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# The effects of ALT-PE supervisory feedback on the teaching behaviors of preservice physical education teachers

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THE EFFECTS OF ALT-PE SUPERVISORY FEEDBACK ON THE  
TEACHING BEHAVIORS OF PRESERVICE PHYSICAL  
EDUCATION TEACHERS

by

Linda L. Griffin

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,  
and Recreation at  
Ithaca College

September 1986

Thesis Advisor: Dr. Victor H. Mancini

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## ABSTRACT

The study compared the effects of conventional supervisory feedback and systematic supervisory feedback obtained through the use of the Academic Learning Time-Physical Education (ALT-PE) instrument (Siedentop, Tousignant, & Parker, 1982) on the teaching behaviors of preservice teachers. Freshmen physical education majors ( $N = 44$ ) enrolled in the Elementary Games course at Ithaca College were videotaped twice while teaching in a micropeer setting. The two videotapes of each subject were coded using the ALT-PE instrument; intraobserver agreement was .94. Subjects were randomly assigned to a control group and a treatment group. The subjects in the control group received conventional supervisory feedback while viewing their tapes. Subjects in the treatment group received instruction and supervision in ALT-PE in addition to conventional supervisory feedback while viewing their tapes. To identify whether differences in teaching behaviors existed between the control and treatment groups, MANOVA was performed on the ALT-PE variables at both the context and learner involvement levels. This was followed by ANOVA to determine which of the variables independently contributed to the significant differences between the two groups. The MANOVAs on the context level variables

( $F [6,37] = 4.384$ ) and on the learner involvement level variables ( $F [7,36] = 11.319$ ) revealed significant differences between the two groups ( $p < .05$ ). ANOVA revealed six ALT-PE variables on which the two groups were different when the variables were considered independently. Students of teachers in the treatment group accrued more ALT-PE, spent less time in transition and management behaviors, and more time in game play. Students of teachers in the control group spent more time engaged in on-task behavior as well as more time waiting. Teachers who received instruction and supervision in ALT-PE were more effective and provided more opportunities for their students to be actively involved in their classes.

THE EFFECTS OF ALT-PE SUPERVISORY FEEDBACK ON THE  
TEACHING BEHAVIORS OF PRESERVICE PHYSICAL  
EDUCATION TEACHERS

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A Thesis Presented to the Faculty of  
the School of Health, Physical  
Education, and Recreation  
Ithaca College

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

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by  
Linda L. Griffin  
September 1986

Ithaca College  
School of Health, Physical Education, and Recreation  
Ithaca, New York

CERTIFICATE OF APPROVAL

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MASTER OF SCIENCE THESIS

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This is to certify that the Master of Science Thesis of  
Linda L. Griffin

submitted in partial fulfillment of the requirements  
for the degree of Master of Science in the School of  
Health, Physical Education, and Recreation at Ithaca  
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## DEDICATION

This thesis is dedicated to my family and my few "golden" friends for their belief in me to take a chance and succeed.

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## Chapter 1

### INTRODUCTION

Many researchers over the past few years have used interaction analysis (IA) as a method of providing supervisory feedback for preservice teachers. The effects of instruction and supervision in IA on teaching behaviors were considered by Getty (1977), Hendrickson (1975), and Vogel (1976). Inturrisi (1979), Rochester (1976), and van der Mars (1979) studied its effects on teacher effectiveness, attitudes, and perceived teaching behaviors, respectively. The above studies indicated that those teachers trained in IA exhibited more indirect teaching behaviors, used more verbal questioning in their classes, and demonstrated the use of more teacher praise and acceptance. These teachers were also found to be more effective, to have more positive attitudes, and to give more accurate estimates of classroom interaction.

The next group of studies expanded on these investigations by considering the lasting effects of instruction and supervision in IA on teaching behavior. Getty (1977) found the effects of training in IA could be maintained 1 month after the training program ended. Mancini, Morris, and Getty (1979) also found this to be the case in relation to teacher effectiveness. Mancini,

Frye, and Quinn's study (1982) was the first to look at the long-term effects of instruction and supervision in IA on teaching behavior, effectiveness, and attitudes of inservice physical educators up to 4 years after undergraduate teacher training. The results indicated that teachers trained in IA were more indirect in their teaching style, were more effective, and had more positive attitudes; these effects were maintained 1 to 4 years later. Grecic, Mancini, and Wuest (1984), using the same subjects as Mancini et al. (1982), investigated the lasting effects of instruction and supervision in IA on student involvement, specifically Academic Learning Time-Physical Education (ALT-PE), during classes taught by inservice physical educators who received instruction and supervision in IA and those who did not receive instruction and supervision in IA. The researchers found that those teachers who had received instruction and supervision in IA had more student involvement in their classes and their students accrued more ALT-PE.

Recently, researchers have become increasingly interested in the effects of teaching behavior on student learning. New theoretical research models have been devised using this focus. The most popular model has been the process-product design, in which the process is seen as the teachers' behaviors, the product

being the students' rate of achievement (Dunkin & Biddle, 1974).

The Beginning Teacher Evaluation Studies (BTES) demonstrated that it was possible to use student time-on-task for the product measure of achievement; this was named Academic Learning Time (ALT) (Fisher et al., 1978). Siedentop, Birdwell, and Metzler (1979) extended the ALT concept to the physical education environment. This modification--ALT-PE--was defined as the amount of ALT accrued by a student while engaged in a physical education setting (Metzler, 1980b).

This study takes another step in the use of systematic observation instruments to help undergraduate physical education majors acquire teaching skills. This study used the revised ALT-PE instrument (Siedentop, Tousignant & Parker, 1982) to provide preservice teachers with supervisory feedback. The effects of supervisory feedback were assessed using the revised ALT-PE instrument.

#### Scope of Problem

The study was conducted to determine the effects of instruction and supervision through ALT-PE on the observed teaching behaviors of preservice physical educators. The subjects were 44 preservice physical

education majors enrolled in the Elementary Games course at Ithaca College, Ithaca, New York, during the 1984-85 school year. Each subject was videotaped two times throughout the course while teaching in a micro-peer setting. The two tapes made of each subject were coded using the revised ALT-PE instrument. Each subject was randomly placed into a treatment or control group. The subjects in the treatment group viewed their films and received instruction in ALT-PE in addition to conventional feedback in analyzing their lessons. The subjects in the control group also viewed their films but only received conventional feedback for the analysis of their lessons.

#### Statement of Problem

The effects of instruction and supervision using ALT-PE on the teaching behaviors of preservice physical educators and the activities of their students were studied.

#### Null Hypothesis

There will be no significant difference between the teaching behaviors of preservice physical education majors who received instruction in and supervision through the use of ALT-PE and those preservice physical education majors who did not receive instruction and supervision in the use of ALT-PE.

### Assumptions of Study

The following assumptions were made relative to this study:

1. The subjects selected were representative of the population of preservice physical education majors at Ithaca College.
2. The coding of two micro-peer teaching situations using ALT-PE was adequate to yield valid data on the observed student behaviors during these classes.
3. The interval recording format of the ALT-PE observational system used for observing student behavior provided a representative sample of the behaviors which would have been gained from continuous observation.
4. The coder was reliable in the use of ALT-PE.

### Definition of Terms

The following terms were operationally defined for the purpose of this study:

1. Academic Learning Time (ALT) is the amount of time a student spends in relevant academic tasks at a high rate of success (Marliave, 1976).
2. Academic Learning Time in Physical Education (ALT-PE) is the amount of academic learning time accrued by a student while in a physical education class (Metzler, 1980b).
3. Conventional supervisory feedback is the verbal

input directed toward general teaching methodology and problems encountered while teaching (Rochester, 1976).

4. Supervision and instruction in ALT-PE is the information concerning the ground rules, categories, coding, and analysis of ALT-PE given in conjunction with conventional supervisory feedback.

5. Preservice teachers are undergraduate students in physical education who have not yet participated formally in student teaching.

6. Micro-peer teaching is the method of instruction in teacher education which enables preservice teachers to practice teaching skills by teaching their classmates (peers).

#### Delimitations of Study

The following were the delimitations of the study:

1. The subjects were 44 preservice physical education majors receiving their undergraduate teacher training at Ithaca College, Ithaca, New York, and at the time of the study they were enrolled in the Elementary Games course.

2. Only three students were observed during each micro-peer teaching.

3. ALT-PE was the only observational system used to record actual student behaviors.

### Limitations of Study

1. The findings may not be generalized beyond preservice physical education majors who are receiving their undergraduate teacher training at Ithaca College, Ithaca, New York.

