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The Ohio State University

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THE EFFECTS OF PERIODIC PROMPTING ON SELECTED TEACHING BEHAVIORS OF PHYSICAL EDUCATION STUDENT TEACHERS

DISSERTATION

Presented in Partial Fulfillment of the Requirements for the Degree Doctor of Philosophy in the Graduate School of The Ohio State University

By

Hans van der Mars, M.S.

The Ohio State University

1984

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Approved By

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Adviser

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1984
DEDICATION

This study is dedicated to Vic, who first suggested to go on.
ACKNOWLEDGMENTS

The author would like to extend the sincerest appreciation to:

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Chapter 1
INTRODUCTION

Over the past years education has been criticized continuously for its willingness to graduate students who do not possess the necessary skills to function in society. The report developed by the National Commission on Excellence in Education (NCEE), "A Nation at Risk" (1983) is but one in a long list of reports, studies, articles, and books that identify the lack of quality in today's public schools. Others include for example (a) Charles Silberman's "Crisis in the Classroom" (1970), b) Paul Goodman's "Compulsory Mis-education" (1964), c) Ivan Illich's "Deschooling Society" (1971), and more recently d) John Goodlad's "A Place Called School" (1984), e) Ernest Boyer's "High School" (1983), f) Mortimer Adler "The Paideia Proposal" (1982). Many indicators of problems can be found facing the schools in this country. Some include:

1. Some 23 million American adults are functionally illiterate by the simplest tests of everyday reading, writing, and comprehension.

2. Average achievement of high school students on most standardized tests is now lower than 26 years ago when Sputnik was launched.

3. Average tested achievement of students graduating from College is also lower. (National Commission on Excellence in Education, 1983, p. 8-9)

The judgment made about the state of affairs in our nation's schools by the NCEE could be summarized as follows: Standards are too
low, the schoolday is too short, teachers are underpaid, and education is not regarded as a major national priority. Although sporadically a bottoming out has been noted (McGrath, 1983) in the declining achievements of students in public schools, for now "the rising tide of mediocrity" appears to be here to stay.

Siedentop (1982) has indicated that the quality of what transpires in the nation's classrooms and gymnasiums is, to a certain extent, related to the quality of teacher education. With the growing accountability to produce better skilled teachers, teacher education programs across the country have sought many improvements. One of the areas where much energy was put forth has been the development of field experiences that precede the culminating student teaching experience.

In the sixties and early seventies the term "field-experience" was regarded as a synonym for student teaching. Today, however, student teaching is oftentimes only one in a series of field experiences. Pre-service teachers are placed in classrooms earlier than ever before. In some states K-12 certification requirements have been altered so that greater amounts of time will have been spent in classrooms before student teaching is commenced.

In spite of their acceptance, there remains the question of the value of such field experiences. Salzillo and Van Vleet (1977) argued that (early) field experiences remain the largest unvalidated segment of professional teacher preparation programs. More recently, McIntyre (1983) provided an in-depth overview of research on the effectiveness
of field experience programs, and concluded that most findings of research on the student teaching triad were inconclusive. Zeichner (1979) argued that field experiences are neither all good nor all bad.

One area of research that is an intricate part of research on field experience effectiveness is that of the study on the interpersonal relationships that are developed during field experiences. Most of these studies have revolved around the student teaching triad of student teacher, University supervisor, and cooperating teacher. Of these three people, the University supervisor has been criticized most often, and his/her role in the supervisory process is least clear. On the one hand, some studies suggested that University supervisors do influence student teachers. Friebus (1977) found that University supervisors can play an important role as "coaches" by providing suggestions and ideas about specific teaching problems. Zimpher, deVoss, and Nolt (1980) reported that supervisors play an important role in defining and communicating the expectations of the program to both the student teacher and cooperating teacher, phasing the student teacher into the classroom activities, and providing evaluations and constructive criticism.

On the other hand, several studies have indicated that University supervisors had little identifiable effects on student teachers' attitudes, and/or behavior (Schueler, Gold & Mitzel, 1962; Morris, 1974). While McIntyre (1983) noted that findings on the interpersonal relationships within the student teaching triad are inconclusive, Mosher and Purpel (1972) concluded that "... there is virtually no
research suggesting that supervision of teaching, however defined or undertaken, makes any difference." (p. 50). Furthermore, Medley (1971) has argued:

It has always been somewhat of a puzzle how a supervisor could have much effect on a student teacher's behavior, when all he can do is talk and all the time he spends with her is five hours spread over a semester. (p. 159)

In the physical education profession, there has been a considerable surge in research on teaching over the past decade. Some of this work has included experimental research on alternative supervisory strategies. Interaction analysis has been used successfully in changing student teachers' behavior ( Getty, 1977; Vogel, 1977; Inturrisi, Mancini & Frye, 1982). The supervision research program at Ohio State University has shown repeatedly that student teachers' behavior can be changed (Locke, 1977). Using strategies that have their roots in Applied Behavior Analysis it has been shown that these changes can be effected even with agents other than the University supervisor. Hughley (1973) and Rife (1973) showed that a University supervisor can change the behavior of student teachers. Boehm (1974), Darst (1974), and Hamilton (1974) found similar results when both University supervisor and cooperating teacher worked together. Dodds (1975) showed that peer supervision is a viable approach to student teaching supervision. Placing the cooperating teacher in the role of primary change agent was found to be equally successful (Cramer, 1977; Hutslar, 1976).

In the opening paragraph of a study on the implementation of technology in the study of teaching behavior of physical educators, Nelson (1977) noted that "... educational practice has been
relatively unaffected by technology and continues to be 'stained' more by human passion than by either science or technology." (p. 1). In that same study, a wireless communication system was utilized to prompt in-service physical education teachers on selected teaching behaviors. As noted by Skinner (1968), a prompt is not an end, but rather a means of obtaining a response so that reinforcement can be obtained. Prompts are distinct from cues in that a cue is a discriminative stimulus that is associated with reinforcement. In a setting such as a gymnasium, the teacher's goal is to respond to the natural cues in the environment (Catania, 1968). Providing prompts can help to achieve this goal.

Within the context of teacher education programs, the concept of efficiency plays an important role. In a limited timespan, pre-service teachers are to develop certain teaching skills deemed to contribute to effective teaching in classrooms. Skinner (1968) addressed this issue:

The preponderance of research in operant approaches to teaching deals with the consequences of behavior, as it should, since the consequence determines the probability of reoccurrence of the response. But waiting for a response to occur so that reinforcement can be given is 'inefficient'. A response can be prompted so that it will occur sooner, be reinforced, and thus result in faster learning. (p. 207)

Nelson (1977) successfully changed teachers' behavior by way of prompting through a wireless communication system. The use of positive skill feedback, and the use of students' first names was increased successfully. This study was different from other supervision research completed at Ohio State University, in that the intervention consisted of prompting only. Other studies have utilized
"intervention packages" (Siedentop, 1981). Intervention packages have traditionally included direct information feedback, and in addition any of the following: a) Instructions, b) goal-setting, c) modeling, d) prompting, and e) competency-based modules. McKenzie (1981) indicated the following:

Although these intervention packages have been generally successful in altering the teaching performance of the student teachers, attempts have not been made in physical education settings to examine the relative effectiveness of each individual component. (p. 48)

Johnston and Pennypacker (1980) addressed a similar point:

Most applied human behavioral research is, intentionally or not, directed toward the generality of methods of behavioral control. This is understandable, because the contingencies surrounding the conduct of experimentation in field settings discourage serious efforts to identify and pursue fundamental behavioral phenomena. Unfortunately, efforts to assess the generality of methods can, under the effects of those same contingencies, become premature drives to establish the universal efficacy of methodological 'packages'... Methodological generality should be pursued by sound empirical development of the subcomponent parts of variables of a procedure with the form of the finally assembled procedure being primarily determined by this kind of experimental evidence, rather than by theoretical marketing, or personal preconceptions. (p. 404)

Presently, there is little evidence about the potential uses of low-cost, commercially available technological devices in supervisory settings at the pre-service level of training. Furthermore, little is known about the effects of intervention package components when used individually in physical education settings. One study by McKenzie (1981) has shown the effects of goal setting and information feedback as interventions. Use of first names, and positive skill feedback was significantly increased and the number of "OK's" used by the subject (experienced male teacher) was decreased. The effects of prompting on
selected teaching behaviors emitted by pre-service physical education teachers are unknown as of yet. The present investigation focused on this.

**Scope of Problem**

The objective of this study was twofold. First, the effects of periodic prompting on selected teaching behaviors of physical education student teachers were studied. Three pre-service physical education majors enrolled in the School of Health, Physical Education, and Recreation at Ohio State University served as subjects for this investigation. During the winter quarter of 1983 all subjects completed their student teaching requirements while teaching in a suburban middle school in the Columbus, Ohio area. Treatment consisted of the subjects receiving prompts from the investigator/supervisor by way of a wireless communication system while teaching their classes. The prompts were directed toward the subjects' use of positive skill feedback, positive behavior feedback, students' first name, and gymnasium scanning.

Second, the use of a wireless communication system as part of supervisory strategies was also studied. Each individual subject was interviewed following the completion of his/her student teaching. The purpose of this interview was to gather information on how the subjects experienced the use of a wireless communication system during their teaching sessions.
Statement of Problem

This investigation was conducted to study the effects of periodic prompting on the use of positive skill feedback, positive behavior feedback, students' first names, and gymnasium scanning by physical education student teachers. Furthermore, the use of a wireless communication system as a supervisory strategy in physical education was also studied.

