methods represented experimental conditions.[31] The instrument used to measure change in teacher behavior was OSCAR, Observation Scale and Rating, an instrument developed by Hunter College. No significant differences were found between the control group O and the experimental groups K and OK. There were, however, very small differences favoring K over groups O and OK.[32] Both the Stroller and Lesser study and the Schueler and Gold study failed to compare their observation treatments to a group receiving no observation. This type of comparison would have established a control group against which the experimental groups could have been compared.

Aubertine's research at Stanford clearly showed that to change teacher trainees' behavior, some type of feedback was necessary. His findings showed that trainees who were provided video feedback and an opportunity to practice correcting their mistakes from previous teaching acts performed better at the $p < .01$ level of confidence on subsequent demonstrations than a control group which received neither

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[31] Herbert Schueler and Milton J. Gold, "Video Recordings of Student Teachers--A Report of the Hunter College Research Project Evaluating the Use of Kinescopes in Preparing Student Teachers," Journal of Teacher Education, 15:359, December 1964.

[32] Ibid., p. 362.

video feedback nor the opportunity to practice.[33]

Grant Sponsored Research

A publication by J. Christopher Reid and Donald W. MacLennan who summarized over 350 Office of Education sponsored research studies on instructional television and film was cited in this chapter because of the publication's importance to researchers doing work in the area of educational television, an area closely related to the problem of this study.[34]

Substantive Research Reported in Doctoral Dissertations

A search of several sources which were previously referred to at the beginning of this chapter yielded nine dissertations that were relevant to the problem of this study. Two dissertations have inservice emphasis and seven dissertations had preservice emphasis.

The purpose of Brooks' dissertation at Stanford was to assess the effectiveness of three approaches to an in-service program designed to help teachers modify their classroom behavior. The basic proposition tested was that teachers,

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[33] Horace E. Aubertine, "The Set Induction Process and Its Application in Teaching," The Journal of Educational Research, 61:366, April 1968.

[34] J. Christopher Reid and Donald W. MacLennan, Research in Instructional Television and Film, Department of Health Education and Welfare, Office of Education, Title VII, pt. b, NDEA (Washington: Government Printing Office, 1967).

through critical self-appraisal of their classroom interaction as viewed on videotape recordings, would evidence greater growth in classroom behavior than would teachers who did not see themselves on videotape.[35] The three inservice education programs were based on the following: (1) a program restricted to a study of analysis of teacher classroom behavior and teacher-pupil interaction, (2) a program restricted to teachers viewing their own videotapes of classroom interaction at regular intervals, and (3) a program including both programs one and two.[36] Thirty-six fourth, fifth, and sixth grade teachers in twelve schools serving educationally disadvantaged children in an urban area were randomly assigned to three groups (A=1, B=2, C=1&2) for ten weekly inservice sessions of two hours each.[37] Changes in teacher behavior were determined by analyzing three twenty-minute tapes of each teacher recorded before and after the inservice program. The measuring instrument used was developed by E. Wayne Roberson at the University of Arizona. Roberson's instrument was developed to be used as an analytical tool for teachers who code their own videotapes. The instrument measures cognitive and affective teacher objectives, closed and open

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[35]Elbert Daniel Brooks, "Effect of Alternate Techniques for Modifying Teacher Behavior" (unpublished Doctoral dissertation, Stanford University, 1967), p. 1.

[36]Ibid., p. 2.

[37]Ibid.

teacher methods, and verbal and non-verbal teacher expressions.[38] Brooks' statistical analysis rejected the hypotheses as there were no significant differences between groups.[39] The use of a control group of teachers who would not have received any treatment might have strengthened Brooks' study.

Woolman's research at the University of Houston investigated the effectiveness of videotaped classroom demonstrations to the following: (1) changing instructional practices and viewpoints of teachers, (2) analyzing the results of the videotapes with and without certain supervisory and counseling procedures, and (3) relating the amount of change as seen by trained observers to the amount of change as revealed by an inventory of teacher opinion and understanding.[40] Sixty-six teachers were chosen and assigned to three groups: (1) a control group who did not view the videotapes and received no information, (2) an experimental group who viewed the tapes only, and (3) an experimental group who viewed the tapes and who participated in discussions following each viewing.[41] Members of groups two and three viewed five thirty-minute videotapes (prepared in advance) during a four

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[39] Ibid., p. 121.

[40] Lorraine Woolman, "The Effect of Video-Taped Single Concept Demonstrations in an In-Service Program for Improving Instruction" (unpublished Doctoral dissertation, University of Houston, 1968), p. 9.

[41] Ibid., p. 40.

month period.[42] Observers visited and measured all of the participating teachers before and after the five tapes had been viewed. Woolman accepted the null hypothesis that there was no difference between the three groups.[43] The addition of a fourth group which would have received video-audio feedback of their own teaching rather than attempting to emulate a model-teacher would have provided a comparison which might have produced significant behavioral changes between the groups.

Millett's research attempted to answer two questions. Could videotapes be produced which displayed selected pupil cognitive behaviors desired in secondary school social studies and which also displayed developmentally related teacher behaviors: If produced and used for training purposes, could the videotapes be demonstrated to affect the teaching behavior of social studies intern teachers?[44] Forty-three intern teachers were randomly assigned to four different training groups. All interns received identical classroom materials to use in their experimental lessons. Group one participated in an unstructured discussion of the material they were to teach.

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[42] Ibid., p. 49-50.

[43] Ibid., p. 55-60.

[44] Gregg Baldwin Millett, "Comparison of Four Teacher Training Procedures in Achieving Teacher and Pupil Translation" (unpublished Doctoral dissertation, Stanford University, 1967), p. 3.

Group two was orally instructed on how to use teacher translation tactics. Group three viewed two video tapes showing teachers using translation tactics. Group four was given a combination treatment of groups two and three. After a training session the interns taught an experimental lesson. These lessons were audio-recorded and generated the data for measuring purposes.[45] Statistical analyses showed significant differences at the $p < .05$ level between Group four and Groups two and three.[46] The author noted that the normality assumption upon which the F test is contingent was not fully met; therefore, the significant differences obtained by the statistical analysis were probably not valid.

Kriebs' dissertation at Temple University compared the effectiveness of two types of videotaped instruction for preparing elementary school teachers. Specifically, the study sought to determine if preservice teachers who observed videotapes of elementary school children using scientific methods performed significantly better as science teachers than did preservice teachers who observed videotapes of the traditional lecture-demonstration type without children.[47]

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[45] Ibid., p. 6.

[46] Ibid., p. 84.

[47] Jean Oak Kriebs, "The Effect of Videotaped Elementary School Science Classroom Demonstrations on Science Teaching" (unpublished Doctoral dissertation, Temple University, 1967), p. 6.

