The lasting effects of instruction and supervision in interaction analysis on the teaching behavior, effectiveness, and attitudes of inservice physical educators

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THE LASTING EFFECTS OF INSTRUCTION AND SUPERVISION IN INTERACTION
ANALYSIS ON THE TEACHING BEHAVIOR, EFFECTIVENESS,
AND ATTITUDES OF INSERVICE PHYSICAL EDUCATORS

by

Patricia Ann Quinn

An Abstract

of a thesis submitted in partial fulfillment
of the requirements for the degree of
Master of Science in the School
of Health, Physical Education
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Thesis Advisor: Dr. Victor Mancini
ABSTRACT

This investigation studied the long-term effects on inservice physical educators' teaching environments, including observed teaching behavior, teaching effectiveness, and attitudes toward teaching, as a result of the supervision and/or instruction in interaction analysis (IA) received during undergraduate teacher training. The subjects were 26 inservice physical educators who were in their first 3 years of teaching. During their undergraduate teacher training all subjects had been involved in research studies investigating the effects of instruction and/or supervision in CAFIAS. The assignment of subjects to either the treatment or the control group was based on whether or not they had received instruction and/or supervision in IA during their undergraduate training. The instruments used to collect data included CAFIAS for measuring teaching behavior and interaction patterns, the Teacher Performance Criteria Questionnaire (TPCQ) for measuring teaching effectiveness, and the Teaching Situation Reaction Test (TSRT) for assessing attitudes toward teaching. Each subject was videotaped at his/her school while teaching two regular classes of his/her choice. CAFIAS was used to code those videotapes and provide the data on teaching behavior. The TSRT, which provided data on teaching attitudes, was also completed by each subject. A panel of four experienced judges viewed the videotapes and completed the TPCQ for each subject to provide the data on teaching effectiveness. Multivariate analysis of variance (MANOVA) followed by discriminant function analysis and univariate analyses of variance (ANOVA's) were used first to identify significant differences in the overall teaching environment between the treatment and control groups. The MANOVA determined significant between-group differences in overall teaching environment. The discriminant function analysis identified that 97.5% of the between-group variability was accounted for by 3 of the 10 teaching environment variables: teacher use of verbal acceptance and praise, and student
suggested pupil verbal and nonverbal initiation. The ANOVA's identified that 5 of the 10 teaching environment variables had contributed to the between-group differences: the TPCQ variable, the TSRT variable, and the three CAFIAS variables of teacher use of verbal and nonverbal acceptance and praise and teacher use of verbal questioning. In the second analysis, the MANOVA performed on the eight selected CAFIAS variables indicated that the treatment and control groups differed significantly (p < .05) in teaching behaviors, with the treatment group rated as more indirect in their teaching behavior than the control group. The treatment group used greater amounts of praise, acceptance, and questioning, while the control group showed greater amounts of information-giving, direction-giving, and criticism as revealed by the comparison of the top 10 interaction patterns and the graphical comparison of the percentage of occurrence of teaching behaviors. The MANOVA on the 11 TPCQ variables indicated a significant (p < .05) difference in teaching effectiveness between the groups; a discriminant function analysis showed that 81% of the variability between groups was accounted for by four variables: clarity, enthusiasm, use of criticism, and probing. The ANOVA's showed that all 11 TPCQ variables contributed to those between-group differences with the treatment group rated as more effective than the control group. The ANOVA performed on the TSRT scores indicated that the treatment group was significantly (p < .05) more indirect and more positive in attitudes toward teaching than the control group. These findings led the investigator to conclude that inservice physical educators who had received IA exposure were more indirect in their teaching style, had greater pupil initiative displayed by their students, scored better on the teaching effectiveness variables, and were more positive and indirect in their attitudes toward teaching than those physical educators who had not received IA exposure. It was also concluded that these effects of IA exposure were maintained 1 to 4 years after the cessation of training in IA.
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A Thesis Presented to the Faculty of
the School of Health, Physical
Education and Recreation
Ithaca College

In Partial Fulfillment of the
Requirements for the Degree
Master of Science

by
Patricia Ann Quinn
May 1982
CERTIFICATE OF APPROVAL

MASTER OF SCIENCE THESIS

This is to certify that the Master of Science Thesis of

Patricia Ann Quinn

submitted in partial fulfillment of the requirements
for the degree of Master of Science in the School of
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DEDICATION

This thesis is dedicated to my brother, Timothy J. Quinn, whose life and death helped me to realize the importance of listening to and dealing with people as individuals.
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Chapter 1

INTRODUCTION

The teaching profession, now more than ever before, is being asked to justify itself in terms of its ability to produce an educated young person capable of functioning in today's world. What are the most important aspects of the learning process, and why are many of our young people unsuccessful in fulfilling the requirements of that process?

As far back as 20 years ago, Mitzel (1960) stated that the dominant aspect of the educational process appeared to be the interaction between teacher and student. LaGrand (1972) stated that the quality of relationships between teacher and student is the catalyst that causes teaching methods to be either successful or unsuccessful. Later research offered that teaching and learning cannot be separated (Ausubel, 1968; Hellison, 1973; Miller, Cheffers, & Whitcomb, 1974). Today, people who recognize that the interaction process in the classroom is an essential part of learning are labeled as humanistic educators (Batchelder, 1975).

The study of teaching behavior has a relatively brief history since it has been only recently that researchers have found a satisfactory method of observing and recording interaction as it occurs in the classroom. That method is generally termed systematic observation.

The use of systematic observation in research on teaching behavior is a relatively recent phenomenon when one considers how long the interaction process has been occurring in the classroom. It is only in the last
In several decades that the use of systematic observation instruments has come to be an accepted method of describing what is happening in the classroom. The descriptive-analytic system, a form of systematic observation, is one in which the researcher simply attempts to obtain an objective and detailed description of in-class events as they occur in their natural setting (Anderson, 1978). Interaction analysis (IA) is one such descriptive-analytic system in that it "is an attempt to systematically record spontaneous classroom behaviors and teacher-pupil interaction with a minimum of observer bias" (Cheffers & Mancini, 1978, p. 39). Interaction analysis is a widely used observational system in education (Anderson & Barrette, 1978).

Flanders (1960) developed the Flanders Interaction Analysis System (FIAS). It is the most extensively used interaction analysis instrument for education, either in its original form or in one of its modified versions (Amidon & Hunter, 1966; Dougherty, 1971; Galloway, 1963, 1968; Mancuso, 1972; Melograno, 1971; Ober, Bentley, & Miller, 1971).

When we speak of systematic observation as it pertains to instruments designed specifically for physical education, we are speaking of an even more recent phenomenon. The Videotape Data Bank, developed at Columbia University (Anderson & Barrette, 1978), was a major influence in the development of many instruments to be used specifically in physical education classes.

One of the first to modify FIAS specifically for the physical education setting was Timer (1967). To date, though, the interaction analysis system most widely used in research pertaining specifically to physical education has been Cheffers' Adaptation of Flanders' Interaction Analysis System (CAFIAS). Cheffers (1972) modified FIAS with the physical education setting
in mind. He categorized the nonverbal as well as the verbal behavior of both the teacher and student, the class structure, the teaching agent, and the type of student response. CAFIAS is a valid and reliable instrument which is capable of presenting a clear, sensitive picture of the teaching-learning process in both physical education and academic settings, and, therefore, has been used by many researchers in a variety of ways since its development (Cheffers & Mancini, 1978).

One of the ways researchers have used CAFIAS is in conjunction with another instrument in order to investigate the relationship between two or more variables. Keilty (1975) developed the Teacher Performance Criteria Questionnaire, in order to assess teacher effectiveness. He used it in conjunction with CAFIAS and two other instruments in his study of the effect of instruction and supervision in interaction analysis on the attitudes, effectiveness, and pupils' perceptions of teacher influence of preservice physical education teachers. CAFIAS and the Teaching Situation Reaction Test were used by Inturrisi (1979) to investigate the effects of feedback and interpretation of interaction analysis on the teaching behaviors and attitudes of physical education student teachers.

This study is similar to the above-mentioned investigations (Inturrisi, 1979; Keilty, 1975) in that CAFIAS is used along with two other instruments. However, when speaking specifically of long term effects of the previously stated variables as they relate to inservice physical educators, completed research is scarce. Therefore, this study is an attempt to ascertain if there are any significant long term effects on the observed teaching behavior, teaching effectiveness, and attitudes toward teaching of inservice physical educators as a result of the instruction and/or supervision in interaction analysis received during teacher training experiences. The instruments to be used in conjunction with CAFIAS, which will record the observed teaching behavior, are
the Teacher Performance Criteria Questionnaire (TPCQ) which measures teacher effectiveness, and the Teaching Situation Reaction Test (TSRT) which assesses the teacher's attitudes toward teaching.

Scope of Problem

The study was conducted to determine if there are lasting effects on the teaching environment including observed teaching behavior, teaching effectiveness, and attitudes toward teaching, of inservice physical educators as a result of the supervision and/or instruction in interaction analysis received during undergraduate teacher training. Twenty-six physical educators who received their undergraduate teacher training at Ithaca College, Ithaca, New York, served as subjects for this investigation. Each subject was videotaped while teaching two of his/her physical education classes. The two tapes made of each subject were coded using Cheffers' Adaptation of Flanders' Interaction Analysis System (CAFIAS). Each subject completed the Teaching Situation Reaction Test at his/her convenience. A panel of experienced judges observed the videotapes made of each subject and then completed the Teacher Performance Criteria Questionnaire for each subject.

The subjects were placed into treatment or control groups according to the type of supervisory feedback of teaching methods received during undergraduate teacher training. Those in the treatment group received conventional feedback as well as supervision and/or training in interaction analysis. Those in the control group received only conventional feedback.

Statement of Problem

This investigation was conducted in order to study the lasting effects of supervision and/or instruction in interaction analysis on the observed teaching behaviors, teaching effectiveness, and attitudes toward teaching of inservice physical educators.
**Major Hypothesis**

There will be no significant difference in overall teaching environments—
as identified by teacher-student interaction behaviors, teaching effectiveness, and attitude toward teaching—between the physical educators who received supervision and/or instruction in interaction analysis during undergraduate teacher training and those who did not receive supervision and/or instruction in interaction analysis during undergraduate teacher training.

**Sub-Hypotheses**

1. There will be no significant difference in teaching behaviors, as recorded by CAFIAS, between those physical educators who received supervision and/or instruction in interaction analysis during undergraduate teacher training and those who did not receive supervision and/or instruction in interaction analysis during undergraduate teacher training.

2. There will be no significant difference in the teaching effectiveness, as rated by a panel of experienced judges using the Teacher Performance Criteria Questionnaire, between those physical educators who received supervision and/or instruction in interaction analysis during undergraduate teacher training and those who did not receive supervision and/or instruction in interaction analysis during undergraduate teacher training.

3. There will be no significant difference in the attitudes toward teaching, as assessed by the Teaching Situation Reaction Test, between those physical educators who received supervision and/or instruction in interaction analysis during undergraduate teacher training and those who did not receive supervision and/or instruction in interaction analysis during undergraduate teacher training.
Assumptions of Study

The following assumptions were made relative to this investigation:

1. The subjects selected were representative of the physical educators who graduated in 1976, 1977, or 1978 from Ithaca College and had received undergraduate teacher training at Ithaca College.

2. The coding of two classes for each subject using CAFIAS was appropriate to yield valid data on the observed teaching behavior for each subject.

3. The Teacher Performance Criteria Questionnaire provided valid data on the teaching effectiveness of the subjects.

4. The Teaching Situation Reaction Test provided valid data on the subjects' attitudes toward teaching.

Definition of Terms

The following terms were operationally defined for this study:

1. Interaction Analysis (IA) is an observational technique that records the frequency of teacher-pupil interpersonal behaviors (Amidon & Hough, 1967).

2. Flanders' Interaction Analysis System (FIAS) is a system designed to objectively describe the verbal interaction between teachers and pupils as it occurs in the classroom through 10 categories of behavior, with the teacher's behavior classified as either direct (decreasing students' freedom) or indirect (increasing students' freedom) (Flanders, 1970).

3. Cheffers' Adaptation of Flanders' Interaction Analysis System (CAFIAS) is a validated extension of FIAS, developed to record verbal and nonverbal behaviors and specifically designed for implementation in describing teacher-pupil interaction in classes of physical activity.
4. **Observed teaching behavior** is the teaching behavior exhibited in the classroom by the teacher as recorded by CAFIAS.

5. **Teacher Performance Criteria Questionnaire (TPCQ)** is a 16-item questionnaire, developed by Kielty (1975), based on the 11 teacher behavior variables identified by Rosenshine and Furst (1971) as being related to teaching effectiveness.

6. **Teacher effectiveness** is the extent to which the inservice physical educators exhibit the 11 teaching behavior variables as measured by the Teacher Performance Criteria Questionnaire.

7. **Teaching Situation Reaction Test (TSRT)** is a paper and pencil test used to measure attitudes toward teaching by ranking four possible solutions to a simulated teaching situation.

8. **Attitudes toward teaching** refers to the extent to which the inservice physical educators use direct or indirect behaviors as measured by the responses to the various situations on the Teaching Situation Reaction Test.

9. **Direct teaching behavior** is teaching behavior that limits students' freedom of action in the class (Amidon & Flanders, 1971).

10. **Indirect teaching behavior** is teaching behavior that encourages students' freedom of action in the class (Amidon & Flanders, 1971).

11. **Verbal behaviors** are observable and audible human behaviors (Cheffers, 1974).

12. **Nonverbal behaviors** are observable human behaviors that are not expressed verbally (Cheffers, 1972).

13. **Conventional feedback** is the input directed toward general teaching methodology and problems encountered while teaching (Rochester,
14. Undergraduate teacher training is that training received by pre-
    service physical educators during undergraduate curriculum and methods
    classes and/or student teaching experiences.

15. Inservice physical educators are those teachers who have re-
    ceived the appropriate teaching certification and are presently teaching
    physical education in a public or private school.

**Delimitations of Study**

The following were the delimitations of this study:

1. The subjects were 26 inservice physical educators who received
    their undergraduate teacher training at Ithaca College, Ithaca, New York,
    and were members of either the 1976, 1977, or 1978 graduating class of the
    same institution.

2. CAFIAS was the only instrument used to record the actual teaching
    behaviors.

3. The Teacher Performance Criteria Questionnaire was the only
    instrument used to measure teacher effectiveness.

4. The Teaching Situation Reaction Test was the only instrument used
    to assess attitudes toward teaching.

5. All subjects were videotaped while teaching two classes of their
    own choosing at their schools of employment.

**Limitations of Study**

The following were the limitations of this study:

1. The findings related to the observed teaching behaviors may only
    be valid for comparison when CAFIAS is used for coding.

2. The findings related to the teacher effectiveness may only be
valid for comparison when the Teacher Performance Criteria Questionnaire is used for data collection.

3. The findings related to attitudes toward teaching may only be valid for comparison when the Teaching Situation Reaction Test is used for data collection.

