



A comparison of live model versus videodisc instruction employed when instructing preservice teachers in the use of specific teaching behaviors  
by Bruce David Marvel

A thesis submitted in partial fulfillment of the requirements for the degree of Doctor of Education  
Montana State University  
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**Abstract:**

The problem of this study was to compare the teaching quality of preservice teachers instructed using live modeling of specific teaching behaviors with the teaching quality of preservice teachers instructed using videodisc examples of the behaviors. The microteaching episodes of the preservice teachers were judged for the presence of each of four specific teaching behaviors; if the behavior was deemed to be present, then a qualitative assessment of the behavior was made. The dependency of the occurrence of each behavior and subsequent quality of that behavior upon the instructional methodology was analyzed using the Chi Square Test of Goodness of Fit.

This study was conducted at Montana State University during the fall and winter quarters of the 1988-89 academic year. The participants in the study were all those students enrolled in a junior level, secondary education, general methods course during the fall and winter quarters. Students in the control group received their basic instruction in the use of four specific teaching behaviors by observing the instructor model the behaviors during a lesson presented in class. Those in the experimental group received their instruction by viewing videodisc examples of the four behaviors. The four target behaviors used in the study were: (1) anticipatory set, (2) statement of objectives, (3) check for student understanding, and (4) closure.

The results concerning the presence of the behaviors were that the teaching methodology of instruction via videodisc was superior in enabling preservice teachers to use the behaviors of statement of objectives and closure in their own teaching. Videodisc instruction was not significantly more effective than live modeling in inducing the participants to employ the target behaviors of anticipatory set and check for understanding.

The results concerning the quality level of the behaviors were that the quality of the anticipatory set, statement of objectives, and closure behaviors used by the participants in the study were found to be dependent upon teaching methodology. In each case, observation of the videodisc sequences was a more effective teaching strategy in terms of its ability to promote the use of the target behavior at increased quality levels.

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INSTRUCTION EMPLOYED WHEN INSTRUCTING  
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SPECIFIC TEACHING BEHAVIORS**

by  
**Bruce David Marvel**

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APPROVAL

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This thesis has been read by each member of the graduate committee and has been found to be satisfactory regarding content, English usage, format, citations, bibliographic style, and consistency, and is ready for submission to the College of Graduate Studies.

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## ABSTRACT

The problem of this study was to compare the teaching quality of preservice teachers instructed using live modeling of specific teaching behaviors with the teaching quality of preservice teachers instructed using videodisc examples of the behaviors. The microteaching episodes of the preservice teachers were judged for the presence of each of four specific teaching behaviors; if the behavior was deemed to be present, then a qualitative assessment of the behavior was made. The dependency of the occurrence of each behavior and subsequent quality of that behavior upon the instructional methodology was analyzed using the Chi Square Test of Goodness of Fit.

This study was conducted at Montana State University during the fall and winter quarters of the 1988-89 academic year. The participants in the study were all those students enrolled in a junior level, secondary education, general methods course during the fall and winter quarters. Students in the control group received their basic instruction in the use of four specific teaching behaviors by observing the instructor model the behaviors during a lesson presented in class. Those in the experimental group received their instruction by viewing videodisc examples of the four behaviors. The four target behaviors used in the study were: (1) anticipatory set, (2) statement of objectives, (3) check for student understanding, and (4) closure.

The results concerning the presence of the behaviors were that the teaching methodology of instruction via videodisc was superior in enabling preservice teachers to use the behaviors of statement of objectives and closure in their own teaching. Videodisc instruction was not significantly more effective than live modeling in inducing the participants to employ the target behaviors of anticipatory set and check for understanding.

The results concerning the quality level of the behaviors were that the quality of the anticipatory set, statement of objectives, and closure behaviors used by the participants in the study were found to be dependent upon teaching methodology. In each case, observation of the videodisc sequences was a more effective teaching strategy in terms of its ability to promote the use of the target behavior at increased quality levels.

## CHAPTER 1

## INTRODUCTION

Introduction

The nation's colleges of education have been indicted for their incomplete and inadequate preparation of preservice teachers in a myriad of reports issued in the 1980's (Holmes Group, Inc., 1986; Carnegie Forum on Education, 1986; Adler, 1982; National Commission for Excellence in Teacher Education, 1985). Several of these reports document an educational scenario that their authors envision for the near future in the United States. The low prestige and low pay of the teaching profession does not attract highly qualified undergraduate students into the program. The lower qualified students who are in the education program are not being sufficiently prepared, either in content or methodologies, to adequately teach in the nation's schools. Consequently, we are experiencing a decline in the academic achievement of the students in our nation's schools (Carnegie Forum on Education, 1986).

Experience in the classroom has traditionally been seen as an essential part of the initial preparation of teachers (Lanier & Little, 1984). In many teacher education programs, the time spent by undergraduates directly observing exemplary teachers and their methods is limited. This is due in part to the lack of available classroom placements for the larger teacher education programs and the logistical

problems faced when attempting to place 100 to 200 students each semester. The number of hours of practice teaching experience can range from as few as 90 to a peak of 300 (Conant, 1973). It has been found, however, that an increase in the quantity of these direct observations resulted in a corresponding increase in the quality of the undergraduate's initial teaching experience (Sunal, 1980). An alternative to the field based observation of these teaching behaviors may be to provide the students with actual teaching scenarios on film in the normal college classroom. These vignettes could then be viewed by the general methods class as a group, and analyzed and discussed in the presence of the instructor.

As a delivery system for this type of instruction, videodisc is superior to videotape or film. The prime factor which elevates videodisc above the other two video mediums is the ability to rapidly access any part of the disk by using the remote control (Hoffmeister et al., 1985). Any of the 54,000 individual frames of the disc can be reached in less than two seconds (Van Horn, 1987). This allows the user the freedom to search out and view any segment on the disc quickly without the necessity of the long and inaccurate searches needed with videotape.

#### Need for the Study

Montana State University (MSU), with over 10,000 students enrolled for the 1988-89 academic year, is the largest institution of higher education in Montana (Registrar's Office, MSU, 1988). The university currently graduates approximately 150 secondary education majors per year in 15 academic disciplines (Teacher Certification Department, MSU, 1988). The traditional course of study for these students is to spend the

majority of their freshman, sophomore, and junior years acquiring the necessary proficiency in their chosen content field; only in the latter part of their junior year and most of their senior year do they take courses in pedagogy in the College of Education (Montana State University Catalog, 1988).

Throughout their university experience the students in secondary education at Montana State University have limited practical field experience. A one-quarter credit practicum is taken during the junior year, and a few of the specific content methods courses require the student to teach two or three 15-minute lessons in the local junior high or high school. These episodes, combined with the 10 weeks of student teaching in their senior year, encompass the entire scope of the student's field based experience (Montana State University Catalog, 1988).

An increase in the quantity and quality of field observation and practice by preservice teachers has been shown to effect a significant difference in the ability of these students to model specific teaching behaviors. The more examples of good teaching and good teaching behaviors a beginning teacher can see, the greater the chance that the novice teacher will incorporate these behaviors into his/her own repertoire of teaching strategies (Sunal, 1980).

One of the initial courses that all secondary education majors at Montana State University are required to take is EDSD 350, Strategies in Teaching. Commonly taken during the junior year, EDSD 350 is a four quarter credit, general methods class. There are three sections of EDSD 350 offered during the fall quarter, three sections during winter quarter, and two sections in the spring quarter. An average of 25 students are

enrolled in each section. Strategies in Teaching is the second education course required of all secondary education majors, being preceded by a course in educational psychology. The scope of EDS 350 includes instruction in planning for teaching, teaching methodologies, process skills, and a 15-minute teaching experience, or "microteach," for each of the students (Montana State University Catalog, 1988).

As part of their preparation for the microteaching experience, the students in this course are instructed in the various components of effective teaching. These include, but are not limited to: statement of objectives, anticipatory set, guided and independent practice, closure, feedback and correctives, check for student understanding, active student participation, questioning techniques, and informal means of assessment. Due to the large number of students enrolled in the class each quarter, and the fact that Bozeman has but one high school and one junior high, it is not possible to provide a field experience in which the students in EDS 350 might observe exemplary teachers employing these strategies. To compensate for the inability of the students to observe these behaviors in the public schools, it is currently the practice of the course instructor to demonstrate the behaviors in the form of a model secondary school lesson presented in class.

The model teaching episode is a ninth grade physical science lesson, lasting approximately 45 minutes, which incorporates all of the behaviors the students are expected to demonstrate during their in-class teaching experience. It is taught by the instructor to the college class as if they were hypothetical ninth grade students. The lesson is halted at appropriate times to allow the students and/or instructor to identify the

specific strategy being employed, and for the instructor to field any questions. A 50-minute discussion of the lesson and the strategies takes place during the next regularly scheduled class period.

After this rather cursory opportunity to observe the behaviors, the students are required to plan and teach a micro lesson in class in which these various teaching behaviors are employed. To compensate for these students' lack of observation time and experience, the initial five or ten teaching episodes are critiqued by the instructor in front of the entire class immediately upon their completion. In this manner the students' live observation time is multiplied, and their understanding of the application of the strategies in practice is expanded. It had been observed, however, that the teaching ability of those students asked to microteach early was in many cases woefully inadequate. What was needed in this case was an improved method of instruction which would more adequately prepare these students to incorporate the specific teaching behaviors into their own teaching repertoire.