A sample group of preservice teachers was selected from Temple University's undergraduate science education students. For six weeks the experimental and control groups observed and taught a lesson in an elementary classroom, observed the respective videotape series, and repeated their teaching experiences. Pre- and post-videotape checklists and pre- and post-tests of science knowledge yielded data which were analyzed to determine the relative effectiveness of the two techniques for teaching science methods to prospective elementary school teachers.[48] Kriebs' statistical analysis accepted the null hypothesis that there was no difference in the two types of videotaped instruction. However, preservice teachers who observed the experimental videotapes tended to increase their rating from their initial status to their final status more than those who observed the control videotapes.[49] Kriebs' research might have shown statistically significant differences between the two groups of science education students if the variance in the two respective treatments had been increased.

Barron's work at the University of Southern Mississippi attempted to ascertain whether or not significant gains in

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[48] Ibid., p. 18.

[49] Ibid., p. 67.

openness would be evident in a selected group of college students who received elementary language arts methods instruction supplemented by microteaching and videotape techniques over a group supplementing instruction by classroom observations and over a group not supplementing instruction.[50] Openness was defined as the extent to which a person can receive, evaluate, and act on relevant information.[51] A Teacher Problems Q-Sort was utilized as a measure of openness.[52] Forty-two students were randomly assigned to three treatment groups--Group One participated in microteaching, Group Two observed classes, and Group Three compiled a non-annotated bibliography.[53] Barron concluded from the statistical analysis that Group One evidenced a positive and significant gain in openness as measured by the Teacher Problems Q-Sort. Groups Two and Three did not experience a significant gain.[54] Although Barron concluded that Group One's pre- to post-test gain was significantly greater than the gain evidenced by either Group Two or Group Three, the F test for the main effect of

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[50] Bennie George Barron, "An Investigation of the Effect of Videotape and Micro-Teaching Technique on Openness" (unpublished Doctoral dissertation, University of Southern Mississippi, 1967), p. 3.

[51] Ibid., p. 6.

[52] Ibid.

[53] Ibid., p. 26.

[54] Ibid., p. 67.

treatments was not significant; therefore, it should have been concluded that the three treatments did not significantly affect the three groups.

Reynolds' Ohio State University study compared the relative change in role concept between a group of science student teachers supervised in the usual manner with a group supervised with videotape recordings.[55] Thirty-nine students were given Corwin's Professional-Employee Orientation Role Concept Scale before and after their student teaching experience.[56] No significant differences were reported between the experimental and control groups relative to the pre-test and post-test scores of the role concept scale.[57] There were, however, ten of the eighteen behavior areas tested that were significant at the $p < .05$ level for those who received video feedback.[58] Reynolds might have limited his study by selecting an instrument that did not discriminate between the criteria established by the hypotheses sufficiently well enough for the differences to be discerned.

Young's research at Stanford attempted to determine the effectiveness of recorded supervisory comments on a video-

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[55]George William Reynolds, "The Usefulness of the Portable Video Recorder in Supervising Student Teachers of Science" (unpublished Doctoral dissertation, Ohio State University, 1966), p. 6.

[56]Ibid., p. 49.

[57]Ibid., p. 81.

[58]Ibid., p. 82.

tape recording of a teacher's own performance.[59] All subjects in the experiment prepared a five-minute lecture. This initial teaching session served as the pre-test from which base-line levels of teaching behavior were derived. The subjects then viewed symbolic model teachers on videotape. The subjects retaught the same lesson two more times. The final teaching episode served as the post-test.[60] The results of the study indicated that a model with a contingent focus (supervisory comments on tape) failed to produce significantly greater differences in teacher behavior than a model with a non-contingent focus.[61] Young's research might have been substantially improved if he had used an instrument for which standardized validity and reliability coefficients had been reported.

Acheson tested empirically the effects on selected behaviors of teachers in training who observed their own teaching via audio-visual recordings during supervisory conferences.[62] Forty-eight teacher-interns were videotaped two

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[59] David Brandon Young, "The Effectiveness of Self Instruction in Teacher Education Using Modelling and Video-Tape Feedback" (unpublished Doctoral dissertation, Stanford University, 1967), p. 1.

[60] Ibid., p. 42.

[61] Ibid., p. 116.

[62] Keith Alan Acheson, "The Effects of Feedback From Television Recordings and Three Types of Supervisory Treatment" (unpublished Doctoral dissertation, Stanford University, 1964), p. 1.

times each for twenty minutes.[63] Treatments were the following:

	Supervisory Treatment		
	Direct	Indirect	None
TV feedback	A	B	C
No TV feedback	D	E	F.[64]

The two criteria measurements were teacher monologue in terms of percent of time and the frequency of episodes of teacher-pupil interaction.[65] Television feedback combined with supervisory conferences, either direct or indirect, produced significantly greater changes in the selected behaviors than supervisory conferences, either direct or indirect, without television feedback. Teacher monologue decreased while frequency of episode data showed no change.[66] Acheson might have increased the power of the main effect treatments if he had used repeated measures on the subjects rather than the pre- post-test model used in his study.

Olivero's study attempted to answer the following three questions; (1) Does feedback from supervisors who

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[63] Ibid., p. 25.

[64] Ibid., p. 26.

[65] Ibid., p. 29.

[66] Ibid., p. 34.

observe television recordings produce more change in trainees' behaviors than feedback from supervisors who observe the lesson taught in the classroom? (2) Do trainees need to have feedback from supervisors in order to change behavior? (3) Does verbal and videotape feedback from supervisors produce more change in trainees' behavior than verbal feedback from supervisors?[67] The Stanford Micro-Teaching Appraisal Guide was used to quantify changes in behavior. Ninety students were chosen for the study and were assigned to nine treatment groups.[68] Each trainee had four practice-teaching opportunities, taught a five minute videotaped lesson, received one of nine treatments, and retaught the same five minute lesson to a different group.[69] Results showed that the answer to question one was no. Answers to questions two and three were yes.[70] Although the microteaching model used by Olivero is a rather well accepted and documented model for teacher preparation, the question should be raised as to whether or not, for research purposes, microteaching suffices as an adequate sampling of a teacher-intern's behavior.

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[67] James Lee Olivero, "Video Recordings As a Substitute For Live Observations in Teacher Education" (unpublished Doctoral dissertation, Stanford University, 1964), p. 1.

[68] Ibid., p. 34.

[69] Ibid., p. 27.

[70] Ibid., p. 81.