4. The findings of this investigation should not be generalized beyond inservice physical educators who received their undergraduate teacher training at Ithaca College and graduated from Ithaca College in 1976, 1977, or 1978.
Chapter 2

REVIEW OF RELATED LITERATURE

The review of related literature relevant to this study was focused on the following areas: (a) value of interaction analysis in modifying teaching behavior, (b) interaction analysis and its influence on teacher effectiveness, (c) the influence of interaction analysis on attitudes toward teaching, and (d) summary.

Value of Interaction Analysis in Modifying Teaching Behavior

Descriptive studies had to first be completed in order to determine the teaching behaviors before any modification of those behaviors could take place. Prior to the 1970's there was little research done in the development of observation systems specific to the description of physical activity classes. Research is only now beginning to provide the necessary data in physical education.

Nygaard (1975) used Flanders' Interaction Analysis System (FIAS) to describe the teaching behavior in 40 physical education classes at various grade levels from elementary to college. His findings showed those physical education teachers to be a direct verbal influence while viewing themselves as being the authority figure, doing most of the talking, and emphasizing content. Student talk was very limited, with the primary interaction pattern being one of lecture, followed by silence or confusion, followed by lecture.

Quarterman (1978) did a descriptive study of 24 elementary physical educators' reactions to students' skill attempts and class behavior. Teachers' reactions were observed through the use of event recording while Duration and Playcheck recordings were used in the observation of students'
behaviors. The investigator concluded that (a) there were very low rates of positive teacher reactions, (b) there were high rates of management time, and (c) disapprovals were immediate reinforcers to the teachers.

Cheffers and Mancini (1978) used Cheffers' Adaptation of Flanders' Interaction Analysis System (CAFIAS) to describe the interaction patterns and teaching behaviors of physical educators on the 83 videotapes of the Columbia University Videotape Data Bank Project (Anderson and Barrette, 1978). The investigators pointed out that among their findings was the absence of teacher praise and acceptance and student-initiated activity. The predominant interaction patterns found for both elementary and secondary physical education classes were mostly extended teacher information giving, followed by direction giving and predictable student responses. However, it was also found that there was an indication that in physical education classes there is a greater accent on participation than there is in the other subject area classrooms. Cheffers and Mancini (1978), because of the above finding, pointed out that "if this is true, then much of the justification for the inclusion of physical education as an essential curriculum activity is supported" (p. 48).

These findings of direct teacher influence, teacher dominance of classroom activity, lack of encouragement and questioning by teachers, and lack of student-initiated activity should seem contradictory in light of the research and literature which support indirect teacher influence as having a positive effect on the achievement and attitude development of students. Having surveyed the literature, Lombardo (1979) summarizes this contradiction with two generalizations:

1. By an overwhelming margin, teachers dominate the activities and interaction of the classroom. Flanders (1960) aptly encapsulates
the research: "In the average classroom someone is talking two-thirds of the time; two-thirds of that time the person talking is the teacher; and two-thirds of the time the teacher talks he is using direct influence". (p. 313)

2. Students of indirect teachers achieve more and develop attitudes more favorable toward school and the teacher. (p. 32)

With the knowledge provided by these descriptive physical education studies, researchers have begun investigating the value of interaction analysis training and/or supervision as a method of modifying the high percentage of direct teacher influence found in the classroom. A logical place for research to begin was with the somewhat "captive audience" known as the preservice and student teacher.

Using the Timer-Love Adaptation of FIAS, Love and Barry (1971) investigated the differences between those student teachers trained and those not trained in interaction analysis. Results indicated those physical education student teachers trained in interaction analysis were able to objectively analyze their own behavior and were more willing to modify their behavior at the conclusion of their student teaching than those not trained in interaction analysis.

Several investigators have used Cheffers' Adaptation of Flanders' Interaction Analysis System (CAFIAS) as the treatment in studies of the effect of interaction analysis on the teaching behavior of preservice physical education teachers. Keilty (1975) used CAFIAS in his investigation of the effects of instruction and supervision in interaction analysis on the teaching behavior of student teachers. Preservice secondary physical education teachers were given 15 hours of instruction in the use and understanding of CAFIAS prior to peer teaching. Results showed that those subjects trained in the use of
CAFIAS were thought by their pupils to be more indirect in their teaching, as indicated in the Pupil Opinion Questionnaire.

Hendrickson (1975) and Rochester (1976) also used CAFIAS to study the effects of interaction analysis training on the teaching behavior of pre-service physical education teachers. Hendrickson (1975) divided her 40 subjects into a control group and a treatment group. The control group received only feedback from videotapes, while the treatment group received feedback from videotapes along with instruction in CAFIAS as well as a CAFIAS computer printout of the lessons each taught. The setting was a micro-peer teaching situation over a period of 1 semester. The results showed more indirect teaching patterns among those preservice teachers who had received CAFIAS instruction and feedback in that they exhibited more teacher questioning, more teacher praise and acceptance, more student contribution, more student-initiated behavior, and more individual and small group instruction. Rochester (1976) expanded on this study by giving both her treatment and control groups instruction in CAFIAS, while her treatment group received additional training and experience in the actual coding procedures used for the CAFIAS system. This study was also conducted using preservice physical education teachers in a micro-peer teaching setting. The investigator concluded, from the results, that those preservice teachers in the treatment group had less teacher talk, more teacher questioning, and more student-initiated behavior occurring in their classes.

Vogel (1976) went a step further and studied the effects of training in CAFIAS on the teaching behavior of 40 physical education student teachers. Vogel's (1976) treatment group received 10 hours of instruction and coding experience in CAFIAS along with computer feedback. The control group received only conventional feedback with review of videotapes. Those student teachers
trained in CAFIAS posed more nonverbal questions of students, used more praise and acceptance of students' ideas, and had more verbal and nonverbal student contribution in their classes.

Getty (1977) expanded upon Vogel's (1976) work by increasing the training in CAFIAS that the treatment group received from 10 to 15 hours. During the first 5 weeks of the semester, the 15 student teachers in the treatment group received 15 hours of instruction and supervision in the practical application of the CAFIAS system. The 15 student teachers in the control group received 15 hours of conventional supervisory feedback during the same time period. Those teachers in the treatment group were found to be more indirect in their influence; to make more use of questioning, praise, and acceptance; and to have more pupil-initiated behavior than student teachers in the control group. These differences in teaching behavior were not only found immediately following the treatment phase of the study but, again, when data were collected 1 month later, without any additional treatment. Getty (1977) made a very important point with this last part of his investigation because it was a significant, although short term, finding in favor of the lasting effects of instruction in interaction analysis on the teaching behavior of preservice physical education teachers. One of Getty's (1977) recommendations for further study also speaks to this important point of the lasting effect of interaction analysis on teaching behavior when he suggests a follow-up study of the subjects after 1 year of teaching in order to investigate the long-term effects of instruction in interaction analysis on teaching behavior.

The research done after preservice teachers trained in interaction analysis have become inservice teachers is very scarce. Again, because of the "newness" of this whole area of research in teaching behavior, the process has been slow.
Gellman (1968) was one of the first to do a follow-up investigation of inservice teachers who had previously received instruction and supervision in interaction analysis as student teachers. Gellman (1968) used a sample of Zahn's (1965) subjects after they had completed 1 year of inservice classroom teaching. FIAS was the instrument used to collect the data on verbal classroom interaction. None of the subjects received any additional instruction or supervision in interaction analysis after the undergraduate student teaching experience. Gellman (1968) concluded that 1st-year teachers trained in interaction analysis tend to be more indirect in verbal interaction patterns than do those 1st-year teachers who received conventional training. This finding offers evidence of the lasting effects of training and supervision in interaction analysis on the teaching behavior of inservice teachers.

Henry (1971) studied the effect of instruction in interaction analysis on the teaching behavior of teachers before and after they entered the teaching profession. Student teachers were randomly assigned to either an experimental or a control group. Audio tapes of classroom interaction were analyzed using FIAS. Data were collected during the 1st and last weeks of student teaching and again during the 4th month of the 1st year of teaching for those who accepted teaching positions in the academic year following their student teaching experience. The treatment was administered to the experimental group during the 4th week of the student teaching experience. It was concluded, based on the findings, that the teaching style of those student teachers in the experimental group was altered toward a more indirect style, and that this change toward an indirect style, once effected, continued after the student teachers entered the teaching profession. Henry's (1971) findings lend further support to the lasting effects of training in interaction analysis on teaching behavior.
Smith (1976) investigated the effect of preservice instruction in FIAS on
the verbal interaction of student, 1st-, 2nd-, and 3rd-year teachers in a
latitudinal study involving a total of 93 subjects. One group consisted of
those student, 1st-, 2nd-, and 3rd-year teachers who had received 13 clock
hours of preservice instruction in FIAS. The control group consisted of
student, 1st-, 2nd-, and 3rd-year teachers who had not received any pre-
service instruction in FIAS. An hour of classroom verbal interaction for
each subject was coded using FIAS. It was concluded that those teachers with
preservice instruction in FIAS consistently showed more indirect verbal
behavior and more extended use of student ideas. Those student, 1st-, 2nd-, and
3rd-year teachers without the preservice instruction exhibited more
direct teacher response to student talk. Smith's (1976) conclusion that
student, 1st-, 2nd-, 3rd-year teachers with preservice instruction in
interaction analysis tend to be more indirect and accepting of students'
ideas again tends to support the lasting effect of IA on teaching behavior.

Interaction Analysis and Its Influence
on Teacher Effectiveness

Over the years researchers have attempted to measure teacher effectiveness
in a variety of ways. Initially, research concentrated on outcome as a measure
of effectiveness and used criterion-of-effectiveness paradigms to identify a
criterion for measuring teacher effectiveness.

A paradigm developed at the University of Wisconsin used categories of
criteria such as practice teaching scores, inservice ratings, peer ratings,
pupil ratings, and pupil gain scores. The relationship between these categories
as independent variables and student outcomes as the dependent variable was
studied (Barr, Worcester, Abell, Beecher, Jensen, Peronto, Ringness, & Schmid,
1961).
Domas and Tiedeman (1950) were instrumental in the formation of another widely used paradigm through their 1,000 source annotated bibliography. Effectiveness was judged on the basis of performance on tests, subjectively evaluated pupil achievement, and judgments by administrators, teachers, and pupils.

Teacher effectiveness was divided into four areas by Mitzel (1957): teachers' human characteristics, contingency factors which influence behaviors in the educational process, classroom behaviors of both teachers and students, and criteria which measure change in student behavior. Of these four areas, Mitzel thought the study of teacher and student classroom behavior would provide the best chance for improvement of teacher effectiveness (Gage, 1972).

Rochester (1976) reported that a large number of researchers believe the study of the relationship between teacher behaviors and pupil achievement is essential when discussing teacher effectiveness. Flanders (1960) reported the positive relationship between indirect teacher behaviors and improved pupil achievement and morale. He also found in that same study that teachers of classes with above average student achievement displayed indirect teaching behaviors, such as use of student ideas, positive reinforcement, and acceptance of student feelings, and also appeared to be more flexible in their behaviors than teachers who displayed direct teaching behaviors.

Amidon and Flanders (1971) documented the positive influence of indirect teaching behavior on student achievement in that students displayed increased initiative, increased voluntary social contributions, and increased problem solving contributions when working under conditions with a large proportion of integrative teacher contacts.
Hughes (1973) found that there was a positive relationship between high student achievement and positive teacher reaction to pupil responses. Sandefur and Adams (1976) offered that indirect teaching behaviors, including praise, encouragement, acceptance, and questioning, produced responsible, confident, and initiating students.

After reviewing many process-product studies which attempted to show the relationship between teaching behaviors and student achievement, Rosenshine and Furst (1973) identified 11 variables which seemed to be most important in the measurement of teacher effectiveness. Those 11 variables were clarity, variability, enthusiasm, task-oriented and/or business-like behavior, student opportunity to learn, use of student ideas, use of criticism, use of structuring statements, use of multiple levels of discourse, probing, and perceived difficulty of course work. Later, this list was revised to include only nine variables: clarity, variability or flexibility, enthusiasm, task-oriented and/or business-like behavior, criticism, teacher indirectness, student opportunity to learn criterion material, use of structuring comments, and multiple levels of questions or cognitive discourse (Rosenshine & Furst, 1973).

Good, Biddle, and Brophy (1975) supported the validity of Rosenshine and Furst's variables and the relationship to student achievement. Other researchers endorsed the list of variables with some reservations. Brophy and Evertson (1976) noted the improvement over previous lists, but also stated that more research was needed since some of the relationships were only moderate. Kennedy and Bush (1976) also wanted more extensive research in order to develop more consistency in measurement.

Using Rosenshine and Furst's 11 variables, Keilty (1975) developed an instru-
ment to be used in the assessment of teacher effectiveness. The opinion of a panel of judges on the degree to which teachers displayed the 11 behavior variables was sought by Keilty's observational rating system known as the Teacher Performance Criteria Questionnaire. Keilty (1975) obtained reliability figures of .83 for internal consistency and .95 for inter-observer reliability.

Several researchers (Flanders, 1970; Hough & Amidon, 1967) have noted that among the most important aspects of interaction analysis research have been the attempts to discover, objectively, how effective and ineffective teachers differ from each other and to assist teachers in identification of their teaching behaviors so as to vary those behaviors when the situation warrants a change.

The research is not plentiful, but several studies have concentrated on the influence of training and/or supervision in interaction analysis on the variables related to effectiveness in teaching.

Hough and Amidon (1964) studied student teachers who had received instruction in Flanders' Interaction Analysis System (FIAS) and were rated by their college supervisors as more effective than those student teachers who had received instruction only in conventional learning theory. The problem with this study was the subjective ratings of college supervisors as the measurement of teaching effectiveness. In a follow-up study (Furst, 1967) some of the subjectivity was eliminated through the use of the Verbal Interaction Category System to record the classroom behaviors of three groups of student teachers. One group studied learning theory concurrent with student teaching, the second group was enrolled in an interaction analysis course concurrent with student teaching, and the third group received training in interaction analysis prior to student teaching. The results favored both experimental groups who received the training in interaction analysis as being more indirect and effective in their teaching behaviors than the control group which received
only learning theory instruction. There was still, however, a question of subjectivity concerning the assessment of teaching effectiveness. The above examples might lead one to agree with Medley and Mitzel (1958, 1959), who question the relevance of most of the study done on teacher effectiveness because the criteria of effectiveness used were generally invalid, and the measures of teacher behavior were not objective.

In an attempt to more objectively assess the influence of interaction analysis on teaching effectiveness, CAFIAS has been used in conjunction with Keilty's (1975) Teacher Performance Criteria Questionnaire which was based on the 11 variables identified by Rosenshine and Furst (1973). Keilty (1975) studied preservice physical educators in micro-peer and student teaching situations. He used CAFIAS to record teaching behavior and the Teacher Performance Criteria Questionnaire, completed by an experienced panel of judges, to assess teaching effectiveness. The experimental group received 15 hours of instruction in CAFIAS and supervisory feedback in the form of interpretation of the CAFIAS matrices of the lessons taught in the micro-peer setting. The control group received conventional supervisory feedback and no exposure to CAFIAS. There were no significant differences found in teacher behaviors or in teacher effectiveness between the experimental and control groups at the end of either the micro-peer situation or the student teaching situation. The investigator cited the artificiality of the micro-peer situation and the brief 3-week student teaching situation as possible explanations for the lack of significant differences between experimental and control groups.