2. The findings may only be valid for comparison to the extent that three randomly selected students are representative of the whole class.

3. The findings related to the observed student behaviors may only be valid for comparison when ALT-PE is used for coding.

## Chapter 2

### REVIEW OF RELATED LITERATURE

The review of related literature relevant to this study will focus on the following areas: (a) the use of intervention and feedback to modify teaching behavior in physical education, (b) the Beginning Teacher Evaluation Studies, (c) studies involving Academic Learning Time-Physical Education, and (d) summary.

#### The Use of Intervention and Feedback to Modify Teaching Behavior in Physical Education

IA is the method whereby preservice teachers can see an objective event-by-event description of their lesson and can be made aware of the amount of verbal and nonverbal interaction that occurred (Rankin, 1976). The significance of IA in teacher preparation is the immediate, objective feedback that can be shared by the supervisor with the preservice teacher on completion of a lesson. The supervisor and teacher, therefore, can use IA to select and modify the teaching behaviors that require attention.

Over the past 10 years the utilization of IA as an intervention technique to change teachers' behaviors has become increasingly frequent. The first attempt to utilize this approach was undertaken by Love and Barry (1971) who trained student teachers to use the Timer-

Love adaptation of Flanders' Interaction Analysis System and a videotape recorder during undergraduate teacher training. Each student teacher was videotaped four times during the 6-week period, and each tape was coded by all students and a supervising teacher. The findings of Love and Barry were student teachers developed a sense of cooperation with each other during the training period and were able to analyze their own teaching, in addition to demonstrating both the desire and ability to change their own teaching behaviors.

A number of investigators have used the OSU Teaching Behavior Scale to observe student physical education teachers. Hughley (1974) gave daily directed informational feedback to four student teachers which resulted in an increase in positive teaching behaviors. A similar study conducted by Rife (1973) employed feedback and modeling as a method of intervention and reduced the supervision to twice a week. In addition, this was effective in increasing positive teaching behaviors and reducing negative behaviors. Boehm (1974), Darst (1976), and Hamilton (1974) all investigated the effects of competency-based teaching intervention consisting of instructions, graphic feedback, goal setting, cueing, and reinforcement on student teachers at the junior high, senior high, and

elementary school levels, respectively. The researchers found that due to the treatments employed behaviors improved in the desired manner.

A peer intervention model, in which student teachers coded one lesson a day taught by a peer and provided graphic and verbal feedback and reinforcement after the lesson, was developed by Dodds (1975). The peers proved to be reliable and were successful in creating more positive student teacher behaviors. Dessecker (1976) went an additional step and measured the effects of self-intervention on student teachers' behaviors. Three student teachers wearing small tape recorders taught and recorded one lesson each day. The tapes were coded after the lesson and percentages tallied for the various behaviors, and the data were sent back to the college supervisor. The results indicated that self-assessment is an effective means of increasing positive teaching behaviors and decreasing negative behaviors.

The effects of training cooperating teachers in applied behavior analysis on student teachers' behaviors were analyzed by Cramer (1978) and Hutsler (1977). In order for comparisons to be made, treatment and control groups were formed. The treatment group received instruction and supervision from the cooperating

teacher; the control group did not. There was a short-term training program in which each of the cooperating teachers participated. This taught them the principles of applied behavior analysis and gave them experience using an observational system. Cooperating teachers observed and coded one lesson each day and initiated interventions when appropriate. In each situation, significant changes in behavior were observed in the teacher in the treatment group; however, no substantial changes were indicated in the control groups' teachers' behaviors.

Countiss (1976) studied the effects of training in a number of teaching styles on the behaviors and attitudes of inservice physical education teachers. The IA instrument that was used to observe teacher and student behaviors was the Spectrum Adaptation of Flanders' Interaction Analysis System (SAFIAS) with the Minnesota Teaching Attitude Inventory (MTAI) and the Pupil Control Ideology (PCI). No substantial relationship was found between the use of indirect behaviors by teachers trained in SAFIAS and those not trained in SAFIAS. However, the trained teachers demonstrated a greater number of teaching styles which allowed greater student decision-making, and, in addition, did have significantly more on-task student

behavior.

McKenzie (1976) and Stewart (1978) developed and evaluated student teacher training centers which were behaviorally-based. Each student teacher participated in a variety of workshops and modules created to improve teaching skills and alter student behavior. Peers observed, analyzed, and provided feedback during actual teaching. The results indicated that the centers were successful in changing both teaching and student behaviors in the manner desired. A similar study was conducted by Currens (1977) to discover whether a more relevant behavioral training model could be developed by combining the Responsive Teaching Model and the Ohio State Competency-Based Model. Sixteen preservice physical education teachers were the subjects, and an observational coding system was developed by the observer. Results indicated that the intervention package plus feedback, cueing, modeling, and reinforcement produced positive behavioral changes. These changes were also observable when FIAS was used to code teacher behaviors.

Metzler (1976) administered a three-part intervention consisting of a reading sheet, a feedback session, and establishment of behavioral goals to five student teachers. The two types of recording techniques

used were event-recording and placheck. They determined baseline rates of selected student behaviors: positive skill attempt feedback, negative skill attempt feedback, and negative nonskill attempt feedback. The results suggested that intervention was the cause of changes in all except one of the behavioral categories observed.

A study designed to implement a peer feedback system in an early field experience was conducted by McMillan (1979). Twenty-one physical education majors participated in a peer observation training course. Once checked for reliability, the peer observer used duration, event and placheck recording techniques to record target behaviors and then presented his/her findings to the preservice teacher. Using the evaluation, interns decided on teaching skills that required attention. As a result of peer feedback, 69% of the behaviors intervened upon changed in the desired manner. Gusthart (1982) investigated the teaching behaviors displayed by 20 college students during a five-stage, 2-year, supervised field experience. The Observation System for Content Development-Physical Education (OSCD-PE) suggested that subjects in the study were superior in the following areas: activity time, positive reinforcement, specific feedback, and individualized tasks.

A study by Davis (1980) considered the value of both self-evaluation and cooperating teacher evaluation as forms of feedback. The interventions attempted to increase positive statements, decrease negative statements, and increase specific content information and information statements. There were three randomly selected groups of 10 elementary school student teachers. One group received self-feedback plus feedback from a cooperating teacher. The second group experienced only self-feedback. A third group of subjects served as the control and received only conventional feedback. The findings indicated that the cooperating teacher group changed the selected teaching behaviors in the desired manner. In the self-evaluation and control groups there were inconsistencies; however, all groups increased the mean percentage of positive feedback during intervention.

Arena (1980) used the Feedback Description System (FCDS) as an intervention in an effort to increase the rate of augmented feedback of three student teachers. A substantial increase in augmented feedback was observed after using the information gained through the application of FCDS instrument.

McKenzie (1981) and Rushall and Smith (1979) conducted single-subject investigations to determine the

effects of intervention on teaching behaviors. The Coach Observation Schedule was used by Rushall and Smith to measure the effects of a self-recording technique on the behaviors of a senior male swimming coach. The findings showed that the treatment changed and increased positive coaching behaviors. McKenzie (1981) studied the effectiveness of supervisor feedback and goal-setting intervention on the instructional behaviors of an experienced physical education teacher immediately, and over a period of time. The teacher received feedback in the selected target behaviors during a 5-minute session immediately after the lesson, and new goals were set. This was found to be effective in bringing about substantial changes for the three target behaviors. Follow-up observations conducted a year later showed a decrease in the use of positive specific feedback statements; however, the frequency of use was still higher than during the baseline period.

The Cheffers' Adaptation of Flanders' Interaction Analysis System (CAFIAS) (Cheffers, 1972) has often been used as a research tool and as a part of a teacher preparation program for physical education majors. In addition, several researchers have used CAFIAS as the treatment in investigations involving the effects of instruction and supervision in interaction analysis on

teaching behaviors. An investigation conducted by Keilty (1975) examined whether 15 hours of instruction and supervision in CAFIAS would facilitate an increase in teacher effectiveness. The findings showed no significant difference for teacher behaviors or teacher effectiveness as identified by the Teacher Performance Criteria Questionnaire (TPCQ). However, it was indicated that student teachers exposed to CAFIAS were perceived by the students to be more indirect in their teaching as identified by the Pupil Opinion Questionnaire.