Inasmuch as the design of the author's dissertation was dissimilar from any of the studies presented in Chapter II, it was concluded that the literature reviewed in this chapter served to substantiate that the design of this study was unique and that the research findings added new knowledge to the extant body of research on videotape usage in preservice teacher education.

CHAPTER III

CONDUCT OF THE EXPERIMENT

I. INTRODUCTION

The purpose of this chapter was to describe the following: (1) the major effects tested through this study, (2) the sample used for data collection for this study, (3) the procedures used to implement the overall design, and (4) the criterion measures and the instrument used through this study, and (5) the equipment and taping techniques used in this study.

II. THE MAJOR EFFECTS

Three major effects on teacher-interns' behavioral change were tested through this study. Those three major effects were the following: (1) the type of treatment given to each group, (2) the time interval between each teacher-intern's treatment session, and (3) the interaction of treatments and time interval.

The five treatments that were administered to the groups are displayed in FIGURE 1 which describes the operational design--five groups, each of which received different treatments. The x's in the respective cells formed by the format of this chart indicates the specific treatment that was given to the members of the five groups used in this study.

Groups	Treatments				
	Video feed-back only	Video-audio feed-back	Audio feed-back only	Video-audio critique and type script	No feed-back
EG1*	X				
EG2		X			
EG3			X		
EG4				X	
Control					X

*EG=experimental

FIGURE 1

OPERATIONAL DESIGN

Eight hypotheses were postulated through the research design, three of which were stated in the null form and five were stated in the research form. The five research hypotheses and their illustrations were the following:

1. H_1--There will be significant behavioral changes between those teacher-interns who observe their own videotapes and those who do not observe their own tapes (see Illustration A).

feedback _____ vs. _____ no feedback

Illustration A

2. H_2--There will be significant behavioral changes between those teacher-interns who did not observe their own video-tapes and those teacher-interns who respectively received video feedback only, audio feedback only, and video-audio feedback plus critique plus type scripts (see Illustration B).

no feedback _____ vs. _____ video, audio, and video-audio plus critique plus type script

Illustration B

3. H_3--Teacher-interns who receive video feedback only while observing their own tapes will experience behavioral changes as much as or more than teacher-interns who receive video-audio feedback (see Illustration C).

video-audio feedback _____ vs. _____ video feedback only

Illustration C

4. H_4--Teacher-interns who receive audio feedback only while listening to their own tapes will experience behavioral changes as much as or more than teacher-interns who receive video-audio feedback (see Illustration D).

audio feedback only _____ vs. _____ video-audio feedback

Illustration D

5. H_5--Teacher-interns who receive video-audio feedback will experience behavioral changes as much as or more than teacher-interns receiving video-audio feedback plus a type script plus a critique (see Illustration E).

video-audio feedback plus type script plus critique _____ vs. _____ video-audio feedback

Illustration E

The use of a 3 x 5 (repeated measures) Lindquist Type I, two-way classification analysis of variance design precipitated the formulation of three null hypotheses from which inferences were made to the five previously mentioned research hypotheses.

H_{01}--There will be no significant differences at the five percent level of confidence between the groups' means due to the types of treatments given each group.

H_{02}--There will be no significant differences at the five percent level of confidence between the groups' means due to the time interval between each teacher-intern's treatment sessions.

H_{03}--There will be no significant differences at the five percent level of confidence between the groups' means due to the interaction of treatments and time interval.

The evaluation of this research project, answering the problem generated questions, was accomplished by testing the three null hypotheses and inferring from them to the five research hypotheses. FIGURE 2 illustrates the overall statistical design from which the above three null hypotheses emanated.

Time Interval Between
Treatment Sessions

Treatments	Session 1 —TI→ Session 2	—TI**→ Session 3
EG1*	EG1	EG1
EG2	EG2	EG2
EG3	EG3	EG3
EG4	EG4	EG4
Control	Control	Control

*EG=experimental
**TI=time interval= 5 days

FIGURE 2

3 x 5 DESIGN: OVERALL STATISTICAL MODEL

Each of the five groups used in this study was given a different treatment (see FIGURE 1) on three different occassions. The time interval between the initial session and the final session for each group was approximately 15 days.

FIGURE 2 illustrates the effect of treatments on the five groups, the effect of the time interval between treatment sessions, and the effects of the interaction of treatments and time interval on the five groups. Statistical analysis of this design includes all possible combinations of treatments and group comparisons (0 to n combinations), of which only five were studied through this dissertation.

III. THE SAMPLE

The sample used to obtain data for this study was the twenty-five Cycle II Teacher Corps interns (the group which entered the University of Houston in July 1967) who were in their second long-term semester of local education agency internship and graduate studies program at the University of Houston. Teacher Corps interns were persons recruited into the teaching profession who had earned a baccalaureate degree and who were admitted to the University of Houston's Graduate School. After the two-year internship and graduate studies program, the intern will have earned the Master of Education degree and a Texas teacher's certificate.[71]

A target school's eligibility for participation in the Teacher Corps program was determined by the percentage of its scholastic population whose families earned less than $3,000 per year. This poverty index had to exceed both the national average of 18 percent and the Texas average of 12 percent. Each of the target schools in which Teacher Corps interns worked had a poverty index of over 50 percent.

FIGURE 3 displays selected census data germane to the study sample. Of the 13 females and 12 males in the group, 19 were married, 4 were Negro, the average age was 34, the average Graduate Record Examination Score (combined verbal and

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[71] V. J. Kennedy and Robert E. Roush, "Reaching and Teaching the Poverty Child," The Texas Outlook, 51:18-19, June 1967.

Interns' Code Number	Age	Sex	Marital Status	Ethnic Group	Elementary or Secondary team	GRE	GPA	Undergraduate Major
C1*	45	F	M	W	E	850	3.8	Government
C2	31	M	M	W	S	870	3.0	Spanish
C3	31	F	S	W	F	830	2.8	Spanish
C4	45	M	M	W	E	920	2.5	Psychology
C5	45	F	M	W	E	1090	3.0	English
EG1-1*	25	M	S	W	S	1220	3.3	Religion
EG1-2	24	M	M	W	S	1080	3.3	Government
EG1-3	36	F	M	N	E	660	2.7	Education
EG1-4	23	F	S	N	S	900	3.8	English
EG1-5	40	F	M	W	E	640	2.5	Government
EG2-1	35	F	M	N	E	440	2.0	Education
EG2-2	39	M	M	W	E	800	3.2	Music
EG2-3	37	F	M	W	E	1020	3.5	Business
EG2-4	23	F	S	W	S	1010	3.5	English
EG2-5	35	M	M	W	E	1310	3.0	Engineer
EG3-1	26	M	M	W	S	950	3.0	Phys. Ed.
EG3-2	23	F	M	W	S	1190	3.7	Spanish
EG3-3	48	M	M	W	S	910	3.0	History
EG3-4	36	F	S	W	E	940	3.0	Art
EG3-5	22	M	S	W	E	1400	3.0	Religion
EG4-1	40	F	M	N	S	700	2.8	Home Econ.
EG4-2	40	M	M	W	E	890	3.3	Engineer
EG4-3	23	M	M	W	E	1000	3.2	Psychology
EG4-4	42	M	M	W	E	880	3.3	Business
EG4-5	45	F	M	W	E	840	3.0	Business

*C=control
**EG=experimental
GRE=Graduate Record Exam
GPA=gradepoint average

FIGURE 3

STUDY SAMPLE PROFILE

quantitative aptitude test) was 959, the cumulative grade-point average (4.0 system) was 3.1, and 7 teacher-interns were out-of-state students.