Two videodiscs containing selected teaching episodes have recently been produced by the Minnesota Educational Computing Consortium (MECC) in cooperation with the Association for Supervision and Curriculum Development (ASCD). These videodiscs contain multiple examples of each of the selected teaching behaviors. The 1988 MECC/ASCD Catalog describes the videodiscs as follows:

Teaching Episodes: Resources for the Analysis of Instruction. This package helps teachers increase the effectiveness of their instructional decisions and their impact on learning. Video examples of teaching strategies and techniques are provided for recognition, labeling, and analysis. Concepts such as anticipatory set, active participation, and planning/design are covered.

Improving Teacher Effectiveness. The goal of this self-paced package is to make teachers more aware of the basic principles of effective teaching. Topics include teaching to the objective, encouraging active participation, and increasing intent to learn. (MECC, 1988, p. 4)

Videodisc technology and videodisc instructional methods have the potential to profoundly affect education in America (Hannafin, 1985). The inherent instructional capabilities of videodisc, i.e., rapid access time, the ability to repeat any segment at will, and the ability to immediately interact and respond to student input, when combined with the multiple examples of each of the specific teaching behaviors found on these particular discs, may provide an enhanced instructional experience concerning the use of these specific strategies.

No research is currently available concerning the educational efficacy of these particular videodiscs. In an effort to measure the effectiveness of videodiscs in imparting to the students those teaching behaviors needed for their microteaching experience, these specific discs were used in the Strategies of Teaching course in lieu of the lesson modeled by the instructor.

#### Statement of the Problem

The purpose of this study was to compare the teaching quality of preservice teachers instructed using instructor modeling of specific teaching behaviors, with the teaching quality of preservice teachers instructed using videodisc examples of the behaviors.

Questions to Be Answered

- (1) Was the presence or absence of an anticipatory set in the teaching episode of a student independent of whether the student was in the control or experimental group?
- (2) Was the presence or absence of a statement of objectives in the teaching episode of a student independent of whether the student was in the control or experimental group?
- (3) Was the presence or absence of a check for student understanding in the teaching episode of a student independent of whether the student was in the control or experimental group?
- (4) Was the presence or absence of closure in the teaching episode of a student independent of whether the student was in the control or experimental group?
- (5) Was the level of quality of the anticipatory set behavior in the teaching episode of a student independent of whether the student was in the control or experimental group?
- (6) Was the level of quality of the statement of objectives behavior in the teaching episode of a student independent of whether the student was in the control or experimental group?
- (7) Was the level of quality of the check for student understanding behavior in the teaching episode of a student independent of whether the student was in the control or experimental group?
- (8) Was the level of quality of the closure behavior in the teaching episode of a student independent of whether the student was in the control or experimental group?

### Procedures

The study was conducted at Montana State University during the fall and winter quarters of the 1988-89 academic year. The students participating in the study were those enrolled in the secondary general methods course, EDS 350--Strategies in Teaching. EDS 350 is a required course for all secondary education majors at MSU, and from previous enrollment figures it was estimated that approximately 150 students would be participating in the study. However, due to lower than average enrollments, the number of participants was actually 112, with 58 in the experimental group and 54 in the control group. These figures represent all students enrolled in the course during the fall and winter quarters of the 1988-89 academic year.

There are three sections of EDS 350 offered during the fall quarter and three sections offered during the winter quarter. Through a random selection process, one of the three sections in the fall and two of the winter sections of the course were chosen to receive videodisc instruction in the use of the behaviors; conversely, two sections in the fall and one section in the winter were selected to directly observe the behaviors being modeled by the instructor during the live demonstration lesson.

Both groups received identical textbook and lecture material during the course. The difference in instruction occurred in the two class sessions prior to the students' microteaching experience. In the video-disc, or experimental groups, the instructor used two videodiscs, produced jointly by MECC and ASCD, to provide group instruction to the

students concerning those specific teaching behaviors they were to incorporate into their microteach. During the two 50-minute class periods, the students and instructor were engaged in the process of viewing, analyzing, and discussing the various teaching vignettes.

The groups which did not receive the videodisc instruction, i.e., the control groups, instead directly observed the instructor as he taught a model secondary lesson during the first 50-minute class. Identical teaching behaviors as those viewed by the experimental group were incorporated into this lesson. During the second class session with the control groups, there was a discussion and question/answer period in which the students were encouraged to analyze the behaviors modeled by the instructor.

All students, in both the experimental and control groups, were then required to do a microteach of approximately 15 minutes duration into which they incorporated the teaching behaviors they had observed live or viewed on the videodisc. The students were then divided into lab teaching groups of four students each. Each individual therefore taught only to the other three members of their particular group, in isolation from other class members. In this way the groups which were assigned to teach in the latter part of the week did not have the added benefit of learning from the teaching performance of the remaining 25 members of the class.

All of the teaching episodes were videotaped as they occurred, without feedback from the instructor. The videotapes were then analyzed for the purposes of this investigation. All episodes were examined by the researcher to determine if the behaviors of anticipatory set, statement of objectives, check for understanding, and closure were present,

and if they were present, the relative quality of the behaviors was then assessed.

A panel of three outside judges was formed to establish the relative reliability of the researcher's analysis of the teaching behaviors. These judges were trained by the researcher to identify and rate the quality of each of the specific behaviors under study. The independent judges then selected 10 student teaching episodes at random, and rated them concerning the presence and quality of the four teaching behaviors. Their findings were then compared to the researcher's analysis of the same 10 episodes, and a relative rater reliability established. The three independent judges also rated the quality of the behaviors exhibited in the teaching episodes on the videodisc, and the teaching behaviors exhibited by the instructor of ESD 350 during the presentation of the model lesson. In this manner a relative determination of the quality of the teaching on the videodisc was established and compared to the quality of the teaching behaviors demonstrated by the instructor.

The resultant scores of all the teaching episodes were then analyzed to determine if there was significant dependency of the presence of the behaviors upon teaching methodology, and if there was significant dependency of the quality of the behaviors present upon the teaching methodologies used in the study.

The ratings for the control group were compared to the ratings of the experimental group in eight categories: (1) to test for dependency of the quantity of the anticipatory set behavior on initial teaching methodology, (2) to test for dependency of the quality of the anticipatory set behavior on initial teaching methodology, (3) to test for dependency of

the quantity of the statement of objectives behavior on initial teaching methodology, (4) to test for dependency of the quality of the statement of objectives behavior on initial teaching methodology, (5) to test for dependency of the quantity of the check for understanding behavior on initial teaching methodology, (6) to test for dependency of the quality of the check for understanding behavior on initial teaching methodology, (7) to test for dependency of the quantity of the closure behavior on initial teaching methodology, and (8) to test for dependency of the quality of the closure behavior on initial teaching methodology.

The observed quantities of the behaviors in each of the categories listed above were compared using a chi square test of independence. Chi square is a nonparametric test of significance which is appropriate for use when the data are in the form of frequency counts in two or more categories (Gay, 1976). The number of each behavior performed at a particular quality level was also compared using the chi square test of independence.

### Limitations and Delimitations

#### Limitations

- (1) The study was limited to students enrolled in ESDS 350--Strategies in Teaching, at Montana State University.
- (2) The study was conducted during the fall and winter quarters of the 1988-89 academic year.
- (3) The teaching episodes on the videodisc were selected by ASCD and MECC.

Delimitations

- (1) The study included all 112 junior level students enrolled in the general secondary education methods class at Montana State University during the fall and winter quarters of the 1988-89 academic year. Of the total enrollment, 58 of the students were in the videodisc group, and 54 in the direct observation group.

## CHAPTER 2

## REVIEW OF LITERATURE

Introduction

For the purpose of this study, the literature was reviewed and organized according to the three main topics of research relating to learning through observation, learning through the use of instructor modeling, and research relating to learning using video media.

Learning through Observation

Observational learning is generally defined as the ability to acquire new behaviors in response to observing the behaviors of a model (Bandura, 1968). In a review of 17 research studies conducted between 1968 and 1980 pertaining to the efficacy of specific procedures for training teachers in behavior modification skills, Allen and Forman (1984) concluded that didactic training alone was proven to be an ineffective method of training. But the studies reviewed also suggested that didactic training in conjunction with role playing and role playing with modeling of the skills may lead to greater acquisition of the skills involved.

In Bandura's (1977) analysis of the acquisition of social behaviors by humans, he belies the assertion that all learning occurs through the process of performing responses and observing their effect. Bandura's contention is that virtually all learning results from the observation of

other people's behavior around us, and the consequences of that behavior for the other person. He further states that this ability of the human species to learn from observation is fundamental in allowing us to acquire large, integrated patterns of behavior, without amassing the behaviors through a laborious process of trial and error. Specifically, Bandura asserts that some complex behaviors acquired by humans can be produced only through the aid of modeling.

Within his formation of the social learning theory, Bandura (1977) has developed four component processes of learning through observation. Attentional processes relate to the various factors which govern the ability to concentrate, and subsequent accuracy of observation, which the observer is able to bring to bear upon the modeled task. In terms of its ability to command the attention of the viewer, television and televised images have been found by Bandura to be exceedingly compelling. Bandura asserts that televised models are so effective in capturing the attention of the viewer that viewers learn much of what they see without extrinsic motivation.