Hendrickson (1975) used CAFIAS to train preservice physical educators during micro-peer teaching lessons. The control group students viewed their videotapes and received conventional supervisory feedback. The students in the treatment group viewed their videotapes and received conventional feedback plus instruction in CAFIAS and feedback in the form of computer printouts. The class taught by preservice teachers trained in CAFIAS demonstrated more teacher questioning, more teacher praise and acceptance, more individual and small group instruction, and more student contribution. A similar study conducted in a micro-peer teaching setting was undertaken by Rochester (1976). Thirty-six undergraduate student teachers were randomly selected

and randomly assigned to either a control group or treatment group. The subjects in both groups received instruction and supervision in CAFIAS; however, the treatment group received additional supervision and experience in the coding with CAFIAS. Rochester established that more verbal questioning, less teacher talk, and more student-initiated behavior were evident in classes taught by student teachers who received extra instruction. In addition, there was found to be a substantial correlation between teacher effectiveness, as measured by the TPCQ, and teacher behavior, as identified by CAFIAS.

Vogel (1976) studied the effects of instruction and supervision in CAFIAS on 40 physical education student teachers. The subjects in the control group received conventional supervisory feedback while the treatment group received 10 hours of instruction and experience in the coding of CAFIAS, along with computer feedback. All subjects were videotaped during two 50-minute lessons. The subjects trained in CAFIAS demonstrated more use of acceptance and praise, more verbal questioning, and permitted more verbal and nonverbal student-initiated behaviors.

Getty (1977) conducted a similar study which was an expansion of Vogel's (1976) research; however, he

increased the training in CAFIAS for the treatment group from 10 hours to 15 hours. The control group received 15 hours of conventional supervisory feedback during the same period. The subjects in the treatment group exhibited more use of verbal questioning, more praise and acceptance, and allowed more student-initiated behavior. The findings also show that the effects of instruction and supervision of CAFIAS on the teaching behaviors could be maintained 1 month after training has ended. Mancini et al. (1979) used the TPCQ on the same group of subjects used by Getty (1977) to examine the lasting effects of instruction and supervision in CAFIAS on teacher effectiveness. It was found that the treatment group scored higher on the TPCQ and that teacher effectiveness could also be maintained over a 1-month period.

Stevens (1979) studied the effects of instruction and supervision in CAFIAS upon teaching behaviors of elementary physical education teachers. All subjects were assigned to either a treatment or control group by random selection and were observed once a day for 20 consecutive days. The first 5 days were videotaped and provided baseline data. The next 10 days were designed as a training period in which all subjects received some form of feedback. The control group received

conventional feedback the day following their lesson. Treatment group subjects received instruction and supervision in CAFIAS. The final 5 days were used for the collection of data. Visual analysis of the data revealed that from pre- to post-test the treatment group indicated increases in praise, acceptance, questioning, empathetic behavior, student interpretive behavior, and student-to-student interpretive interaction. A comparable investigation was undertaken by Lombardo (1979) using four elementary teachers over 20-day periods. Results similar to Stevens (1979) were found.

The effects of feedback and interpretation of CAFIAS on the attitudes and teaching behaviors of physical education students were considered by Inturrisi (1979). Twenty-eight student teachers were selected and randomly assigned to either a control or treatment group. The treatment group subjects received conventional supervisory feedback plus feedback in the form of the results of CAFIAS analysis. The assessment of teacher attitudes was made by the Teacher Situation Reaction Test (TSRT). The findings showed that those student teachers who received feedback and interpretation in CAFIAS had more positive teaching behaviors and attitudes than those who did not receive feedback and instruction in CAFIAS.

van der Mars (1979) examined the effects of instruction and supervision in CAFIAS on the relationship between perceived and observed teaching behaviors of preservice physical education teachers. Random selection was used to assign subjects to control and treatment groups. Prior to and following each videotaped class, subjects completed the Teacher Questionnaire on Objectives (TQO) to record perceived teaching behaviors. All subjects received conventional supervisory feedback while viewing the videotape. In addition, the subjects in the treatment group received instruction and supervision in CAFIAS and were shown a comparison of their post-class estimates from the TQO and observed scores from the CAFIAS computer printout. The findings from the control group suggested that teachers were unaware of the majority of classroom behaviors. Results from the treatment group indicated more accurate estimates of classroom interaction. In addition, they were also more indirect in their teaching behavior following instruction and supervision in CAFIAS.

Mancini, Frye, & Quinn (1982) were one of the first to study the lasting effects of instruction and supervision in CAFIAS on teaching behaviors, effectiveness, and attitudes. They studied 16

inservice physical education teachers up to 4 years later following cessation of training. All subjects were assigned to either the control or treatment group depending on the type of supervisory feedback received during teacher preparation. Subjects in the control group received conventional supervisory feedback. Those in the treatment group received conventional supervisory feedback plus instruction and supervision in CAFIAS. All subjects were videotaped while teaching two lessons. Teaching effectiveness was measured by the TPCQ and attitudes towards teaching by the TSRT. The results suggested that physical educators who received instruction and supervision in CAFIAS during teacher training were more indirect in their teaching style and made more use of verbal and nonverbal acceptance and praise and verbal questioning in their classes. In addition their students exhibited more verbal and nonverbal initiated behavior.

Eleven effectiveness variables comprise the TPCQ: 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. A MANOVA performed on 11 variables indicated a

significant between-group difference in favor of the treatment group suggesting that the teachers who received instruction and supervision in IA were more effective than those who did not. The discriminant function analysis showed that the four variables-- clarity, enthusiasm, use of criticism, and probing-- accounted for 81% of the total between-group variance. An ANOVA was also used to identify the difference between groups for each of the variables independent of the other 10 variables. Substantial differences were found for all 11 variables, and the treatment group again was considered more effective.

In addition it was concluded that all these effects could be maintained 1 to 4 years after the cessation of training in IA. These findings confirmed the results of three studies that considered the lasting effects of instruction and/or supervision in the academic field (Gellman, 1969; Henry, 1971; Smith, 1976).

#### Beginning Teacher Evaluation Studies

Researchers involved in the overall area of teacher effectiveness have been increasingly interested in the effects of teaching behaviors on student learning. Due to this change in emphasis from investigating teacher behaviors to studying student behaviors, new theoretical models have been devised, perhaps the most popular being

the process-product design which originated in the field of classroom investigations. In this design, the process was seen as the students' behaviors, the product being the students' quality of achievement (Dunkin & Biddle, 1974).

Educational investigators who are concerned with the general area of teacher effectiveness have been interested in the effects of teaching behaviors on student learning. During the 1970s the Beginning Teacher Evaluation Studies (BTES), which were conducted at the Far West Laboratory for Research and Development in San Francisco, discovered that time was the most important variable in the learning process (Fisher et al., 1978). Berliner (1979) suggested that it was possible to use time-on-task for product measures of actual achievement. Romberg (1980) offered a three-part statement of explanation of this relationship:

1. Teacher actions imply student activity.
2. Student learning activity implies student achievement; and, therefore, by transitivity one can deduce that
3. Teacher actions imply student achievement. (p. 82)

Through the BTES studies this concept of time-on-task became known as ALT, defined as the amount of time

a student spends engaged in relevant learning tasks with a high degree of success (Marliave, 1976).

The ALT model focuses upon two time variables: allocated time and engaged time. Allocated time refers to the time a student allocates to a particular task. Engaged time refers to the time a student is paying attention to that activity. There are three success levels identified to reflect the degree to which the student understands the task. High success is evident when a student finds the task relatively easy and, therefore, performs with few mistakes. Medium success indicates some understanding of the task, although not total understanding. Low success refers to very little understanding and limited correct responses. Another important variable within the learning process is task relevancy. If a task is too difficult, the student will not be successful; therefore, learning will not take place. However, if the task is designed to be appropriate to the student's level, learning will take place (Fisher et al., 1978).

Studies within the BTES research consisted of an extensive examination of ALT in many areas of elementary reading and mathematics (Fisher et al., 1978). Twenty-four second grade and 21 fifth-grade teachers were

observed 1 full day each week for a 6-month duration. From the study came 14 major findings, five of which were directly related to ALT and students' achievement:

1. Student learning is positively associated with the amount of time the teacher allocates to instruction.
2. The amount of time students are actually engaged is positively associated with learning.
3. High success is positively associated with student learning.
4. Low success is negatively associated with student learning.
5. Negative attitudes are not related to increases in ALT.