Analysis

In order to study the effects of periodic prompting on the selected dependent variables of this experiment, the multiple baseline design across behaviors (Hall, 1971; Hersen & Barlow, 1976) was utilized. Cooper (1974) indicated that in some cases this design is more appropriate for studies done in classroom settings, "... since the logic of this design does not call for a reversal condition." (p. 122). The use of this design can show that if changes occurred in those behaviors that were treated, while yet untreated behaviors remained at the baseline levels, a functional relationship exists between the independent and dependent variable(s).

In order to study the use of wireless communication in supervisory settings in physical education, all subjects were interviewed. Each interview was audio-taped and transcribed. Transcripts were reviewed and analyzed by question.
Hypotheses

The hypotheses for this study were that:

1. Periodic prompting would be an effective means for increasing the rate of positive skill feedback used by physical education student teachers.
2. Periodic prompting would be an effective means for increasing the rate of positive behavior feedback used by physical education student teachers.
3. Periodic prompting would be an effective means of increasing the rate of students' first name usage by physical education student teachers.
4. Periodic prompting would be an effective means for increasing the rate of gymnasium scanning by physical education student teachers.
5. The use of a wireless communication system would be beneficial in the supervision of physical education student teachers.

Assumptions of Study

The following assumptions were made relative to this investigation:

1. In a study using the multiple baseline design, if behavioral changes occur regularly after intervention while other behaviors remain at baseline rate, the changes observed are due to the intervention rather than alternative variables.
2. The videotape-recordings made of classes were an accurate reflection of events as they occurred.
Definition of Terms

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

1. **Accuracy**: "... the extent to which obtained measures approximate values of the 'true' state of nature..." (Johnston & Pennypacker, 1980).

2. **Applied behavior analysis**: Use of operant psychology principles and techniques in applied settings. Frequently it is referred to as behavior modification and reinforcement learning theory.

3. **Baseline**: The level at which a behavior is occurring before attempts are made to modify it (Hall, 1971).

4. **Behavior**: An observable response of the human organism.

5. **Event recording**: A tally or frequency count of discrete behaviors as they occur (Cooper, 1974).

6. **Feedback**: Information generated about a response that is used to modify the next response (Siedentop, 1983).

7. **Positive behavior feedback (verbal)**: Praise, supportive statements and all verbalizations which imply a positive value judgment by the teacher about student behavior other than skill performances, such as "Thank you, Mary, for being so attentive today"; "You helped out Jeff with cleaning out the equipment, that's nice."

8. **Positive skill feedback (verbal)**: Praise, supporting statements and all verbalizations which imply a positive value judgment by the teacher about the skill performance of students, such
as "Nice going with that hip circle"; "Your angle of take-off was perfect on that last jump".


11. **Scanning**: A body- and/or head-movement to one or more other areas in the gymnasium while attending to one or more students at the same time during skill-practice episodes.

12. **Stability**: The capacity of an instrument to yield the same measurement values over time when brought into contact with the same state of nature. Also often referred to as "reliability" (Johnston & Pennypacker, 1980).

13. **Student teacher**: A college student, who, after completing his/her required coursework, spends, as part of the bachelor's degree requirements, ten consecutive weeks in a public school under supervision and in the role of physical education teacher.

14. **Supervision of skill performance**: Time spent where a subject is observing (i.e. looking at) a skill attempt by a student, and/or interacting with (a) student(s) regarding the subject matter (e.g. additional instruction, prompts, feedback, etc.) while at a teaching station or approaching a teaching station.

**Delimitations of Study**

1. All subjects taught the same activity in their classes.

2. All subjects taught their classes in a team-teaching situation.
3. Subjects were observed at only the middle school level.

**Limitations of Study**

1. Three students enrolled in the School of Health, Physical Education, and Recreation at The Ohio State University served as subjects for this study.

2. Selected dependent variables were limited to the subjects' use of a) positive skill feedback, b) positive behavior feedback, c) students' first names, and d) scanning.

3. Periodic prompting served as the primary intervention for all four dependent variables.

4. Due to logistical limitations, only 24 observations of each subject were used in the analysis of this investigation.
Chapter 2

REVIEW OF RELATED LITERATURE

In this chapter, the reader will be introduced to literature on educational supervision, prompting, and active supervision. In the area of educational supervision, a brief overview will be provided on the purposes of supervision, the current models of supervision, and supervision in physical education. Research on prompting will be presented in two sections. In the first section, literature will be covered where prompting was used as a means of implementing other independent variables, whereas, the second section will include an overview of research where prompting served as an independent variable. In a related section, a brief overview will be presented of the use of communication systems in educational settings. In the final section of this chapter, the reader will be presented with a brief overview of literature that focuses on "active supervision". The purpose of including this section is to show the basis from which the fourth major dependent variable of this study was developed.

Purposes of Supervision

The intent of this section is to provide the reader with the background of both historic and more recent perceptions of the purposes of educational supervision in this country. In their opening paragraph on the history of supervision in education, Alfonso, Firth,
and Neville (1981) argued that "To understand the supervisory process in education. . . requires knowledge of the way in which the process evolved within the institution of American public education." (p. 18). A useful way of coming to grips with the history of supervision is to trace the purposes of this process. In the following two sections, an overview will be given of historic and current thoughts on the purposes of supervision respectively.

**Past Purposes of Educational Supervision**

The stated purposes ascribed to the process of supervision have changed dramatically over the past 80 years. The notion that the supervisor is a change agent whose goal is to improve the quality of instruction is characteristic only since the mid-fifties (Wiles, 1955). This "new" perception of the supervisor's role tends to coincide with changes found in the strategies used to study teacher effectiveness (Medley, 1979), and the 1957 launching of the Sputnik satellite by the Soviet Union.

In the search for indices of effective teaching, the 1950s constituted an era of transition from research focusing on the effectiveness of different methods of teaching to research that focused on actual teaching behaviors and student achievement. Although Barr, Thorgerson, Johnson, Lyon, and Walvoord (1935) called for criteria of teacher effectiveness to be based on pupil gains rather than expert opinion, it was not until the late 1950s that this notion was given careful attention. And the use of "systematic
observation of teaching in the classroom as a means of studying the nature of effective teaching was uncommon before 1960." (Medley, 1979, p. 15). This is important to note, in that, up to that point there appears no indication in the supervision literature that the primary objective of a supervisor is to improve the quality of instruction and subsequently student achievement.

The launching of Sputnik constituted the beginning of an era in which the educational institution was the prime target for change with one major objective: The improvement of the quality of instruction given to students in this country's public schools and Universities.

Particularly in the early efforts of supervision in schools, the absence of this objective can be explained by the type of personnel involved in supervision. Most of the people involved in supervision were laypersons. Alfonso et al. (1981) pointed out that as far back as the early part of the eighteenth century "Layman were given the responsibility of making inspectional tours of the schools in order to evaluate school facilities, upkeep, and the progress of pupils." (p. 21). Suzzallo (1969) documented the transition from using laypersons to special school officials in supervisory duties:

At first, when neither the business nor the teaching aspect of a school was regarded as a difficult matter, the people, as a whole, in their town meeting, attended to it well enough. As the notion of the whole business of education came to demand special and frequent attention, the power was delegated to select men, who were the town's representatives, or to the ministers, who were the town's learned men having a special interest in education... The special school officials which came into existence were the school committeemen and the school superintendents. The development of each marked a significant period in the growth of local supervision. The school committee came first, and was, in a sense, evolved from the town meeting, as the superintendent was later evolved from the school committee. (p. 2)
But the economic growth during the Industrialization resulted in the growth of large urban communities, particularly around the 1830s. Subsequently, schools' enrollments also increased dramatically. Many responsibilities, previously attended to by superintendents, were turned over to the schools' principals (Pierce, 1935). Fulltime school supervision, as carried out by the principal represented the extension of the superintendent's office in each individual school.

Alfonso et al. (1981) noted that:

It is not difficult to understand, therefore, that supervision in the early nineteenth century was basically managerial. Supervision maintained its inspectional tone previously seen in the supervision of the district schools by the lay committees of the eighteenth century. (p. 24)

Furthermore, it was noted that:

Any recognition of the principal as an instructional supervisor or as a leader in instructional improvement was not, at this time, considered germane to the principal's responsibilities. (p. 25)

Not until after World War One did the concept of supervision change from being inspectional in nature to one that was described by Wiles (1955) as a cooperative-democratic approach to supervision.

Lucio and McNeil (1969) pointed out that:

Related to the economic and social transformations of the depression and war years were the spirited pleas for a kind of supervision which would emphasize the ideals of a democratic order. Instead of emphasis upon tradition—the leader and the led—supervision became associated with precepts respecting human personality and encouraging wide participation in the formulation of policy. (p. 10-11)

Kyte (1930), basing his ideas largely on viewpoints proposed by Dewey (1902), argued that the objective of supervision is "... the maximum development of the teacher into the most professionally efficient person she is capable of becoming at all times." (p. 45).
Such notions remained prevalent until the 1950s. Why the improvement of the effectiveness of teachers was not regarded as a major objective of supervision appears to be the result, in part, of who was involved in the supervisory process. Mosher and Purpel (1972) pointed out that ". . . historically, supervision developed as an adjunct to administration." (p. 29). Today, supervisory functions are still filled by people who are in positions that are primarily administrative in nature.

Thus, the pattern which emerges is one where the stated purposes of supervision have changed dramatically over the years. However, both Mosher and Purpel (1972), and Locke (1979) claimed that supervision practices have changed remarkably little. Mosher and Purpel (1972) noted:

"The history of supervision reveals surprisingly exact precedents for the muddy contemporary definitions of supervision. . . . In this sense, to read about supervision in 1920 is to read about supervision in 1970." (p. 14)

And in opening his address to the American Academy of Physical Education, Locke (1979) claimed: "Supervision as it is practiced today suffers from the same limitations which bedeviled it 50 years ago. There have been no dramatic breakthroughs in practice." (p. 1).