The selected sample differed and was atypical from the regular graduate student at the University of Houston inasmuch as their undergraduate majors were academic areas other than education (see FIGURE 3).

IV. THE PROCEDURE

The procedures used to implement the research design of this study are presented in FIGURES 4, 5, and 6. A time schedule for this project was calculated by using standard Program Evaluation Review Techniques (PERT).[72] The calculated critical path, using t_e values, was 337 days (see FIGURE 4). The activities and associated events were identified (see FIGURE 5). Scheduled completion dates were established for each event (see FIGURE 6). PERT was used because this study was financed by a U. S. Office of Education grant which stipulates the use of some time estimate.

A table of random numbers was used to randomly assign teacher-interns to a group. The same selection technique was used to assign experimental treatments to the groups. Each

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[72] Desmond L. Cook, Program Evaluation and Review Technique Applications in Education, United States Department of Health, Education, and Welfare, Office of Education, Cooperative Research Monograph No. 17 (Washington: Government Printing Office, 1966), p. 63.

Notes:
1. Event numbers are circled
2. Numbers between events represent time (t_e) in days
3. Critical path is shaded

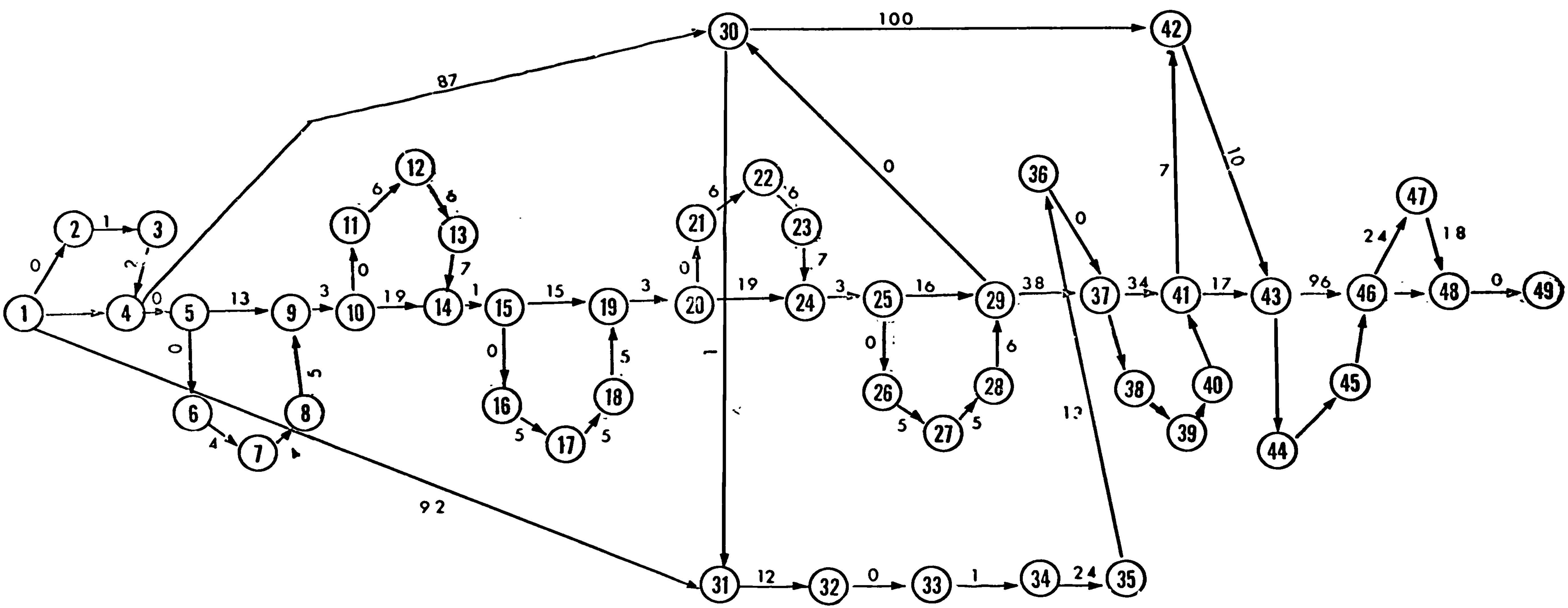

FIGURE 4

PERT NETWORK: DESIGN AND DELIVER MODEL

*	1.	Project Start
	2.	Start Sample Selection
	3.	Complete Sample Selection
*	4.	Start Treatment Application
*	5.	Start Control Group
*	6.	First Five Video Tape Sessions
*	7.	Second Five Video Tape Sessions
*	8.	Third Five Video Tape Sessions
*	9.	Complete Control Group
*	10.	Start Experimental Group One
*	11.	First Five Video Tape Sessions
*	12.	Second Five Video Tape Sessions
*	13.	Third Five Video Tape Sessions
*	14.	Complete Experimental Group One
*	15.	Start Experimental Group Two
*	16.	First Five Video Tape Sessions
*	17.	Second Five Video Tape Sessions
*	18.	Third Five Video Tape Sessions
*	19.	Complete Experimental Group Two
*	20.	Start Experimental Group Three
*	21.	First Five Video Tape Sessions
*	22.	Second Five Video Tape Sessions
*	23.	Third Five Video Tape Sessions
*	24.	Complete Experimental Group Three
*	25.	Start Experimental Group Four
*	26.	First Five Video Tape Sessions
*	27.	Second Five Video Tape Sessions
*	28.	Third Five Video Tape Sessions
*	29.	Complete Experimental Group Four
	30.	Complete Treatment Application
	31.	Start Interim Progress Report
	32.	Complete Interim Progress Report
	33.	Mail Interim Progress Report to USOE
	34.	Start External Evaluator's Coding
	35.	Complete External Evaluator's Coding
	36.	Start Data Summary
	37.	Statistical Analyzation of Data
	38.	Complete Data Interpretation
	39.	Complete Conclusions
	40.	Complete Tables
*	41.	Complete Data Summary
	42.	Mail Interim Progress Report to USOE
*	43.	Start Narrative
	44.	Report Format Designed
	45.	Report Refined and Edited
*	46.	Complete Narrative
	47.	Copy Ready for Printer
*	48.	Final Report Mailed to USOE
*	49.	End Project