It was indicated that the proportion of allocated time in which students were actually engaged differed greatly. Some classes had an average engagement rate as low as 50% while others were as high as 90%. The results suggested that although teachers may allocate the same amount of time to a specific task, one class could have as much as twice as much learning time as the other (Fisher et al., 1978).

These results confirmed the beliefs of the BTES team--that ALT is a viable predictor of student learning.

Studies Involving Academic Learning Time-Physical  
Education

The BTES concept of ALT was modified by Siedentop et al. (1979) to develop an observation tool to permit the coding of physical activity. This modification, ALT-PE, is a systematic approach for studying teacher effectiveness and student participation patterns in the gymnasium or playing field (Metzler, 1980b). This initial system (which most of the research up to this point have utilized) consisted of four major decision levels: setting, content, learner moves, task difficulty, and 25 further categories. It included the category ALT-PE which was defined as any observed interval in which a target student was coded as being motorically engaged in a relevant task with easy level of difficulty (Metzler, 1980b).

The reliability of the ALT-PE instrument (Siedentop et al., 1979) was measured by Godbout (1980). The generalizability theory was used to consider two possible sources of error--the observers and the target students--from which results were generalized to the whole group. Four major variables--allocated time to physical education content (PE-content), learner engaged time in relevant task material, success rate in material, and ALT-PE--were investigated. Fourteen

secondary school physical educators' classes were coded by three observers using a 6-second observe, 6-second record format. Each observer was responsible for three students. An analysis of variance treatment indicated that three of the four dependent variables (PE-content, student engaged time, and overall ALT-PE) indicated high generalizability coefficients. ALT-PE had a generalizability coefficient of .87 with one observer coding three target students and .96 with two observers coding six target students. However, low reliability was observed for the students' rate of success variable, but this was seen as more of a reflection of the teachers' absence of variation than an increase in error term. Godbout also concluded that the recording format provided a fairer sample of the class time with 50% of the total class devoted to student observation.

Metzler (1980b) used the ALT-PE instrument (1979) to discover the amount of ALT accrued in a variety of physical education settings. The teachers were 21 physical educators teaching at the elementary, junior high, and high school levels. A total of 32 classes were observed in 13 different activities, with two or three target students observed in each class. Each observer completed 13 weeks of training, and four methods of determining reliability were used.

Descriptive statistics showed that students were involved in PE content 73.6% of the class time. ALT-PE occurred 26.8% of all class intervals, and ALT-PE(M) 7.5% of all intervals. Both ALT-PE and ALT-PE(M) were highest at the elementary level followed by the junior high and high school levels, respectively.

The same set of data was also examined by Metzler (1980a) to determine the amounts of ALT-PE and ALT-PE(M) accrued in each of the 13 different physical education activities. The highest mean percentages of ALT-PE were found in volleyball (59.4%) and soccer (40.3%); the lowest were found in football (14.1%) and gymnastics (12.3%). On the whole, students engaged in team activities accrued more ALT-PE but less ALT-PE(M); this suggested that different teaching methods may be used in team activities compared with individual activities. Five of the 32 classes were observed for the entire teaching unit to discover whether the students' ALT-P and ALT-PE(M) would increase as the unit progressed; however, this was found not to be the case.

An investigation was conducted by Godbout, Brunelle, and Tousignant (1983) in which 30 elementary and 31 secondary school physical educators were observed twice over a 2-month period. The class time allocated to PE content activity was 65.7% at the elementary level

and 81.1% at the secondary level. ALT-PE constituted 31.3% and 36.4% of the class time, respectively. The study found that at the secondary level students spent as much time in nonengaged activity as engaged. At the elementary level they spent a little more time engaged than nonengaged.

Shute, Dodds, Placek, Rife, and Silverman (1982) conducted a study to measure the differences in learning opportunities in elementary movement classes. The subjects for the study were a female physical educator in her first year of teaching and 105 elementary students from 20 classes. Percentages were derived for three student classifications: sex, skill level, and special needs students. The results indicated equal opportunities exist for all groups (79% of the time being devoted to PE content). Nonspecial needs students were engaged in a motor response at an easy level of difficulty, ALT-PE(M), 13% of the time compared with 6% for special needs students. Placek, Silverman, Shute, Dodds, and Rife (1982) investigated the differences in learning opportunities in traditional elementary physical education classes. Subjects consisted of one male physical educator and 53 elementary school first, third, and fifth grade pupils. ALT-PE percentages were derived for three student classifications: high-,

medium-, and low-skilled students; girls and boys; and for different instructional units taught. The results showed that no significant differences in ALT-PE existed between the groups. However, high-skilled students accrued 15% ALT-PE(M) compared with 9% and 8% for medium- and low-skilled students, respectively.

A closer examination of the ALT-PE accrued by mainstreamed handicapped and regular students was undertaken by Auferheide, McKenzie, and Knowles (1982). Teachers were identified as users and nonusers of individualized instruction. Two subjects, a nonhandicapped and a handicapped student, were observed alternately during each of the 60 classes ( $N = 120$ ). No significant differences were found for either total engaged or nonengaged time. Considerable differences were noted between experimental groups. Students engaged in classes taught by the teachers using individualized instruction were engaged 57.20% of class time compared with 48.94% for the students of nonusers. Their engaged times at an easy level were also significantly higher, 33.08% and 17.50%, respectively.

A similar study was conducted by Auferheide, Olson, and Templin (1981) to determine the degree to which mainstreamed handicapped and regular students had an equal opportunity to learn. The subjects included 34

junior high school students and four teachers. A mainstreamed handicapped and a nonhandicapped student were coded in each of the 17 classes. The results again indicated no substantial differences in ALT-PE (regular students accrued 45.94% compared with 44.94% for handicapped students). Handicapped students were engaged more often (58.60% compared with 54.35% for regular students); however, regular students accrued slightly more ALT-PE(M), 9.06% compared with 8.06% for handicapped students.

To enable a comparison to be made with the college level classes, Metzler (1981a) measured the amount of ALT-PE gained by students in eight different college activity classes. The findings showed that 45% of all class time was devoted to ALT-PE, 18.5% of which was accounted for by ALT-PE(M). These figures were double those found in grades K-12. Metzler believed this showed a need for improved planning, instruction, organization, and management on behalf of the K-12 teacher.

In recent years a number of investigators have analyzed the value of different forms of feedback and intervention in an effort to increase teacher effectiveness. One of the first studies that sought to do this was conducted by Whaley (1980). Twelve students

from four schools were observed in their daily physical education class for 7 weeks. The first intervention came halfway through the study. Teachers were made aware that more engaged time and motor responses were desirable; however, the means of accomplishing this was not discussed. Students were made aware of the desired outcome in the second intervention. Daily feedback was continued to both teachers and students throughout the study. The results indicated that daily monitoring and feedback had no significant effects on ALT-PE or teaching behavior.

A similar study was initiated by Birdwell (1980) in which three inservice physical educators received instruction and daily feedback in an effort to increase ALT-PE and ALT-PE(M). The teacher was not only made aware that changes in management, feedback, and student nonengaged time were desirable but also instructed them how this might be achieved. The results indicated a significant increase in both ALT-PE and ALT-PE(M) for all classes observed. ALT-PE increased from an average of 34.7% to 57.3%, and ALT-PE(M) increased from 17.5% to 37.7%.

Paese (1982) evaluated the effect of feedback on the ALT-PE and ALT-PE(M) of two student teachers at the secondary level. The teachers both received verbal and

written feedback after each of their observed classes. They were also instructed how they could decrease management time and increase the students' motor responses. The use of feedback led to an increase in motor engagement from an average of 18.5% during baseline to 43% after implementation of feedback, and ALT-PE(M) from 7.5% to 19%.

Beamer's (1983) investigation made an attempt to increase the ALT-PE of two physical educators and nine physical education students in two middle schools. Teachers were asked to increase large group monitoring, to get the class into activities quicker, and to give more feedback to low-skilled students. Results indicated that PE content averaged 68% and ALT-PE 15% of class time. In one of the schools the interventions were successful but not in the other. The factors which affected ALT-PE were the nature of the activity, the amount of activity time available, and the efficient use of activity time.

The value of intervention and feedback was investigated by Metzler (1981b). A student teacher and three students from each of the two classes were observed during an archery unit. Baseline measurements indicated low percentages of motor engagement, motor responding, and ALT-PE(M) along with high percentages of

not-engaged waiting and interim activities. The teacher moved the targets further apart (which allowed two students to shoot at the same time) and used an extra supply of arrows. Metzler suggested that altering different instructional factors could lead to an increase in motor engagement and ALT-PE(M).