In their review of research on supervision, Mosher and Purpel (1972) provided three possible explanations of why there has been a lack of change in supervision practices: a) There remains the lack of agreement on what is the "right" way to teach, b) the lack of reliability of the instruments (mostly rating scales) used in supervision and research, and c) the variability in the supervisor's
observations. "Supervisors either see different teaching behavior when they observe a classroom in action or they evaluate the same behavior differently." (p. 51). These limitations resulted in supervisory observations being low in both validity and reliability.

Present Purposes of Educational Supervision

Cogan (1973) was one of the first to place "improvement of classroom instruction" as the primary objective of supervision. As part of the model of supervision, developed in the 1950s, Cogan (1973) discriminated between general supervision and clinical supervision. The difference will be explained in detail in the section on Clinical Supervision. Cogan (1973) argued that a supervisor's task was to concern him-/herself primarily with the teacher's performance in the classroom.

Current views on the purposes of educational supervision were also summarized by Locke (1979). Four different purposes were identified:

. . . (1) evaluative inspection of school teachers in order to generate information used in such decisions as hiring, firing, tenure, promotion and rewards, (2) efforts by administrators and subject matter specialists to improve the instructional effectiveness of teachers, (3) the oversight and tutelage provided by a cooperating practitioner during the apprenticeship of a student teacher, and (4) the visitations of a training program representative during that same exercise. (p. 2)

The focus of each of the above four can be on evaluation or skill development, or a combination of both. The review of literature for this investigation will focus primarily on the third and fourth with an emphasis on supervision research at the pre-service level. The
intention is to provide an overview of the research to date that has attempted to determine effective strategies to change the behavior of (pre-service) teachers.

Clinical Supervision

The supervision model that is probably most widely known, and has received most attention over the past ten years is the Clinical Supervision model. In its original form, it was developed almost 30 years ago by Cogan (1973) while working in the Master of Arts in Teaching Program at Harvard University. Since then, the model has been adapted by others (Acheson & Gall, 1980; Boyan & Copeland, 1978; Goldhammer, 1969; Harris, 1975; Moore & Mattalliano, 1970; Simon, 1977). The importance of this model lies in the fact that it constituted the first systematic approach to the improvement of classroom instruction.

Cogan (1973) defined clinical supervision by comparing it to what was termed "general supervision". It was explained that general supervision:

... subsumes supervisory operations that take place principally outside the classroom. The events occurring inside the classroom are treated by supervisors and teachers mainly as a background of shared professional understandings about schooling.

General supervision, therefore, denotes activities like the writing and revisions of curriculums, the preparation of units and materials of instruction, the development of processes and instruments of reporting to parents, and such broad concerns as the evaluation of the total educational program. (p. 9)

On the other hand, clinical supervision was defined as "... the rationale and practice designed to improve the teacher's classroom performance." (p. 9). More recently, Denham (1977) defined it as:
those efforts to improve instruction that involve in-class and face-to-face interactive relationships between teachers and supervisors. (p. 33)

The distinction in the above definitions between in-class and out-of-class supervision is useful to the extent that it provides a parameter for the supervision research to be reported later in this chapter.

Characteristics of Clinical Supervision

With the improvement of in-class instruction as the primary objective of clinical supervision, its main characteristics are comprised of a) a strong dependence on the collection of systematic and objective data; b) the colleagueship between supervisor and teacher, which then should result in the making of shared decisions regarding what to improve, and how to improve. The commonly observed "superior-subordinate" relationship is considered counterproductive in clinical supervision; and c) the downplay of the evaluative component in the supervisory process. The last two characteristics appear to be, in part, influenced by, and derived from Cogan's (1973) notions regarding the relationship of teachers to the process of supervision as a whole. Cogan (1973) argued:

... two observations can be made. First, public school teachers almost unanimously endorse the idea of supervision in principle. Second, they often limit severely the supervisory practices they will welcome in reality. Teachers tend to exhibit two patterns of response: (1) a kind of emotionalized allegiance to the concept of supervision and (2) a swift and apprehensive rejection of all but a narrow range of approved supervisory activities. (p. 15)

Elsewhere, in explaining the parameters of the supervisor's professional domain, Cogan (1973) further clarified what is meant by
the need for colleagueship between teacher and supervisor, and the
absence of any evaluative indices:

. . . the supervisor's work with the teacher stops when it
threatens the teacher's sense of his own dignity or human worth.
For example, the analysis of a teacher's classroom behavior stops
when the implications of such an analysis seem likely to threaten
the teacher's security or seriously damage his concept of
himself. (p. 25)

Reavis (1976) reported two more notions on which the clinical
supervision model is based: "... instruction can only be improved
by direct feedback to the teacher on aspects of his or her teaching
that are of concern to that teacher." (p. 360). The dependence on
direct feedback explains the strong emphasis on the use of systematic
observation techniques, the results of which serve as the starting
point for each conference. Having the teacher select the problem area
as a prerequisite for the improvement of instruction strongly
influences the context of the relationship between the teacher and
supervisor. This would also explain the stated need for colleagueship
within the clinical supervision process.

On the basis of these notions Cogan (1973) developed the
following eight-phase cycle of supervision:

1. Establishing the teacher-supervisor relationship.
2. Planning with the teacher.
3. Planning the strategy of observation.
4. Observation of the instruction.
5. Analyzing the teaching-learning process.
6. Planning the strategy of the conference.
7. Conference.
8. renewed planning.
In the opening chapter of his book, Cogan (1973) argued that "Clinical supervision is conceived of essentially as a set of empirically developed practices centering around classroom teaching-learning." (p. 10). This notion will be discussed further in the next section where the effectiveness of this supervision model will be reviewed.

Cogan (1973) suggested that certain phases in the original cycle could be adapted or even omitted. Since its development, the clinical supervision model has been adapted by others. For example, Goldhammer (1969) proposed a model consisting of five stages: a) Pre-observation conference; b) observation; c) analysis and strategy; d) supervision conference; and e) post-conference analysis. The pre-observation conference as proposed by Goldhammer (1969) is a combination of the first three phases developed by Cogan (1973). The result of the pre-observation conference is a "contract" that is written up by both teacher and supervisor. The "analysis and strategy" stage in Goldhammer's model is analogous to Cogan's (1973) fifth and sixth phases. More recently, Boyan and Copeland (1978) developed a cycle which was labeled as the Instructional Supervision process. The proposed sequence of this model included the following steps:

1. Pre-observation conference:
   a) Behaviorally define the area of concern.
   b) Base rate or criterion rate of behavior.
   c) Select or construct observation instrument.

2. Observation:
   a) Observe behavior.
3. Analysis:
   a) Analyze results.
   b) Behavior to be maintained or changed.

4. Post-observation conference:
   a) Feedback results.
   b) Determine strategies.

5. Recycle.

It should be noted that all the different adaptations of Cogan's (1973) original model were still based on the same premises:
   a) Objectively collected data form the basis for the feedback needed to change the teacher's performance; b) the relationship between teacher and supervisor should at all times be characterized by colleagueship, and an absence of threat; c) behavior change should not be imposed by the supervisor, but rather recognized and desired by the teacher; and d) the absence of formal evaluation. All supervisory activities are to be conducted in a strictly nonjudgmental fashion.

Effectiveness of Clinical Supervision Model

While noting that "...there is widespread agreement that the major goal of supervision is to improve instruction", Denham (1977) also indicated that "...except for several doctoral dissertations, virtually no research studies have been conducted in supervision; none have been conducted specifically to assess how much (or whether) clinical supervision really improves instruction." (p. 33). Mosher and Purpel (1972) reached a similar conclusion: "It is a fact that
there is no conclusive empirical evidence that clinical supervision changes what teachers do." (p. 111).

Since then, a review of publications dealing with clinical supervision, conducted by Sullivan (1980), has produced one study where the supervisory cycle served as the independent variable and where in-class teaching behaviors were selected as dependent variables. Skrak (1973) studied the effects of clinical supervisory procedures with and without immediate secondary reinforcement on teaching behavior which were selected by both teachers and supervisors. The criterion for success in the use of immediate secondary reinforcement during teaching observations was the degree to which behavioral change was effected with immediate secondary reinforcement over and above the degree of behavioral change which was effected without immediate secondary reinforcement during teaching observations. Based on the results of the study, it was concluded that the use of immediate secondary reinforcement during teaching observations in clinical supervision is a valuable tool which can be employed to assist teachers in their development of desirable behavior patterns. However, it was also noted that immediate secondary reinforcement does not necessarily guarantee a greater degree of behavioral change than do clinical supervisory procedures which do not employ the secondary reinforcement.