Rochester (1976) used a modification of the Teacher Performance Criteria Questionnaire and CAFIAS to study the relationship between teacher effectiveness variables and training in interaction analysis. She found significant differences
between the treatment and control groups of preservice physical educators in teacher behaviors, and a significant relationship between teacher effectiveness and teacher behavior variables. Rochester's (1976) subjects were undergraduate physical education students enrolled in a teaching methods course prior to student teaching. Data were collected from micro-peer teaching situations. All subjects viewed videotapes of the lessons they taught and received instruction and supervision through conventional feedback and a computer print-out of CAFIAS data. Treatment subjects received additional instruction in the coding process and actually used CAFIAS to code videotapes of the micro-peer lessons, followed by a discussion of the coding results. Rochester found two significant canonical correlations between teacher effectiveness and teacher behavior variables. The CAFIAS variables of teacher talk, teacher nonverbal, confusion, student talk, and student nonverbal were correlated with the TPCQ teacher effectiveness variables of variability, business-like or task-oriented behavior, and probing. The second correlation related the same CAFIAS variables with the TPCQ variables of clarity; variability; opportunity to learn; accepting, encouraging, and indirectness; use of structuring and summary comments; and types of questions. On the basis of these significant correlations, Rochester (1976) rejected her hypothesis that there would be no significant canonical correlation between teacher effectiveness, as measured by the 11 variables of the Teacher Performance Criteria Questionnaire, and teacher behavior, as identified through use of CAFIAS.

Avery (1978) used Rosenshine and Furst's variables, in a modified form of the Teacher Performance Criteria Questionnaire, to identify effective and less-effective coaches. CAFIAS was used to describe the interaction patterns of both groups. The subjects were 30 secondary school coaches. Two 30-minute videotapes of practice sessions were made for each subject and coded using CAFIAS to provide the data for coaching behaviors. A panel of judges viewed
the videotapes and scored each subject on the Coaches' Performance Criteria Questionnaire, a modification of the Teacher Performance Criteria Questionnaire, consisting of nine questions based on the teaching variables that correlate with pupil achievement, as identified by Rosenshine and Furst (1973). The median of the total scores of all the judges on all the variables was used to separate subjects into two groups labeled effective coaches and less effective coaches. The means of the CAFIAS variables of the effective and less effective coaches were compared. The results showed that teaching behaviors, as identified by CAFIAS, were different for effective and less effective coaches. Effective coaches had significantly higher mean scores than less effective coaches on the following CAFIAS variables: teacher use of acceptance and praise, verbal; teacher use of acceptance and praise, nonverbal; pupil verbal initiation, teacher suggested; pupil nonverbal initiation, teacher suggested. The investigator pointed out that these types of behaviors indicated a total involvement with and enthusiasm for practice and were components of indirect teacher behavior. Therefore, one of the conclusions of this study was that effective coaches, as identified by the Coaches' Performance Criteria Questionnaire, were more indirect in their teaching behavior, as identified by CAFIAS coding, than less effective coaches.

Rotsko (1979) also used the Coaches' Performance Criteria Questionnaire in conjunction with CAFIAS to determine if there were any differences between the coaching behaviors of successful and less successful coaches. Ten male high school varsity basketball coaches served as subjects. Each subject was videotaped during four practice sessions. The videotapes were then coded using CAFIAS to analyze coaching behavior and viewed by a panel of judges using the Coaches' Performance Criteria Questionnaire to analyze coaching
effectiveness. The subjects were divided into equal groups of successful and less successful coaches according to their ratings on the CPCQ. The coaching behaviors of the two groups were then compared. The two groups were found to be significantly different on 3 of the 20 CAFIAS variables and 3 of the 26 CAFIAS parameters. Coaches in the successful group used significantly more verbal and nonverbal praise, while coaches in the less successful group used significantly more verbal criticism. The successful group also displayed more verbal and nonverbal acceptance and praise and more total acceptance and praise, while the less successful group showed more total pupil initiation which was student suggested. The investigator concluded that the successful coaches were more indirect in their teaching methods than the less successful coaches, using a greater amount of verbal and nonverbal praise, more verbal and nonverbal acceptance, and more verbal and nonverbal questioning. The less successful coaches were more direct in their coaching behavior, using more verbal and nonverbal information giving, more verbal and nonverbal direction giving, and more verbal and nonverbal criticism.

Using CAFIAS and the Teacher Performance Criteria Questionnaire, Mancini, Morris, and Getty (1979) studied the effects of interaction analysis instruction and supervision on teaching behavior and teaching effectiveness of physical education student teachers. Thirty subjects were divided into a control group which received 15 hours of conventional supervisory feedback and a treatment group which participated in 15 hours of instruction and supervision in the practical application of CAFIAS. All subjects were videotaped three times while teaching: during the first 3 weeks of the semester, immediately after the end of the training sessions, and 1 month after the cessation of the training periods. Data for final analysis were collected during the second and third videotapings
of each subject. Data for the analysis of teaching behavior were provided by the computer analysis of the CAFIAS variables as expressed in ratios or percentages. Data for analysis of teacher effectiveness were provided by the ratings of five judges who completed the TPCQ for each subject immediately following the viewing of the videotapes of each subject. A significant difference between treatment and control groups was found across the CAFIAS variables with 7 of the 8 CAFIAS variables contributing significantly to the between groups difference. This led to the rejection of the hypothesis that there would be no significant difference in teacher behaviors between physical education student teachers who received instruction and supervision in the practical application of coding interaction analysis and those student teachers not so trained. A significant difference between treatment and control groups was also found across the teacher effectiveness variables with all 11 of the teacher effectiveness variables contributing significantly to the between-groups difference. This led to the rejection of the hypothesis that there would be no significant difference in teacher effectiveness, as measured by the TPCQ, between physical education student teachers receiving instruction and supervision in the practical application of coding interaction analysis and those student teachers not so trained. These differences in both teaching behavior and teaching effectiveness were evident after the second taping and were maintained for the third taping, which was done 1 month after the cessation of the training sessions with no additional treatment given to any of the subjects. The investigators cited the above-mentioned findings as lending support to the lasting effects of instruction and supervision in interaction analysis on the teaching behavior and teaching effectiveness of student teachers. Based on the findings of this study, the investigators concluded that student teachers who received instruction in the
practical application of coding interaction analysis exhibited a more indirect teaching style than those teachers who received conventional supervisory feedback regarding their teaching; student teachers trained in interaction analysis scored higher on the teacher effectiveness variables, as measured by the TPC2, than those student teachers not so trained; and the effects of instruction in interaction analysis on the teaching behavior and teaching effectiveness of student teachers can be maintained 1 month after cessation of the training period. Although the lasting effects of interaction analysis training on teaching behavior and teaching effectiveness found in this study were only demonstrated over a brief time span, it is a beginning in the study of this most important aspect of teacher training.

Influence of Interaction Analysis on Attitudes Toward Teaching

The attitudes of teachers concerning their interpersonal relationships with students has not been the focus of extensive research even though it is known that attitudes are reflected in behavior and that all behavior, including teaching behavior, is influenced by attitudes (O'Brien, 1974). Early work by Lipscomb (1962) using his own instrument, Lipscomb Scale of Teacher Attitude, showed that attitudinal change in elementary education student teachers occurred in the direction of the cooperating teachers' expressed attitudes. More extensive use has been made of another instrument, the Minnesota Teacher Attitude Inventory (MTAI), which predicts the success with which a teacher handles interpersonal relationships with students (Buros, 1953). Several studies (Elswick, 1975; Jekel, 1966; Muto, 1967) simply recorded pretest and posttest scores on the MTAI for student teachers, with results indicating that student teaching was not a significant factor in any change of attitudes toward teaching.

Several studies have used the MTAI in conjunction with Flanders' Interaction Analysis System (FIAS) to determine if training and/or supervision in
interaction analysis prior to or in conjunction with student teaching would result in a change in attitude. Romoser (1964) studied 92 graduate students in a teacher education program with only the treatment group receiving 3 days of instruction in FIAS. Using the MTAI as a pretest and posttest, the results demonstrated that 3 days of instruction in FIAS could change the attitudes of the graduate student teachers toward "lenient tolerance".

Thirty student teachers served as subjects for Marazza (1973) who administered the MTAI as a pretest and posttest to all subjects while dividing them into three groups for treatment. Ten subjects received training in FIAS, another 10 received training in FIAS and questioning strategies, and the remaining 10 subjects served as a control group. It was concluded that those student teachers trained in FIAS displayed greater positive changes in attitude than those not trained.

Krajewski (1971) conducted a more extensive, year-long treatment of 20 masters degree teaching interns which included videotaping and FIAS evaluation matrices in addition to the usual supervision techniques. Another 21 interns served as a control group receiving only the usual type of supervision. In addition to the results demonstrating that the experimental group became more indirect in their approach, the correlation matrices also demonstrated that the interns in the experimental group were more accurate in their perception of self as well as more positive in attitude toward teaching than the control group.

O'Brien (1974) used FIAS as a supervisory technique and the MTAI as a pretest and posttest with 40 elementary student teachers. Results showed that the attitudes of student teachers supervised with feedback from FIAS were not changed significantly. However, the experimental group did show a trend in attitude change toward the positive direction as measured by their MTAI scores.

Another instrument used to assess attitudes toward teaching, the Teaching
The Situation Reaction Test (TSRT), measures attitudes through forced-choice responses to simulated teaching situations (Hough & Duncan, 1965). The reliability, validity, and theoretical construct of the TSRT have been studied, and the TSRT has demonstrated that it is reliable, highly fake-resistant, and able to accurately predict teaching potential for both inservice and preservice teachers (Hough & Duncan, 1965). It has been used mainly in research pertaining to the assessment of the effectiveness of preservice education experiences. On the TSRT a low score denotes an indirect approach while a high score is indicative of a direct approach, therefore, it is an instrument to be used to assess and predict teaching potential (attitudes) along a direct-indirect continuum (Keilty, 1975).

Studies investigating the attitude change of student teachers receiving instruction and/or supervision in FIAS, using pretest and posttest administration of the TSRT, were conducted by Zahn (1965), Hough and Amidon (1964), and Furst (1967). Zahn (1965) found that those student teachers who received instruction and supervision in interaction analysis had more positive attitudes than those in the control group who received only conventional instruction and supervision. Hough and Amidon (1964) concluded that those student teachers who received instruction in FIAS showed a greater positive change in attitudes, as measured by the pretest and posttest TSRT scores, than those who did not receive such training. The subjects in Furst's (1967) study were divided into three groups: no training in FIAS, training in FIAS before student teaching, and training in FIAS during student teaching. There were significant differences in the pre-test and posttest scores on the TSRT for those students who received instruction in FIAS, both prior to and concurrent with student teaching, indicating a positive change in attitudes. All three of the above-mentioned studies suggest that student teachers who learn interaction analysis gain in positive
attitudes toward teaching, while those not receiving such exposure do not gain.

Moskowitz (1966) conducted a study which included both cooperating teachers and student teachers as subjects. The treatment group of cooperating teachers received 25 hours of training in the use of interaction analysis as a supervisory tool while the treatment group of student teachers received 60 hours of training in interaction analysis as it pertains to their own teaching. Results demonstrated that trained cooperating teachers had more positive attitudes toward teaching and toward their student teachers, although the differences were not statistically significant.

Using the TSRT and FIAS as the instruments, Aoki (1969) operationally defined the dependent variable of change in attitude toward teaching situations as the difference between pretest and posttest scores on the TSRT. The subjects were 64 preservice secondary school teachers, and the results of the study suggest that the combination of instruction in interaction analysis and the belief-disbelief system relates to differences in change in attitude toward teaching situations.

As a result of his investigation of the construct validity of the TSRT as an instrument for the assessment of preservice education students' reactions to teaching situations, Murray (1967) states that there is some evidence that scores on the TSRT relate to in-service teacher performance. Murray's (1967) results, that in-service teachers who scored high on the TSRT differed significantly from those who scored low on the TSRT in the use of verbal and nonverbal behaviors, indicate a relationship between increased skill in reacting to classroom situations and higher scores on empathetic behavior and lower scores on control (direct) types of behavior.
The results of a study done by Gellman (1968) tend to support Murray's (1967) statement. Gellman (1968) investigated the long range effects of the use of interaction analysis as a means of instruction and supervision of student teachers. The TSRT was used to measure the attitudes of inservice teachers at the end of their 1st year of teaching. Results indicated a relationship between the type of instruction and supervision received as a preservice teacher and the attitudes toward teaching held after 1 year as a full-time, inservice teacher. The 1st-year teachers trained in interaction analysis were found to be more indirect in verbal behavior and more positive in their attitudes toward teaching than those 1st-year teachers trained through conventional means (Gellman, 1968).

Thompson (1966) conducted a study of inservice teachers' attitudes and their students' academic achievement. Using the TSRT to assess attitude, the results indicated that students taught by the teachers with better scores on the TSRT showed significantly greater gains in academic achievement than did those students taught by the teachers who scored poorly on the TSRT.

Investigations of attitudes toward teaching among physical educators, as assessed through the use of the TSRT, have been conducted by Lewis (1974), Keilty (1975), and Intrerisi (1979). Twenty-five male health and physical education student teachers served as subjects for Lewis (1974). Those in the treatment group received 10.5 hours of training in FIAS plus feedback, using FIAS, following one health education lesson taught by each subject. Those in the control group participated in the regular student teaching seminar and received feedback through conventional observation forms. From his results, Lewis (1974) concluded that training in FIAS did not significantly affect the student teachers' attitude toward teaching as assessed by the TSRT.

Keilty (1975) was the first to use the TSRT in conjunction with CAPIAS to
study the teaching attitudes of male preservice physical education teachers. All 21 subjects participated in a semester-long preservice teacher education program, the beginning of which consisted of a peer-teaching program followed by a student teaching program during the last 3 weeks. Only the 11 subjects in the experimental group received 15 hours of instruction in the use and understanding of CAFIAS prior to the beginning of the peer teaching segment of the program. All subjects then taught their first three short lessons during the peer-teaching experience, after which they all participated in conferences and viewed videotapes and discussed their performances with their supervisors and peers. All subjects then engaged in a follow-up conference, after each lesson, with the investigator during which those in the control group received conventional reinforcement of the previous input, while those in the experimental group received feedback in the form of interpretations of interaction analysis matrices of their lessons. The TSRT was administered to all subjects as the pretest for attitudes toward teaching at the end of the peer teaching experience. The posttest administration of the TSRT was done at the end of the 3-week student teaching experience.