Retention processes are the second of the four processes identified by Bandura (1977) as essential for learning from observation. Humans rely on imaginal and verbal methods of encoding information and behaviors for future recall, with verbal encoding being the most effective in adults.

The third of Bandura's (1977) components of modeling is the process of transforming the encoded symbolic representations of behaviors into actions initiated by the observer. The major factor which may impede doing what one has observed has been identified as lack of prerequisite skills in the proper execution of the new behavior. Evidence presented

by Bandura suggests that observational models which are less than perfect are better at imparting new behaviors to the observers. Once the learner has had a chance to practice the modeled behaviors, a more perfect example of the behavior is more readily assimilated by the learner.

The last component of the four processes developed by Bandura (1977) as part of his social learning theory is motivational processes. Bandura asserts that, in general, humans tend to reproduce behaviors which result in outcomes they value, or which seem to be rewarding for others. Therefore, motivating people to replicate observed behaviors will depend upon the value assigned to the behavior by the respondent, given their current value system.

Through their review of the observational learning literature up to 1986, Browder et al. (1986/87) have characterized a theoretical three stage hierarchy of skill development through observation. These levels are similar to Bandura's (1977) in that they start with the processes associated with acquiring the target behavior. In the next phase the respondent gains fluency in reproducing the behavior through practice and refining of skills. In the last phase, the learner begins to generalize the usage of the behavior and will begin to see adaptations of the behavior which are applicable in other situations.

Newman and Fuqua's (1988) research into the effects of positive and negative modeling on the subsequent behaviors exhibited by the learner demonstrates that negative modeling can produce training outcomes in counselor training which approximate the results achieved through positive modeling. However, they recommend that further study be conducted to quantify the limits of the negative modeling approach. Other studies

contradict the findings of Newman and Fuqua (Allen & McDonald, 1967; Berlinger, 1969) and point to the negative effects of incorrect models in the acquisition of positive performance behaviors.

#### Learning through Observation of Live Models

Even though the research supported the use of filmed models, research and theory in social development (Bandura, 1977) suggest that live instructor modeling of teaching behaviors is even more effective (Wilson, 1987).

Some of the research on the effects of modeling from live models deals with the behaviors which are modeled by the cooperating teacher and the transferability of these behaviors to the student teachers in their tutorage. In an analysis of related research completed prior to 1987, which was limited to empirical studies in teacher education, Wilson (1987) found that considerable empirical research exists which supports the hypothesis that student teacher observation of the cooperating teacher leads to acquisition of those behaviors by the student teacher.

Supporting this contention, Courts (1984), in a study using 31 preservice teachers, ascertained that effective behaviors exhibited by cooperating teachers were imitated by their student teachers. In related findings from the same study, no evidence was found that ineffective behaviors were also modeled, or that the acquisition of effective behaviors depended upon student teacher sex, cooperating teacher sex, or selected personality factors. These conclusions were also supported by Douge (1985), who studied the use of teaching behaviors by physical education interns who either observed a cooperating teacher or received

written suggestions concerning the use of the behaviors. Douge concluded that more of the behaviors were used by the group who observed the cooperating teachers.

There is limited research available which documents the effectiveness of positive behaviors modeled by the instructors of teacher education courses (Wilson, 1987). In one study of this nature, eight teaching behaviors were modeled by the instructors in vocational teacher education classes at Virginia Polytechnic Institute and State University in a study designed to test the effectiveness of role modeling on subsequent teacher competence (Reece et al., 1986). The eight behaviors were: (1) explanation of the lesson objectives, (2) set induction, (3) displaying enthusiasm, (4) assessing student understanding, (5) encouraging student contributions to the class, (6) providing real world examples, (7) using appropriate teaching methods, and (8) reviewing material near the end of the lesson.

After modeling these behaviors in the classroom for a year, Reece et al. (1986) were able to assess the influence of this strategy upon the student teachers. More than half of the students said that the modeling of the behaviors positively influenced how they taught during their student teaching. The two behaviors the faculty found to be the most difficult to model, and the students found to be the most difficult to emulate, were set induction and reviewing major points at the end of the lesson.

Learning through Observation  
of Filmed Models

The use of video technology in teacher training has been advocated since it first became accessible in the early 1960s. In those bulky cameras, microphones, and playback units teacher educators saw instruments for observation and magnification of human behavior as well as a means for recording, preserving, and re-using human experiences. (Frager, 1985, p. 16)

Concerning the use and efficacy of video technology, Schoonover et al. (1983) conclude that visual media provides a flexible method of using a single process to portray knowledge, demonstrate interfactional skills, reinforce attitudes, and are effective in producing long-term change.

Video technology in teacher education has traditionally been used within the context of the three phases of microteaching: (1) students viewing a demonstration of a teaching technique, (2) students practicing the technique by teaching the lesson to a group, and (3) students receiving immediate feedback by viewing their teaching video (Frager, 1985).

Although the research results are not unanimous in their conclusions, most studies support the use of taped models to demonstrate specific teaching skills (Wilson, 1987). Frager (1985), in his extensive review of the research concerning the use of video technology in teacher education from 1966 to 1982, concludes that most of the studies validate the specific uses for video recording and playback, while limitations to effectiveness are only briefly discussed or implied. He does, however, note the lack of studies which link the use of video technology to mastery of teaching competencies and suggests this as one direction for future research concerning the uses of video.

Much of the research concerning the use of video in teacher education focuses on using the videotape of the teacher to provide immediate feedback to that teacher concerning performance (Walters, 1974; Martin, 1987). Hendricson et al. (1983) showed that instructors significantly improved their lecture skills and reduced problems in organization and delivery skills by over 60 percent, after being involved in a self assessment and peer critique program in which they watched a videotape of their teaching. The positive results reported from this study were achieved after only a single, two-hour critique and video review session.

Studies which focus on the differential effects of symbolic modeling (written) and perceptual models (visual) provide differing conclusions. In a study by Lerner (1972), with 40 students assigned to three experimental groups and one control group, no significant differences were found among the achievements of the three experimental groups. Group one received verbal feedback about their microteaching performance, group two received videotaped replays of their performance, and group three received both feedback modes. These conclusions were also reproduced by Konczak and Dossett (1986) whose four experimental groups were instructed with one of the following media types: (1) audio only, (2) text only, (3) audio plus text, and (4) video plus audio. Konczak and Dossett did find that audio alone was superior to video plus audio in terms of enabling the students to use the new behavior.

These findings are reinforced by Pickett (1989) who, in a review of the literature relating to the teaching of gymnastics skills through videotape, noted eight out of nine empirical studies in which no significant difference was found between the performance of those students

allowed to view their gymnastics routines on videotape and those students taught in the traditional manner.

However, these findings are not in agreement with Allen and McDonald (1967) and McDonald and Koran (1969) who found that perceptual modeling processes may be superior to symbolic modeling in training situations. In support of this view, Nagy and Thomas (1981), in a study designed to test the effectiveness of two library usage videotapes, found that students who viewed the videotapes scored significantly better on a written test of library skills than did those students who did not view the tapes.

Due to the decline of demonstration schools for future teachers' observation and practice, many departments of education are relying on the public schools in their areas for demonstration sites (Gilstrap, 1986). However, Gilstrap also concludes that student teacher experiences in the schools are usually individual in nature and therefore difficult to use as the basis of group discussion and analysis in a whole class situation.

The perception that videotaped teaching episodes may provide an alternative learning experience to field observation has prompted research activities to test the effectiveness of the medium and its ability to allow preservice teachers to identify and employ teaching behaviors. Volker et al. (1986) used interactive videotape in a study designed to test the effectiveness of the technology in enabling preservice teachers to spot effective teaching behaviors. Students using the interactive system felt they were more actively involved in the learning process, and that the experience was more meaningful because of their control of the

learning. The authors conclude with the following statement concerning the logical next step for the research:

Identifying appropriate and inappropriate behaviors in others is one thing; incorporating suitable behavior into your own teaching style is quite another. If the ultimate goal is to modify preservice teachers' classroom behavior, however, practice in assessing teaching behavior of others is an important first step. (Volker et al., 1986, p. 60)

Gliessman and Pugh (1978) found evidence to support the contention that learning to identify instances of specific teaching behaviors on tape can contribute directly to acquisition of the referent behaviors by the participants. In their study they compared the efficacy of video examples of teaching behaviors with high structure with video examples which had low structure. Their findings indicate that both groups had significant gains in concept acquisition but that there was no significant difference between the overall achievement of the two groups. These findings support the conclusions of Pell and Gay (1977) who also used tapes of teaching behaviors to instruct junior level preservice teachers. Pell and Gay divided 96 students into four groups to receive instruction in the following ways: (1) viewing the tapes, (2) verbal instruction and viewing the tapes, (3) verbal instruction alone, and (4) a control group which received no instruction. Not only did all groups which received some form of instruction significantly improve on posttest achievement, the control group performed just as well as each of the experimental groups.