* On Critical Path

FIGURE 5

EVENT IDENTIFICATION

Event Number	Description	Scheduled completion date
*1	Start Project	3-1-68
*5	Start Control Group	3-4-68
*10	Start Experimental Group One	3-18-68
*15	Start Experimental Group Two	4-4-68
*20	Start Experimental Group Three	5-13-68
*25	Start Experimental Group Four	5-30-68
31	Start Interim Progress Report	6-7-68
33	Mail Interim Progress Report	6-7-68
35	Complete External Evaluator's Coding	7-15-68
37	Statistical Analyzation of Data	7-27-68
*41	Complete Data Summary	8-30-68
42	Mail Interim Progress Report to USOE	9-6-68
*43	Start Narrative	9-16-68
*46	Complete Narrative	12-20-68
*48	Final Report Mailed to USOE	1-31-69
*49	End Project	

* On Critical Path

FIGURE 6

PERT MILESTONE EVENTS

member of each group was videotaped three times. Taping sessions lasted twenty minutes each. Allen's research established a twenty-minute session as a time period sufficient to sample teachers' behavior.[73] Each group was given a different treatment. All of the videotapes were coded using the FVIAS. The tapes were coded by two independent coders so that a Scott Coefficient of Reliability between coders could be computed.[74] A special interaction analysis computer program prepared by Ralph E. Foster and revised by Robert E. McClintock was used in a Scientific Data Systems Sigma 7 Computer in the University of Houston's Computer Center.

The statistical analysis was accomplished by using a 3 x 5 Type I Lindquist Analysis of Variance Design.[75]

V. THE CRITERION MEASURE

Olivero developed several criteria for use in selecting an instrument. Those criteria were the following: (1) the instrument should measure behavior identified as being relevant to the teaching act; (2) the instrument should be designed so that ratings can be quantified; (3) the

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[73] Allen and Young, op. cit., p. 4.

[74] Flanders, op. cit., p. 25.

[75] E. F. Lindquist, Design and Analysis of Experiments in Psychology and Education (Boston: Houghton Mifflin Company, 1953), pp. 267-273.

instrument should discriminate between criteria; (4) the instrument should be reliable; and (5) the instrument should produce results that are generalizable to situations beyond the actual laboratory setting.[76] The FVIAS satisfied the criteria enumerated above and was used as the change measuring instrument for this study.

The FVIAS is an observational procedure used to classify the verbal behavior of teachers and students.[77] Using this system, verbal behavior in the classroom was classified into ten category designations. These ten categories of teacher and student verbal behavior were illustrated in FIGURE 7.[78] In coding classroom behavior, every three seconds the observers wrote down the category number of the observed interaction. The observers recorded these numbers in columns of paired sequences.[79] After a lesson was coded, the data were collected and entered onto a ten row by ten column matrix (see FIGURE 8). Classroom behavior is thus quantified.

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[76] Olivero, op. cit., pp. 28-29.

[77] Edmund J. Amidon, "Interaction Analysis" (excerpts from paper read at Teacher Education Conference, University of Rochester, January 1966), p. 1.

[78] Ned A. Flanders and Edmund J. Amidon, The Role of the Teacher in the Classroom: A Manual for Understanding and Improving Teachers' Classrcom Behavior (Minneapolis: Paul S. Amidon and Associates, Inc., 1963), p. 12.

[79] Ibid., p. 13.

TEACHER TALK	INDIRECT INFLUENCE	1. ACCEPTS FEELING: accepts and clarifies the feeling tone of the students in a nonthreatning manner. Feelings may be positive or negative. Predicting or recalling feelings. 2. PRAISES OR ENCOURAGES: praises or encourages student action or behavior. Jokes that release tension, but not at the expense or another individual; nodding head, saying "um hm" or "go on" 3. ACCEPTS OR USES IDEAS OF STUDENTS: clarifying building, or developing ideas suggested by a student. 4. ASKS QUESTIONS: asking a question about content or procedure with the intent that a student answer.
	DIRECT INFLUENCE	5. LECTURING: giving facts or opinions about content; expressing his own ideas; asking rhetorical questions. 6. GIVING DIRECTIONS: directions, commands, student is expected to comply. 7. CRITICIZING OR JUSTIFYING AUTHORITY: statements intended to change student behavior from non-acceptable to acceptable; bawling someone out.
STUDENT TALK		8. STUDENT TALK- RESPONSE: talk by students in response to teacher. 9. STUDENT TALK - INITIATION: talk by students which they initiate.
		10. SILENCE OR CONFUSION: pauses , short periods of silence or periods of confusion.

FIGURE 7

SUMMARY OF CATEGORIES FOR INTERACTION ANALYSIS*

*see footnote 78.

	1	2	3	4	5	6	7	8	9	10
1	1				1				1	
2		4	1					2		
3		1	6	1				2		
4			1	14				5		
5	1				48			6		
6						1		4		
7							4		1	
8		2	2	5	6	4		11		
9	1						1		9	1
10									1	2
TOTAL	3	7	10	20	55	5	5	30	12	3
%	2	4½	6½	13½	36½	3½	3½	20	8	2

Matrix Total: 150

Teacher Talk

Columns 1-7 = 105

105 ÷ 150 = 70%

Student Talk

Columns 8-9 = 42

42 ÷ 150 = 28%

Indirect (1-4) ÷ Direct (1-4) plus (5-7) = I/D Ratio

$$\frac{40}{40 \text{ plus } 65} = \frac{40}{105} = .38$$

FIGURE 8

A SAMPLE MATRIX

Statistical manipulation of the matrix's data yielded one statistic which was used as the quantitative criterion for this study. I/D Ratio (see FIGURE 8) is a ratio of a teacher's indirect verbal behavior (categories 1-4, FVIAS) to a combination of his indirect and direct verbal behavior (categories 5-7 FVIAS). An I/D Ratio of .50 would be interpreted to mean that for every one indirect teacher statement, there would be one direct teacher statement.

VI. THE EQUIPMENT AND TAPING TECHNIQUES USED IN THIS STUDY

The videotape equipment and accessories used in this study was a Sony EV-200 one-inch videotape recorder, a Sylvania camera (525 line), a Canon zoom lens (25-100 mm., 1:18), a Sony monitor, 2 Electro-Voice lavalier microphones, a Wollensak four-track audiotape recorder (Model 5730), and 25 Scotch Brand videotapes (1 inch x 2460 feet--24.50 mm. x 750m).