Keilty's (1975) results did not show significant differences in attitudes toward teaching between those student teachers who had received instruction and supervision in CAFIAS and those who had not received such training. From those results, Keilty (1975) concludes that the 3-week physical education student teaching experience had little effect on measures of attitudes toward teaching compared to those same measures at the end of the peer teaching program. He offers two observations resulting from his study: (a) a 3-week period during the end of the school year (May) is insufficient to develop either skills or attitudes concerning teaching and, in fact, may even be damaging to student teachers; (b) the 15 hours of instruction in CAFIAS may have been
an inadequate amount of time.

Inturrisi (1979) also studied physical education student teachers using CAFIAS and the TSRT to assess teaching behaviors and attitudes toward teaching. The subjects for this study were 28 physical education student teachers who were randomly assigned to either the treatment or the control group. All subjects were videotaped three times during their student teaching experience, which included both elementary and secondary situations. The first and second videotapes were used to provide supervisory feedback to all the subjects, with the third tape used for final data analysis. All subjects viewed their videotapes with the investigator. The investigator provided those in the control group with conventional supervisory feedback during the individual viewing sessions. Those in the treatment group, in addition to the conventional supervisory feedback, received information regarding CAFIAS including the categories, parameters, ground rules, coding and practical use. The treatment group also received a summary and evaluation of their individual CAFIAS computer printouts of their videotaped lessons. The TSRT was administered to all subjects at the beginning and again at the conclusion of their student teaching experience. The videotapes of the third lesson taught by each subject were coded using CAFIAS to provide the data on teaching behaviors.

Inturrisi's (1979) results differed from Keilty's (1975), in that she found significant differences in teaching attitudes between the treatment and control groups, as assessed by the TSRT. Inturrisi (1979) concluded, as a result of her investigation, that those student teachers who received feedback and interpretation in interaction analysis, through CAFIAS, were more indirect in their teaching behavior and more positive in their attitudes toward teaching than those student teachers who did not receive such exposure to interaction analysis.
Summary

Several researchers conducted descriptive physical education studies which found a predominance of direct teacher influence and teacher dominance along with a lack of teacher encouragement and student-initiated activity. Researchers then began investigating the value of interaction analysis training as a means of modifying teaching behavior. Several investigators found that those preservice and student teachers who had received instruction and/or supervision in CAFIAS exhibited more indirect teaching patterns than those preservice and student teachers who had received only conventional supervisory feedback.

Follow-up studies concerning the lasting effects of interaction analysis training on inservice teachers is very scarce. Getty (1977) found that the effects of IA training were present 1 month after the cessation of training. Gellman (1968) and Henry (1971) found that those student teachers who had received training in interaction analysis exhibited a more indirect teaching style which, once effected, continued during their 1st year of teaching. Smith's (1976) investigation also supports the long-term effects of preservice training in IA. He concluded that those student, 1st-, 2nd-, and 3rd-year teachers who had received instruction in interaction analysis tended to be more indirect and accepting than those who had not received such preservice instruction.

When investigating teacher effectiveness, a large number of researchers seem to indicate that the relationship between teacher behaviors and student achievement must be considered as essential. Rosenshine and Furst (1973) developed a list of variables which appeared to be most important in the assessment of teacher effectiveness. Keilty (1975) used Rosenshine and Furst's (1973) variables to develop the Teacher Performance Criteria Questionnaire (TPCQ) to assess teacher effectiveness.
Rochester (1976) found teacher effectiveness to be related to teacher behavior. Avery (1978) and Rotsko (1979) concluded that effective coaches were more indirect in their teaching behavior than less effective coaches.

Mancini et al. (1979) concluded that those student teachers who received instruction in IA exhibited a more indirect teaching style and scored higher on the teacher effectiveness variables than those student teachers who had not received instruction in interaction analysis. These effects also were maintained for 1 month after the cessation of the training period.

Since all behavior is influenced by attitudes, and those attitudes are reflected in behavior, researchers have developed methods of assessing attitudes toward teaching to be used in conjunction with instructions which record teaching behavior. Several studies using FIAS in conjunction with the MTAI have concluded that training and/or supervision in IA during teacher training resulted in positive changes in attitude toward teaching.

Three studies using the TSRT in conjunction with FIAS suggest that student teachers who learn IA gain in positive attitudes toward teaching, while those not receiving such training do not gain. Murray (1967) stated that there is evidence that scores on the TSRT relate to inservice teacher performance. Findings of Gellman (1968) and Thompson (1966) tend to support this statement and also are indicative of the lasting effect of IA training on attitudes. Thompson's (1966) results indicated that students taught by the teachers with better scores on the TSRT showed greater gains in academic achievement than did those students taught by teachers who scored poorly on the TSRT. Keilty (1975) and Inturrisi (1979) using the TSRT in conjunction with CAFIAS reached conflicting conclusions concerning differences in attitudes toward teaching between those student teachers who had received IA training and those who had not received such training. A possible explanation could be that Keilty's
(1975) subjects who showed no significant differences had only a 3-week experience while Inturrisi's (1979) subjects, who showed more positive attitudes with interaction analysis training, had a semester-long experience.
Chapter 3

METHODS AND PROCEDURES

This chapter deals with the methods and procedures used in this investigation. It includes the selection of subjects, the testing instruments employed, and the treatment administered to all subjects. Also described in this chapter are the establishment of coder reliability, judges' reliability, procedure, methods of data collection, and the scoring and treatment of the data.

Selection of Subjects

With the help of the Ithaca College Office of Alumni Relations and the School of Health, Physical Education and Recreation Placement Office, possible subjects within a reasonable geographic area (New York and neighboring states) were identified. Those who had been involved in interaction analysis and teaching behavior studies as undergraduate students, in either a treatment or control capacity, were contacted requesting their cooperation in a follow-up study. Several of those initially contacted provided the names of additional possible subjects. Several of those who replied were not able to participate in this study due to the fact that they had changed occupation and were no longer teaching physical education. Therefore, the final number of subjects consisted of those who replied to the request, agreed to participate, and met the necessary requirements of previously being involved as an undergraduate and presently being a physical educator at a public or private school within a "reachable" geographic area. The subjects were 26 inservice physical educators who had received their undergraduate teacher training at Ithaca College, Ithaca, New York. The subjects also received their undergraduate degrees in physical education from the same institution in either 1976, 1977, or 1978. The assignment of subjects to either the treatment or the control group was based on whether or not they had received instruction and/or supervision in inter-
action analysis during their undergraduate teacher training.

Testing Instruments

Cheffers' Adaptation of Flanders' Interaction Analysis System (CAFIAS) (Cheffers, 1972) was the instrument used to measure observed teaching behavior in this study. Developed primarily for physical activity classes, this system objectively records verbal and nonverbal behaviors, types of student response behavior, class structure, and teaching agencies. In this system behaviors are recorded every 3 seconds or as often as they change. Cheffers (1972) determined that CAFIAS measured aspects of human behavior that could not be measured by Flanders' Interaction Analysis System (FIAS) beyond the .05 level of significance through the blind-live interpretation method of comparison. By comparing CAFIAS with FIAS, Cheffers (1972) established his system as a valid testing instrument. Appendix D presents the categories for CAFIAS.

The second testing instrument used was the Teacher Performance Criteria Questionnaire (TPCQ), developed by Keilty (1975) to measure teaching effectiveness. Rosenshine and Furst (1973) identified 11 variables upon which the TPCQ is based. Those variables are clarity, variability, enthusiasm, business-like task-oriented behavior, opportunity to learn, indirectness (accepting, encouraging), use of criticism, use of structuring and summary comments, types of questions, probing, and difficulty level of instructions. A slightly modified version of the TPCQ, which included all 11 variables, was used for this study. Keilty (1975) obtained three estimates of reliability on his instrument. Internal consistency was determined to be .83, inter-observer reliability was computed as .96, and percentage of rater agreement was .90.
Attitudes toward teaching were measured by the instrument developed at Temple University entitled the Teaching Situation Reaction Test (TSRT) in which the subject responds to a simulated teaching situation (Hough & Amidon, 1964). It is a forced-choice instrument in which the subject responds to a 48-item test with four possible solutions to each item. The teaching situations are divided into four dimensions: (1) the type of classroom control used, direct or indirect; (2) the teacher-student relationship, empathetic or self-oriented; (3) the approach used whenever a control of instructional problem arises, objective or subjective; and (4) the approach to methodology, experimental or conservative (Hough & Amidon, 1964). This instrument objectively measures and predicts teaching potential along the direct-indirect continuum. A low score is considered indirect and positive in attitudes toward teaching with a high score being indicative of a direct approach and a negative attitude toward teaching (Amidon, 1967). The internal consistency of the TSRT was computed by Hough and Amidon (1964) to be .94, by using the Ross and Stanley split half procedure; test-retest reliability was found to be .94 with a standard error of 1.97. Kielty (1975) used the revised edition of the TSRT reported by Duncan and Hough (1966). Test-retest reliability was reported for the revised edition at .84 (Duncan, Hough, & Thompson, 1966).

Coder Reliability

Coder reliability was determined by the use of the Spearman rank-order correlation technique. One videotape from the treatment group and one from the control group were randomly selected and coded by an expert coder in two independent observations in order to provide data for this analysis.

Judges' Objectivity

An intraclass correlation technique was used to assess total mean difference among judges for all subjects as a measure of judges' objectivity on the Teacher
Performance Criteria Questionnaire.

Procedure

The investigator obtained names and places of employment of prospective subjects from among Ithaca College's 1976, 1977, and 1978 physical education graduates. Letters were sent requesting the cooperation of these physical educators. From those who responded, agreed to participate, and were within the geographical range of the investigator, subjects were contacted and appointments were made for videotaping sessions. The 26 subjects, who taught in 26 different public or private schools throughout New York, northeastern New Jersey, and eastern Pennsylvania, were videotaped by the investigator at their school while teaching two of their regular classes. A microphone was used—in most cases, a wireless microphone—by all subjects in order to capture all verbal interaction. Each subject chose which two classes were to be videotaped and was asked to go ahead with whatever lesson had been previously planned, thus avoiding a special lesson for the videotaping sessions. Each subject also completed, at his/her convenience, the Teaching Situation Reaction Test.

Subjects were assigned to treatment or control groups according to the instruction and/or supervision received during undergraduate teacher training experiences. Those subjects assigned to the control group received conventional feedback during undergraduate teacher training which included viewing videotapes of their own teaching during which emphasis was placed on class control, use of equipment and facilities, and methodology. The treatment group included those subjects who, in addition to the above mentioned conventional feedback, received instruction and/or supervision in interaction analysis through information concerning the ground rules, categories, coding and computer analysis of CAFIAS.
Throughout the collection and analysis of the data, the investigator was not aware of which subjects were assigned to the treatment group and which subjects were in the control group so as to avoid any bias.

Methods of Data Collection

Data for the analysis of observed teaching behavior were collected from both videotapes made of each subject. The videotapes were coded by an expert coder using CAFIAS.

Four experienced teachers who had successfully completed the course "Analysis of Teaching Behavior", offered through the Graduate Department of Physical Education at Ithaca College, Ithaca, New York, rated all subjects on the Teacher Performance Criteria Questionnaire. The judges viewed the videotapes of all the subjects and, immediately afterward, rated each subject on the variables measured by the TPCQ in order to provide data for the analysis of teacher effectiveness.

Data for the analysis of attitudes toward teaching were collected from the Teaching Situation Reaction Test which was completed by all subjects.

Scoring Data

Data collected from the coding of the videotapes using CAFIAS were transposed to computer cards for computer analysis. Included in the computer printout are the matrices, ratios, and percentages for the CAFIAS variables used in this study.

The responses to each of the questions on the Teacher Performance Criteria Questionnaire range from 1 (never) to 5 (consistently). For each subject a total score was established from the sum of all judges' scores on all TPCQ variables. Also established for each subject was the sum of all judges' scores for each TPCQ variable.
A total score for each subject on the Teaching Situation Reaction Test was computed directly from the test, with a lower score indicative of a more indirect approach and a higher score indicative of a more direct approach by the subjects.

**Treatment of Data**

Multivariate analysis of variance (MANOVA) was used to determine whether differences in overall teaching environment existed between treatment and control groups. Those variables used to identify overall teaching environment were the eight teaching behavior variables, as identified by CAFIAS; the teaching effectiveness variable, as identified by the total sum of all judges' scores on the TPCQ; and the attitudes toward teaching variable, as assessed by the TSRT. Discriminant function analysis was used to calculate the percent that each variable contributed to any differences between the treatment and control groups. In order to identify between-group differences for each of the 10 teaching environment variables independent of the other nine variables, univariate analysis of variance (ANOVA) was used.

The eight teaching behavior variables, as identified by CAFIAS, were then taken separately with a MANOVA used to determine whether differences in teaching behaviors existed between the treatment and control groups. Discriminant function analysis was also used to calculate the percent contributed by each variable to the overall variance between treatment and control groups. Univariate analysis of variance was used to determine how much each of the eight CAFIAS variables contributed to any between-group differences independent of the other seven variables.

Further analysis on teaching effectiveness was performed using the sum of all four judges' scores on each of the 11 TPCQ variables. MANOVA was used
to determine whether differences in teaching effectiveness, as identified by the TPCQ, existed between treatment and control groups. Discriminant function analysis was performed to determine the percent that each variable contributed to the total variance between treatment and control groups. In order to identify between-group differences for each of the 11 teaching effectiveness variables independent of the other 10 variables, univariate analysis of variance was used.

Each subject's score on the TSRT was used and a univariate analysis of variance was performed to determine if significant differences existed between treatment and control groups on attitudes toward teaching.

The .05 level of significance was set for all tests prior to the collection of data.

**Summary**

The subjects were 26 physical educators who had received their undergraduate teacher training and physical education degrees from Ithaca College, Ithaca, New York, in 1976, 1977, or 1978. Subjects assigned to the control group had received only conventional supervisory feedback during undergraduate training while those in the treatment group had also received instruction and/or supervision in interaction analysis.

Data for the analysis of observed teaching behaviors of each teacher were collected from two videotaped classes and coded using CAPIAS. Judges viewed the videotapes of each subject and used the TPCQ to score all subjects on teacher effectiveness. The data for attitudes toward teaching were collected from each subject's score on the TSRT.

MANCOVA's, followed by discriminant function analysis and univariate ANOVA's were used first to identify significant differences in the overall teaching environment between treatment and control groups. The variables used to identify overall teaching environment were the eight teaching behavior variables
(CAFIAS), the teaching effectiveness variable (TPCQ), and the attitudes toward teaching variable (TSRT).

In the second analysis, the eight CAFIAS variables were analyzed separately to identify significant differences in teaching behavior between the treatment and control groups. Teaching effectiveness was also analyzed separately using the sum of all four judges' scores on each of the 11 TPCQ variables. The total score for each subject on the TSRT was determined. An ANOVA was performed to determine if significant between-group differences existed in attitudes toward teaching. For all tests the .05 level of significance was set prior to data collection.
Chapter 4

ANALYSIS OF DATA

This chapter presents the results of the statistical analysis of the data obtained from this study. The statistical analysis of the data was divided into seven sections: (a) coder reliability, (b) judges' objectivity, (c) analysis of physical educators' overall teaching environment data, (d) analysis of physical educators' interaction data, (e) analysis of physical educators' effectiveness data, (f) analysis of physical educators' attitude data, and (g) summary.