Lange (1971) studied the effects of a single 20-minute video of a model teacher on the ability of student teachers to model the behavior. He was able to show that a significantly greater amount of the behaviors

were exhibited by the group which viewed the tape than were used by the control group which viewed a neutral tape. These conclusions are also supported by Wagner (1973) who found that learning to identify instances of a specific behavior in a video example has a significant effect on the frequency of using that skill in a subsequent microteach, without prior practice.

Haberly (1981) used videotaped models and microteaching to train preservice science teachers in the use of prelaboratory and divergent questioning skills. The use, or lack thereof, of these behaviors by the preservice teachers in the classroom during their student teaching experience was then examined. The results of the study indicate that the students were able to acquire the behaviors of prelaboratory and divergent questioning through the use of videotaped models and microteaching practice, but that their ability to transfer these skills to the classroom was limited. Specifically, Haberly found that the use of the prelaboratory behavior did transfer to the classroom during student teaching while the use of divergent questioning did not transfer.

This agrees with the conclusions of Copeland (1975), after finding no significant difference in the rates of exhibition of teaching skills during student teaching between those students who were in a preservice teacher education program which included microteaching and students in a program which did not include microteaching. However, Copeland did find that upon completion of the microteaching program, the experimental group exhibited a significantly higher mean rate of occurrence of the target behaviors.

In a study with 37 preservice elementary education majors, Kelly (1984) found that live and videotape models were equally effective in their ability to develop music teaching behaviors in a microteaching environment. Students participating in the study either viewed a live model demonstrate the skills or a videotape of the model, and were then observed and evaluated during five peer teaching episodes. They were also required to take a written exam which measured their understanding of the skills involved.

In a study which is closely related to the current one, Martin and Fanslow (1980) studied the effectiveness of videotape versus live model presentations. They sought to evaluate the quantity, and to a limited extent the quality, of two teaching behaviors necessary for use by home economics teachers. The effects of practice versus no practice in the use of the behaviors was also investigated. The two teaching behaviors which were either modeled live or seen on videotape were laboratory teaching and demonstration strategies in home economics. Four experimental groups, with approximately 12 students in each group, were created as follows: (1) model live presentation, no practice; (2) model videotape presentation, no practice; (3) model live presentation, practice; and (4) model videotape presentation, practice. The dependent variables were scores on an achievement test and rating score on their performance of the demonstration and laboratory strategies in a microteaching environment.

Based upon the analysis of their results, Martin and Fanslow (1980) concluded that there was no difference in the achievement of the four groups as measured by their performance on the written achievement test.

They were also unable to find any significant difference among the four groups and their ability to perform the laboratory strategy in a micro-teaching episode. However, a significant difference in demonstration skill performance in a microteaching experience was found between those students who viewed the videotape and those who viewed the live model.

Their conclusions state:

Inspection of the mean scores shows that students who viewed the videotape model presentations had a higher mean score (73 percent) than students who watched the live model presentation (60 percent). Since 70 percent was established as an acceptable level performance, the students who observed the videotape reached performance levels considered acceptable whereas the students who observed the live model did not reach this level. (Martin & Fanslow, 1980, p. 418)

While achievement as measured on a written test was at acceptable levels, Martin and Fanslow (1980) report that performance of the laboratory strategy was not judged as acceptable for either instructional methodology. They suggest that more learning opportunities may be needed due to the complex nature of the laboratory teaching paradigm.

## CHAPTER 3

## PROCEDURES

Introduction

Classroom observations and experience have been determined to be an essential component in the initial preparation of teachers (Lanier & Little, 1984). In a study done by Sunal (1980), direct observation of exemplary teaching behaviors in the field was shown to result in a corresponding increase in the quality of an undergraduate's initial teaching experience. The focus of this study was to ascertain whether the use of videodisc provides superior instruction over live modeling in the use of specific teaching behaviors for preservice teachers.

The problem of this study was to compare the quality of teaching of preservice teachers in a microteaching environment, of those students who observed specific teaching behaviors being modeled by the instructor, with the teaching quality of students who observed the behaviors via a videodisc medium.

This chapter describes the procedures implemented in the study. The population and investigative categories are defined, statistical hypotheses asserted, and methods of data collection, organization, and analysis presented. Precautions taken for accurate compilation of the data are also provided.

### Population Description

The 1988-89 Montana State University Catalog stated that the university is a four-year, public, comprehensive, land-grant university with undergraduate and graduate courses in liberal arts, basic science, the professional areas, agriculture, architecture, business, nursing, education and engineering. The enrollment figure for the 1988-89 academic year was approximately 11,000 students. Demographic statistics compiled on the total university population indicate that 84 percent of the students were Montana residents, and that 25 percent of the student body was 25 years of age or older (Montana State University Catalog, 1988).

The population which participated in the experiment consisted of all of the students enrolled in EDS 350--Strategies in Teaching at the university during the fall and winter quarters of the 1988-89 school year. A total of 112 students were included in the study.

Demographics compiled on the students enrolled in Strategies in Teaching during fall and winter quarter of the 1988-89 school year show that 10 percent of the population were of sophomore standing, 37 percent had junior standing, 35 percent were seniors, 8 percent were in their fifth year of undergraduate study, while a final 8 percent were non-degree students. Gender distribution was almost equally split with 52 percent male and 48 percent female students. One-third of the students participating were over age 25 at the time the study was conducted.

## The Experiment

### Assignment to Groups

For the purposes of the study, the students enrolled in EDSD 350-- Strategies in Teaching during the fall and winter quarters of the 1988-89 academic year were designated as control or experimental groups, based upon the random assignment of the largest section in the fall quarter. To accomplish this, a number was randomly chosen from the random numbers section of the *CRC Standard Mathematical Tables* (12th edition). If the number was 0 to 4, the fall class section with the largest enrollment would have been a control group; conversely, if the number was 5 to 9, the largest class would have been designated as an experimental group.

The number selected from the random numbers table was a 3. Thus, the largest section in fall quarter was a control group, the next largest section was designated as an experimental group, and so on. During winter quarter there were two experimental groups and one control group. The final total in the experimental group was 54, and the total number of students in the control group was 58.

Factors which were considered in developing the section assignment system were, first, that there were three sections of the course in the fall and another three sections in the winter, and secondly, that it has historically been the case that one of the three sections offered in each quarter is significantly under-enrolled compared to the other two sections. Therefore, the assignment of the sections to either the control or experimental group was done systematically to ensure as equal a

distribution of the population between the control and experimental groups as was possible.

### Treatment by Groups

Control group. The control group received a live demonstration of the specific teaching behaviors being measured in the study, during a model lesson taught by the instructor. The four specific behaviors which were pertinent to this study, and later evaluated in the teaching episodes of the students, were: (1) anticipatory set, (2) statement of objectives, (3) check for student understanding, and (4) closure. This 50-minute demonstration lesson was interrupted as necessary to point out the various behaviors being exhibited, and to discuss the implementation of the behaviors with the students. The behaviors exhibited by the instructor during the model lesson were rated by three evaluators trained in this process. Two of the three external evaluators had earned doctoral degrees in education, and the third was in the final stages of completing his doctoral dissertation. Evaluator #1 had five years of experience teaching in public schools and 13 years instructing preservice teachers at Montana State University. Evaluator #2 had eight years of teaching experience in the public schools and five years experience as a graduate teaching assistant. Evaluator #3 had seven years of public school teaching experience and an earned Ed.D. degree.

The evaluators used the standard rating form found in the Appendix and discussed in the Method of Data Collection section of this chapter. All three evaluators rated each of the four behaviors performed by the instructor as "exceeding expectations."

During the next regularly scheduled class following the demonstration lesson, a further discussion was initiated in which the analysis of the model lesson and the behaviors used were the central topics. The students were provided with a handout which summarized the content of the previous day's lesson. The teaching behaviors exhibited in the lesson were defined and redefined during the discussion, within the context of their use during the presentation. The students were also asked to provide other examples of these specific strategies from their own content areas.

The students were then divided into groups of four and assigned lab times in which to teach. By assigning them to groups of four, the students were not able to increase their observation time by watching the teaching episodes of the entire class. With four students in each group, the "teacher" had three "students" in the class to involve in the lesson and, with each microteach limited to a maximum of 15 minutes in duration, the four students could complete the exercise in one hour.

The requirements for this exercise stated that the student include the behaviors of anticipatory set, statement of objectives, check for student understanding, and closure in their lesson. All of the student teaching episodes were videotaped for later analysis.

Experimental group. The videodisc group viewed selected segments of "Improving Teacher Effectiveness" and "Teaching Episodes: Resources for the Analysis of Instruction" videodiscs which were jointly produced by MECC and ASCD. The videodiscs were used in a group instruction mode by the instructor for two 50-minute periods.

Relevant teaching segments which exemplify the proper use of anticipatory set, statement of objectives, check for student understanding, and closure had been identified on these discs by the researcher. Overall, the students saw five examples of anticipatory set, five examples of statement of objectives, five examples of checking for student understanding, and five examples of closure. Due to the nature of videodisc instruction, the instructor was able to sequence these episodes together, repeat them as necessary, and access them rapidly.

During instruction using the videodisc episodes, the class instructor and the students engaged in discussions concerning the implementation of the behaviors by the instructors on the disc. The teaching behaviors seen on the disc were defined and redefined by the students and instructor within the context of their use by the disc instructors. A discussion was also instigated in which the students were asked to recall or create examples of the behaviors related to their specific content areas.