As noted by Denham (1976), and later by O'Sullivan (1982), the question of the effectiveness of the clinical supervision model remains largely unanswered when considering the research base. Thus, the notion that clinical supervision can improve instruction appears
speculative at best. Both Denham (1976) and Goldhammer (1969) provided some useful recommendations for research on the effectiveness of the model. In explaining each phase in the cycle of supervision, Denham (1976) posed questions and provided directions related to each of the phases. For example, with regard to the pre-observation conference, it was argued:

First, we need to know how to conceptualize and conduct the pre-observation conference. Researchers should study how teachers and supervisor can more efficiently and more effectively establish rapport, and get oriented to the students and the lesson, and plan the observation. What sort of a 'contract' or agreement about the observation is necessary or desirable? Can teams of peers be as effective as supervisor? How much teacher tension or anxiety is acceptable or even desirable? . . . Data-based answers to these questions are virtually non-existent. . . (p. 35)

And with regard to the post-observation conference, Denham (1976) claimed that the following questions need to be answered:

To what extent and how should the teacher be involved in planning the conference? How much and which aspects of the data gathered during the observation should be presented to the teacher? What are the most effective strategies for conducting these conferences? When is the best time to stop discussing the lesson observed and move on either to planning the next lesson or to the critique of the cycle just completed? (p. 36)

Goldhammer (1969) addressed the question of "... whether 'teacher development' is treated too much as an end and whether, indeed, it should be regarded more as an intervening variable, that is, as a collection of means directed toward the establishment of valued pupil behaviors." (p. 363). This notion focuses on the necessity to validate processes such as clinical supervision in terms of student outcomes. That is, empirical evidence must be produced that can show that students taught by teachers involved in clinical supervision processes do better than if those teachers would not be
exposed to the same processes. As Goldhammer (1969) succinctly noted: "The position that innovations in supervision and instruction must ultimately be expressed as beneficial changes in the pupils' experiences and behavior is unassailable." (p. 364). O'Sullivan (1982) concluded that a research base on the effectiveness of the clinical supervision model is a necessary if more time, energy, and money is to be devoted to preparing supervisors to implement clinical supervision.

Counseling Model of Supervision

There is the assumption in the field of educational supervision that the analysis of teaching should be restricted to issues of curriculum and content, pedagogy, pupil response, and teacher behavior (Mosher & Purpel, 1972). And, thus, involvement with the personal responses and experiences of teachers should be avoided. However, Mosher and Purpel (1972) argued that "... supervision must be responsive to the teacher as a person." (p. 114). The authors noted, that the person who is learning to teach must change in not only what he/she does, but also what he/she is.

During the early 1970s, Mosher and Purpel (1972) proposed a model of supervision with its roots in counseling theory and methods. Originally, the model was conceptualized for the supervision of beginning teachers. Contrary to, for example, the clinical supervision model, the counseling model focuses on the teacher as a person, rather than as the source of instructional behaviors. The
major intent of the model is to find ways to deal with the personal and emotional dimensions of problems encountered by teachers. At various points, Mosher and Purpel (1972) emphasized that the proposal of supervision by way of counseling strategies was not intended "... as an argument against subject matter or pedagogical competence, or against supervisory analysis of these areas." (p. 137). It would seem that the use of the proposed counseling strategies was intended to complement other methods of supervision, and address intellectual and emotional aspects of teaching. Advocates of the counseling strategies find that supervision which does not deal with such aspects would be "incomplete" (Mosher & Purpel, 1972).

A basic assumption underlying this supervisory strategy is that a person goes through a number of developmental phases when learning to teach. The various developmental phases then form the framework for supervisory activities. Following is a brief overview of Mosher and Purpel's (1972) description of the phases of development:

The first phase of becoming a teacher was described as "learning what one is expected to do and to be as a teacher." (p. 117). Those expectations are shared by those who exert control over the beginning teacher (i.e. student teacher) such as a University supervisor, the school principal, the cooperating teacher, and the University professor of Education. The second phase is signified by the person developing his/her own ideas and plans about what he/she will do and be. Sources of those ideas vary from the person's formal education to previous experiences. The third phase was described as the process of personal role definition. This would include "The development of
distinct individual, and consistent concepts of oneself-as-teacher and of characteristic ways of teaching." (Mosher & Purpel, 1972, p. 121). Levinson (1957) provided a psycho-analytic definition of role definition which stated that it is:

An ego-achievement - a reflection of the person's capacity to solve conflicting demands, to utilize existing opportunities and create new ones and to find some balance between stability and change, conformity and autonomy, the ideal and feasible, in a complex environment. (p. 177)

It was argued by Mosher and Purpel (1972) that the personal changes that take place in the learning process of teaching can be equally relevant for empirical study in supervision as is the novice teacher's learning about curriculum issues and instructional methods. In order to be able to deal with the teacher as a person with significant personal motives and needs, Mosher and Purpel (1972) proposed the use of techniques found in counseling in general, and ego-counseling specifically. The following arguments were provided to support the use of such techniques:

1. The objectives and procedures of supervision resemble in many ways the process of psychotherapy, although with less intent to change the basic personality of the student teacher.

2. The student teacher brings the intellectual and emotional stress which can be caused by practice teaching to his supervisory conferences. As Cogan emphasizes, 'supervision deals with people in their most vital and vulnerable aspects'. Supervision, however, typically tends not to do this. Counseling theory and practice are relatively more attuned to the 'vital and vulnerable' in the individual.

3. The view in teacher education that self-evaluation is important to professional growth would tend to orient supervision toward counseling . . . the teacher wants and has the right to participate in analyzing and controlling his own professional behavior. Counseling puts heavy emphasis on the client's responsibility for analysis and solutions.
4. The importance of self-knowledge - as distinguished from self-evaluation of professional behavior - to the student teachers has considerable support in the literature. This emphasis would seem to imply an argument for counseling as a function of teacher training (though not necessarily as part of supervision), especially insofar as counseling is an educational process directly concerned with greater self-knowledge.

5. It might seem logical to suppose that the effectiveness of the supervision of the student teacher will vary, in important part, with the degree to which this function is both individualized and intensive . . . Counseling concentrates on intensive one-to-one interaction designed to effect change in the individual's behavior. (Mosher & Purpel, 1972, p. 122-123)

Ego-counseling techniques have their basis in the theory that a normal person's behavior is organized by the ego. The ego's structure - made up of values, personality traits, attitudes, assumptions, and its functions (e.g. perception, thought, planning, and action) forms the major focus of ego-counseling. Within that, emphasis is placed on: a) careful appraisal by the individual of him-/herself (as he/she is and as he/she would like to be), b) the relation of the individual's present actions to the realization of his objectives, that is, the connection between means and ends, c) the consideration of obstacles, both personal and situational, to such aims, and d) the development of revised ways of thinking about and acting in the situation of being a teacher. Ego-counseling as a method has been supported in the works of Allport, Hartman, and Bronfenbrenner (Mosher & Purpel, 1972), and, according to Hummel (1965), there is "... fruitful promise for counseling theorists in the works of Piaget, Bruner, George Kelly, and other investigators into the nature of thinking." (p. 97).
Effectiveness of Counseling Methods in Educational Supervision

The answer to the question "Does educational supervision by way of counseling strategies work?" takes on a different character than the similar question for clinical supervision. Because of the clear difference in the goals of both supervisory strategies, one should look for different results in both. As indicated earlier, the primary objective of clinical supervision is the systematic improvement of instruction. In their discussion on definitions of supervision, Mosher and Purpel (1972) noted that there remains a lack of understanding of the teaching process:

There is no generally agreed upon definition of what teaching is or how to measure its effects. The systematic improvement of instruction, and clarification of the place and practice of supervision in such improvement, must ultimately wait upon basic research on questions of this kind. (p. 3)

Since "... there is currently no 'right' view of supervision..." (p. 3), Mosher and Purpel (1972) defined the tasks of supervision as:

... teaching teachers how to teach (in which working with teachers as people is a significant subfunction), and professional leadership in reformulating public education - more specifically, its curriculum, its teaching, and its forms. (p. 3)

Particularly, the second part of the definition (reformulating public education) seems congruent with Cogan's (1973) definition of "general supervision." With regard to supervision by way of counseling methods, Mosher and Purpel (1972) briefly addressed the contention that the central objective and practical test of any supervisory method is its effectiveness in changing the behavior of teachers. Reference was made to evidence that student teachers
supervised through counseling methods could analyze and change their attitudes and behavior in the classroom. It was concluded that findings on both accounts were inconclusive. A closer examination of the evidence (cited in the section "Research in Supervision") revealed one reference to a study conducted by Bennington (1965). In this study, a counseling method was utilized as the independent variable to examine its effects on teachers' self-concept, as measured by "self-acceptance" and "control". The results indicated that those teachers receiving supervision through the client-oriented counseling method were significantly higher in self-acceptance, than teachers in the "traditional" supervision group. Of the remaining studies cited by Mosher and Purpel (1972), the independent variables studied ranged from "use of television" (Schueler, Gold & Mitzel, 1962), to the "use of interaction analysis" (Zahn, 1965). No support could be established for the use of ego-counseling strategies in these studies. Empirical evidence supporting the effectiveness of ego-counseling as a supervisory strategy in the training of pre-service teachers is virtually nonexistent.

The one area of this supervisory strategy that has developed a research base in recent years, is the study of one of the assumptions underlying the counseling strategies. As indicated earlier, it is presumed that teachers pass through a set of developmental stages when becoming a teacher. Recently, the study of developmental stages as related to teaching has produced the "developmental approach" to supervision (Glassberg & Sprinthall, 1980). After documenting the lack of a theory supporting today's teacher education programs, Thies-
Sprinthall and Sprinthall (1980) proposed "... theoretical perspectives as well as research findings which may lead to a promising start for teacher education." (p. 279). Taking the same notion suggested by advocates of ego-counseling strategies, namely that (beginning) teachers pass through certain developmental stages, Glassberg and Sprinthall (1980), and Sprinthall and Thies-Sprinthall (1980) sought to develop "... educational programs which aid student teachers in achieving personal and professional growth." (Glassberg & Sprinthall, 1980, p. 31). The stages of development were rooted in the theoretical constructs proposed by Kohlberg (1968) and Loevinger (1976) (i.e. the cognitive-development theory, and ego-development theory respectively). Findings by Glassberg (1979) supported the notion that teachers found to be at differing stages of development, also tended to exhibit different teaching behaviors. Teachers at the higher developmental levels tended to be flexible, tolerant, and able to utilize a wider range of teaching styles. Furthermore, recent studies with both pre-service and in-service teachers have indicated positive relationships between moral judgment level and role-taking/perspective-taking. Glassberg (1977), Sprinthall and Bernier (1978), and Oja and Sprinthall (1978) found teachers at higher stages of moral reasoning to be able to think and act at a more complex role-taking level. It should be noted that in this area of research "effective teaching" is conceptualized as the ability to role-take and to process experiences at more complex levels. Emphasis on behavioral change is minimal, as indicated by a sporadic use of Interaction Analysis Systems to collect behavioral data.
When considering the primary objective of educational supervision via counseling strategies (i.e. personal and professional growth), and if one is willing to accept the underlying assumptions, one could conclude that the empirical evidence is growing in support of the notion that teachers tend to develop through certain stages. However, the near absence of research findings in support of the supervisory strategies themselves places the counseling strategies in a similar position as that of clinical supervision.