Coder Reliability

The reliability of the coder was assessed by the consistency obtained from two randomly selected class session videotapes, each coded at two independent viewing sessions. A Spearman rank-order correlation was determined by correlating the top 10 cell concentrations for the two independent observations of each tape (see Appendix A). The mean of the correlations was .986 which was sufficient to indicate the coder was reliable.

Judges' Objectivity

Using a two-way analysis of variance design (subjects x judges), an intra-class correlation was calculated to estimate objectivity (inter-judge reliability) for the TPCQ. The following formula, in which variability among judges was considered as error variance, was used to calculate the estimate of objectivity:

\[
R = \frac{MS_{\text{subjects}} - MS_{\text{judges + interaction}}}{MS_{\text{subjects}}}
\]

Due to the differences in application of the scale, the judges' scores were expected to vary somewhat. However, since all four judges rated every subject and the score for each subject was the sum of all four judges' scores,
it was assumed that would control for any error due to the difference in application of the scale. An intraclass correlation of .999 was determined, and it was concluded that the judges' scoring was objective.

Analysis of Physical Educators' Overall Teaching Environment Data

Multivariate analysis of variance (MANOVA) was performed on all 10 of the variables used to identify the overall teaching environment: the eight teaching behavior variables, as identified through CAFIAS; the teaching effectiveness variable, as identified by the sum of all judges' scores on the TPCQ; and the teaching attitudes variable, as measured by the TSRT. The MANOVA for the 10 variables indicated a significant difference between the treatment and control groups' overall teaching environments, $F(10,15) = 44.05, p < .05$. This led to the rejection of the major hypothesis of no significant difference in overall teaching environment between those physical educators who received instruction and/or supervision in interaction analysis during undergraduate teacher training and those physical educators who did not receive supervision and/or instruction in interaction analysis during undergraduate teacher training.

The discriminant function analysis, used to calculate the percent that each variable contributed to the variance between groups, is presented in Table 1 with variables listed in order from greatest to least contribution. Those variables responsible for the greatest percentage of between-group variance are teacher use of verbal acceptance and praise, student-suggested pupil verbal initiation, and student-suggested pupil nonverbal initiation. Together, those three variables accounted for 97.5% of the total variance between the treatment and control groups.
Table 1
Percentage of Contribution of the 10 Teaching Environment Variables to the Discriminant Function

<table>
<thead>
<tr>
<th>Variable</th>
<th>Standardized Discriminant Weighting</th>
<th>Percentage of Contribution to the Discriminant Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teacher-Use of Verbal Acceptance and Praise (TVAP)</td>
<td>.9430</td>
<td>88.93</td>
</tr>
<tr>
<td>Student-Suggested Pupil Verbal Initiation (SSPVI)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Student-Suggested Pupil NonverbalInitiation (SSPNVI)</td>
<td>.1989</td>
<td>3.96</td>
</tr>
<tr>
<td>Teacher-Suggested Pupil NonverbalInitiation (TSPNVI)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teacher Use of Nonverbal Acceptance and Praise (TNVAP)</td>
<td>.0818</td>
<td>.67</td>
</tr>
<tr>
<td>Teacher Use of Verbal Questioning (TVQ)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teacher-Suggested Pupil Verbal Initiation (TSPVI)</td>
<td>.0587</td>
<td>.34</td>
</tr>
<tr>
<td>Attitude Toward Teaching (TSRT score)</td>
<td>-.0488</td>
<td>.24</td>
</tr>
<tr>
<td>Teaching Effectiveness (TPCQ sum)</td>
<td>-.0286</td>
<td>.08</td>
</tr>
<tr>
<td>Teacher Use of Nonverbal Questioning (TNVQ)</td>
<td>-.0165</td>
<td>.02</td>
</tr>
</tbody>
</table>
The means and standard deviations for the treatment and control groups on the 10 overall teaching environment variables are presented in Table 2. Also presented in this table are the univariate analyses of variance (ANOVA's) which identify between-group differences for each variable independent of the other nine variables. The groups differed significantly on three of the eight teaching behavior (CAFIAS) variables: teacher use of verbal acceptance and praise, teacher use of nonverbal acceptance and praise, and teacher use of verbal questioning. The groups also differed significantly on both the teaching effectiveness (TPCQ) variable and the teaching attitude (TSRT) variable. For each variable for which significant differences were found the treatment group was rated as more indirect in approach than the control group.

**Analysis of Physical Educators' Interaction Data**

In order to obtain an analysis of the physical educators' interaction patterns exclusive of the effectiveness (TPCQ) and attitude (TSRT) variables, a separate MANOVA was performed on the eight teaching behavior (CAFIAS) variables. The MANOVA for the eight CAFIAS variables indicated a significant between-group difference, \( F(8,17) = 60.93, p < .05 \). This led to the rejection of the sub-hypothesis of no significant difference in teaching behaviors, as recorded by CAFIAS, between those physical educators who received supervision and/or instruction in interaction analysis during undergraduate teacher training and those who did not receive supervision and/or instruction in interaction analysis during undergraduate teacher training.

The discriminant function analysis of the eight CAFIAS variables indicated a similar order of contribution, from greatest to least, as seen in the discriminant function analysis done for the overall teaching environment. The top three variables contributing to the between-group variance were the same: teacher use
Table 2
Means, Standard Deviations, and ANOVA's for the Treatment and Control Groups on the 10 Teaching Environment Variables

<table>
<thead>
<tr>
<th>Variables</th>
<th>Treatment Group</th>
<th>Control Group</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
</tr>
<tr>
<td>TVQ</td>
<td>27.58</td>
<td>14.49</td>
</tr>
<tr>
<td>TNVQ</td>
<td>23.03</td>
<td>23.09</td>
</tr>
<tr>
<td>TVAP</td>
<td>72.14</td>
<td>6.61</td>
</tr>
<tr>
<td>TNVAP</td>
<td>73.91</td>
<td>12.15</td>
</tr>
<tr>
<td>TSPVI</td>
<td>67.57</td>
<td>16.39</td>
</tr>
<tr>
<td>TSPNVI</td>
<td>55.32</td>
<td>24.27</td>
</tr>
<tr>
<td>SSPVI</td>
<td>16.68</td>
<td>10.80</td>
</tr>
<tr>
<td>SSPNVI</td>
<td>13.60</td>
<td>16.75</td>
</tr>
<tr>
<td>TPCQ</td>
<td>369.20</td>
<td>32.39</td>
</tr>
<tr>
<td>TSRT*</td>
<td>182.10</td>
<td>9.50</td>
</tr>
</tbody>
</table>

*P < .05.

aLower score indicates more indirect behavior.
of verbal acceptance and praise, student-suggested pupil verbal initiation, and student-suggested pupil nonverbal initiation.

The means, standard deviations, and ANOVA's for the eight CAFIAS variables were previously reported and presented in Table 2. The ANOVA's, which identify between-group differences for each variable independent of all other variables, again indicated that the treatment and control groups differed significantly on the same three (out of eight) CAFIAS variables: teacher use of verbal acceptance and praise, teacher use of nonverbal acceptance and praise, and teacher use of verbal questioning. In each case the treatment group was rated more indirect in teaching behavior than the control group.

In addition to the three CAFIAS variables which identified significant between-group differences, the computer analysis also showed there were some differences between the treatment and control groups in the percentage of occurrence of teaching behaviors. The total number of behaviors which occurred was obtained for each group, and the percentage of occurrence of each of the 20 CAFIAS behavior categories was calculated. Figure 1 illustrates the differences between the treatment and control groups in percentage of occurrence of each CAFIAS behavior category. The treatment group displayed a greater amount of verbal and nonverbal praise, verbal and nonverbal acceptance, and verbal and nonverbal questioning. This indicates that those physical educators who received supervision and/or instruction in interaction analysis during undergraduate teacher training showed more indirect teaching behavior than those physical educators who did not receive such supervision and/or instruction. The control group displayed a greater amount of verbal information giving, verbal and nonverbal direction giving, and verbal and nonverbal criticism. This is indicative of a more direct style of teaching among those physical educators who did not receive supervision and/or instruction in interaction analysis during
V and NV refer to verbal and nonverbal.

Figure 1. Mean percentages for the CAFIAS behavior categories.
Narrow Dependence on Teacher

Control

Treatment

Broad Interpretation of Teacher Activities

Pupil Initiative

Confusion Silence Student to Student Interaction

Figure 1 (continued).
undergraduate teacher training. The students of physical educators in the treatment group displayed a greater amount of behavior which showed a broad interpretation of situations presented by their teacher, while students of physical educators in the control group showed a greater amount of predictable behavior and dependence on the teacher. Pupil initiative, both verbal and nonverbal, was shown to be greater among students of the indirect (treatment) physical educators. Students of the direct (control) physical educators displayed more confusion and silence, or student-to-student verbal and nonverbal behaviors, than students of the indirect physical educators.

The most frequent interaction patterns of treatment and control groups were also determined. The top 10 interaction patterns for each group, the percentages of occurrence, and an explanation of each interaction pattern appear in Table 3. In a comparison of interaction patterns, both treatment and control groups displayed extended game playing or interpretive drill situations (G-10-G), however, the percentage of occurrence was twice as great in the control group as in the treatment group. Both groups also had extended information-giving (5-5), but the control group had a greater percentage of occurrence (11.45%) than the treatment group (6.99%). Direction-giving followed by students' predictable, rote response (6-8) was also found in both groups, but the percentage of occurrence (11.55%) for the control group was more than twice as much as the percentage (4.97%) in the treatment group.

Students' predictable, rote response (6-8, 8-6, 8-8, 8-10, 10-8) was more prevalent in the control group, as it appeared in 5 of the top 10 cells. In the treatment group it appeared in only 2 of the top 10 cells (6-8, 8-2). The percentage of occurrence of students' predictable, rote response was also much greater in the control group than in the treatment group.
Table 3

Summary of Most Frequent Interaction Patterns Among the Top 10 Cells of Physical Educators in the Treatment and Control Groups

<table>
<thead>
<tr>
<th>Interaction Patterns</th>
<th>Percent of Occurrence</th>
<th>Interaction Patterns</th>
<th>Percent of Occurrence</th>
</tr>
</thead>
<tbody>
<tr>
<td>8- 2</td>
<td>7.58</td>
<td>10 - 8\</td>
<td>12.26</td>
</tr>
<tr>
<td>5 - 5</td>
<td>6.99</td>
<td>8\ - 10</td>
<td>12.25</td>
</tr>
<tr>
<td>10 - 8\</td>
<td>5.76</td>
<td>6 - 8</td>
<td>11.55</td>
</tr>
<tr>
<td>8\ - 10</td>
<td>5.76</td>
<td>5 - 5</td>
<td>11.45</td>
</tr>
<tr>
<td>6 - 8</td>
<td>4.97</td>
<td>8 - 6</td>
<td>7.84</td>
</tr>
<tr>
<td>8 - 2</td>
<td>4.86</td>
<td>6 - 8\</td>
<td>4.45</td>
</tr>
<tr>
<td>2 - 5</td>
<td>4.57</td>
<td>8 - 8</td>
<td>4.23</td>
</tr>
<tr>
<td>5 - 8\</td>
<td>3.91</td>
<td>8\ - 6</td>
<td>3.52</td>
</tr>
<tr>
<td>2 - 8\</td>
<td>3.68</td>
<td>8 - 10</td>
<td>3.41</td>
</tr>
<tr>
<td>8\ - 8\</td>
<td>3.34</td>
<td>10 - 8</td>
<td>3.32</td>
</tr>
</tbody>
</table>

8\ - 2: students' interpretive response followed by teachers' praise
5 - 5: extended information giving
10 - 8\: extended students' game play or interpretive drills
8\ - 10: extended students' game play or interpretive drills
6 - 8: teachers' directions followed by students' predictable, rote response
8 - 2: students' predictable response followed by teachers' praise
2 - 5: teachers' praise followed by teachers' information giving
5 - 8\: teachers' information-giving followed by students' interpretive response
2 - 8\: teachers' praise followed by students' interpretive response
Table 3
(continued)

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>8-8\</td>
<td>extended students' interpretive response--game play or drills</td>
</tr>
<tr>
<td>8 - 6</td>
<td>students' predictable response followed by teachers' directions</td>
</tr>
<tr>
<td>6 - 8\</td>
<td>teachers' directions followed by students' interpretive response</td>
</tr>
<tr>
<td>8 - 8</td>
<td>extended students' predictable, rote response</td>
</tr>
<tr>
<td>8-6</td>
<td>students' interpretive response followed by teachers' directions</td>
</tr>
<tr>
<td>8 - 10</td>
<td>extended students' predictable, rote response</td>
</tr>
<tr>
<td>10 - 8</td>
<td>extended students' predictable, rote response</td>
</tr>
</tbody>
</table>
Perhaps the greatest difference in interaction patterns between the groups was in the category of teachers' praise (2). The use of praise did not appear in the control group's top 10 interaction patterns. For the treatment group, not only did the use of praise appear in 4 of the top 10 interaction patterns (8-2, 8-2, 2-5, 2-8), it was in the cell (8-2) with the highest percentage of occurrence (7.48%).

Analysis of Physical Educators' Effectiveness Data

When the TPCQ variable was analyzed as part of the overall teaching environment, the treatment group was found to have scored significantly better than the control group. This indicated that those in the treatment group were more effective in their teaching.

Although the teaching effectiveness variable, as identified by the sum of all four judges' total scores on the TPCQ, was analyzed as part of the overall teaching environment, further analysis was possible since the TPCQ was composed of 11 variables on which the judges rated each of the 26 subjects. For this further analysis, the sum of all four judges' scores was obtained for each of the 11 TPCQ variables.

The MANOVA for the 11 TPCQ variables indicated a significant between-groups difference, \( F(11,14) = 7.24, p<.05 \). This led to the rejection of the sub-hypothesis of no significant difference in teaching effectiveness between those physical educators who received supervision and/or instruction in interaction analysis during undergraduate teacher training and those physical educators who did not receive supervision and/or instruction in interaction analysis during undergraduate teacher training.
The discriminant function analysis with variables listed in order from greatest to least contribution is presented in Table 4. The variables responsible for the greatest percentage of between-group variance are clarity, enthusiasm, use of criticism, and probing. Together, those four variables accounted for 81% of the total between-group variance.

Presented in Table 5 are the means and standard deviations for the treatment and control groups on the 11 TPCQ variables. Also presented in this table are the results of the ANOVA's used to identify differences between groups for each of the TPCQ variables independent of the other 10 TPCQ variables. The groups differed significantly on all 11 variables with the treatment group rated as more effective in each case.

Analysis of Physical Educators' Attitude Data

A subject's total score on the TSRT was used to assess his/her attitude toward teaching. As was previously reported in Table 2, the scores for the treatment and control groups on the TSRT were subjected to an analysis of variance and found to be significantly different, \( F(1,24) = 17.50, p < .05 \). Since this indicated that those in the treatment group were more indirect in their attitudes toward teaching than those in the control group, the sub-hypothesis of no significant difference in attitudes toward teaching between those physical educators who received supervision and/or instruction in interaction analysis during undergraduate teacher training and those who did not receive supervision and/or instruction in interaction analysis during undergraduate teacher training was rejected.