The three external evaluators who rated the behaviors exhibited in the model lesson of the instructor also rated the quality of the behaviors on the videodisc. The composite results of their ratings are found in Table 1. The same five examples of each behavior were rated by each of the three evaluators.

Table 1. Composite totals of rated videodisc behaviors.

	Unacceptable	Acceptable	Exceeds Expectations
Anticipatory set	--	9	6
Statement of objectives	--	4	11
Check for understanding	3	9	3
Closure	4	8	3

The students in the experimental group were also divided into groups of four and assigned lab times in which to teach. The students were videotaped while teaching and the tapes reviewed to determine the number of times the four behaviors were used. Once a behavior was determined to be present, a qualitative judgment was made of that behavior.

#### Method of Data Collection

All 112 microteaching episodes were videotaped and the tapes evaluated by the researcher using the form found in the Appendix. The form required the evaluator to first confirm the presence or absence of each of the behaviors under study, i.e., anticipatory set, statement of objectives, check for student understanding, and closure, and then to make a relative assessment concerning the quality of the behavior. The quantitative judgment was made on the form using a simple "yes" or "no" designation, and the qualitative assessment was made by indicating whether the behavior was unacceptable, acceptable, or exceeded expectations. The reliability of the researcher was ascertained by correlating his ratings on 10 of the episodes with the ratings of the three external evaluators on the same 10 episodes.

A Kendall's Coefficient of Concordance was calculated to quantify the correlation of the three external judges with the researcher. Kendall's Coefficient of Concordance is used with nonparametric statistics to measure total correlation when more than two variates are involved (Conover, 1980). Kendall's "W," the correlation coefficient, has a range between 0 and 1, with 0 signifying no agreement and 1 signifying complete agreement (*SPSSx Manual*, SPSS, Inc., 1983). A rater correlation

coefficient of .94 was calculated for the rating of the presence of the behaviors, and a coefficient of .90 tabulated for the rating of the quality of the behaviors.

Of the four behaviors assessed, the anticipatory set usually occurred first in the lesson. Guskey and Easton (1982) noted that attributes which effective teachers have in common are an introduction at the beginning of the lesson, a summary at the end of the lesson, and a defined sequence of developmental steps in between. One of the main purposes of the anticipatory set behavior is to mentally prepare the student for today's content (Hunter, 1982). Hunter also stated that the anticipatory set may include a review of previously learned material which is necessary for an understanding of today's topic. Good and Brophy (1978) characterized the lesson introduction as an activity that should describe what material will be covered and show the relevance of the material to the student. It should also serve to orient the class to the new material by possibly showing the student the structure of the discipline and how the new material relates to larger concepts (Ausubel, 1963). It is often appropriate to include the statement of objectives as part of the anticipatory set, as this serves to orient the students to the content and prepare them for learning (Hunter, 1982; Reece et al., 1986).

For the purposes of this study, an unacceptable anticipatory set behavior was defined as one in which the teacher only reviewed some prerequisite material and then proceeded into the new content. An acceptable behavior by the teacher was defined as one in which a review of prerequisite material was present, and the teacher presented an overview of the material and demonstrated to the student how the new

material would fit into the larger context of the discipline. An anticipatory set behavior which exceeded expectations was defined as one which met the criterion of an acceptable behavior and also served in some way to motivate the students to learn. Through this behavior the teacher either involved, intrigued, or stimulated the students in such a way as to increase their motivation to learn.

The statement of objectives behavior occurred when the students actually stated the behavioral objective(s) which were the basis of their lesson. Beginning the class with an orientation that includes the objectives of the lesson combined with how the lesson relates to previously learned material adds needed structure to the teaching/learning process (Reece, et al., 1986). Students tend to expend more effort and increase their learning if they are made aware of the learning behaviors for the lesson (Hunter, 1982).

An unacceptable statement of objectives was defined as one in which the teacher only implied the nature of character of the lesson objectives. For example, a statement such as, "Today we are going to learn about the Civil War" would be rated as unacceptable. An acceptable statement of objectives behavior was one in which the teacher more clearly defined the nature of the learning which was to transpire. "Today we are going to learn the causes of the Civil War and the names and places of the major battles" would be rated as an acceptable behavior. A statement of objectives which exceeded expectations was one in which the teacher specified in clear terms the exact knowledge and behaviors that the student would be responsible for upon completion of instruction. To continue the example, "Today we are going to discuss the Civil War; at the

end of the discussion you will be able to list the two economic causes and the three political causes and be able to rate them according to their relative importance in causing the war." This example would be rated as a behavior which exceeded expectations.

Teacher initiated questions can be used to develop student interest, direct student thinking, and clarify topics being discussed (Reece et al., 1986). Questioning techniques are an effective means of assessing student understanding during a lesson without the necessity of administering a written test (Hunter, 1982).

When performing the check for understanding behavior, a rating of unacceptable was assigned if the student only asked rhetorical questions of the group as a whole. "Okay, any questions?" was considered to be a check for understanding because it did allow a student to voice a question if desired, but the behavior was unacceptable because it does not provide the teacher with a clear picture of the degree to which the information is being comprehended by the members of the class. An acceptable behavior was one in which the teacher asked specific content related questions, but only called upon those students who raised their hands or volunteered in other ways to answer the question. Whereas this behavior provides the teacher with a more accurate measure of the level of comprehension in the class, it still falls short of assessing the understanding of the entire class. A check for understanding which exceeded expectations involved the teacher in parceling out specific questions to individual students, independent of whether they raised their hands or volunteered to answer. Another form of a check for understanding behavior which would be rated as exceeding expectations is one in which the class is involved in a group

activity through which the teacher may assess the group's understanding as well as individual comprehension of the concepts. A foreign language lesson in which the students are required to play a game of "Simon Says," using the new vocabulary words which pertain to parts of the body, is an example of a group check for understanding which would be rated as exceeding expectations.

By its very nature, closure is the last of the four behaviors to be exhibited during a lesson. In effect, closure is a summary of the lesson in which the new material is recapped and put into the larger context of which it is a part. Cruickshank (1985) reported that teachers who frequently review past concepts are considered to be more clear in their teaching. Smith (1985) suggested that review of key concepts before and after instruction has occurred is essential for student understanding.

For the purposes of this study, an unacceptable closure behavior was one in which the teacher briefly reiterated the lesson content. The behavior was rated acceptable if the content was summarized and appropriate relationships of the lesson segments to each other were made. A behavior which was rated as exceeding expectations involved the teacher in performing the acceptable behaviors, as well as involving the student in drawing conclusions and inferring the relationships inherent in the new material.

#### Rater Reliability

The researcher was the prime reviewer of all the teaching episodes used in the study. The researcher's reliability in the analysis of the teaching episodes was calculated by correlating his ratings on 10 of the

episodes with the ratings of three other evaluators who viewed the same episodes. Kendall's Coefficients of Concordance of .90 and .94 were calculated for the correlation of the ratings for the presence of the behaviors and the quality of the behaviors, respectively.

The three external evaluators were trained by the researcher to recognize and assess the specific teaching behaviors used in the study. This initial training was accomplished by having the evaluators view, discuss with the researcher, and then rate example behaviors. After approximately seven hours of inservice training, the evaluators were given 10 student teaching episodes to assess. Their ratings of these 10 episodes were compared to the researcher's evaluations of the same 10 students and a rater reliability using Kendall's Coefficient of Concordance was calculated on the ratings concerning the presence (.90) and quality (.94) of the behaviors. They also assessed the quality of the behaviors as they appeared on the videodiscs used in the study and the quality of the behaviors exhibited by the instructor in the model lesson. Approximately 40 percent of the behaviors on the disc were rated as exceeding expectations, 50 percent as acceptable, and 10 percent were rated as unacceptable. The behaviors exhibited during the live model lesson were all rated as exceeding expectations. All assessments made by the evaluators were recorded on the standard form used throughout the study.

The researcher has observed and evaluated teaching behaviors in a variety of settings for approximately six years. His experience includes 10 years of teaching, three years as a principal, three years as a researcher and author for Harcourt Brace Jovanovich (a prominent textbook

publisher), two years evaluating student teachers, and two years of experience teaching methodologies to preservice teachers, in which he has evaluated over 500 teaching episodes of the type used in this study.

#### Method of Organizing the Data

Due to the nature of the data and the hypotheses tested in the study, the chi square test of independence was used to evaluate the results of the evaluations. Chi square is a nonparametric test of significance which is appropriate for use when the data are in the form of frequency counts in two or more categories (Gay, 1976). A significant chi square value will indicate if the observed frequencies of the behaviors are different from the frequencies expected if the presence of the behavior was independent of membership in the control or experimental group (Ferguson, 1981).

Standard chi square test for independence contingency tables were used to display the data. A test was run and the results tabulated to determine the dependency of the presence of each of the behaviors in the teaching episode of a student, on whether the student was in the control or experimental group. The chi square test of independence was also performed on the data relating to the quality of each of the behaviors exhibited by the two groups.

To assist the reader in the interpretation of the results, summary tables were also included showing the percentage of each group which performed the behavior at a particular quality level, compared to the total in the group who performed the behavior.