**Supervision Research in Physical Education**

On the following pages an overview of recent supervision research in physical education will be provided. Three prevalent supervisory models were distinguished by Locke (1979). The first was labeled as the "traditional" paradigm. The second model was constituted by supervision utilizing an interaction analysis tool developed by Cheffers (1972) (i.e. Cheffers' Adaptation of Flanders' Interaction Analysis System). The third major model of supervision in physical education was developed at The Ohio State University, with its roots in Applied Behavior Analysis. This research focused on the use of intervention systems for changing teaching behaviors of student teachers. This model has become known as the behavior analysis model of supervision (Locke, 1979).

**Traditional paradigm.** Supervisory activities characteristic of this approach include a strong emphasis on the teacher's weaknesses,
on the basis of largely subjective observational tactics such as eyeballing, and/or anecdotal recording techniques. Furthermore, Reavis (1978) noted that most supervisory sessions between supervisors and teachers tend to be ritualistic in nature. And no systematic approach to the improvement of instruction is utilized.

**Interaction analysis model.** The use of interaction analysis as a means of providing objective feedback regarding the type and frequency of behaviors and interaction patterns between teachers and students in physical education classes has been quite prevalent (Locke, 1977). Following its development by Cheffers (1972), the Cheffers' Adaptation of Flanders' Interaction Analysis System (CAFIAS) has become the most widely used interaction analysis system in physical activity settings. It has been used for a variety of both descriptive and experimental studies. One of its major uses has included the study of its effects, as a feedback instrument, on the teaching behaviors of pre-service teachers (Hendrickson, 1975; Rochester, 1976, van der Mars, Mancini & Frye, 1981); student teachers (Getty, 1977; Inturrizi, Mancini & Frye, 1979; Keilty, 1975; Vogel, 1976); in-service teachers (Lombardo, 1979); and teachers working with multiple handicapped populations (Gaudet, 1982). Generally, treatment consisted of one group receiving "conventional" feedback (i.e. much along the same lines as the traditional paradigm identified before), and a second group receiving feedback based on data collected through interaction analysis. In some studies (Rochester, 1976; Vogel, 1976), the latter group was also trained in the actual use of interaction analysis.
Behaviors of student teachers who were exposed to interaction analysis were significantly different from those receiving conventional feedback. Differences were found in the use of verbal acceptance and praise, use of verbal questioning, and use of nonverbal questioning by the teacher. Furthermore, students in classes taught by student teachers who were given feedback through interaction analysis were contributing verbally and nonverbally to a greater extent, and exhibited more initiation.

One problem, addressed by Dodds (1979), Locke (1979), and McKenzie (1981), that continues to be a limitation of most field research is the lack of maintenance of behavioral changes over an extended period of time, after treatment has been terminated. The general pattern has been for behaviors to return gradually to pre-treatment levels. On a limited basis, research where interaction analysis served as the independent variable has produced changes that were relatively resilient. Getty (1977) found that differences established immediately following the final treatment session were maintained for at least one month afterwards. Mancini, Frye and Quinn (1982) studied 26 teachers who at one point had been involved in earlier experimental studies at Ithaca College. Statistically, significant differences were found in the following behaviors: a) verbal acceptance and praise by teachers; b) use of verbal questions; and c) verbal and nonverbal initiation by students. Lombardo (1979) studied four teachers over a series of 40 observations to determine the degree of variability in teaching behaviors over an extended
period of time. Included in the study was an instruction and supervision component for two of the four teachers that included information generated via CAFIAS. The differences were sustained, in that, a follow-up study of the same subjects after two years produced similar results.

**Behavior Analysis model of supervision**

As indicated earlier, this model of supervision emerged from the Ohio State University behavior analysis research program. This research tradition has its methodological roots in the work done by B. F. Skinner. The fundamental premise of the applied behavior analysis technology is that the probability of a behavior recurring is determined by its consequences (Bijou, 1970; Skinner, 1953). Some of the technology's important characteristics include:

1. Emphasis on the intensive study of the individual subject.
2. Behavior(s) under study are monitored for extended periods of time.
3. Internal validity is determined by observation of the behaviors under treatment-conditions that are altered repeatedly. If the behavior changes with the treatment being applied, and/or terminated, a functional relationship is established.
4. Use of systematic replication to establish generality of treatment across behaviors, subjects, and/or settings.

From 1973 to 1978, a series of studies was completed that focused on the supervision of student teachers. Each study, following the
initial one by Hughley (1973), represented a replication with slight adjustments in both the treatment packages and the personnel administering the treatment. The clear messages from this line of research were that a) student teachers' behavior can be changed by way of the behavior analysis model of supervision (Hughley, 1973; Rife, 1973); b) similar changes can be established when cooperating teachers are teamed with the University supervisor to help collect data (Boehm, 1974; Darst, 1974; Hamilton, 1974); c) peers of student teachers can successfully fulfill a supervisory role and bring about behavioral change (Dodds, 1975); and d) the cooperating teacher can take on the role of primary change agent (Cramer, 1977; Hutsalar, 1976).

In the following subsections, an overview will be presented of the student teaching research in physical education where the behavior analysis model of supervision was utilized. Rather than reporting each individual study, the overview will focus on the following concepts across all studies: a) Number of subjects used; b) experimental design; c) dependent variables studied; d) independent variables utilized; e) determination of treatment effects and size; f) results; and g) recent developments.

Number of Subjects Used

Contrary to research in the social sciences, where heavy emphasis is placed on studying representative samples of populations, applied behavior analysis concentrates on the intensive study of the individual subject. This difference in use of subjects can be traced
back to the two core objectives of any kind of experimental research: a) Explanation of (behavioral) variability, and b) establishing generality of variables, methods, and/or processes across subjects, behaviors, and/or settings (Johnston & Pennypacker, 1980). Applied behavior analysis research has focused on the individual subject on the assumption that variability in behavior is imposed rather than intrinsic (Hersen & Barlow, 1976; Sidman, 1960). In search of sources of behavioral variability the applied behavior analysis researcher has various procedures available, the repeated measurement of the dependent variable(s); and the use of rapidly changing, and improvised experimental designs. Furthermore, generality is sought by way of "systematic" replication, where experiments are repeated with minimal changes in setting, subjects, independent variables, and dependent variables. This strategy is critically different from what is called "direct" replication where data are collected infrequently (oftentimes only once or twice) from a large number of subjects.

In the Ohio State University supervision studies, the number of subjects used ranges from 2 to 16. Dodds (1975), Hughley (1973), and McKenzie (1976) used four subjects, whereas, Dessecker (1975) and Rife (1973) observed three and two respectively. Studies where a competency-based intervention was applied, the number of subjects was slightly larger. Boehm (1974), Darst (1974), and Hamilton (1974) observed eight, seven, and seven subjects respectively. The rationale for this larger number was that these studies were regarded as "reality-tests", where the objective was to determine if it was
possible to implement this model into what is regarded as a normal supervisory situation (i.e. one visit per week while maintaining a full load of student teachers) (Hamilton, 1974). In the remaining three studies (Cramer, 1977; Currens, 1977; Hutslar, 1976) 9, 10, and 16 subjects were studied respectively. The reason for this larger number of subjects was the use of control groups for comparative purposes.

Experimental Design

With the exception of the McKenzie (1976) study where the A-B design was used, all other studies monitored treatment effects via the multiple baseline design (Hersen & Barlow, 1976). Two advantages of this design over the typical reversal (i.e. A-B-A-B design) design were explained by Cooper (1974):

On some occasions the reversal design can present problems for teachers. For example, many school behaviors do not reverse in the second baseline condition; other responses, such as aggressive behaviors, may be undesirable for reversal and some teachers may object to any reversal conditions. When those problems are evident the multiple baseline design can be employed since the logic of this design does not call for a reversal condition. (p. 122)

In using this design, treatment is commenced at different intervals in time across each subject, or across each behavior or setting. A more detailed description of the design can be found in chapter three of this study.

Dependent Variables

The initial criteria which guided the selection of dependent variables (i.e. the behaviors to be changed) in the research program
were reported by Siedentop (1981), and included:

1. Behaviors must be capable of being measured reliably.

2. Behaviors must be accepted by both pre-service and in-service teachers to obtain cooperation.

3. Behaviors must be amenable to change.

The initial variables that were selected included both those that were sought to be decreased (e.g. number of managerial episodes; number of negative interactions; amount of time spent monitoring; or time spent in "no activity"), and those which were sought to be increased (e.g. positive interactions regarding both student skill attempts and appropriate behaviors (Hughley, 1973). Following this initial study, certain adjustments and expansions were made, and gradually data collection instruments became more complex. With the exception of Dessecker (1975), Dodds (1975), and Hustlar (1976), all studies included pupil behavior variables in addition to the student teacher behavior variables. The student behaviors studied included:

1. Percentage of appropriate student behavior (Boehm, 1974; Cramer, 1977; Currens, 1977; Darst, 1974; Hamilton, 1974; Rife, 1973).