Summary

Coder reliability was established at .986 by correlating coding results from two randomly selected class session videotapes at two different viewings.


Table 4

Percentage of Contribution of the 11 TPCQ Variables to the Discriminant Function

<table>
<thead>
<tr>
<th>Variable</th>
<th>Standardized Discriminant Weighting</th>
<th>Percentage of Contribution to the Discriminant Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clarity</td>
<td>.5972</td>
<td>35.70</td>
</tr>
<tr>
<td>Enthusiasm</td>
<td>-.5279</td>
<td>27.87</td>
</tr>
<tr>
<td>Use of Criticism</td>
<td>.3041</td>
<td>9.25</td>
</tr>
<tr>
<td>Probing</td>
<td>.2851</td>
<td>8.13</td>
</tr>
<tr>
<td>Challenge of Instructional Level</td>
<td>.2326</td>
<td>5.41</td>
</tr>
<tr>
<td>Questioning</td>
<td>-.2202</td>
<td>4.85</td>
</tr>
<tr>
<td>Indirectness</td>
<td>.1865</td>
<td>3.48</td>
</tr>
<tr>
<td>Task-oriented Behavior</td>
<td>-.1727</td>
<td>2.98</td>
</tr>
<tr>
<td>Variability</td>
<td>.1061</td>
<td>1.13</td>
</tr>
<tr>
<td>Use of Summary Comments</td>
<td>.0893</td>
<td>.79</td>
</tr>
<tr>
<td>Students' Opportunity to Learn</td>
<td>.0661</td>
<td>.43</td>
</tr>
</tbody>
</table>
Table 5
Means, Standard Deviations, and ANOVA's for the Treatment and Control Groups on the 11 TPCQ Variables

<table>
<thead>
<tr>
<th>Variables</th>
<th>Treatment</th>
<th></th>
<th>Control</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M  SD</td>
<td>M  SD</td>
<td>F</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clarity</td>
<td>38.54 2.44</td>
<td>29.54 6.13</td>
<td>24.19*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Variability</td>
<td>32.46 7.85</td>
<td>15.54 8.24</td>
<td>28.74*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Enthusiasm</td>
<td>36.62 3.95</td>
<td>24.92 9.10</td>
<td>18.07*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Task-oriented Behavior</td>
<td>35.00 3.61</td>
<td>26.85 7.83</td>
<td>11.63*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Students' Opportunity to Learn</td>
<td>34.77 3.79</td>
<td>26.15 7.77</td>
<td>12.92*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Indirectness</td>
<td>34.92 2.87</td>
<td>18.92 7.39</td>
<td>52.98*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Use of Criticism</td>
<td>39.62 1.12</td>
<td>31.62 6.65</td>
<td>18.28*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Use of Summary Comments</td>
<td>27.38 5.80</td>
<td>16.00 3.65</td>
<td>35.91*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Questioning</td>
<td>29.08 6.40</td>
<td>16.31 6.61</td>
<td>25.04*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Probing</td>
<td>23.00 6.36</td>
<td>12.62 3.95</td>
<td>24.99*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Challenge of Instructional Level</td>
<td>37.77 3.17</td>
<td>32.31 1.18</td>
<td>33.95*</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* p < .05.
Using a two-way analysis of variance design on four judges' scores on the TPCQ, an intraclass correlation of .999 was found to be sufficient to conclude that the judges' scoring was objective.

A MANOVA on the eight teaching behavior (CAFIAS) variables, the teaching effectiveness (TPCQ) variable, and the teaching attitudes (TSRT) variable identified statistically significant difference \( F(10,15) = 44.05, p < .05 \) between the treatment and control groups' overall teaching environment. Through discriminant function analysis it was identified that 97.5% of the total between-group variance was accounted for by only three of the variables: teacher use of verbal acceptance and praise, student-suggested pupil verbal initiation, and student-suggested pupil nonverbal initiation.

The univariate ANOVA's presented in Table 2 identified 5 of the 10 overall teaching environment variables that contributed significantly to between-group differences when considered independently of the other variables. They were teaching effectiveness, teaching attitude, and three of the teaching behavior variables.

Each of the three components which made up the overall teaching environment—teaching behavior, teaching effectiveness, and attitudes toward teaching—were separately analyzed to provide further data on the differences between treatment and control groups. The MANOVA performed on the eight teaching behavior (CAFIAS) variables indicated a significant difference in teaching behaviors between those physical educators who received supervision and/or instruction in interaction analysis during undergraduate teacher training and those who did not receive such supervision and/or instruction. The discriminant function analysis and the ANOVA's performed on the eight CAFIAS variables indicated results similar to those found for the overall teaching environment.
The computer analysis also indicated differences between the treatment and control groups in the percentage of occurrence of teaching behaviors. Figure 1 illustrates that those teachers in the treatment group displayed more behaviors indicative of an indirect teaching style, while those teachers in the control group displayed a greater amount of behavior indicative of a direct style of teaching. Students of those physical educators in the treatment group displayed a greater amount of behavior indicating a broad interpretation of situations, while students of the control group physical educators showed a greater amount of predictable behavior and dependence on the teacher. Perhaps the greatest difference in interaction patterns between the treatment and control groups was in the category of teachers' praise. This category did not appear in the control group's 10 most frequent interaction patterns. For the treatment group, not only did the teachers' use of praise appear in 4 of the 10 most frequent interaction patterns, it was in the cell with the treatment group's highest percentage of occurrence (7.58%).

The MANOVA performed on the 11 TPCQ variables indicated a significant difference in teaching effectiveness between those physical educators who received supervision and/or instruction in IA during undergraduate teacher training and those who did not receive such supervision and/or instruction. The discriminant function analysis showed that the variables which contributed the greatest percentage (81%) to the between-group variance were clarity, enthusiasm, use of criticism, and probing. ANOVA's identified that the treatment and control groups differed significantly on all 11 TPCQ variables, with the treatment group rated as more effective in each case.

Each subject's score on the TSRT was used to assess his/her attitudes toward teaching. A significant difference between treatment and control
groups was found indicating that those in the treatment group were more indirect in their attitudes toward teaching than those in the control group.
Chapter 5

DISCUSSION OF RESULTS

The purpose of the study was to determine the lasting effects of instruction and/or supervision in interaction analysis (IA) during undergraduate teacher training on inservice physical educators' overall teaching environment, which included teaching behavior, teaching effectiveness, and attitudes toward teaching. Cheffers' Adaptation of Flanders' Interaction Analysis System (CAFIAS) was used to record the teacher-pupil interaction patterns and behaviors of the physical educators. The Teacher Performance Criteria Questionnaire (TPCQ) was used by a panel of judges to determine teaching effectiveness. Attitudes toward teaching were assessed through the use of the Teaching Situation Reaction Test (TSRT).

This chapter presents a discussion of the results from this investigation. This discussion has been divided into sections: (a) interpretation of results, (b) results related to CAFIAS studies, (c) results related to effectiveness studies, (d) results related to attitude studies, and (e) a summary.

Interpretation of Results

Significant multivariate differences in overall teaching environment were found between the treatment and control group. A MANOVA was performed on all 10 teaching environment variables, which included the 8 teaching behavior (CAFIAS) variables, the teaching effectiveness (TPCQ) variable, and the attitudes toward teaching (TSRT) variable. The discriminant function analysis determined that 88.9% of the between-group variance was attributed to the CAFIAS variable of teacher use of verbal acceptance and praise. The results of ANOVA's, performed to identify between-group differences for each variable independent of the other nine variables, indicated that the treatment and control groups differed significantly on 5 of the 10 overall teaching environment variables. Those five variables included three teaching behavior (CAFIAS)
variables: teacher use of verbal acceptance and praise, teacher use of nonverbal acceptance and praise, and teacher use of verbal questioning. The remaining two variables on which the groups differed significantly were the teaching effectiveness (TPCQ) variable and the teaching attitudes (TSRT) variable. For each of those five variables the treatment group was rated as more indirect than the control group in their overall approach.

In addition to the statistical analysis done on the overall teaching environment data, further analysis was performed. The results were presented separately for the CAFIAS, TPCQ, and TSRT data, in order to determine further differences between physical educators who had received IA training and those who had not received such training during their undergraduate teacher training. A separate MANOVA was performed on the eight CAFIAS variables, and it was found that the treatment and control groups differed significantly in teaching behaviors. The top three variables contributing to the between-group difference, as found by a discriminant function analysis, were the same as previously reported: teacher use of verbal acceptance and praise, student suggested pupil verbal initiation, and student suggested pupil nonverbal initiation. Since the ANOVAs identify between-group differences for each variable independent of all other variables, they were the same as previously reported, with the treatment group rated as more indirect than the control group in teaching behavior.

Data pertaining to the occurrence of teaching behavior were obtained from this additional statistical analysis and identified further differences between treatment and control groups. In general, those physical educators exposed to IA as undergraduates were more indirect in their teaching and interaction patterns than those not exposed to IA as undergraduates. The treatment group (IA exposure) displayed greater amounts of praise, acceptance, and questioning, while the control group (no IA exposure) showed greater amounts of information-giving, direction-giving, and criticism. Students of the treatment
group physical educators responded to the indirect teaching style by displaying greater amounts of behavior indicative of a broad interpretation of the situations presented by their teacher. The control group's students displayed a greater amount of predictable behavior and dependence on the teacher. There was more pupil initiative among students of the treatment group, and the control group's students displayed more silence/confusion or student-to-student behaviors.

There were similarities between treatment and control groups in the 10 most frequent interaction patterns. However, when a more direct type of interaction occurred, such as extended information-giving and direction-giving followed by students' predictable rote response, it was approximately twice as great in the control group than in the treatment group.

The CAFIAS behavior category of teacher praise (category 2) showed the greatest difference in interaction patterns between groups. The control group's 10 most frequent interaction patterns did not include the categories of verbal and nonverbal praise. Within the treatment group, not only did the use of praise appear in 4 of the 10 most frequent interaction patterns, it was part of the pattern which had their highest percentage of occurrence.

Because the total TPCQ score was analyzed as the teaching effectiveness variable within the overall teaching environment and because it was a questionnaire which consisted of 11 separate items or variables, further separate analysis was performed on the 11 TPCQ items using the sum of all four judges' scores as the criterion score on each variable. The MANOVA performed on the 11 TPCQ variables indicated a significant difference in teaching effectiveness between treatment and control groups. The discriminant function analysis showed that four of the TPCQ variables were responsible for 81% of the total between-group variance: clarity, enthusiasm, use of criticism, and probing.
When the ANOVA's were performed to identify between-group differences for each TPCQ variable independent of the other 10 TPCQ variables, it was shown that the treatment and control groups differed significantly on all 11 TPCQ variables. In each case, the treatment group was rated as more indirect in their approach than the control group.

The TSRT, used to assess attitudes toward teaching, only provides one score. Therefore, the analysis of variance, performed previously and reported in Table 2, provided the data necessary to indicate a significant difference, \( F(1,24) = 17.50, p<.05 \), between the treatment and control groups' attitudes toward teaching. This significant difference indicated that the treatment group was more indirect and more positive in attitudes toward teaching than the control group.

**Results Related to CAFIAS Studies**

Descriptive studies of physical education teachers were conducted by Nygaard (1975) and Quarterman (1978) to simply determine what behaviors were being exhibited in the classroom. Cheffers and Mancini (1978) also looked at physical educators' interaction patterns and teaching behaviors. What these investigators found was a high percentage of direct teacher influence in the classroom, with very little teacher use of praise and acceptance and very little student-initiated activity. As a result of those studies, investigators began looking into the value of instruction and/or supervision in IA as a means of modifying the large amount of direct teaching behavior that was found.

Using CAFIAS, the effects of instruction and supervision in IA on preservice physical education teachers' behaviors were investigated by Getty (1977), Hendrickson (1975), Inturrisi (1979), Keilty (1975), Rochester (1976), and Vogel (1976).

Keilty's (1975) findings of no significant differences in teacher
behaviors between the treatment and control groups were contrary to this investigation, which found that those subjects in the treatment group who had been instructed in the use of CAFIAS were more indirect in their overall teaching approach than those in the control group who had not received such training. Keilty (1975) attributed his findings to the artificiality of the micro-peer teaching situation and the brevity of the student teaching situation. Keilty's (1975) results did, however, show that those in the treatment group were thought by their pupils to be more indirect in their teaching, as indicated in the Pupil Opinion Questionnaire.

The investigations of Getty (1977), Hendrickson (1975), Inturrisi (1979), Rochester (1976), and Vogel (1976) produced findings similar to this investigation in that those in the treatment group were more indirect in their teaching behaviors than those in the control group. However, there was no total agreement as to which specific CAFIAS variables contributed significantly to the differences between treatment and control groups. The CAFIAS variable of teacher use of verbal acceptance and praise contributed significantly to the between-group differences in this study as well as in the studies done by Getty (1977), Hendrickson (1975), Inturrisi (1979), and Vogel (1976). Inturrisi (1979) and this investigator were the only ones to also find that the CAFIAS variable of teacher use of nonverbal acceptance and praise contributed significantly to between-group differences. The findings of these previous CAFIAS studies, along with the results of this investigation, indicate that those teachers trained in CAFIAS are more likely to indicate their concern through the use of acceptance and praise of students' ideas than are teachers not so trained.

Getty (1977), Hendrickson (1975), Inturrisi (1979), Rochester (1976), and this investigator found that the CAFIAS variable of teacher use of verbal questioning contributed significantly to between-group differences. Inturrisi (1979) and Vogel (1976) also found the variable of teacher use of nonverbal
questioning to contribute significantly. These findings are indicative of a greater amount of indirect teaching behavior among those teachers trained in CAFIAS in that they use questions, both verbal and nonverbal, as a means of involving their students in the learning process. Since the findings of this investigation concur with those of the previously conducted studies, it seems that the differences found in teaching behaviors are of a long-term nature.

The CAFIAS categories of student suggested pupil verbal initiation and student suggested pupil nonverbal initiation are indicative of the amount of student contribution allowed in the class. This investigation, along with Vogel's (1976), found that both of these CAFIAS variables contributed to the variance between treatment and control groups, indicating that those teachers trained in CAFIAS allowed more student contribution both verbally and nonverbally in their classes than those teachers not trained in CAFIAS. Hendrickson (1975) and Rochester (1976) found that student suggested pupil verbal initiation contributed significantly to the variance between treatment and control groups, while Getty (1977) and Inturrisi (1979) found that the category of student suggested pupil nonverbal initiation contributed significantly to between-group variance. Therefore, this study along with all of the above-mentioned investigations, found that those teachers trained in CAFIAS allowed students more freedom, leading to increased student contribution, than those teachers not trained in CAFIAS.