Each intern was assigned one 60 minute videotape onto which his three twenty-minute sessions were consecutively taped. The equipment was set up and ready for taping in the classrooms before the students entered. The equipment operator taped twenty minutes of the lesson, left the room, and returned to dismantle the equipment after the class was over.

The camera placement was near the back of the room at a 45 degree angle from the teacher. The teacher-intern and the students were respectively panned with the camera whenever inter-

action occured. The teacher-intern wore a lavalier microphone. The second microphone was placed near the center of the arrangement in which the students were seated.

To control the equipment-in-the-room-variable, the same procedures of videotaping were used on all twenty-five teacher-interns.

Upon completion of the videotaping of all five teacher-interns in any one group, the audio tracks of the videotapes were dubbed onto Memorex audiotapes (1.5 mil. x 1200 ft. at 3 3/4 ips, 4 track monaural) using a Wollensak tape recorder.

CHAPTER IV

THE FINDINGS OF THE RESEARCH

I. INTRODUCTION

The purpose of this chapter was to present in narrative and tabular form the results of the research. Specifically, the computation and description of the Scott Coefficient of Coder Reliability was presented in this chapter as were the data and the statistical analysis of the hypotheses.

II. THE DATA

Tables I and II display the data obtained through the research design described in Chapter III. Table I represents the data obtained by the first coder. Table II represents the data obtained by the second coder. Both tables show the alpha-numeric code number for each teacher-intern, the I/D Ratio for each of the three observations, the mean I/D Ratio for each teacher-intern, and the mean I/D Ratio for each of the five groups.

III. THE SCOTT COEFFICIENT

A stratified-random sampling procedure was used to select one matrix from each of the five groups coded by the first coder. These five matrices were matched with the same

TABLE I

I/D RATIOS FOR TREATMENT SESSIONS, MEAN I/D RATIOS FOR INDIVIDUALS, AND MEAN I/D RATIOS FOR GROUPS FIRST CODING

Groups by Individual Members	Treatment Sessions (1)	(2)	(3)	$\bar{X}$ I/D Ratios for Individuals	$\bar{X}$ I/D Ratios Groups
C1*	.45	.39	.31	.38	
C2	.23	.33	.22	.26	
C3	.22	.52	.56	.43	
C4	.44	.33	.29	.35	
C5	.65	.42	.51	.53	.39
EG1-1**	.25	.30	.26	.27	
EG1-2	.46	.44	.09	.33	
EG1-3	.51	.50	.50	.50	
EG1-4	.29	.27	.20	.25	
EG1-5	.31	.44	.13	.22	.33
EG2-1	.75	.63	.26	.55	
EG2-2	.33	.18	.22	.24	
EG2-3	.62	.52	.48	.54	
EG2-4	.52	.21	.39	.37	
EG2-5	.36	.17	.13	.22	.38
EG3-1	.13	.11	.04	.09	
EG3-2	.55	.57	.33	.48	
EG3-3	.09	.23	.38	.23	
EG3-4	.33	.21	.19	.24	
EG3-5	.47	.48	.45	.47	.30
EG4-1	.41	.42	.60	.48	
EG4-2	.47	.40	.50	.46	
EG4-3	.46	.45	.52	.48	
EG4-4	.20	.69	.66	.52	
EG4-5	.53	.68	.52	.58	.50

*C=control
**EG=experimental

TABLE II

I/D RATIOS FOR TREATMENT SESSIONS, MEAN I/D RATIOS FOR INDIVIDUALS, AND MEAN I/D RATIOS FOR GROUPS SECOND CODING

Groups by Individual Members	Treatment Sessions			$\bar{X}$ I/D Ratios for Individuals	$\bar{X}$ I/D Ratios Groups
	(1)	(2)	(3)		
C1*	.45	.37	.30	.37	
C2	.21	.30	.19	.23	
C3	.19	.47	.53	.40	
C4	.42	.32	.29	.34	
C5	.63	.40	.48	.50	.37
EG1-1**	.23	.29	.26	.26	
EG1-2	.45	.42	.10	.32	
EG1-3	.52	.55	.50	.52	
EG1-4	.27	.23	.19	.23	
EG1-5	.29	.42	.11	.27	.32
EG2-1	.72	.59	.24	.52	
EG2-2	.31	.17	.21	.23	
EG2-3	.60	.50	.44	.51	
EG2-4	.51	.20	.37	.36	
EG2-5	.35	.16	.13	.21	.37
EG3-1	.12	.09	.05	.09	
EG3-2	.55	.56	.31	.47	
EG3-3	.09	.21	.37	.22	
EG3-4	.31	.21	.17	.23	
EG3-5	.46	.45	.44	.45	.29
EG4-1	.41	.39	.58	.46	
EG4-2	.47	.40	.50	.46	
EG4-3	.45	.44	.51	.47	
EG4-4	.19	.67	.64	.50	
EG4-5	.53	.65	.50	.56	.49

*C=control
**EG= experimental

matrices coded by the second coder. This procedure provided the data for computing a Scott Coefficient of Coder Reliability. A coefficient of .85 or higher was needed to establish a sufficient level of reliability between coders so that inferences could be made from the statistical analysis presented in another section of this chapter.

The Scott Coefficient is called "pi," and was determined by the formula below:

$$\Pi = \frac{P_o - P_e}{100 - P_e}$$

P_o is the proportion of agreement, and P_e is the proportion of agreement expected by chance.[80]

Tables IV-VIII (see APPENDIX A) display the actual computations of the Scott Coefficients. Column 1 of the tables represents the ten categories of the FVIAS (see FIGURE 7). Columns 2 and 3 represents the actual number of tallies per category for Observer A, the first coder, and for Observer B, the second coder. The proportion of tallies in each category for each observer is expressed as a percent in columns 4 and 5. The differences between columns 4 and 5 are shown in column 6, and the sum of this column is the percent of disagreement. Column 7 represents the average percent falling in each category squared, and the sum of this column is the most accurate estimate of P_e.[81]

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[80] Flanders, op. cit., pp. 25-28.

[81] Ibid. , p. 27.

The five computed Scott Coefficients were .84, .87, .92, .96, and .95. The mean of these coefficients was .91 which exceeded the .85 needed for a reliability level sufficient to make inferences from the data.