3. Duration of active learning time (Boehm, 1974; Cramer, 1977; Darst, 1974; Hamilton, 1974).

Furthermore, the discrimination between specific and general feedback regarding student skill performance and gymnasium behavior was added to most studies. Percentages of Instructional time, Activity time, and Management time were also measured in the studies
completed by Currens (1977), Hutslar (1976), and McKenzie (1976). Dodds (1975) added another dimension to the data collected, by discriminating between (feedback) statements directed to either the whole class, small groups, or an individual student. In some studies (Boehm, 1974; Currens, 1977; Dessecker, 1974; McKenzie, 1976), the category use of students' first name was included, as part of the interpersonal interaction module (See also the next section on Independent Variables). The dependent variables for the present study were selected largely from the aforementioned studies, with the exception of the variable "scanning". The conceptualization of this variable will be explained in Chapter three.

**Independent Variables**

As indicated earlier, the intervention in the studies completed in the Ohio State research program used "packaged" interventions. All of the studies between 1973 and 1977 used treatments that included all of the following: a) Goal-setting. Here the student teachers were given specific objectives regarding certain behaviors or temporal episodes, such as "Increase the rate of positive reactions to student behavior from your current rate of .02 to 1.0 per minute"; b) graphic and/or verbal feedback. Here student teachers were shown summarized results of systematic observations made by an observer (i.e. either the University supervisor, the cooperating teacher, or another student teacher); and c) reinforcement. Here student teachers were told that "I like the way in which you started to use a lot of first names of
students when you interacted with them". Additional intervention techniques were included:

1. Instructions. Subjects were provided with detailed explanations regarding various aspects of the project. For example, in the studies where a competency-based intervention was used, subjects were provided with explanations of each of the modules included in the competency-based intervention package. They were instructed in how to use terminal behavior objectives sheets, and were told what the observational procedures would be, etc. Studies that used such instructions as part of their intervention included Darst (1974), Dodds (1975), Hamilton (1974), Hughley (1973), McKenzie (1976), and Rife (1973).

2. Modeling: Cramer (1976), Currens (1977), Hutslar (1976), McKenzie (1976), and Rife (1973) all used some type of modeling as part of the intervention. Either the supervisor/investigator (e.g. Rife, 1973), or the cooperating teacher (e.g. Hutslar, 1976) would teach a lesson which the subjects were to observe and subsequently use themselves.

3. Cueing: With the exception of Hutslar (1976), and Cramer (1977), all studies used cueing procedures. The type of cueing ranged from pointing out specific instances where the student teacher could have used alternative techniques, to holding up a sign indicating that the amount of positive interaction was too low (Dodds, 1975), to having signs hung up on the walls in the gymnasium indicating the behaviors on which to concentrate (McKenzie, 1976).
4. Competency-based modules: Boehm (1974), Currens (1977), Darst (1974), Dodds (1975), and Hamilton (1974) all used competency-based modules. Subjects were provided with modules on planning, interpersonal relationships, instructional feedback, and classroom management. All modules were related to certain dependent variables. The modules consisted of the competencies to be mastered which were stated behaviorally. Also included were definitions of terms, various learning activities and learning resources, and an explanation of the assessment procedures.

Dodds (1975) and McKenzie (1976) added the use of remedial loops, and completion by subjects of a mini-study using applied behavior analysis strategies. Furthermore, maintenance phases were included. During the initial intervention studies, it was found that when treatments had been finished, the results that had been established gradually diminished, though not to pre-treatment levels. By including maintenance phases following the major treatment phase, the initial changes were easily maintained.

**Determination of Treatment Effect and Size**

Across all related studies, mean rate change and mean percentage change from baseline to treatment conditions served as the means to express the degree of behavior change. Mean rates of behavior were calculated for both baseline and treatment phases across subjects, and the difference constituted the mean rate change. In the discussion section of Chapter four, these mean rate changes will be used for comparative purposes.
Results

In a summary report on the supervision research completed at Ohio State University, Siedentop (1981) condensed the results. Following is an overview of the major findings of those studies:

1. Teaching behavior can be defined clearly enough that it can be observed reliably . . .

2. Observations can be made reliably by supervisors, cooperating teachers, or peer intern students . . .

3. The teaching performance of interns can be changed during a 10-week intern experience. Changes were achieved in each study. The magnitude of changes was more similar than different . . .

4. If maintenance of intervention-induced changes is to occur, it is best achieved through follow-up planning and feedback . . .

5. There is a limit to the number of changes that can be achieved with an intern in a ten-week period . . . A range that reflects our efforts would be from 5 - 12 independent behavioral changes.

6. Interns can utilize behavior change principles themselves, while they are involved in their experience. The later - which included a behavior change project . . . were among our most successful . . .

7. The data-based approach to supervision was generally well received by interns . . . The use of data allowed the supervisor (and cooperating teacher) to assume more of a role as partner in achieving goals and less as judge. Systematic observation . . . is also a tangible way to show interns that the supervisor actually cares about what is happening during the intern experience. We never intended that the systematic observation and data-based approach replace supervision. Instead our goal was to use it to provide a foundation from which better supervision could be done.

8. Virtually every cooperating teacher with whom we worked reacted positively to the data-based approach. (Siedentop, 1981, p. 35-36)

Recent Developments

Since the completion of studies with student teachers, the line of supervision research has been extended to the in-service level.
With the same methodological research tactics being applied, the observation of student behavior changes became a major focus. Until the start of the studies at the in-service level, the observation of student behavior was limited to a) student appropriate/inappropriate behavior; b) response latency; c) time spent in managerial activities; and d) active/inactive learning time (Boehm, 1974; Cramer, 1977; Currens, 1977; Darst, 1974; Hamilton, 1974; Rife, 1973).

The emergence of the Academic Learning Time research provided teaching researchers in physical education with a more comprehensive means of studying students, and a proximal variable for student learning (Siedentop, Metzler & Birdwell, 1979). To date, several in-service supervision research studies have been completed where the effects of changes in teaching behavior on the academic learning time of students in physical education (Beamer, 1982; Birdwell, 1980; Whaley, 1980) were studied, with varying results.

**Package Intervention versus Single Component Intervention**

As indicated in the previous section on supervision research in physical education, the interventions used in the Behavior Analysis model were comprised of various components. These "packaged" interventions most often consisted of a) goal setting; b) verbal and/or graphic feedback; c) reinforcement; and d) modeling. Each of these individual components have been studied to varying degrees on their effectiveness in changing (student) teacher behavior. Generally, the use of specific objectives results in improved student
learning and higher achievement for those working toward the goal
specified in the objectives (Dalas, 1969; McNeil, 1967; Saudergas,
1972).

The literature on the use of feedback indicates that for learning
to occur, feedback must be given in relation to one's progress toward
specified goals (Fuller, Veldman & Richek, 1966; Peck & Tucker, 1973:
Tuckman, McCall & Hyman, 1969; Tuckman & Oliver, 1968). Furthermore,
it appears that feedback provided by another person is more effective
than self-directed feedback.

Few behavioral change strategies have as rich a research base as
does the use of reinforcement. Both as part of an intervention
package and as a single intervention strategy, reinforcement has been
found to be an effective means of changing behaviors in teaching
settings. Thomas, Becker and Armstrong (1968) found students'
appropriate responses to be maintained through the use of positive
reinforcement, and disruptive behavior to be increased by teacher
disapprovals. These findings supported the value of using a positive
approach to classroom discipline. Other investigations have produced
similar results (Crossairt, hall & Hopkins, 1973; Hall, Lund &

Research on modeling has suggested that new responses can be
acquired, or existing responses can be changed as a function of
observing or listening to the behaviors of others and observing the
consequences of those responses (Bandura, Ross & Ross, 1963; Young,
1969). Little is known about the effectiveness of modeling as a
teacher training strategy. Rife (1973) successfully used modeling as
part of an intervention package in changing selected student teaching behaviors. Zevin (1974) found that cooperating teachers have a great modeling influence on their student teachers. It was found that student teachers tended to imitate their cooperating teachers, regardless of the approval or disapproval of their college supervisor. However, Mancini, Goss and Frye (1982) found contradicting results. Comparing behavior patterns of student teachers and their cooperating teachers, it was found that a) student teachers did change in their behavior patterns from the beginning of student teaching to the end; and b) this change was not in the direction of the patterns exhibited by their cooperating teachers.

The present study constituted a departure from the use of "packaged" interventions. The major independent variable chosen for this study was periodic prompting. It is recognized that in an applied setting such as a gymnasium, behavior is more likely to be influenced by a multitude of variables. Furthermore, as Wolf (1973) pointed out, the ultimate changes in behavior are the major concern, rather than the effect of a single causative variable. However, within the realm of teacher training institutions, it might prove useful from a cost-benefit point of view to sort out the relative effectiveness of individual treatment components. According to Kazdin (1973), this cannot be accomplished via "package" interventions. Wolf (1973) also noted that "If indeed the package does have an effect and then if there is some practical or theoretical reason for examining the role individual components, these roles can then be teased out."
(p. 532). In previous supervision research in physical education, prompting has been part of "package" interventions (Dodds, 1975; McKenzie, 1976).