The effects of publicly posting task achievement on the ALT-PE of young swimmers was studied by McKenzie (1980). A high-, medium-, and low-skilled student were observed in each of the two swim classes. During public posting conditions, all swimmers indicated an increase in total engaged time, and two high-skilled swimmers increased their ALT-PE(M) rates from 8% to 20.8% and 13.5% to 25.8%, respectively. In addition, McKenzie considered the effects of using time-out procedures for disruptive behavior on the ALT-PE of a young boy and one of his peers in an adjacent group. A further category Off Task Disruptive (D) was added to the Not Engaged Learner Moves Level to enable the observer to code periods when the student was inappropriately disengaged from the lesson and interfering with the productivity of another learner. The boy observed was coded disruptive an average of 25.5% of the time during the baseline period. During intervention, disruptive behavior fell to 6.3%. When baseline conditions were reinstated, his rate of disruptive behavior rose

slightly to 11.6%; however, this was substantially lower than the original baseline score. A similar trend was observed while coding a boy in an adjacent group. Although neither he nor his group experienced the experimental procedures, they had the opportunity to hear the other group and observe members of that group having to sit-out. This in itself reduced the boy's rate of disruptive behavior from 15.3% to 5.6% during intervention, increasing to 9.4% once baseline conditions were reinstated.

Investigations have also attempted to examine the effects of employing different instructional strategies on teachers' and students' behaviors. An instructional strategy has been defined as the vehicle or delivery system by which ordered information imparts to the learner by the instructor or some other informational providing source (Paese, 1982).

During university fencing classes, McKenzie, Clark, and McKenzie (1982) measured the effects of six instructional strategies: teacher-paced drilling, machine-paced drilling, student-paced drilling, task cards, sparring, and bouting. Fifty-six classes taught by the same instructor were observed using ALT-PE and the Teacher Behavior Observational System. ALT-PE(M) rates during active learning periods ranged from 26.9%

for bouting to 97.9% for machine-paced drilling. Similar differences were also evident relative to teacher feedback. Feedback ranged from 18.7% for teacher-paced drilling compared with 54.8% for student-paced drilling. McKenzie et al. (1982) suggested that the results reflect the importance of examining the various instructional strategies now available.

The effect of three instructional packages on teacher behavior and consequent ALT-PE was examined by Wurzer (1982). The instructional packages were designed to change the management, feedback, and student nonengaged time during volleyball classes taught by three university physical educators. Three randomly selected students were observed in each class for a 15-week period. The findings indicated that the self-directed feedback delivered before each class was successful in changing all student behaviors in the desired manner.

Keller (1982) and Young (1981) have used Experimental Teaching Units (ETU) as a means of measuring ALT-PE. In an effort to reduce the effects of prior learning, both studies used a combined hockey/golf skill in which students had to hit a ball into a hoop 30 yards and 45 yards away, respectively. The ETU designed by Young (1981) consisted of a pre-test followed by a 20-minute lesson, in which only the content was

regulated, followed by a post-test. The results indicated a relationship between ALT-PE and reduced scores showing student mastery of the ETU task. Keller (1982) investigated the effects of two instructional methods, reverse chaining and lecture/demonstration, on student achievement scores. He also considered which length of instructional period--20, 30, or 40 minutes--would produce greater student learning, and whether student ALT-PE(M) is an indicator of student achievement. A pre-test was administered followed by lessons employing the different time periods and instructional methods. The results showed no significant differences in ALT-PE accrued by students taught by different instructional methods or in lessons of different lengths. However, the treatment group did score significantly higher than the group that received no instruction.

In an effort to make the ALT-PE instrument less difficult to use, Siedentop et al. (1982) revised the original system. The revised ALT-PE system (1982) consisted of two major decision levels, context and learner involvement, and 21 further categories. The same recording format was retained from the original system, that is, 6-second observe, 6-second record.

The effects of teacher burnout on the ALT-PE of

students were examined by Mancini, Wuest, Clark and Ridosh (1982) using the revised system. Thirty physical education teachers were placed into either a high-burnout (HB) group or low-burnout (LB) group based on the scores obtained on the Maslach Burnout Inventory (MBI) (Maslach & Jackson, 1981). Each teacher was videotaped three times while teaching his/her regular physical education class, and 180 students were observed. The results showed that more ALT-PE was recorded for students in the LB teachers' classes.

Mancini, Wuest, Vantine, and Clark (1983) conducted a study to assess the effects of instruction and supervision in CAFIAS on the ALT-PE of high-burnout secondary physical education-teachers. In this investigation the revised ALT-PE was used. Six high-burnout physical educators were randomly selected after the administration of the MBI to 10 teachers. Teachers were placed either in a control group or in a treatment group. The study consisted of three phases. Phase 1 consisted of baseline data collection. Phase 2 consisted of administering treatment: the control group received supervisory feedback while observing the videotapes of their teaching; and the treatment group received instruction, supervision, and feedback in CAFIAS while observing their videotapes. Phase 3

consisted of a post-test data collection, and teachers were readministered the MBI at the end of the phase. The data indicated that students in the control group demonstrated an increase in ALT-PE from 21% to 26%, while students in classes taught by the subjects receiving instruction and supervision in CAFIAS increased in ALT-PE from 27% to 46%. These researchers have demonstrated that systematic supervisory feedback can modify teachers' and students' behaviors and also can have an effect on ALT-PE (Mancini et al., 1983).

The subjects in the Mancini et al. (1982) and Grecic (1983) studies were used by Getty (1977), Hendrickson (1975), Rochester (1976), and Vogel (1976). These studies considered the effects of instruction and supervision in CAFIAS on teaching behaviors, attitudes, and effectiveness. The long-term effects of instruction and supervision in CAFIAS on these same variables was assessed by Mancini et al. (1982). Due to the increase in process-product designs, in which the process is the students' behaviors and the product the students' quality of achievement, the next step was to consider the effects of instruction and supervision in CAFIAS on student involvement and achievement, as measured by ALT-PE (Grecic, 1983). The findings in Grecic's study showed that there was a significant difference in the

ALT-PE of students taught by inservice physical educators who received instruction and supervision in CAFIAS and those who did not receive instruction and supervision in CAFIAS.

Another step in the use of systematic observation instruments would be to continue the research concerned with teacher training at the undergraduate level. At the undergraduate level, students can benefit by practicing teaching skills in the micro-peer setting and gain an awareness of the process-product design through the use of the ALT-PE instrument.

#### Summary

The literature relevant to this study strongly indicated that the use of intervention and feedback is an effective means of modifying teaching behaviors. Several investigators have used CAFIAS feedback in an effort to alter student teaching behaviors. Getty (1977), Hendrickson (1975), and Vogel (1976) found that those student teachers who received instruction and supervision in CAFIAS exhibited more indirect teaching behavior than those receiving conventional feedback. Inturrisi (1979), Rochester (1976), and van der Mars (1979) also showed these student teachers to be more effective, to have more positive attitudes, and to be more perceptive relative to classroom interaction. The

lasting effects of this type of instruction and supervision were conducted by Getty (1977), Mancini et al. (1979), and Mancini et al. (1983). Getty (1977) and Mancini et al. (1979) showed that the effects of instruction and supervision in CAFIAS on teaching behaviors and teacher effectiveness, respectively, could be maintained 1 month after cessation of the training period. Mancini et al. (1982) examined the effects of instruction and supervision in CAFIAS on teaching behaviors, teacher effectiveness, and attitudes and found that they could be maintained up to 4 years later.

Recently, the effects of teaching behaviors on student achievement have been used as a means of measuring teacher effectiveness. The BTES developed a system to do this--ALT (Fisher et al., 1978). This was adapted by Siedentop et al. (1979) for use in the physical education setting (ALT-PE), and later revised by Siedentop et al. (1982) to a more abbreviated version. Studies up to this point have generally found that very little ALT-PE takes place during physical education classes. Due to this, various researchers have examined the effects of intervention and feedback on student ALT-PE (Beamer, 1983; Birdwell, 1980; Grecic, 1983; Keller, 1982; Mancini et al., 1983; McKenzie, 1981; Paese, 1982; Whaley, 1980; Wurzer, 1982; Young,

1981). Most of the intervention and feedback techniques utilized were effective in increasing student ALT-PE.

## Chapter 3

### METHODS AND PROCEDURES

This chapter defines the selection of subjects and the method of assignment of subjects to groups, the treatment administered to each group, and the testing instrument employed to measure the time-on-task of the teachers. The establishment of intraobserver agreement, method of data collection, scoring of the data, the treatment of the data, and a summary are also included.