### Statistical Hypotheses

The consequences of committing a Type I or a Type II error were considered prior to deciding upon an appropriate probability level of significance for the chi square test results. In this study, a Type I error would result if a true null hypothesis of "no dependency of the presence of the teaching behaviors upon group membership" was rejected. The consequences of such a Type I error would be to indicate to teacher educators that one or the other of the two methods being compared in the study was more productive in its ability to prepare preservice teachers in the use of specific teaching behaviors, when in fact there was no difference between the two.

A Type II error in this study would result if a false null hypothesis of "no dependency of the presence of the teaching behaviors upon group membership" was retained. The consequences of such a Type II error would be to conclude that the methods were of equal efficacy, when in fact one of the methods was superior to the other.

To achieve a rational balance between the chances of committing either a Type I or Type II error, the statistical hypotheses listed below were tested at the .05 level of significance. The .05 level of significance is generally considered to provide adequate control of both Type I and Type II errors (Ferguson, 1981). For all chi square contingency tables, a probability value associated with the calculated chi square statistic is given. Each hypothesis is stated in the null and alternate forms:

- (1) Ho: The presence or absence of an anticipatory set in the teaching episode of a student was independent of whether the student was in the control or experimental group.
- Hi: The presence or absence of an anticipatory set in the teaching episode of a student was dependent upon whether the student was in the control or experimental group.
- (2) Ho: The presence or absence of a statement of objectives in the teaching episode of a student was independent of whether the student was in the control or experimental group.
- Hi: The presence or absence of a statement of objectives in the teaching episode of a student was dependent upon whether the student was in the control or experimental group.
- (3) Ho: The presence or absence of a check for student understanding in the teaching episode of a student was independent of whether the student was in the control or experimental group.
- Hi: The presence or absence of a check for student understanding in the teaching episode of a student was dependent upon whether the student was in the control or experimental group.
- (4) Ho: The presence or absence of closure in the teaching episode of a student was independent of whether the student was in the control or experimental group.
- Hi: The presence or absence of closure in the teaching episode of a student was dependent upon whether the student was in the control or experimental group.

(5) Ho: The level of quality of the anticipatory set behavior in the teaching episode of a student was independent of whether the student was in the control or experimental group.

Hi: The level of quality of the anticipatory set behavior in the teaching episode of a student was dependent upon whether the student was in the control or experimental group.

(6) Ho: The level of quality of the statement of objectives behavior in the teaching episode of a student was independent of whether the student was in the control or experimental group.

Hi: The level of quality of the statement of objectives behavior in the teaching episode of a student was dependent upon whether the student was in the control or experimental group.

(7) Ho: The level of quality of the check for student understanding behavior in the teaching episode of a student was independent of whether the student was in the control or experimental group.

Hi: The level of quality of the check for student understanding behavior in the teaching episode of a student was dependent upon whether the student was in the control or experimental group.

(8) Ho: The level of quality of the closure behavior in the teaching episode of a student was independent of whether the student was in the control or experimental group.

Hi: The level of quality of the closure behavior in the teaching episode of a student was dependent upon whether the student was in the control or experimental group.

### Method of Analyzing the Data

This section is divided into three subparts: (1) compilation of the data, (2) testing hypotheses, and (3) precautions for accuracy.

#### Compilation of the Data

A direct count of the number of teaching behaviors was made in each of the four categories of anticipatory set, statement of objectives, checking for student understanding, and closure, which were exhibited by the control and experimental groups. Separate totals were tabulated for each of the four teaching behaviors exhibited and a grand total of all behaviors used by each group was calculated. A percentage figure was then calculated for the occurrence of each behavior in the experimental group and the control group by dividing the number of observed behaviors by the total number of possible behaviors in each category.

In the same manner, a total count was made of the number of unacceptable, acceptable, and exceptional behaviors employed by the experimental and control groups. Subtotals were calculated for the relative quality of each of the four categories of teaching behaviors. The percentage of unacceptable, acceptable, and exceptional behaviors in each of the four categories was then calculated based upon the number of students who performed the behavior, not upon the total number of students in the total group.

#### Testing Hypotheses

Hypotheses 1 through 8 were tested using the chi square test of independence. This test is appropriate for testing whether two nominal variables are independent of each other (Ferguson, 1981).

Precautions for Accuracy

Data from the rating forms were transferred to the computer by the researcher and checked for accuracy by another doctoral student skilled in the use of the *Statistical Package for the Social Sciences* (SPSSx) computer program.

## CHAPTER 4

## ANALYSIS OF DATA

Introduction

The data reported in this chapter are arranged according to the order of the hypotheses listed in Chapter 3. A total of eight hypotheses were formulated in Chapter 3, and the results of their statistical analyses are presented here. Standard chi square test of independence contingency tables are used throughout this section to display the data. To assist the reader in the interpretation of the data, tables of group behavior counts and percentages are also included.

A total of 112 students participated in the study. This number represents the entire student enrollment in ESD 350 for fall and winter quarters of the 1988-89 academic year. Of the 112 students participating, 54 students were in the experimental group which received videodisc instruction, and 58 students were in the control group.

Table 2 is a summary table in which the total number of each of the teaching behaviors assessed is tabulated for the control group and the experimental group. The experimental group (N=54) performed a greater number of statement of objectives, check for understanding, and closure behaviors than did the control group (N=58). The greatest differences between the number of behaviors present occurred with the behaviors of statement of objectives and closure.

Table 2. Total of specific behaviors exhibited by control and experimental groups.

	Anticipatory Set	Statement of Objectives	Check for Understanding	Closure
Control Group (N=58)	57	42	51	36
Experimental Group (N=54)	54	50	52	48

Since the control and experimental groups differed in size, Table 3 is presented to depict the raw counts of behaviors as percentages of the total number of behaviors able to be performed by each group. In each case, it can be seen that a greater percentage of students in the experimental group performed each of the specific behaviors.

Table 3. Percentage of specific behaviors exhibited by control and experimental groups.

	Anticipatory Set	Statement of Objectives	Check for Understanding	Closure
Control Group (N=58)	98.2%	72.4%	87.9%	62.0%
Experimental Group (N=54)	100.0%	92.5%	96.2%	88.8%

If a particular teaching behavior was exhibited by an individual, a qualitative measure of that behavior was then made. Of those students in the two groups who did perform a behavior, a count was made of the number of unacceptable, acceptable, and those behaviors which exceeded

expectations for each of the four behaviors measured. These raw counts and their percentage of the total number of students who performed the specific behavior have been tabulated and appear in Tables 4 through 7. The N for the control and experimental groups were derived from Table 2, and consequently change from table to table since the percentages were calculated based upon the total number in each group who performed the behavior, not the total number of students in the group.

Table 4. Quality of anticipatory sets exhibited by control and experimental groups.

	Unacceptable	Acceptable	Exceeds Expectations
	<----- % of N ----->		
Control Group (N=57)	24.5	66.6	8.7
Experimental Group (N=54)	5.5	66.6	27.7

As indicated by the data in Table 4, a greater percentage of students in the control group had anticipatory sets which were unacceptable; conversely, a greater percentage of the students in the experimental group had anticipatory sets which exceeded the expected quality. Both the control and the experimental groups had equal percentages of behaviors rated as acceptable.

Table 5 presents the quality of statement of objectives exhibited by the control and experimental groups. Of those students in each group who exhibited the statement of objectives behavior, a greater percentage of

students in the experimental group had behaviors rated as exceeding the expectations for that behavior. The control group had a greater percentage of behaviors rated as acceptable and unacceptable.

Table 5. Quality of statement of objectives exhibited by control and experimental groups.

	Unacceptable	Acceptable	Exceeds Expectations
	<----- % of N ----->		
Control Group (N=42)	30.9	47.6	21.4
Experimental Group (N=50)	20.0	22.0	58.0

The same pattern was repeated for the percentages of the check for understanding behavior in the two groups. The experimental group had a greater percentage of behaviors rated as exceeding expectations, while the control group had a greater number of behaviors rated as acceptable and unacceptable. The results are tabulated in Table 6.

Table 6. Quality of check for understanding exhibited by control and experimental groups.

	Unacceptable	Acceptable	Exceeds Expectations
	<----- % of N ----->		
Control Group (N=51)	13.7	82.3	3.9
Experimental Group (N=52)	1.9	51.9	46.1

The group percentages of closure behaviors rated unacceptable, acceptable, and exceeding expectations followed the same distribution pattern found in Tables 5 and 6. The control group had the greater percentage of unacceptable and acceptable behaviors and the experimental group had the greater percentage of behaviors rated as exceeding expectations. The data are presented in Table 7.

Table 7. Quality of closure exhibited by control and experimental groups.

	Unacceptable	Acceptable	Exceeds Expectations
	←----- % of N ----->		
Control Group (N=36)	22.2	58.3	19.4
Experimental Group (N=48)	8.3	50.0	41.6

#### Quantity of Behaviors Present

The data presented in Tables 8 through 11 were calculated using the chi square test of independence (Ferguson, 1981). The data were analyzed using the SPSSx computer program on the mainframe computer at Montana State University. An alpha level of .05 was used throughout the data analysis.