**Research on Prompting**

With the emergence of programmed instruction in the 1950s, prompts and prompting became part of a revolution in learning theory. The concept of prompting is based largely on the analysis of verbal behavior by Skinner (1957), and the practical experience of those involved in programmed instruction (e.g. Markle, 1964). In the research literature, the two terms prompt and cue are used interchangeably. The distinction between the two is best explained by their respective definitions. Whaley and Malott (1971) defined cues as discriminative stimuli that are associated with reinforcement. It is the stimulus, or antecedent, that will control a response when this response (or behavior) has been learned. Thus, in the classroom, the goal for a teacher is to respond to the naturally occurring cues in that setting. For a teacher to learn to react to new cues more/less often, one can use prompts. A prompt was described by Skinner (1957) as a supplementary stimulus, and as a means of obtaining a response so that reinforcement can be obtained (Skinner, 1968). Allyon and Azrin (1968) defined prompting as the introduction of a particular stimulus in an environmental setting to increase the probability that a particular response will occur. Prompts are frequently used to develop new behavioral repertoires. It is a
technique which is often utilized in educational settings. For example, the provision by a teacher of the beginning of a verbal response to be made by a student, or pointing at the word posted on the wall are prompts. Gestures, directions, demonstrations, or physical guidance can all be prompts.

Research in the area of Applied Behavior Analysis over the past fifteen years has focused predominantly on the effects of manipulating the consequences of behavior. However, Skinner (1957) pointed out the usefulness of prompting in the teaching of new responses:

> When terminal behavior has been specified, arrangements must be made to strengthen it through reinforcement. Simply waiting for behavior to occur so that it can be reinforced is inefficient, indeed, for many parts of a terminal repertoire, quite useless. (p. 206)

Nelson (1977) indicated that "A response can be prompted so that it will occur sooner, be reinforced and hopefully learned more quickly." (p. 19).

Experimental research where prompting served as the independent variable is spars. In fact, little is known about the use and effects of prompting. Burleigh and Marholin II (1977) explained that:

> Although verbal and physical prompts almost always accompany differential reinforcement procedures, there is little empirical evidence to suggest when, how, how long, under what conditions, and in what form they should be used. In fact, a review of the major textbooks in the area of behavior modification reveals little or no discussion on the proper use of behavioral prompts. (p. 110)

Early research that has been conducted, occurred mostly in the area of language training through programmed instruction. At that time, for example, some research was conducted to determine whether instructional programs were programmed effectively (Holland & Kemp,
The influence of overprompting on student performance was studied (Anderson & Faust, 1967; Anderson, Faust & Roderick, 1968; Kress & Gropper, 1964). Holland and Kemp (1965), while using a "black-out" technique, studied the degree to which teaching materials were programmed effectively. It was contended that in highly programmed material, blacking out even a small number of words (i.e. prompts) should increase error rates, since the blacked-out words must serve as the basis for answers. On the other hand, in highly unprogrammed material, blacking out a sizable proportion of material may leave error rates unaffected. Results showed error rates to increase only slightly when 68.6% of the words were blacked out.

Anderson and Faust (1967) hypothesized that overprompting by means of underlining the response to be made would inhibit the number of words that could be recalled since the person responding would not need to attend to the actual discriminative stimulus. Results indicated that those students who completed the test with underlines as additional prompts did score lower on the recall test, lending support to the notion of overprompting.

Anderson, et al. (1968) repeated the above study with actual lesson materials. Those subjects who were "overprompted" again scored lower, but were able to complete the program faster than those receiving standard prompts.

Anderson and Faust (1967) in their study on strong formal prompts in programmed instruction pointed out that the majority of research on
prompting has involved the use of paired associate lists. Within that specific area, it was repeatedly demonstrated that people learn faster under prompting conditions as compared to what was labeled the anticipation, or confirmation method (Cook & Spitzer, 1960; Hawkins, Peterson, Schweid & Bijou, 1966; Levine, 1965; Sidowski, Kopstein & Schillerstad, 1961).

Research on prompting in other applied settings also has been limited. As the following overview will indicate, prompting has been used either as a means of implementing a particular intervention (Hall et al., 1968; Moore & Bailey, 1973; Stuart, 1970), or as the intervention itself (Geller, Farris & Post, 1973; Glynn & Thomas, 1974; Johnson, 1968; Knapczyk & Livingston, 1974; Paloutzian, Hasazi, Streifel & Edgar, 1971; Petersen, Austin & Lang, 1979; Risley & Reynolds, 1970; Strain, Shores & Kerr, 1976; Van Houten & Sullivan, 1975). When used as an intervention, it was mostly combined with other intervention components, such as various reinforcement procedures.

**Prompting as Intervention Implementation.**

Hall et al. (1968) studied the effects of contingent attention on the study behavior of a first grader and five third graders. During the treatment phases of a study utilizing a reversal design, the teacher was prompted to reinforce study behavior by moving to the student's desk, make a verbal comment, give a pat on the shoulder, or the like. Prompting occurred by way of a small square of colored paper held up by the observer. As such, prompting served the function
of implementing the actual treatment namely: contingent reinforcement. The results showed a sharp increase in the study behavior rates of the subjects, during the first treatment phases. During a brief reversal phase (i.e. attention only after periods of non-study behavior), study behavior rates decreased to the initial baseline levels with the exception of two subjects. Reinstatement of contingent attention again produced increased study behavior rates, which were maintained after the prompts were no longer used.

Stuart (1970) used an instrument that provided prompts to a 14-year-old delinquent and the mother, to interact positively with each other. Positive interaction rates were successfully increased from .09 to 9.26 per 30 minutes.

Pre-academic and social behavior was successfully increased in a pre-school 3 year old who showed "autistic-like" behavior (Moore & Bailey, 1973). Following a baseline condition, the mother of the child was systematically prompted by the experimenter in the systematic application of social approval and disapproval techniques. Pre-academic behavior was intervened on first. After consistent rates of pre-academic behavior were achieved, prompting for this behavior was terminated and started for social behavior. The prompting consisted of precise instructions to the mother. She was told when to give the subject a task, when to praise, and when to punish. Pre-academic behavior levels of approximately 80%, and social behavior levels of approximately 60% achieved during the prompting condition were maintained after prompts were discontinued. Earlier, Hawkins
et al. (1966) also used prompting in a similar fashion to teach parents to better apply their social consequences.

**Prompting as Intervention.**

Risley and Reynolds (1970) studied the effects of emphasizing words by the raising of the voice on the percentage of words that could be imitated by 4- and 5- year olds. The proportion of words that was stressed was systematically varied anywhere from 4% to 32%. The results showed that the overall proportion of words imitated across experimental conditions changed minimally. Generally, the percentage of correctly imitated words increased as the proportion of stressed words decreased. It was concluded, that the almost universal use of stress or emphasis to facilitate imitation of specific aspects of verbal behavior is, in fact, functional - if not used too frequently.

In a study on pollution behavior, Geller et al. (1973) studied the relative effectiveness of five different prompting procedures to determine which of these increased the probability of customers selecting soft drinks in returnable rather than non-returnable containers. The prompting variants included: a) No prompts; b) one student giving incoming customers a handbill urging the purchase of soft drinks in returnable containers; c) the distribution of the handbills by one student and public charting of each customer's container purchases; d) the handbill distribution and charting by a five member group and e) the handbills distributed and purchases charted by three females. Results differed little across the various
prompting procedures. Purchases of drinks in returnable containers increased an average of 25%, indicating that the mere distribution of handbills was sufficient in altering the purchasing behaviors of customers. More recently, Tuso and Geller (1976) published a report in which a review was provided on the application of operant technology in dealing with various environmental/ecological problems. Essentially, the interventions used were either preventative in nature (usually in the form of a type of prompting procedure), or remedial (incorporating some form of positive reinforcement). The prompting procedures varied from modeling techniques, to written and/or verbal prompts, presented either publicly or on a one-to-one basis. The review indicated that each of the 32 studies reviewed showed relative success in increasing the probability of ecologically-related responses.

Knapczyk and Livingston (1974) studied the effects of prompting by a classroom teacher and aide on the question-asking behavior of two students in a special education (E.M.R.) class at the junior high school level. Data were collected on the question-asking behavior, on-task behavior, and accuracy of performance on class assignments. Using a multiple baseline design combined with a reversal design, the teacher initiated the prompting condition by instructing subject one to raise a hand and ask a question whenever difficulty was encountered on an assignment. On the first day, three prompts were provided and one or two during each of the following three days. Anytime the student raised the hand and asked a question, an answer was provided.
During the first treatment phase, the frequency of questions asked ranged from 6 to 13 per reading session, up from a stable zero rate during the initial baseline. A seven session reversal (ignoring the raised hand of the subject) produced similar rates as those during the initial baseline. During a second treatment phase, two prompts were given on the first day and none thereafter. Question-asking rates for this subject returned to levels approximating those of the initial treatment phase. A second subject's question-asking rate was increased, following a 35 session baseline, to 5.3 questions per session.

It was suggested that the prompting procedure used was easily employable to initiate question-asking behavior, and seemed well-suited for the educational environment because it required a minimum amount of teacher time to institute. Furthermore, it involved little or no record keeping, and necessitated no alteration of ongoing classroom structure. It was also suggested that prompts can be faded when higher grades and social reinforcement are sufficient for maintaining the response.

Using an A-B-A-BC reversal design, Glynn and Thomas (1974) studied the effects of cueing on self-control (i.e. on-task) behavior of nine elementary school children, who were labeled as "difficult to manage" in terms of gaining and holding attention. Initial treatment consisted of the self-assessment and self-recording by all students of their behavior each time a signal occurred. Signal intervals varied randomly from 1 to 5 minutes. Each class period would have
approximately 10 to 12 signals. If the student would be on-task at the time of the signal, he/she would record a check. Each check could be exchanged for 1 minute of free time at the end of the lesson.