IV. THE RESULTS

In Table III the results of the analysis of variance statistical treatment are presented. Three F ratios were computed. The mean square of the treatments divided by the mean square of $error_b$ produced and F ratio of 1.84 which failed to exceed the $p>.05$ table value of 2.87 and was therefore concluded to be not significant. The mean square of the time interval between treatment sessions divided by the mean square of $error_w$ produced an F ratio of 1.67 which failed to exceed the $p>.05$ table value of 3.23, and was therefore concluded to be not significant. The mean square of time interval and treatments (interaction) divided by the mean square of $error_w$ produced an F ratio of 1.92 which failed to exceed the $p>.05$ table value of 2.18, and was therefore concluded to be not significant.

TABLE III

ANALYSIS OF VARIANCE FOR THE EXPERIMENT

Source	SS	df	MS	F	p .05
Total	1.97	74	-	-	-
Between subjects	1.22	24	-	-	-
Treatments	.33	4	.083	1.84	N. S.
$Error_b$	.89	20	.045	-	-
Within subjects	.75	50	-	-	-
Time interval	.04	2	.020	1.67	N. S.
Treatments x Time interval	.22	8	.023	1.92	N. S.
$Error_w$	.49	40	.012	-	-

Three null hypotheses were tested by the analysis of variance. H_{01}--There will be no significant differences between the groups' means due to the type of treatment given each group. This hypothesis was accepted because the F ratio of 1.84 was not significant at the $p>.05$ level

H_{02}--There will be no significant differences between the groups' means due to the time interval between treatment sessions. This hypothesis was accepted because the F ratio of 1.67 was not significant at the $p>.05$ level

H_{03}--There will be no significant differences between the groups' means due to the interaction of treatments and time interval. This hypothesis was accepted because the F ratio of 1.92 was not significant at the $p>.05$ level.

Acceptance of all three null hypotheses was tantamount to rejecting the following five research hypotheses presented in Chapter III:

(1) There will be significant behavioral changes between those teacher-interns who observe their own videotapes and those who do not observe their own tapes.

(2) There will be significant behavioral changes between those teacher-interns who did not observe their own videotapes and those teacher-interns who respectively received video-audio feedback plus critique plus type scripts, video feedback only, and audio feedback only.

(3) Teacher-interns who receive video feedback only while

observing their own tapes will experience behavioral changes as much as or more than teacher-interns who receive video-audio feedback.

(4) Teacher-interns who receive audio feedback only while listening to their own tapes will experience behavioral changes as much as or more than teacher-interns who receive video-audio feedback.

(5) Teacher-interns who receive video-audio feedback will experience behavioral changes as much as or more than teacher-interns receiving video-audio feedback plus a type script plus a critique.

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

I. INTRODUCTION

The purpose of this chapter was to summarize the findings of the research, draw conclusions, and make recommendations for further study.

II. PURPOSE OF THE STUDY

The purpose of this study was to investigate the use of the videotape recorder as a feedback device for teacher-interns. Specifically the study attempted to answer these two major questions:

1. Was there any significant measurable change in teacher-interns' behavior after the teacher-interns viewed themselves in videotaped teaching situation?

2. Did the effect of the additional inputs of critique and type script complement videotape feedback to produce behavioral changes?

These two questions generated four sub-questions around which this study was designed.

1. Did teacher-interns who did not observe their own videotapes experience behavioral changes as much as or more than teacher-interns who viewed their own videotapes?

2. Did teacher-interns who received video feedback only while observing their own tapes experience behavioral changes as much as or more than teacher-interns who received video-audio feedback while observing their own tapes?

3. Did Teacher-interns who received only audio feedback while listening to their own tapes experience behavioral changes as much as or more than teacher-interns receiving video-audio feedback?

4. Did teacher-interns who received only video-audio feedback experience behavioral changes as much as or more than teacher-interns receiving video-audio feedback plus a type script plus a critique.

III. SUMMARY OF RELATED RESEARCH

Much of the early research on the use of the video recorder in preservice teacher education was conducted at Stanford University. Microteaching utilized videotaped lessons of teacher-interns as feedback for improvement in future videotaped teacher-student encounters. Stanford reported research which showed that TV feedback could produce significant behavioral changes.

Research conducted at The University of Texas showed that feedback from 8 mm. film could significantly change teachers' behavior over a period of time. Research on the use of kinescopes as a substitute for teacher-interns' direct observation in the classroom showed no significant behavioral changes. Research on the in-service education use of videotape as a direct source of feedback or as a modelling feedback source reported no significant differences. Research

on videotape as a feedback source at Temple University, University of Southern Mississippi, and at Ohio State University reported no significant differences. Three studies completed at Stanford University did, however, attribute significant behavioral changes to videotape feedback.

IV. DESIGN OF THE STUDY

The research design used in this study incorporated the use of five five-member groups upon which experimental variables were manipulated.

A table of random numbers was used to randomly assign teacher-interns to a group and to assign experimental treatments to the groups. Each member of each group was videotaped three times. Taping sessions lasted twenty minutes each.

The control group's members were taped and coded with the FVIAS. This group did not receive any feedback.

Members of Experimental Group One were taped and coded with the FVIAS. This group received immediate video feedback only.

Members of Experimental Group Two were taped and coded with the FVIAS. This group received immediate video-audio feedback.

Experimental Group Three members were taped and coded with the FVIAS. This group received immediate audio feedback only.

Experimental Group Four members were taped and coded with the FVIAS. This group received immediate video-audio feedback plus a critique plus a type script mailed to them prior to the subsequent tape session.

The quantitative criterion used in this study was I/D Ratio. A Lindquist Type I Design Analysis of Variance was used to statistically analyze the data.

V. SUMMARY OF RESULTS

A Scott Coefficient of .91, which exceeded the minimum reliability level of .85, was obtained as a measure of agreement between the two coders used in this study. It was concluded that valid inferences from the data analysis could be made.

F ratios for the three null hypotheses did not exceed the $p > .05$ table value, and were therefore concluded to be not significant. Acceptance of the three null hypotheses precluded accepting the five research hypotheses.

VI. CONCLUSIONS

The statistical inferences from this study were the following: (1) videotape feedback to teacher-interns did

not produce behavioral changes significantly different from those teacher-interns who did not receive feedback; (2) the addition of inputs such as critique and type scripts did not produce behavioral changes significantly different from those teacher-interns who received video-audio feedback; (3) the time interval between treatment sessions did not produce significantly different behavioral changes from teacher-interns' initial status to a final status; and (4) the interaction of treatments and time interval did not produce significant differences between the groups' means.

It was concluded, that within the limitation imposed by this study, the "no significant differences" might be attributed to the following eight variables:

1. The interns' average age was 34. Perhaps a younger group would have responded differently.

2. The interns were teaching in six different school districts. Having a sample in one school district might have made a difference.