In each contingency table, in the column under the heading, "yes," the "expected" value is the number of students expected to have performed the behavior and is calculated based upon the assumption of no dependency between the two independent variables. The "observed" value under the "yes" heading is the actual number of students who did perform the

behavior. Under the "no" heading, the "expected" value refers to the number of students who were expected not to include the behavior in their teaching, and the "observed" value is a count of the actual number of students who failed to include the behavior.

A correction factor which is commonly recommended for use with 2 x 2 chi square calculations of the type found in Tables 8 through 11 is Yates' correction for continuity (Ferguson, 1981). Yates' correction has been applied to the data in the contingency tables and is reflected in the chi square values shown in each case.

Tables 8 through 11, respectively, present the statistical findings related to the following null hypotheses from Chapter 3:

- (1) The presence or absence of an anticipatory set in the teaching episode of a student was independent of whether the student was in the control or experimental group.
- (2) The presence or absence of a statement of objectives in the teaching episode of a student was independent of whether the student was in the control or experimental group.
- (3) The presence or absence of a check for student understanding in the teaching episode of a student was independent of whether the student was in the control or experimental group.
- (4) The presence or absence of closure in the teaching episode of a student was independent of whether the student was in the control or experimental group.

Table 8 presents the number of anticipatory sets exhibited by the control and experimental groups. However, since 50 percent of the expected values in the table are 5 or less, this particular chi square analysis is not capable of providing meaningful results (Ferguson, 1981).

Table 8. Chi square test of independence for anticipatory set by method.

	<----- Present ----->			
	Yes		No	
	Expected	Observed	Expected	Observed
Control Group (N=58)	57.5	57.0	0.5	1.0
Experimental Group (N=54)	53.5	54.0	0.5	0
-----				
Critical chi square = 3.84		DF = 1		Alpha = .05
Calculated chi square = .00		DF = 1		Prob. = 1.00

The presence of the statement of objectives behavior was shown to be dependent upon group membership; 50 of the 54 students in the experimental group exhibited the behavior, compared to 42 of the 58 students in the control group. The chi square value of 6.44 was shown to have a probability of .01, and therefore the null hypothesis of no dependency of the statement of objectives behavior upon group affiliation was rejected. The data are presented in Table 9.

Table 9. Chi square test of independence for statement of objectives by method.

	<----- Present ----->			
	Yes		No	
	Expected	Observed	Expected	Observed
Control Group (N=58)	47.6	42.0	10.4	16.0
Experimental Group (N=54)	44.4	50.0	9.6	4.0
-----				
Critical chi square = 3.84		DF = 1		Alpha = .05
Calculated chi square = 6.44		DF = 1		Prob. = .01

Table 10 presents data relating to the dependence of the check for understanding behavior upon the method of instruction. Once again, 50 percent of the expected values in the table were less than 5. This is due to the fact that a vast majority of the students in the control and the experimental groups included a check for student understanding in their teaching episode. The effect of this performance is to drastically reduce the expected values for the number of students in both groups who did not include the behavior. As with Table 8, the chi square values generated by such a distribution are not meaningful.

Table 10. Chi square test of independence for check for understanding by method.

	----- Present ----->			
	Yes		No	
	Expected	Observed	Expected	Observed
Control Group (N=58)	53.3	51.0	4.7	7.0
Experimental Group (N=54)	49.7	52.0	4.3	2.0
-----				
Critical chi square	= 3.84	DF = 1	Alpha = .05	
Calculated chi square	= 1.60	DF = 1	Prob. = .20	

Table 11 depicts the chi square results of the analysis for the presence of the closure behavior by instructional method. There was significant dependency of the presence of the closure behavior upon whether the student was in the control or experimental group. A greater number of the students in the experimental group included the behavior in their teaching than expected, while fewer of the students in the control

group performed the behavior than was expected. Given these numbers, it follows that a greater number of the students in the control group did not include the behavior in their teaching than was expected, and fewer of the experimental group did not include the behavior. The calculated chi square value of 9.3 had a probability associated with it of .002. This is less than the alpha level of .05, so the null hypothesis of no dependency of the closure behavior on group membership was rejected. These data appear in Table 11.

Table 11. Chi square test of independence for closure by method.

	----- Present ----->			
	Yes		No	
	Expected	Observed	Expected	Observed
Control Group (N=58)	43.5	36.0	14.5	22.0
Experimental Group (N=54)	40.5	48.0	13.5	6.0
-----				
Critical chi square = 3.84		DF = 1		Alpha = .05
Calculated chi square = 9.30		DF = 1		Prob. = .002

#### Quality of Behaviors Present

The data presented in Tables 12 through 15 concern the analysis of the quality of behaviors present in each group. These data were also calculated using the chi square test of independence (Ferguson, 1981), and analyzed using the SPSSx computer program on the mainframe computer at Montana State University. An alpha level of .05 was used throughout the data analysis.

Under each of the quality headings in the tables, the "expected" value is the number of students expected to have performed the behavior at the quality level indicated, out of the number of students in that group who exhibited the behavior. The "observed" value under each quality heading is the actual number of students to have performed the behavior at that level.

The Yates' correction factor for continuity was not used in the calculation of the chi square values for these tables due to the fact that the tables were 2 x 3, with a corresponding DF of 2 (Ferguson, 1981).

Tables 12 through 15 present the statistical findings related to the following null hypotheses listed in Chapter 3:

- (5) The level of quality of the anticipatory set in the teaching episode of a student was independent of whether the student was in the control or experimental group.
- (6) The level of quality of the statement of objectives in the teaching episode of a student was independent of whether the student was in the control or experimental group.
- (7) The level of quality of the check for student understanding in the teaching episode of a student was independent of whether the student was in the control or experimental group.
- (8) The level of quality of closure in the teaching episode of a student was independent of whether the student was in the control or experimental group.

Table 12 displays the data pertaining to the quality of the anticipatory set behaviors which were performed by the students in the control and experimental groups. The control group had a greater number of

unacceptable behaviors than expected, whereas the experimental group had a greater number of behaviors which exceeded expectations than were predicted. The chi square value of 12.09 is significant with a probability level of .002; therefore the null hypothesis of no dependency between the quality of the anticipatory set behavior and membership in the experimental or control groups was rejected.

Table 12. Chi square test of independence for quality of anticipatory set by method.

	<u>Unacceptable</u>		<u>Acceptable</u>		<u>Exceeds Expectations</u>	
	Expected	Observed	Expected	Observed	Expected	Observed
Control Group (N=57)	8.7	14.0	38.0	38.0	10.3	5.0
Exper. Group (N=54)	8.3	3.0	36.0	36.0	9.7	15.0
-----						
Critical chi square	= 5.99		DF = 2		Alpha = .05	
Calculated chi square	= 12.09		DF = 2		Prob. = .002	

The data in Table 13 show that there were approximately eight more high quality statement of objectives behaviors observed in the experimental group than were expected, whereas the control group had approximately eight fewer high quality behaviors than were expected. The control group had 20 observed acceptable behaviors compared to the expected value of 14, and the experimental group had 11 observed acceptable behaviors, which was less than the expected value of 16.8. The observed values for both the experimental and control groups were relatively close to their respective expected values. The calculated chi

square value of 12.93 with its probability of .001 reflects the deviations of the observed frequencies from the expected values. The null hypothesis of no dependency of the observed quality of the statement of objectives behavior on whether the students were in the control or experimental groups was therefore rejected.

Table 13. Chi square test of independence for quality of statement of objectives by method.

	<u>Unacceptable</u>		<u>Acceptable</u>		<u>Exceeds Expectations</u>	
	Expected	Observed	Expected	Observed	Expected	Observed
Control Group (N=42)	10.5	13.0	14.2	20.0	17.3	9.0
Exper. Group (N=50)	12.5	10.0	16.8	11.0	20.7	29.0
-----						
Critical chi square	= 5.99		DF = 2		Alpha = .05	
Calculated chi square	= 12.93		DF = 2		Prob. = .001	

Of the total number of students in both the control and experimental groups who did include the check for understanding behavior in their teaching (N=103), only eight of the behaviors were rated as unacceptable. Due to the low number of unacceptable behaviors, and the relatively equal numbers of students who performed the behavior in the two groups, the expected value in this column for both the control and experimental groups was 4. It is a commonly accepted rule when calculating chi square that 80 percent of the expected values must be 5 or greater for meaningful conclusions to be drawn from the data. In this case, roughly 30 percent

of the expected values were less than 5; thus, no meaningful interpretation of the data was possible. The data appear in Table 14.

Table 14. Chi square test of independence for quality of check for understanding by method.

	<u>Unacceptable</u>		<u>Acceptable</u>		<u>Exceeds Expectations</u>	
	Expected	Observed	Expected	Observed	Expected	Observed
Control Group (N=51)	4.0	7.0	34.2	42.0	12.9	2.0
Exper. Group (N=52)	4.0	1.0	34.8	27.0	13.1	24.0
-----						
Critical chi square =	5.99		DF =	2		Alpha = .05
Calculated chi square =	26.36		DF =	2		Prob. = .000

The observed and expected frequencies of each of the three qualities of closure behaviors are reflected in Table 15. The control group had less than expected numbers of high quality closure behaviors and more than expected behaviors rated unacceptable. The observed high quality behaviors in the experimental group were greater than expected, and the number of observed unacceptable behaviors was less than expected. The calculated chi square value of 6.2 had a probability of .04; therefore, the null hypothesis of no dependency of the quality of the behavior upon group membership was rejected.