In terms of lasting effects of IA training on teacher behavior, Getty's (1977) finding of significant between-group differences 1 month after the cessation of CAFIAS instruction and supervision was in accord with the findings of this study. A lasting effect was indicated from instruction and/or supervision in CAFIAS on the teaching behavior of physical educators from 1 to 4 years after the cessation of training in CAFIAS. Both investigations showed that the treatment group was more indirect in their influence; used
more questioning, acceptance, and praise; and had more student-initiated behavior than the control group.

Three investigations (Gellman, 1968; Henry, 1971; Smith, 1976) used Flanders' Interaction Analysis System (FIAS) in follow-up studies of inservice teachers who had previously received instruction and supervision in IA as preservice or student teachers. Gellman's (1968) conclusion that 1st-year teachers trained in IA as student teachers tended to be more indirect in interaction patterns than those 1st-year teachers who did not receive IA training was in concurrence with the findings of this study, which indicated that those teachers who received undergraduate IA training were more indirect in their teaching style than those who had not received such training. Both studies offer evidence of the lasting effects of training and supervision in IA on the teaching behavior of inservice teachers. Henry's (1971) findings that the teaching style of those student teachers trained in IA was altered toward a more indirect style and that this alteration, once effected, continued after the student teachers entered the teaching profession also lend support to the findings of this investigation and to the lasting effects of IA training on teaching behavior.

Smith (1976) and this investigator found that those teachers with undergraduate instruction in IA showed more indirect verbal behavior (questioning, acceptance, and praise) and more use of student ideas. Smith's (1976) findings are in accord with those of this study in that they both lend further support to the lasting effects of IA training on teaching behavior.

The practical application for the findings of this investigation, as well as those of the earlier studies (Gellman, 1968; Getty, 1977; Hendrickson, 1975; Henry, 1971; Inturrisi, 1979; Rochester, 1976; Smith, 1976; Vogel, 1976), on IA training of perservice teachers and the lasting effects of such training on inservice teachers appears to be obvious. Perhaps the conventional method
of instruction and supervision of preservice and student teachers should be reviewed in light of these findings of both a short-term and a long-term nature. If the teacher behaviors displayed by those teachers exposed to interaction analysis evoke a greater amount of student contribution to the learning process perhaps IA training should be included in teacher education programs. When inservice teachers who received IA exposure during undergraduate teacher training show more indirect teaching behaviors (questioning, acceptance and praise) and more use of student ideas than those not exposed to IA perhaps the inclusion of interaction analysis training in the teacher education curriculum might help to produce more humanistic educators.

Results Related to Effectiveness Studies

Recently, several studies using CAFIAS and Keilty's (1975) Teacher Performance Criteria Questionnaire (TPCQ) have attempted to objectively assess the influence of IA on teaching effectiveness. Keilty (1975), using both the TPCQ he developed and CAFIAS, studied the teaching effectiveness and behaviors of preservice and student teachers. Contrary to the findings of this investigation Keilty (1975) found no significant differences in teaching behavior or teaching effectiveness between those in the treatment group who had received instruction and supervision in CAFIAS and those in the control group who had received no exposure to CAFIAS. Keilty (1975) offered that the briefness of the student teaching situation was a possible explanation for his results of no significant between-group difference.

Rochester (1976) used CAFIAS and a modified version of the TPCQ to study the relationship between teacher effectiveness variables and IA training. Rochester's (1976) findings of significant differences between treatment and control groups in teacher behavior and a significant relationship between teacher effectiveness and teacher behavior variables concurs with this investigation. Both found that those trained in IA exhibited more indirect teaching behaviors and
scored higher on the teacher effectiveness variables than those not trained in IA.

Avery (1978) and Rotsko (1979) used a modified version of the TPCQ to identify effective and less-effective coaches and CAFIAS to determine if differences existed in the two groups' coaching (teaching) behaviors. Avery (1978) found that the teaching behaviors were different for effective and less-effective coaches, with the effective coaches scoring higher on the CAFIAS variables of teacher use of verbal acceptance and praise and teacher use of nonverbal acceptance and praise. This investigator found similar results in that the treatment group scored significantly higher than the control group on both the teaching effectiveness variable and the same two CAFIAS variables. Avery's (1978) findings that effective coaches were more indirect in their teaching behavior than less effective coaches concur with this investigation which found that those teachers trained in IA were rated as both more indirect and more effective than those not so trained.

Rotsko (1979) used the categories of successful and less successful coaches in his study in which significant differences were found between the two groups. Based on his results, Rotsko (1979) concluded that the successful coaches were more indirect in their teaching than the less successful coaches and used a greater amount of verbal and nonverbal acceptance, more verbal and nonverbal praise, and more verbal and nonverbal questioning. This investigation found results similar to Rotsko's (1979) in that the treatment group, using more verbal and nonverbal acceptance, praise, and questioning, was rated as more effective and more indirect in teaching behavior than the control group. This investigation compares with Rotsko (1979) findings; the less successful coaches were more direct in their coaching behavior, and used more verbal and nonverbal information-giving, direction-giving, and criticism. The findings of these investigations were also similar in that the control group was rated
as less effective and more direct in their teaching behavior, using more verbal
information-giving, more verbal and nonverbal direction-giving, and more verbal
and nonverbal criticism.

Using CAFIAS and the TPCQ, Mancini, Morris, and Getty (1979) studied
physical education student teachers and the effects of instruction and supervision
in IA on their teaching behavior and teaching effectiveness. A significant
difference between treatment and control groups was found in teaching behavior
which compares with this investigation which also found significant between-
group differences in teaching behavior. Although Mancini et al. (1979) found
seven of the eight CAFIAS variables contributed to the between-group differences
and this study found that only three of the eight CAFIAS variables contributed
to the differences between the treatment and control groups, there were two of
the contributing variables which were common to both studies. Those two
variables were teacher use of verbal acceptance and praise and teacher use of
verbal questioning, which indicated that those in the treatment group were
more indirect in their teaching style than those in the control group.

Also in concurrence with Mancini et al. (1979), this investigation found
significant between-group differences in teaching effectiveness. In both studies
the treatment group was rated as more effective, with all 11 TPCQ variables
contributing significantly to between-group differences. The findings of Mancini
et al. (1979) agreed with this investigator's results concerning the lasting
effects of instruction and supervision in IA on the teaching behavior and
teaching effectiveness of physical educators. Mancini et al. (1979) found that
the between-group differences in teaching behavior and teaching effectiveness
were still evident 1 month after the cessation of CAFIAS training. This
investigation found that those same between-group differences in the teaching
behavior and teaching effectiveness of physical educators who had received
instruction and supervision in IA were evident 1 to 4 years after the cessation
of CAFIAS training. Both findings, therefore, offer evidence of the lasting effect of IA instruction and/or supervision on the teaching behavior and teaching effectiveness of physical educators.

When considering the results found by Rochester (1976), Avery (1978), Rotsko (1979), Mancini et al. (1979), and this investigator, there seems to be further evidence to support the inclusion of IA training in the teacher education curriculum. If those teachers who received IA training as undergraduates are found not only to be more indirect in their teaching behavior, but also to have scored better on the teacher effectiveness variables than those who did not receive such training it would appear to be worth the effort to incorporate IA into the methods used to instruct and supervise future teachers.

Results Related to Attitude Studies

Romoser (1964), Krajewski (1971), and Marazza (1973) conducted studies to determine if training and/or supervision in IA would result in a change in student teachers' attitudes toward teaching. Using FIAS in conjunction with the Minnesota Teacher Attitude Inventory (MTAI), all three of the studies concluded that those in the treatment group who had received IA instruction and/or supervision displayed a more positive change in attitudes toward teaching than those in the control group who had not received IA training. Although in this investigation different data-gathering instruments were used, similar results were found in that the treatment group who had received IA training were rated as more positive in attitudes toward teaching than the control group who had not received such training. O'Brien (1974) also used the MTAI and FIAS with student teachers, but, contrary to this investigation, O'Brien's (1974) results showed no significant change in attitudes of student teachers who had received IA training. However, the investigator reported that the MTAI scores of the treatment group did show a trend in attitude change in a positive direction.
Furst (1967), Hough and Amidon (1964), and Zahn (1965) also used FIAS, but in conjunction with the TSRT, to determine the attitude change of student teachers who had received instruction and/or supervision in IA. All three of these studies found that those student teachers who had received IA training showed a greater positive change in attitudes toward teaching than those student teachers who had not received such training. This investigation found similar results indicating that IA instruction is related to attitudes toward teaching.

From Murray's (1967) study of the construct validity of the TSRT as an instrument for the assessment of preservice teachers' reactions to teaching situations came some evidence that scores on the TSRT relate to inservice teacher behavior. This investigation's findings agree with Murray's (1967) results that inservice teachers who scored high on the TSRT differed significantly in the use of verbal and nonverbal behaviors from those who scored low on the TSRT. Murray's (1967) results also indicated a relationship between increased skill in reacting to classroom situations and higher scores on empathetic (indirect) behavior and lower scores on control (direct) types of behavior. This relationship, along with Thompson's (1966) findings that students taught by inservice teachers with better scores on the TSRT showed significantly greater gains in academic achievement than those students taught by teachers who scored poorly on the TSRT, seems to support the thought that the student fares better when taught by those with an indirect style and a positive attitude toward teaching.

Gellman's (1968) study of the long range effects of IA training on the attitudes of inservice teachers reported results similar to those of this investigation. The TSRT was used to assess the attitudes of inservice teachers after 1 year of teaching. Gellman's (1968) results seem to support Murray's
(1967) findings in that those 1st-year teachers trained in IA as undergraduates were found to be more indirect in verbal behavior and more positive in their attitudes toward teaching than those 1st-year teachers trained through conventional means. Gellman's (1968) findings concur with this investigation not only in the differences in behaviors and attitudes but also in the long term effects of IA instruction and/or supervision on those behaviors and attitudes.

The results of a study of the attitudes toward teaching of health education student teachers by Lewis (1974) were contrary to those of this investigation. Using FIAS and the TSRT, Lewis (1974) concluded that training in IA did not significantly affect the student teachers' attitudes toward teaching.

Keilty (1975) and Inturrisi (1979) used the TSRT in conjunction with CAFIAS to study the teaching attitudes and behaviors of physical education student teachers. Both investigations involved a pretest and posttest administration of the TSRT and training in CAFIAS. Keilty's (1975) results were contrary to those found in this study in that he (Keilty, 1975) found no significant differences in attitudes toward teaching between those student teachers who had received training in CAFIAS and those who had not received such training. Based on his findings, Keilty (1975) offered the observation that a 3-week period during the end of the school year (May) is not sufficient to develop either skills or attitudes concerning teaching and may even be damaging to student teachers. For this investigation, those inservice teachers who served as subjects had participated in a semester-long student teaching experience preceded by a semester-long preservice teaching experience, which may possibly account for the difference in findings between Keilty (1975) and this investigation.
Inturrisi's (1979) results were contrary to Keilty's (1975) in that she found significant differences in both teaching behavior and attitudes toward teaching between treatment and control groups. From these results, Inturrisi (1979) concluded that those student teachers who received feedback and interpretation in IA, through CAFIAS, were more indirect in their teaching behavior and more positive in their attitudes toward teaching than those student teachers who had not received an exposure to interaction analysis. Not only were the findings of this investigation similar to those of Inturrisi (1979), but they also indicated that the effects of IA training are long-term in that those inservice teachers so trained were more indirect in behavior and more positive in attitudes as many as 4 years after the cessation of that training.

As was previously mentioned in this chapter concerning teaching behaviors and teaching effectiveness, there appears to be some evidence to support the inclusion of IA exposure for undergraduate teacher trainees as it relates to attitudes toward teaching. If those teachers who received training in IA as undergraduates were found to be more indirect in their behavior and more positive in their attitudes toward teaching then those teachers trained through conventional methods, then possibly it is time to re-evaluate those methods. It seems that enough evidence has been gathered thus far to warrant at least a trial requirement for preservice teachers to be exposed to interaction analysis.

Summary

Significant differences in overall teaching environment were found between the treatment and control groups, with the treatment group rated as more indirect than the control group on 5 of the 10 variables: teacher use of verbal acceptance and praise; nonverbal acceptance and praise; and verbal questioning; teaching effectiveness; and attitudes toward teaching. These
results led to the rejection of the major null hypothesis of no significant
difference in overall teaching environment between those physical educators
who received IA training during undergraduate teacher training and those who
did not receive such training.

The sub-hypotheses of no significant differences in teaching behaviors,
teaching effectiveness, and attitudes toward teaching between those physical
educators who had received IA training during undergraduate teacher training
and those who had not received such training were also rejected. The CAFIAS
data indicated significant differences in teaching behaviors between the
treatment and control groups with the control group displaying greater amounts
of direct behaviors (information-giving, direction-giving, and criticism)
while the treatment group showed greater amounts of indirect behaviors (praise,
acceptance, and questioning). There were similarities in interaction patterns
between the treatment and control groups. However, when a more direct type
of interaction occurred it was approximately twice as frequent in the control
group as in the treatment group. The behavior category of teacher use of
praise showed the greatest difference in interaction patterns between the groups.
This category did not appear in the control group's 10 most frequent interaction
patterns while it appeared in 4 of the 10 most frequent patterns for the treat-
ment group.

The treatment and control groups differed significantly on all 11 of the
variables included in the TPCQ, with the treatment group rated as more indirect
and more effective than the control group in each one.

The data on attitudes toward teaching indicated a significant difference
between the treatment and control groups' teaching attitudes with the treatment
group rated as more indirect and more positive in attitudes toward teaching
than the control group.
Earlier investigations that used CAFIAS to study the effects of instruction and supervision in IA on preservice and student teachers' behaviors found results similar to those of the present study. Different studies found different CAFIAS variables contributing significantly to between-group differences, however, all the results indicated that those teachers trained in CAFIAS were more likely to indicate their concern through the use of acceptance and praise of students' ideas than were teachers not so trained. This investigation along with those previous studies also found that those teachers trained in CAFIAS allowed students more freedom, which led to increased student contribution, than those teachers not trained in CAFIAS. Several studies (Gellman, 1968; Getty, 1977; Henry, 1971; Smith, 1976) have agreed with this one and have concluded that a lasting effect of IA training on teaching behavior is indicated.

This study and previous investigations have found significant differences between treatment and control groups in teaching effectiveness with those who were more indirect in their teaching behaviors also rated as more effective. Those were also the findings of the present study. The lasting effects of those between-group differences were indicated in the results found by Mancini et al. (1979) and this investigator.

Although several different data-gathering instruments were used to study attitudes toward teaching and how they are affected by IA training, previous investigators' findings were similar to those of this study. All of the studies concluded that those who had received IA instruction and/or supervision showed a change toward more positive attitudes toward teaching than those who had not received IA training. Inturrisi (1979) used the TSRT in conjunction with CAFIAS, as did this investigator. The findings of the two studies were similar in that those who had received IA exposure were more indirect in their
teaching behavior and more positive in their attitudes toward teaching than those who had not received exposure to IA. The findings of Gellman (1968) and this investigation also support the lasting effects of IA training on attitudes toward teaching.