3. The interns were teaching in both elementary and secondary schools. If the sample had been either all elementary or all secondary, perhaps a difference would have been found.

4. The students taught by the interns were all from families whose yearly income was less than $3,000.00. A different student population could have affected the interns' response.

5. A different sample might have affected the outcome, however, the sample represented the entire population of Cycle II Teacher Corps intern's enrolled in the University of Houston.

6. An uncontrolled variable which might have affected the measured behavior exhibited by the teacher-interns in this study was the subject-matter content taught by the teacher-interns.

7. The quantitative criterion, I/D Ratio, used in this study may not have been the most appropriate index of teacher-behavior. Perhaps it was too gross of a measure to be significantly changed by the types of feedback given to the five groups used in this study.

8. The variance between the five respective treatments may not have been maximized sufficiently well enough to be heterogeneous.

VII. RECOMMENDATIONS FOR FURTHER RESEARCH

The findings of this study were an addition to the present small body of research on the use of videotape as a feedback source to preservice preparation of teacher-interns.

Several recommendations might serve to guide future researchers doing work in this area. The study should definitely be replicated using the same design to substantiate the findings of this study. The study should be repeated using different

types and combinations of feedback than those used in this study. Researchers should experiment with the time interval between observations. A different sample should be used with this design. A different student population with whom the sample works should be used with this design. The data should be obtained by using such different instruments as OSCAR, Provo Code, Houston Code, Microteaching Analysis Scale, and others that will be developed in the future.

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APPENDIX A

CALCULATION OF CODER RELIABILITY USING THE SCOTT METHOD

TABLE IV

CALCULATION OF CODER RELIABILITY USING THE SCOTT METHOD*

FVIAS Categories	Observer A	Observer B	%A	%B	% Diff.	(Ave. %)^2
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1	0	0	0.0	0.0	0.0	0.000
2	33	31	8.1	7.6	0.5	0.616
3	0	2	0.0	0.5	0.5	0.006
4	101	115	24.7	28.3	3.6	7.002
5	120	101	29.3	24.9	4.4	7.290
6	12	12	2.9	3.0	0.1	0.087
7	20	21	4.9	5.2	0.3	0.255
8	84	90	20.5	22.2	1.7	4.558
9	7	1	1.7	0.2	1.5	0.090
10	32	33	7.8	8.1	0.3	0.632
Total	409	406	99.9	100	12.9	20.556

$$\Pi = \frac{P_o - P_e}{100 - P_e} = \frac{(100 - 12.9) - 20.6}{100 - 20.6} = .84$$

*Data were collected from C3, Treatment Session 2.

TABLE V

CALCULATION OF CODER RELIABILITY USING THE SCOTT METHOD*

FVIAS Categories	Observer A	Observer B	%A	%B	% Diff.	(Ave. %)^2
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1	0	0	0.0	0.0	0.0	0.000
2	11	11	2.6	2.6	0.0	0.000
3	0	0	0.0	0.0	0.0	0.000
4	26	22	6.2	5.2	1.0	0.325
5	101	90	24.0	21.4	2.6	5.152
6	3	6	0.7	1.4	0.7	0.001
7	0	0	0.0	0.0	0.0	0.000
8	10	6	2.4	1.4	1.0	0.036
9	145	149	34.4	35.4	1.0	12.180
10	125	137	29.7	32.5	2.8	9.672
Total	421	421	100	99.9	9.1	27.366

$$\pi = \frac{P_o - P_e}{100 - P_e} = \frac{(100-9.1) - 27.36}{100 - 27.36} = .87$$

*Data were collected from EG1-1, Treatment Session 3.

TABLE VI

CACULATION OF CODER RELIABILITY USING THE SCOTT METHOD*

FVIAS Categories	Observer A	Observer B	%A	%B	%Diff.	(Ave. %)^2
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1	0	0	0.0	0.0	0.0	0.000
2	39	37	9.5	9.0	0.5	0.856
3	1	3	0.2	0.7	0.5	0.002
4	60	65	14.7	15.9	1.2	2.340
5	72	66	17.6	16.1	1.5	2.839
6	27	28	6.6	6.8	0.2	0.449
7	2	2	0.5	0.5	0.0	0.002
8	97	92	23.7	22.5	1.2	5.336
9	13	17	3.2	4.2	1.0	0.137
10	98	99	24.0	24.2	0.2	5.808
Total	409	409	100.0	99.9	6.3	17.769

$$\pi = \frac{P_o - P_e}{100 - P_e} = \frac{(100 - 6.3) - 17.77}{100 - 17.77} = .92$$

*Data were collected from EG2-3, Treatment Session 2.

TABLE VII

CALCULATION OF CODER RELIABILITY USING THE SCOTT METHOD*

FVIAS Categories	Observer A	Observer B	%A	%B	% Diff.	(Ave. %)^2
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1	0	0	0.0	0.0	0.0	0.000
2	52	49	13.2	12.6	0.6	1.664
3	1	4	0.3	1.0	0.7	0.004
4	77	78	19.6	20.1	0.5	3.940
5	128	123	32.6	31.6	1.0	10.304
6	22	22	5.6	5.7	0.1	0.319
7	3	3	0.8	0.8	0.0	0.006
8	79	78	20.1	20.1	0.0	4.040
9	12	13	3.1	3.3	0.2	0.010
10	19	19	4.8	4.9	0.1	0.235
Total	393	389	100.1	100	3.2	20.522

$$\Pi = \frac{P_o - P_e}{100 - P_e} = \frac{(100 - 3.2) - 20.52}{100 - 20.52} = .96$$

*Data were collected from EG3-5, Treatment Session 1.

TABLE VIII

CACULATION OF CODER RELIABILITY USING THE SCOTT METHOD*

FVIAS Categories	Observer A	Observer B	%A	%B	% Diff.	(Ave. %)^2
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1	0	0	0.0	0.0	0.0	0.000
2	35	34	10.3	10.1	0.2	1.040
3	0	1	0.0	0.3	0.3	0.002
4	50	51	14.7	15.2	0.5	2.235
5	107	106	31.5	31.5	0.0	9.922
6	0	0	0.0	0.0	0.0	0.000
7	0	1	0.0	0.3	0.3	0.002
8	50	43	14.7	12.8	1.9	1.891
9	62	64	18.2	19.0	0.8	3.459
10	36	36	10.6	10.7	0.1	1.134
Total	340	346	100.0	99.9	4.1	19.685

$$\pi = \frac{P_o - P_e}{100 - P_e} = \frac{(100 - 4.1) - 19.69}{100 - 19.69} = .95$$

*Data were collected from EG4-3, Treatment Session 2.