#### Selection of Subjects

The subjects were 44 physical education majors from the 1984-1985 fall and spring semester class of Elementary Games at Ithaca College, Ithaca, New York. The investigator randomly assigned the subjects to either a treatment group or a control group by the flip of a coin.

#### Treatment of Subjects

All subjects participating in this investigation were videotaped on two separate occasions. The teachers in the control group received conventional supervisory feedback. This consisted of viewing videotapes of their own teaching and receiving feedback which emphasized class control, organization, use of equipment and facilities, and methodology. The teachers in the treatment group received conventional supervisory

feedback plus instruction and supervision using ALT-PE. They received information concerning the ground rules, categories, and coding of ALT-PE. For each class following the teachers' peer teaching, the teachers were given information about their teaching behaviors and students' activities obtained by calculating the ALT-PE data for the class.

#### Testing Instrument

The testing instrument used to code the behaviors that occurred during the micro-peer teaching session was the revised ALT-PE observation instrument (Siedentop et al. 1982). The revised ALT-PE observation instrument consisted of two major decision levels: context level and learner involvement level. There were three major subdivisions within the context level (general content, subject matter knowledge, and subject matter motor) and 13 further categories which described the nature of the class environment. There were two major subdivisions at the learner involvement level (not engaged and motor engaged) and eight further categories that described actual student behavior. The 6-second observe, 6-second recording format was used in this study.

#### Intraobserver Agreement

Intraobserver agreement (IOA) for this study was assessed using the scored-interval agreement method

(Hawkins & Dotson, 1975). Two randomly selected videotapes were coded during two independent coding sessions by Dr. Victor Mancini, an expert coder. IOA was calculated on an interval-by-interval basis and was computed by dividing the number of intervals on which there was agreement by the number of agreements and disagreements and multiplying the results by 100 (Herson & Barlow, 1976). The formula is given below:

$$\frac{\text{Agreements}}{\text{Agreements} + \text{Disagreements}} \times 100 = \% \text{ of agreement or IOA}$$

When the target behavior was recorded as occurring during the same interval in both coding sessions, it was determined to be in agreement. It was determined to be in disagreement when the behavior recorded during the same interval did not concur for both coding sessions.

#### Procedures

The preservice teachers, wearing a wireless microphone, were videotaped teaching two micro-peer lessons in an Elementary Games course. Three randomly selected students within each class were observed alternately by an observer using the ALT-PE instrument. The observer used a 6-second observe, 6-second record format and was paced by a digital display on the TV monitor.

### Method of Data Collection

Three randomly selected students in each of the two micro-peer lessons taught by the 44 preservice physical education majors were coded by Dr. Victor Mancini using the revised ALT-PE instrument.

### Scoring of Data

Data collected from the coding of ALT-PE were hand-scored and compiled into percentages for the 21 variables as identified by ALT-PE. These variables were then grouped into 13 variables to facilitate data analysis.

### Treatment of Data

Multivariate analysis of variance (MANOVA) was performed to determine whether differences in teaching behaviors as identified by ALT-PE existed between the treatment and control groups. The data were then subjected to univariate analysis of variance (ANOVA) to identify which of the 13 ALT-PE variables independently contributed to significant differences between the two groups. For all tests the .05 level of significance was set prior to data collection.

### Summary

The subjects for this study were 44 physical education majors from the 1984-1985 fall and spring semester class of Elementary Games at Ithaca College,

Ithaca, New York. Subjects in the control group received conventional supervisory feedback, while those in the treatment group received conventional supervisory feedback and instruction and supervision using ALT-PE.

The preservice teachers were videotaped teaching two lessons in a micro-peer setting. Three randomly selected students in each class were observed alternately, and their behaviors coded using the ALT-PE instrument. A 6-second observe, 6-second record format was used. IOA was calculated according to the scored-interval method (Hawkins & Dotson, 1975).

MANOVA was performed to determine significant differences in the teaching behaviors between the treatment and the control groups. ANOVA was then executed to identify which of the 13 ALT-PE variables, when identified independently, contributed significantly to any differences between the groups. The .05 level of significance was set for all tests prior to the collection of data.

## Chapter 4

### ANALYSIS OF DATA

This chapter presents the results of a comparison between the academic learning time of students engaged in classes taught by preservice physical educators who received instruction and supervision using ALT-PE and those preservice physical education majors who did not receive instruction and supervision in ALT-PE. The revised ALT-PE instrument (Siedentop et al., 1982) was used to measure students' and teachers' behaviors. The chapter is divided into three sections: intraobserver agreement, analysis of data, and summary of the findings.

#### Intraobserver Agreement

Intraobserver agreement (IOA) scores were computed using the scored-interval method on an interval-by-interval basis (Hawkins & Dotson, 1975). Four randomly selected videotapes, two from the control group and two from the treatment group, were coded during two independent observation sessions by an expert in descriptive-analytic techniques. IOA was calculated for each category of the ALT-PE system. IOA ranged from 91.9% to 100% which was sufficient to indicate the coder was reliable.

### Analysis of Data

MANOVA was performed on 13 selected variables identified through the use of ALT-PE. The analysis of the 13 variables was performed in two separate groups. The MANOVA performed on the 6 context level variables revealed a significant difference between groups. The MANOVA resulted in a Hotelling's  $T^2$  (1, 2, 17.5) = .71 that converts to an approximate  $F$  (6, 37) = 4.38,  $p < .05$ . The MANOVA performed on the 7 learner involvement variables revealed a significant difference between groups. The MANOVA resulted in a Hotelling's  $T^2$  (1, 2.5, 17) = 2.20 that converts to an approximate  $F$  (7, 36) = 11.32,  $p < .05$ . The findings of these significant between-groups differences led to the rejection of the null hypothesis that there would be no significant difference between the teaching behaviors of preservice physical education majors who receive instruction in and supervision through the use of ALT-PE and those preservice physical education majors who do not receive instruction and supervision in the use of ALT-PE.

ANOVA on the 13 ALT-PE variables (see Table 1) identified five variables that independently contributed to the significant between-groups difference. These six variables were transition/management, game play,

Table 1

Univariate Analysis of Variance Contrasting Treatment and Control Groups

Variables	$F^a$	Significance Level
Context Level		
Transition/Management	21.14341	.000
Technique	.00137	.971
Strategy	.08046	.778
Rules	1.96104	.169
Skill Practice	2.22993	.143
Game Play	4.15849	.048
Learner Involvement Level		
Waiting	18.99668	.000
Off-task	3.32864	.075
On-task	12.59843	.001
Cognitive	.21056	.064
Motor Appropriate	56.47147	.000
Motor Inappropriate	.19776	.659
Motor Supportive	.81507	.372

<sup>a</sup>  $df = (1,42)$  for all tests.

waiting, on-task, and motor appropriate or ALT-PE.

The percentages for the ALT-PE categories (Table 2) revealed the location of the differences between the groups. The total percentages for the context level revealed considerable differences for two of the three subdivisions: general content and subject matter motor. Control group classes were involved in general content activities, specifically transition and management activities, 27.4% of the time compared with 15.7% for the treatment group.

There was little difference between the two groups in the amount of time spent in subject matter knowledge. The students in the control group spent 26.5% of their time receiving knowledge related to physical activity compared with 24.4% for treatment group students; preservice teachers in both groups allocated 80% of this time to instructing the class in technique. Both groups devoted 1% of this time to talk about strategy, while the control group teachers took slightly longer explaining the rules of an activity.

Both groups spent the majority of their lessons involved in physical education motor activity; however, considerable differences were observed between groups. The treatment group students spent 59.4% of their time in motor activity compared with 46% for the control

Table 2

Percent Occurrence of all ALT-PE Categories

ALT-PE Categories	Control Group	Treatment Group
General Content	27.4	15.7
Transition and Management	27.4	15.7
Subject Matter Knowledge	26.5	24.5
Technique	20.1	20.0
Strategy	0.2	0.1
Rules	6.2	4.3
Subject Matter Motor	46.0	59.4
Skill Practice	1.4	6.1
Game	44.5	53.3
Not Motor Engaged	75.1	50.0
Waiting	22.3	8.3
Off-Task	1.9	6.5
On-Task	23.4	14.8
Cognitive	27.6	26.3
Motor Engaged	24.1	49.7
Motor Appropriate	21.7	46.9
Motor Inappropriate	2.3	1.8
Motor Supportive	0.1	1.0

group students. The treatment group was involved in skill practice a greater length of time (6.1% versus 1.4%). They also recorded greater percentages for game play (53.3% versus 44.5%).