For a practical application it appears that some evidence has been presented to support the inclusion of IA instruction and/or supervision in the undergraduate teacher training curriculum. If those teachers who received training in IA as undergraduates were found to be more indirect in their behavior, more effective, and more positive in their attitudes than those teachers trained through conventional methods, then possibly it is time to include IA training in those methods. Exposure to interaction analysis, at least on a trial basis, seems to be warranted for teacher trainees and inservice teachers as well.
Chapter 6
SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS FOR FURTHER STUDY

Summary

This investigation was conducted in order to study the long term effects on the overall teaching environment of inservice physical educators as a result of the supervision and/or instruction in interaction analysis received during undergraduate teaching training. The subjects were 26 inservice physical educators in their first 3 years of teaching who had received their undergraduate teacher training and degrees at Ithaca College, Ithaca, New York. The assignment of subjects to either treatment or control groups was dependent on the type of supervisory feedback of teaching methods received during undergraduate teacher training. Those assigned to the control group received only conventional supervisory feedback while those in the treatment group received supervision and/or instruction in interaction analysis along with the conventional feedback. Observed teaching behavior was recorded through the use of Cheffers' Adaptation of Flanders' Interaction Analysis System (CAFIAS), the Teacher Performance Criteria Questionnaire (TPCQ) was used to measure teaching effectiveness, and teaching attitudes were assessed by the Teaching Situation Reaction Test (TSRT).

Each subject was videotaped at his/her school while teaching two of his/her regular classes. The TSRT was also completed by each subject. A panel of judges viewed both videotapes and completed the TPCQ for each subject. Data for analysis of teaching behavior were obtained from the CAFIAS coding of both videotapes for each subject. A computer analysis provided matrices, ratios, and percentages for the CAFIAS variables. Teaching effectiveness data were provided by the establishment of a total score for each subject from the sum
of all judges' scores. Also established for each subject was the sum of all judges' scores for each of the 11 TPCQ variables. A total score for each subject on the TSRT was computed and provided the data for analysis of attitudes toward teaching.

Multivariate analysis of variance (MANOVA), followed by discriminant function analysis and univariate analysis of variance (ANOVA), was used first to identify significant differences in the overall teaching environment between treatment and control groups. The variables used to identify overall teaching environment were the eight teaching behavior variables (CAFIAS), the teaching effectiveness variable (TPCQ), and the attitudes toward teaching variable (TSRT). In the second analysis, the eight CAFIAS variables were analyzed separately to identify significant differences in teaching behavior between treatment and control groups. Teaching effectiveness was also analyzed separately using the sum of all four judges' scores on each of the 11 TPCQ variables. The total score for each subject on the TSRT was determined. An ANOVA was performed to determine if significant between-group differences existed in attitudes toward teaching. The .05 level of significance was set for all tests.

A significant difference between the treatment and control groups' overall teaching environment was determined through the MANOVA on the 10 variables. This led to the rejection of the major null hypothesis of no significant difference in overall teaching environment between those physical educators who received instruction and/or supervision in interaction analysis during undergraduate teacher training and those physical educators who did not receive such instruction and/or supervision. As found by the discriminant function analysis, 3 of the 10 variables were responsible for 97.5% of the total between-group variance: teacher use of verbal acceptance and praise, and student suggested pupil verbal and nonverbal initiation. The univariate
ANOVA's identified 5 of the 10 variables that, when considered independently, contributed to between-group differences. These five variables were the teaching effectiveness (TPCQ) variable, the teaching attitudes (TSRT) variable, and three of the teaching behavior (CAFIAS) variables, including teacher use of verbal and nonverbal acceptance and praise, and teacher use of verbal questioning.

The MANOVA performed during the separate analysis done on the teaching behavior (CAFIAS) variables determined a significant difference between treatment and control groups. This led to the rejection of the sub-hypothesis of no significant differences in teaching behaviors between those physical educators who received instruction and/or supervision in IA during undergraduate teacher training and those physical educators who did not receive such instruction and/or supervision. The discriminant function analysis and the ANOVA's performed on the eight CAFIAS variables indicated results similar to those found for the overall teaching environment. The top three variables contributing the greatest percentage to the between-group variance were the same. The ANOVA's again indicated significant between-group differences for the same three CAFIAS variables. Between-group differences in the percentage of occurrence of teaching behaviors were also found indicating that those teachers in the treatment group displayed a greater amount of indirect behaviors while those teachers in the control group displayed a greater amount of direct behaviors. The greatest difference in interaction patterns between the treatment and control groups was in the category of teachers' use of praise.

The MANOVA performed for the additional analysis on the teaching
effectiveness (TPCQ) variables indicated a significant between-groups difference, which led to the rejection of the sub-hypothesis of no significant difference in teaching effectiveness between those physical educators who received instruction and/or supervision in IA during undergraduate teacher training and those physical educators who had not received such instruction and/or supervision. The variables which contributed the greatest percentage to the between-group variance, as indicated by the discriminant function analysis, were clarity, enthusiasm, use of criticism, and probing. The ANOVA's determined that the treatment and control groups differed significantly on all of the TPCQ variables.

The ANOVA performed on the TSRT scores indicated a significant difference between treatment and control groups on attitudes toward teaching with the treatment group being more indirect and positive in teaching attitudes than the control group. This led to the rejection of the sub-hypothesis of no significant differences in attitudes toward teaching between those physical educators who received instruction and/or supervision in IA during undergraduate teacher training and those who did not receive such instruction and/or supervision.

Conclusions

The findings of this investigation support the following conclusions comparing inservice physical educators who received instruction and/or supervision in IA during undergraduate teacher training and those who did not receive such instruction and/or supervision:

1. Inservice physical educators who received IA exposure were more indirect in their teaching style, making greater use of verbal and nonverbal acceptance and praise of students' ideas and using more verbal questioning in their classes.
2. Students of physical educators who received IA exposure displayed greater pupil initiative, both verbal and nonverbal, and more behavior indicative of a broad interpretation of situations presented by their teachers.

3. Inservice physical educators who received IA exposure scored better on the teaching effectiveness (TPCQ) variables.

4. Inservice physical educators who received IA exposure were found to be more positive and indirect in their attitudes toward teaching as assessed by the TSRT.

5. The effects of instruction and/or supervision in IA on the overall teaching environment, including teaching behavior, effectiveness, and attitudes, were maintained 1 to 4 years after the cessation of training in interaction analysis.

**Recommendations for Further Study**

1. Conduct an investigation which would study physical educators in separate categories, such as elementary/secondary level, male/female teachers, same number of years of teaching experience.

2. Conduct similar follow-up studies in order to collect more data on the long term effects of IA training.

3. Conduct a similar study of physical educators with more inservice experience in order to determine if the effects of IA training increase, remain the same, or decrease as the number of years since the cessation of IA training increases.

4. Conduct a study to determine if there would be any difference in the impact of IA training dependent upon when such training was received—during undergraduate teacher preparation or following the acquisition of several years of inservice experience.
Appendix A
CODER'S RELIABILITY* FOR SELECTED SUBJECTS
USING SPEARMAN'S RHO
Subject 101 -- Treatment

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<td>8</td>
<td>.50</td>
<td>.25</td>
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<td>8.5</td>
<td>9.5</td>
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<td>1.00</td>
</tr>
<tr>
<td>4 - 8\</td>
<td>10</td>
<td>9.5</td>
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<td>.25</td>
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*$r_s = .9879$.

Top 10 cells listed refer to the order of coder's numerical frequency.

Rank observation one and two refer to the origin of the coding.

$d$ refers to the differences between the ranks of each cell for observation one and observation two.

$d^2$ refers to the $d$ column squared.
Appendix A (continued)

CODER'S RELIABILITY* FOR SELECTED SUBJECTS

USING SPEARMAN'S RHO

Subject 214 -- Control

<table>
<thead>
<tr>
<th>Cells</th>
<th>Rank Observation</th>
<th>Rank Observation</th>
<th>d</th>
<th>d²</th>
</tr>
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<td>10 - 8</td>
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<td>2</td>
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<td>1.00</td>
</tr>
<tr>
<td>8 - 10</td>
<td>2</td>
<td>1</td>
<td>1.00</td>
<td>1.00</td>
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<td>6 - 8</td>
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<td>0.00</td>
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</tr>
<tr>
<td>8 - 6</td>
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<td>4</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
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<td>5</td>
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<td>0.00</td>
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<td>0.50</td>
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</table>

Total: 2.50

*r = .9848.

Top 10 cells listed refer to the order of coder's numerical frequency.

Rank observation one and two refer to the origin of the coding.

d refers to the differences between the ranks of each cell for observation one and observation two.

d² refers to the d column squared.
Appendix B

CLASSIFICATION OF DATA FOR ALL SUBJECTS
ON THE EIGHT CAFIAS VARIABLES

1. Teacher use of verbal questioning (TVQ)
2. Teacher use of nonverbal questioning (TNVQ)
3. Teacher use of verbal acceptance and praise (TVAP)
4. Teacher use of nonverbal acceptance and praise (TNVAP)
5. Teacher-suggested pupil verbal initiation (TSPVI)
6. Teacher-suggested pupil nonverbal initiation (TSPNVI)
7. Student-suggested pupil verbal initiation (SSPVI)
8. Student-suggested pupil nonverbal initiation (SSPNVI)
Appendix C

THE CATEGORIES OF CHEFFERS' ADAPTATION OF FLANDERS' INTERACTION ANALYSIS SYSTEM

Coding Symbols
Teacher
Environment (E)
Student (S)

Relevant Behaviors

<table>
<thead>
<tr>
<th>Categories</th>
<th>Verbal</th>
<th>Nonverbal</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Praises, commends, jokes</td>
<td>Smiles, nods with smile, (energetic) winks, laughs</td>
</tr>
<tr>
<td>2-12</td>
<td>Encourages</td>
<td>Claps hands, pats on the shoulder, places hand on head of student, wrings student's hand, embraces joyfully, laughs to encourage, spots in gymnastics, helps child over obstacles</td>
</tr>
</tbody>
</table>

Appendix C (continued)

Relevant Behaviors

<table>
<thead>
<tr>
<th>Categories</th>
<th>Verbal</th>
<th>Nonverbal</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td></td>
<td>13</td>
</tr>
<tr>
<td>3-13</td>
<td>Accepts, clarifies, uses, and develops suggestions</td>
<td>Nods without smiling, tilts head in empathetic reflection, sighs empathetically</td>
</tr>
<tr>
<td></td>
<td>and feelings by the learner</td>
<td>Shakes hands, embraces sympathetically, places hand on shoulder, puts arm around shoulder or waist, catches an implement thrown by student, accepts facilities</td>
</tr>
<tr>
<td>4</td>
<td></td>
<td>14</td>
</tr>
<tr>
<td>4-14</td>
<td>Asks questions requiring student answer</td>
<td>Wrinkles brow, opens mouth, turns head with quizzical look</td>
</tr>
<tr>
<td></td>
<td>Face:</td>
<td>Posture:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Places hands in air, waves finger to and fro anticipating answer, stares awaiting answer, scratches head, cups hand to ear, stands half turned toward person, awaits answer</td>
</tr>
</tbody>
</table>
### Appendix C (continued)

#### Relevant Behaviors

<table>
<thead>
<tr>
<th>Categories</th>
<th>Verbal</th>
<th>Nonverbal</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td></td>
<td>15</td>
</tr>
<tr>
<td>5-15</td>
<td>Gives facts, opinions, expresses ideas, or asks rhetorical questions</td>
<td>Face: Whispers words inaudibly, sings or whistles</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Posture: Gesticulates, draws, writes, demonstrates activities, points</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>16</td>
<td></td>
</tr>
<tr>
<td>6-16</td>
<td>Gives directions or orders</td>
<td>Face: Points with head, beckons with head, yells at</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Posture: Points finger, blows whistle, holds body erect while barking commands, pushes child through movement, pushes child in a given direction.</td>
</tr>
</tbody>
</table>
Appendix C (continued)

Relevant Behaviors

<table>
<thead>
<tr>
<th>Categories</th>
<th>Verbal</th>
<th>Nonverbal</th>
</tr>
</thead>
<tbody>
<tr>
<td>7-17</td>
<td>Criticizes, expresses anger or distrust, sarcastic or extreme self-reference</td>
<td>Face: Grimaces, growls, frowns, drops head, throws head back in derisive laughter, rolls eyes, bites, spits, butts with head, shakes head</td>
</tr>
<tr>
<td>8-18</td>
<td>Student response that is entirely predictable, such as obedience to orders, and responses not requiring thinking beyond the comprehension phase of knowledge</td>
<td>Face: Poker face response, nods, shakes, gives small grunts, quick smile</td>
</tr>
<tr>
<td></td>
<td>Posture: Moves mechanically to questions or directions, responds to any action with minimal nervous activity, robot-like</td>
<td>Posture: Hits, pushes away, pinches, grapples with, pushes hands at student, drops hands in disgust, bangs table, damages equipment, throws things down</td>
</tr>
</tbody>
</table>
Appendix C (continued)

Relevant Behaviors

<table>
<thead>
<tr>
<th>Categories</th>
<th>Verbal</th>
<th>Nonverbal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eine (8)</td>
<td>Predictable student</td>
<td>Face: A &quot;What's more, Sir&quot; look, eyes sparkling</td>
</tr>
<tr>
<td>Eine (8)</td>
<td>responses requiring some measure of evaluation</td>
<td>Posture: Adds movements to those given or expected, tries to show some arrangement requiring additional thinking: e.g., works on gymnastics routine, dribbles basketball, all game playing</td>
</tr>
<tr>
<td>Eineteen (18)</td>
<td>and synthesis from the student, but must remain within the province of predictability. The initial behavior was in response to teacher initiation.</td>
<td></td>
</tr>
</tbody>
</table>
## Relevant Behaviors

<table>
<thead>
<tr>
<th>Categories</th>
<th>Verbal</th>
<th>Nonverbal</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>Pupil-initiated talk that is purely the result of their own initiative and that could not be predicted</td>
<td>Face: Interrupting sounds, gasps, sighs</td>
</tr>
<tr>
<td>9-19</td>
<td>Posture: Puts hands up to ask questions, gets up and walks around without provocation, begins creative movement education, makes up own games, makes up own movements, shows initiative in supportive movement, introduces new movements into games not predictable in the rules of the games</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Stands for confusion, chaos, disorder, noise, much noise</td>
<td>Face: Silence, children sitting doing nothing, noiselessly awaiting teacher just prior to teacher entry, etc.</td>
</tr>
</tbody>
</table>

1 From Cheffers, Amidon, and Rodgers (1974).
REFERENCES


Cheffers, J. T. F. *The validation of an instrument designed to expand the Flanders system of interaction analysis to describe nonverbal interaction, different varieties of teacher behavior, and pupil responses.* Unpublished doctoral dissertation, Temple University, 1972.


Flanders, N. A. Analyzing teaching behavior. Reading, Ma.: Addison-Wesley 1970.


Galloway, C. M. Nonverbal communication. Theory into Practice, 1968, 7, 172-175.


Muto, N. F. A study of changes in teaching style during the student teaching experience (Doctoral dissertation, Syracuse University, 1967).


Rosenshine, B., & Furst, N. The use of direct observation to study teaching.