Table 15. Chi square test of independence for quality of closure by method.

	<u>Unacceptable</u>		<u>Acceptable</u>		<u>Exceeds Expectations</u>	
	Expected	Observed	Expected	Observed	Expected	Observed
Control Group (N=36)	5.1	8.0	19.3	21.0	11.6	7.0
Exper. Group (N=48)	6.9	4.0	25.7	24.0	15.4	20.0
-----						
Critical chi square =	5.99		DF =	2		Alpha = .05
Calculated chi square =	6.20		DF =	2		Prob. = .04

## CHAPTER 5

## SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Introduction

The information reported in this chapter presents an overview of the study, provides conclusions based upon the interpretation of the results of the study, and recommends areas for further research. The conclusions and recommendations are provided separately for the analysis of the quantity of behaviors present and for the analysis of the quality of the observed behaviors.

Summary

This study was conducted at Montana State University during the fall and winter quarters of the 1988-89 academic year. The purpose of the study was to investigate the differential effects of two teaching methodologies employed when instructing preservice teachers in the use of specific teaching behaviors.

The participants in the study were all those students enrolled in a junior level, secondary education, general methods course during the fall and winter quarters. The six sections of the course were systematically assigned to either the control or the experimental group. The control group members received their basic instruction in the use of four specific teaching behaviors by observing the instructor model the behaviors

during a lesson presented in class. The students in the experimental group received their instruction by viewing videodisc examples of the four behaviors. The four target behaviors used in the study were: (1) anticipatory set, (2) statement of objectives, (3) check for student understanding, and (4) closure.

All students were required to complete a 15-minute microteach into which they incorporated the four target behaviors. All of the teaching episodes were videotaped for analysis. Each microteach was evaluated to determine if the specific teaching behavior was exhibited by the student, and secondly, if the behavior was present, a determination of the quality of that behavior was made.

The data were analyzed to determine if the number of each of the four behaviors included in the teaching of the experimental group and the control group was dependent upon the method of initial instruction each group received. If the behavior was present, dependency of the quality of the specific behavior upon instructional method was also tested. The dependency of the occurrence of each behavior and subsequent quality of that behavior were analyzed using the chi square test of goodness of fit.

### Conclusions

#### Quantity of Behaviors Present

The following conclusions are offered based on the analysis of data pertaining to the number of each of the behaviors which were exhibited by the control and experimental groups.

- (1) Since 111 of the 112 students in the study included an anticipatory set in their teaching episode, the use of the videodisc sequences was not shown to be superior in enabling students to use this behavior.
- (2) The fact that the presence of the statement of objectives in the teaching episode was dependent upon initial instructional methodology, combined with the observation that the experimental group had a higher rate of occurrence of the behavior than did the control group, demonstrated that viewing videodisc examples of this behavior is more effective than live modeling in causing students to include instances of the behavior in their teaching.
- (3) Videodisc instruction was not superior to live modeling in causing students to use the behavior of check for understanding in their teaching.
- (4) Videodisc modeling of the behavior was more effective in causing students to include instances of closure in their teaching than instruction via live demonstration.

In summary, the teaching methodology of videodisc modeling was superior in enabling preservice teachers to use the behaviors of statement of objectives and closure in their own teaching. These findings are in agreement with Bandura (1977), Martin and Fanslow (1980), and Sharp (1981).

The behaviors of statement of objectives and closure are relatively prescriptive in nature, and may not be assimilated easily by the students. The videodisc presentation, in allowing the student to view only one behavior at a time, may expedite the transfer of the behavior to the student.

Videodisc instruction was not significantly more effective than live modeling in inducing the participants to employ the target behaviors of anticipatory set and check for understanding. The conclusion that the methodology of live demonstration is equally as effective as videodisc modeling is supported by the work of Kelly (1984) and King (1979). The effectiveness of direct modeling in enabling students to use the behavior of anticipatory set is somewhat in disagreement with the work of Reece et al. (1986).

The overwhelming number of students in both the experimental and control groups who included the behaviors of anticipatory set and check for understanding in their teaching may indicate that these behaviors have been a common element experienced throughout their education. If this were the case, further instruction in their use would not significantly impact the ability of the students to perform the behavior.

#### Quality of Behaviors Present

The following conclusions are presented based on the analysis of data concerning the quality of the four target behaviors exhibited by the control and experimental groups.

- (1) Videodisc instruction was more effective than live demonstration in enabling students to perform an anticipatory set at a level which exceeded expectations, whereas both modes of instruction were equally effective in enabling students to perform the behavior at an acceptable level.
- (2) Videodisc instruction was superior to live demonstration in enabling students to perform the behavior of statement of objectives at a

quality level which exceeded expectations. Live modeling was effective in enabling students to perform the behavior at an acceptable level.

- (3) The data were not sufficient to determine a significant result concerning the dependency of the quality of the check for understanding behavior upon teaching methodology.
- (4) Videodisc modeling was more effective than the live modeling method in producing high quality closure behaviors in the student's teaching.

In summary, the quality of the anticipatory set, statement of objectives, and closure behaviors used by the participants in the study were found to be dependent upon teaching methodology. In each case, using the videodisc sequences for instruction was a more effective teaching strategy in terms of its ability to promote the use of the target behavior at increased quality levels. It should also be noted, however, that the direct modeling of the behavior continually produced more students capable of performing the behaviors at an acceptable level than was expected. This conclusion was also reached by Sunal (1980). Therefore, both methods of instruction are effective, but the videodisc instruction creates a condition in which the students are able to use the behaviors at a higher quality. This condition may be the ability to focus the student's attention directly upon the usage of one specific behavior at a time for a relatively short duration, thus increasing the student's conceptual understanding of the behavior. These findings contradict those of Haberly (1981), but are in agreement with Bandura (1977) and Kelly (1984).

## Recommendations

### Recommendations for Action

- (1) Instructors of preservice teachers should be encouraged to include videodisc examples of positive teaching behaviors as part of the process of preparing teachers to use those same behaviors.
- (2) Colleges of Education should consider creating a library of video-taped teaching episodes by taping local teachers who have been identified as exemplary in their use of specific instructional strategies. This library of teaching vignettes could be used either in a whole class environment or by individual students requiring further examples of the target behavior.
- (3) Due to the limited but positive effects of the live demonstration methodology, instructors in teacher education classes should continually model the behaviors they expect their students to use in later teaching situations. This recommendation is in agreement with those advanced by Reece et al. (1986).

### Recommendations for Further Study

- (1) This study should be replicated in other geographical locations with students from suburban and urban backgrounds. The students in this study were predominantly Montana residents from rural environments, which may limit the ability to generalize the research findings to students from more populated areas.
- (2) The study should also be replicated using a variety of other target teaching behaviors. It may be that the results obtained when more complex teaching behaviors are used by the preservice teachers will

differ from the results of this study. This is in agreement with conclusions drawn by Martin and Fanslow (1980).

- (3) Further research should be performed to investigate the long-term effectiveness of the videodisc instructional methodology in enabling preservice teachers to use the target behaviors in an effective manner during their student teaching experience.
- (4) Further study should be performed to investigate the benefits of instructor modeling of correct positive behaviors in teacher education classes over an extended period of time. This area of research is neglected and the possible benefits in teacher education are considerable (Wilson, 1987).
- (5) Further research should be conducted to investigate the effectiveness of preservice teachers observing exemplary classroom teachers live via television transmission versus viewing prerecorded video vignettes. A project in which video cameras were installed in public school classrooms and the live broadcasts beamed into a university undergraduate teacher education class was begun in 1986 in Iowa (Merkley & Hoy, 1985; Hoy, 1985). A study which investigated the effectiveness of this methodology when compared to live demonstration in the classroom, or prerecorded video sequences, would be of benefit to further understand the relative merits of the three approaches.
- (6) Further research should be performed to investigate the efficacy of having students watch the videotape of their microteaching and then compare their performance to the taped model teacher. The use of the taped microteaching performance to provide feedback to the student is one of the more common ways video is used in preservice teacher

education (Frager, 1985). A synergistic effect of this strategy may occur when combined with observation of the model teacher on videotape and result in greater ability of the student to perform the behavior in subsequent teaching episodes.

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APPENDIX

## MICROTEACHING EVALUATION FORM

Student Name: \_\_\_\_\_ -or- Student Number: \_\_\_\_\_

Evaluator's Name: \_\_\_\_\_

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Teaching Behavior:(1) Anticipatory Set/Advance OrganizerAccomplished:  Yes  NoQuality:  Unacceptable  Acceptable  
 Exceeds Expectations(2) Statement of the Lesson Objective(s)Accomplished:  Yes  NoQuality:  Unacceptable  Acceptable  
 Exceeds Expectations(3) Check for Student UnderstandingAccomplished:  Yes  NoQuality:  Unacceptable  Acceptable  
 Exceeds Expectations(4) ClosureAccomplished:  Yes  NoQuality:  Unacceptable  Acceptable  
 Exceeds Expectations

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