Substantial differences were found for overall engaged and not-engaged categories at the learner involvement level. Control group students were not-engaged 75.1% of the time versus 50.3% of the time for the treatment group. The control group students spent far longer waiting to participate (22.3% versus 8.6%) and were involved in more off-task behavior (1.9% versus .5%). However, control group students were on-task more often (23.4% versus 14.9%). The treatment group students were engaged in cognitive tasks 26.3% of the time compared with 27.6% for the control group.

Treatment group students spent much more time actively involved in motor tasks (49.7% versus 24.1% for the control group) and over twice as long engaged in motor activity at the appropriate level--ALT-PE (46.9% versus 21.7%). They also spent slightly less time inappropriately engaged (1.8% versus 2.3% for the control group). Students in both groups spent little time in motor supporting activities.

#### Summary

IOA for the study was determined by Dr. Mancini, an

expert in descriptive analytic studies. He coded four randomly selected lessons during two independent observation sessions. IOA was calculated according to the scored-interval method and ranged from 91.9% to 100%, which was sufficient to indicate the observer was reliable. MANOVA was used to determine whether significant differences existed in teaching behaviors between the treatment group and control group. The MANOVA on the general context level variables resulted in a Hotelling's  $T^2$  (1, 2, 17.5) = .71 that converts to an approximate  $F$  (6, 37) = 4.38,  $p < .05$ . The MANOVA on the learner involvement level variables resulted in a Hotelling's  $T^2$  (1, 2, 17) = 2.20 that converts to an approximate  $F$  (7, 36) = 11.32,  $p < .05$ . ANOVA identified five variables that independently contributed to the significant between-groups difference: (a) transition and management, (b) game play, (c) waiting, (d) on-task, and (e) motor appropriate.

Differences between the control and treatment groups were observed at both the context and learner involvement levels. The control group spent a greater amount of time organizing class activity. Only slight differences were found within the subject knowledge categories. Control group teachers devoted slightly more time during their class transmitting knowledge related to motor activity.

The treatment group students spent more time involved in physical education activities than control group students (59.4% versus 45.9%). They also devoted a longer time to skill practice. The treatment group students were involved in game play more than the control group students.

The most significant differences were found within the engaged and not-engaged categories. Treatment group students were more actively involved in class and were more than twice as successful as control group students during these motor activities, accruing 46.9% ALT-PE compared with 21.7% for the control group.

## Chapter 5

### DISCUSSION OF RESULTS

The present study is another step in the investigation of the use of systematic observation instruments to help undergraduate physical education majors acquire teaching skills. This chapter will discuss the results of this study and make comparisons with findings of other related studies.

Statistical comparison of data revealed that considerable differences did exist in the ALT-PE of students engaged in classes taught by those preservice teachers who received instruction and supervision using a systematic observation instrument, specifically ALT-PE. The treatment group spent much less time involved in transition and managerial activities which made more time available for motor activity. However, the control group spent more time in transition and managerial activities which explains the greater time students spent in on-task activities and in waiting. The fact that there was more waiting would contribute to students' off-task behavior. Off-task behavior refers to inappropriate disengagement from the lesson by the students. The students in the control group spent more time waiting which would lend itself to the students becoming disengaged from the lesson. Students in both

groups spent approximately the same amount of time receiving knowledge related to physical activity and involved in cognitive tasks. The largest differences were observed between groups within the subject matter motor categories. The control group preservice teachers tended to devote less time to skill practice which could be due to the less efficient transition and managerial techniques employed by teachers. However, their students spent 44.5% of their motor activity in game play. In the treatment group the preservice teachers showed efficient organizational and managerial techniques and their students had more time available for active participation in motor activities (subject matter motor). Therefore, time could be allocated to skill practice to refine skills and still have enough time for game play.

The treatment group students were also more than twice as successful during these motor activities as identified by the accrued ALT-PE. This suggested that the preservice teachers who received supervisory feedback using ALT-PE used their time more efficiently and set more realistic and obtainable goals. The fact that treatment group students gained higher percentages on both these variables suggested that their preservice teachers utilized more appropriate instructional designs

and were more aware of the needs for compatibility between students' abilities and instructional goals. It also suggested that ALT-PE is not only an indicator of student achievement but of teacher effectiveness as well.

Most of the investigations to this date have utilized the original ALT-PE system (Siedentop et al., 1979). Because of the similarities between the original system and revised ALT-PE system (Siedentop et al., 1982) used in this investigation, comparisons to the findings of previous researchers can be made, although the reader should proceed with caution. Subject matter knowledge and subject matter motor in the revised system contained almost identical categories to the PE content level in the original system. In addition, for this study transition and management were combined into a single category because of the nature of the micro-peer teaching situation. Motor engaged in the revised system was similar to engaged motor categories in the original system. And ALT-PE in the original system consisted of motor activity at easy, medium, cognitive, or indirect levels. Most other individual categories remained the same. The remainder of this chapter will discuss the findings of this investigation related to ALT-PE and CAFIAS studies.

Intervention and feedback have been used by a number of researchers to increase ALT-PE. Whaley (1980) attempted to increase the engaged and motor responding percentages through daily teacher and pupil feedback. His findings indicated that the treatment had no significant effect on either of these ALT-PE variables unlike this investigation where considerable differences were recorded.

Birdwell (1980) made teachers aware that changes in management, feedback, and student nonengaged time were desirable in order to increase ALT-PE and ALT-PE(M). Both these motor response categories increased the following feedback, ALT-PE from 34.7% to 57.3% and ALT-PE(M) from 17.7% to 37.7%. These ALT-PE and ALT-PE(M) increases were similar to the percentage difference (18.8%) observed in this study between the treatment group and control group. The increase in the motor response categories were also comparable with those found by Paese (1982), who successfully used written and verbal feedback to increase motor engagement from an average of 18.5% to 43%, and ALT-PE(M) from 7.5% to 19%. Beamer (1983) also used feedback in an attempt to increase ALT-PE in two middle schools. The treatment, however, was only successful in one of the schools. Beamer concluded that the amount of time available and

the efficient use of activity time were the significant factors affecting ALT-PE. The general content percentages in this study supported this view. Consequently, although teachers in both groups were allocated the same amount of time for instruction, treatment group teachers used their time more efficiently. Treatment group students spent much less time on managerial and organizational activities, engaged in relevant motor activity more frequently, and recorded twice as much ALT-PE as control group students.

Changes in the design of lessons can also influence student accrual of ALT-PE. Metzler (1981a) found that a simple intervention of moving archery targets further apart (thus, allowing two students to shoot at the same time) and a further supply of arrows increased motor engaged percentages from 15.4% to 35%, and ALT-PE(M) from 11.8% to 29.5%. Instructional packages have also been used to change teachers' behaviors. Wurzer (1982) also discovered that instructional packages designed to change management time, feedback, and student nonengagement were successful in changing behaviors in the desired manner.

Grecic et al. (1984) conducted a study to determine the lasting effects of training in CAFIAS on the ALT-PE of students taught by inservice physical educators. The

inservice physical educators had participated in intervention studies during their undergraduate preparation.

Teachers who received conventional supervisory feedback during their preparation were assigned to the control group while teachers in the treatment group received conventional supervisory feedback plus instruction and supervision in CAFIAS. Treatment group students were more actively involved in class and were twice as successful as control group students during these motor activities, accruing 40.1% ALT-PE compared with 21.3% for the control group. Instruction and supervision in interaction analysis was responsible for the significant difference in ALT-PE. The effects of instruction and supervision in IA on student ALT-PE were maintained 1 to 4 years after cessation of the training period.

Mancini et al. (1983) endeavored to determine the effects of training in CAFIAS on the ALT-PE of students taught by burned out secondary school physical educators. The results showed that those teachers who received systematic supervisory feedback using CAFIAS increased their ALT-PE from 27% to 46% as compared with an increase of 21% to 26% for the control group. The percentage difference for ALT-PE between the control and

treatment group after exposure to CAFIAS (20%) was also very similar to the difference observed in the study conducted by Grecic et al. (1984) (18.8%). From these studies it was evident that intervention and feedback using systematic observation instruments can be used to successfully change teachers' behaviors and influence students' opportunities to learn. These findings support the findings of the present investigation which used a systematic observation instrument, ALT-PE, to provide teachers' with feedback about their behaviors.

The findings of this study also confirmed those of previous CAFIAS studies by Getty (1977), Hendrickson (1975), Inturrisi (1979), Rochester (1976), van der Mars (1979), and Vogel (1976). The process of receiving systematic supervisory feedback was found to be effective in bringing about desired changes in teachers' and students' behaviors.

The results from studies conducted by Getty (1977), Mancini et al. (1979), Mancini, Frye, & Quinn (1982), and Grecic et al. (1984) were similar. These researchers found that training using systematic supervisory feedback had lasting effects. Getty (1977), and Mancini et al. (1979) found that those teachers trained in CAFIAS continued to exhibit more indirect teaching behaviors and to score higher on the TPCQ 1

month later.

In a study conducted by Mancini, Wuest, Clark, & Ridosh (1982) the TPCQ was used to measure teacher effectiveness. The TPCQ consisted of 11 variables as identified by Rosenshine and Furst (1973): 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. Four of these variables (clarity, task-oriented and/or business-like behavior, student opportunity to learn, perceived difficulty level of course work) were reflected in categories found within the ALT-PE system.

The clarity of the teachers' instructions has a significant affect on whether the student responds in an appropriate or inappropriate manner. This would be reflected in the ALT-PE categories of motor appropriate, motor inappropriate, on-task, and off-task. Task-oriented and/or business-like behavior relates to how well the teacher uses the time available. This would be reflected in the ALT-PE categories of transition and management. The students' opportunity to learn will be enhanced when they are actually engaged in motor activity. This would be reflected in ALT-PE

categories of engaged and not-engaged. The difficulty level of a particular activity has an influence on whether students will be appropriately or inappropriately engaged. This would be reflected in the ALT-PE categories motor appropriate and motor inappropriate.

The treatment group in the study by Mancini, Frye, & Quinn (1982) scored higher on all 11 variables-- clarity being responsible for the greatest percentage of between-group variance (35.7%). The same teachers were subjects in a study conducted by Grecic et al. (1984) and the results also indicated more favorable percentages on the related ALT-PE variables. They spent less time on managerial and organizational activities which led to higher engaged percentages and more appropriate participation. These results confirmed the view of Siedentop et al. (1979) that the amount of ALT-PE is an indirect measure not only of student achievement but also of teacher effectiveness.

Due to the differences in instrumentation, the data from Grecic et al. (1984) study cannot be directly compared with the findings of the Mancini, Frye, & Quinn (1982) study. Mancini, Frye, & Quinn (1982) found that those teachers that received instruction and supervision in CAFIAS were more indirect in their teaching

behaviors, more positive, and more effective. In the Grecic et al. (1984) study it was determined that their students accrued more ALT-PE. These findings suggested that the instruction and supervision in CAFIAS has a significant and lasting effect on the overall teaching behaviors and student achievement. This being the case, it is perhaps time to incorporate training in IA into our professional preparation programs. This can be shown in the present study which studied the effects of instruction and supervision using ALT-PE on observed student behaviors of preservice physical education majors.

The findings of this investigation and those findings of other researchers offer strong support for the use of a variety of systematic observation techniques in undergraduate professional preparation programs.

This study differed from many of the previous studies because it was the first time many of the preservice physical education majors had taught. This is an important factor because it demonstrates the possible influences that instruction and supervision in ALT-PE can have on the preparation and effectiveness of preservice teachers.

Both the student teacher and the supervisor need

to be made more aware of the teaching and student behaviors that occur during the class. Training supervisors to utilize IA techniques would enable them to diagnose teaching behaviors more effectively and to provide student teachers with systematic supervisory feedback to modify their behaviors.

#### Summary

Significant differences were found for the 12 of the 13 ALT-PE categories. The treatment group students recorded more favorable ALT-PE percentages and were more successful when motor engaged (ALT-PE). This led to the rejection of the null hypothesis that there would be no significant difference in the ALT-PE of students taught by preservice physical education majors who received instruction and supervision in ALT-PE and those who did not receive instruction and supervision in ALT-PE.

The effects of instruction and supervision in ALT-PE were very similar to those observed in many of the intervention and feedback studies. This study also confirmed the findings of previous researchers (Getty, 1977; Hendrickson, 1975; Inturrisi, 1979; Mancini et al., 1979; Rochester, 1976; Stevens, 1979; van der Mars, 1979; Vogel, 1976) who also found instruction and supervision in IA to have significant effect on teaching behaviors, and Mancini et al. (1983) who found changes

specifically in student academic learning time. More importantly, when the findings of the Mancini, Frye, & Quinn (1982) study are viewed in conjunction with the findings of Grecic et al. (1984) study, strong evidence is offered that instruction and supervision in CAFIAS not only has a significant and lasting effect on teaching behaviors but on student academic learning time. These findings support the view that some type of training using systematic observation in IA should be available within our teacher training colleges. Receiving systematic feedback early in undergraduate preparation will enable the preservice teachers to have more opportunities to improve their teaching behaviors. This will help preservice teachers become effective teachers which will enhance their field experiences.

## Chapter 6

### SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS FOR FURTHER STUDY

#### Summary

The purpose of the study was to determine the effects of instruction and supervision through ALT-PE on the observed teaching behaviors of preservice physical educators. Forty-four preservice physical education majors enrolled in the Elementary Games course at Ithaca College, Ithaca, New York were the subjects for this study. The preservice teachers were randomly placed into a control or a treatment group. Each subject was videotaped two times throughout the course while teaching in a micro-peer setting. The subjects in the control group also viewed their films and received conventional feedback for the analysis of their lessons. The subjects in the treatment group viewed their films and received instruction in ALT-PE in addition to conventional feedback in analyzing their lessons. In all, 88 micro-peer lessons were observed using the ALT-PE observational system (Siedentop et al., 1982). MANOVA was performed to determine whether a significant difference in the teaching behaviors existed between the treatment and control groups. ANOVA was then executed to identify which of the 13 ALT-PE variables, when

identified independently, contributed significantly to any difference between the groups. Percentages for all ALT-PE categories were calculated. Descriptive statistics were used to locate where the differences in student involvement and ALT-PE existed between the control and the treatment groups.

Examination of the data showed that significant differences did exist between control group teachers and the treatment group teachers at the .05 level. This led to the rejection of the null hypothesis that stated there would be no significant differences between the teaching behaviors of preservice physical education majors who received instruction in and supervision through the use of ALT-PE and those preservice physical education majors who did not receive instruction and supervision in the use of ALT-PE.

Treatment group teachers devoted far less time to organizational and managerial activities such as selecting teams, giving directions, and changing activities. Due to this more efficient use of time, treatment group students participated in motor activity substantially longer. They were involved in more skill practice and game play. Both groups spent similar amounts of time transmitting knowledge about the subject matter being taught.

Treatment group students were motor engaged 49.6% of the time compared with 24.0% for the control group students. The control group students, therefore, spent more time not-engaged in motor activities (75.2% versus 50.0%). The majority of this difference was due to the fact that the control group students spent greater amounts of time waiting (22.3% versus 8.3%) and off-task (1.9% versus .51%). The treatment group students participated in more subject-related motor activity and were more successful accruing more than twice as much ALT-PE as control group students (46.9% versus 24.1%).

#### Conclusions

The results of the study led to the following conclusions regarding the differences between the teaching behaviors of preservice physical education majors who received instruction in and supervision through the use of ALT-PE and those preservice physical education majors who did not receive instruction and supervision in the use of ALT-PE:

1. Control group students spent almost twice as much time on managerial and organizational tasks.
2. Treatment group students spent a greater amount of time in subject matter motor.
3. Control group students spent greater amounts of time inactive, either waiting to participate, or

performing on-task activities.

4. Treatment group students were motor engaged more often than control group students.

5. Treatment group students accrued twice as much ALT-PE as control group students. This indicated greater student achievement and teacher effectiveness.

6. Instruction and supervision in ALT-PE were responsible for the significant difference in preservice teacher effectiveness, as indicated by accrued ALT-PE.

#### Recommendations for Further Study

The following recommendations are suggested for further study:

1. A follow-up study relative to the long-term effects of instruction and supervision in ALT-PE on the subjects in this study as they progress through their teacher training at Ithaca College.

2. A follow-up study where the teachers would teach the same lesson in an experimental teacher unit.

3. A comparative study relative to the effects of instruction and supervision in IA on preservice teachers at other teacher training programs.

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