Following a second baseline phase of two weeks, the initial treatment condition was reinstated along with the teacher flashing a behavior specification chart (prompts). The students were asked to mark themselves on-task only, if they were "doing what the chart says". Treatment effects were determined by differences in mean percentages of on-task behavior between baseline and treatment conditions. Although both treatments showed improvements in the on-task behavior of the students, the inclusion of the prompts (i.e. behavior specification charts) produced improvements that were markedly greater with less variability.

In an effort to increase the rate of teacher praise, and to compare the relative efficacy of prompting and self-recording in changing praise behavior, Van Houten and Sullivan (1975) used pre-recorded audio cues via the school's public address system. The setting of criterion rates, counting and graphing of praise statements by the subjects did not alter the rate of such statements. The initiation of the audiocueing via the PA system (presented at a mean rate of two per minute) produced marked increases in the praise rates of all three subjects. The removal of the cues (i.e. a reversal phases) did not produce a reduction in praise rate of either teacher, with rates remaining well within the ranges established during the initial treatment phase. Reinstatement of the cues (increased mean
rate of three cues per minutes) produced further increases in the rates of praise. It was speculated that cueing was more effective than self-recording because the cues provided a frequent discriminative stimulus to look and attend to student behavior, the absence of which would cause the teacher to get so involved with other matters that they would forget to praise. The authors also noted that the utility of the cueing was demonstrated by the fact that rates of praise remained at treatment levels after a third baseline condition was incorporated.

A combination of verbal and physical prompts, plus verbal praise contingent on appropriate social behaviors was employed by Strain et al. (1976) to study its effects on the rates of positive motor-gestural and vocal-verbal responses of three behaviorally handicapped pre-school boys. The initiation of teacher prompting and reinforcement during interventions rapidly increased the use of positive social behaviors by each subject and decreased the use of negative social behaviors. The authors noted that since prompting and reinforcement were used as an intervention package, the relative contributions of each individual procedure were unclear.

A similar situation occurred in the studies by Paloutzian et al. (1971), Johnson (1968), and more recently Petersen et al. (1979). Paloutzian et al. (1971) successfully increased social interactions between severely retarded children by prompting them to imitate the social behavior of a model, and then providing them with food reinforcement for successful imitation. Petersen et al. (1979),
closely replicating and extending the Strain et al. (1976) study, successfully increased the rate of social behaviors between retarded and legally blind adolescents by way of prompting and reinforcement.

Johnson (1968) studied the effects of prompting, feedback and practice on the ability to observe and report accurately intended student behavior by pre-service teacher trainees. Those who received prompting, feedback and practice were more accurate in the observation and reporting of student behavior. As was the case with the aforementioned studies, the degree to which prompting contributed to the treatment effects could not be determined.

Although prompts may be used to initiate new behaviors and/or increase the occurrence of already existing behaviors, they may also be used to terminate various aversive ones. However, it is possible that rather than terminating particular aversive behaviors, prompts may actually reinforce those same behaviors (Burleigh & Marholin II, 1977). In a study on the effects of verbal prompts on aversive behavior, Burleigh and Marholin II (1977) compared them with the effects of differential reinforcement on the same behavior. Using an A-B₁-C₁-B₂-C₂-B₃ reversal design the effects of the two experimental procedures were evaluated on an aversive behavior labeled as "placing hands over adult's face" which was exhibited by a severely retarded male. Results indicated that the percentage of "eyes visible" intervals increased when the contingency for eyes visible was instituted. However, the introduction of verbal prompts resulted in a decrease in the percentage of intervals eyes visible. It was
concluded that differential reinforcement alone was more effective at establishing an incompatible behavior than prompting and subsequent reinforcement of the same behavior. Based on the findings, Burleigh and Marholin II (1977) suggested that:

Although prompts are often useful early in training, they should usually be faded as training progresses. One must be careful not to delay the fading of prompts once appropriate behavior is established lest the behavior become dependent on the prompts. (p. 120)

Nelson (1977) was the first to study the effects of periodic prompting on selected teaching behaviors in a physical education setting. Contrary to the studies done by Dodds (1975) and McKenzie (1976), where prompting was used as part of a treatment package, in Nelson's (1977) study, prompting served as the major independent variable. Using the multi-element design (or alternate condition design), it was found that via a one-way wireless communication system, prompting was effective in increasing the use of a) positive skill feedback; b) positive behavior feedback; c) use of first names; d) non-verbal skill feedback; and e) nonverbal behavior feedback.

In summary, research which involved the use of prompting is quite limited. In certain cases, prompting was used to implement interventions (Hall et al., 1968; Moore & Bailey, 1973; Stuart, 1970). When used as an actual intervention, it contributed to changes in on-task behavior (Knapczyk & Livingson, 1975), social behavior (Strain et al., 1976), pollution behavior (Geller et al., 1973), verbal imitation (Risley & Wolf, 1970), and teacher praise (Van Houten & Sullivan, 1975). Since prompting is used often in combination with other intervention strategies, its contribution to the treatment effects
remain unclear (Burleigh & Marholin II, 1977). Furthermore, prompting may reinforce aversive behaviors rather than decrease the occurrence of such behaviors.

**Communication systems**

For quite some time, the available technology for (wireless) communication has been used extensively in the areas of psychotherapy, and counseling education (Saywer, 1969; Schwitzgebel, 1968). The first use of wireless communication in educational settings was made by Herbert and Swayze (1964), in the early 1960s and has been used in various areas of teaching.

This development is not typical of teacher education (Herold, Ramirez III & Newkirk, 1971). Numerous systems of varying degrees of sophistication have been developed and introduced. For detailed descriptions and explanations of technical data regarding the various available systems, the reader is referred to a) Schwitzgebel (1968); b) Stumphauzer (1970); c) Herold et al. (1971); d) Nordquist (1971); and e) Weathers and Liberman (1973).

**Research on Active Supervision**

The inclusion of the variable scanning marks an attempt to address one aspect of what has been labeled "active supervision" (Siedentop, 1983), and also monitoring (Fisher, Berliner, Filby, Marliave, Cahen & Dishaw, 1981; Tousignant, 1982). For the purpose of avoiding confusion in terms of the various labels used, it should be noted that
the term "active supervision" does not represent any behavior or activity on the part of an outside observer for the purpose of describing and/or evaluating the performance of a teacher. Rather, it is a group of teacher behaviors aimed at keeping track of student's behavior during classes.

Through descriptive research efforts in physical education, it has been found that monitoring behavior exhibited by a teacher accounts for a considerable proportion of the total class time. Anderson and Barrette (1978) reported the observation of motor activities to be the most prevalent behavior in terms of the way in which teachers spend their time. A little over 21% of the total class time is spent in this type of behavior. Siedentop (1983) noted that monitoring behavior accounts for anywhere between 20% to 45% of classtime. It was also noted that up to this point, the behavior of monitoring remains largely unstudied and unanalyzed. Two problems seem to be contributing to this apparent lack of knowledge about teachers' monitoring behaviors. First, the observation systems used to study monitoring tend to limit the findings to the extent that only instances of at least 5 to 10 seconds are captured. Thus, the lack of sensitivity of the observation systems used may in fact limit the accuracy of the above data. Second, there is a definitional problem. Anderson and Barrette (1978) used the term "Observing" and defined it as "Silently attending to student(s) who are performing motor activities." (p. 25). Siedentop (1983) defined monitoring as "... time spent observing students without interaction." (p. 55). Fisher
et al. (1981) defined monitoring in two ways. It was defined both as "... keeping track of student progress on instructional tasks." (p. 11); and also as "... the teacher behavior of circulating around the room during seatwork." (p. 11). And finally Tousignant (1982) defined it as "... the teacher's active supervision associated with the implementation of the accountability system." (p. 116).

Siedentop (1983) indicated that monitoring behavior can be productive to the extent that it contributes to the close and active supervision of individual students. Research in regular classrooms has shown, that, when students are in seatwork, active supervision on the part of teachers contributed to student achievement (Fisher et al., 1981). Seatwork as an organizational structure used in classrooms has an analog in physical education settings. Many times students will be working on their own or in small groups on certain tasks, with the teacher going around and providing assistance, feedback, further instruction, etc. In such situations "active supervision" is important for keeping students on-task, keeping close to any safety problems, and distributing feedback to all students in class.

Rosenshine (1979) pointed out that the management of students in seatwork is a major problem for teachers: "Although it is not difficult to manage a small group of children that a teacher is working with, the management of seatwork for the remaining students is a difficult and relatively unstudied task." (p. 46). Findings in the Beginning Teacher Evaluation Study (BTES) showed that when students
are in seatwork conditions and working alone, they tend to spend more
time off-task (16%) and in transition (10%) as compared to more
closely supervised conditions. When in large group settings (closer
supervision by the teacher), off-task behavior occurred only four to
six percent of the classtime (Filby & Marliave, 1977; Fisher, Filby &
Marliave, 1977). When correlating class structure with student
achievement in Elementary classrooms, Stallings and Kaskowitz (1974)
found that time spent working with only one or two students was
negatively related to achievement. It was also found that classes
with a wide range of concurrent activities also had lower achievement
scores. It was suggested that teachers in these situations were
unable to supervise such a variety of activities.

As part of a discussion on certain findings of the BTES project,
Fisher et al. (1981) provided the findings regarding the monitoring
behavior of teachers in reading and math classes. When interpreted as
keeping track of student progress, it was found that monitoring
occurred mostly through the use of questioning. It was noted that
"Students pay attention more when they are more often involved in
substantive interaction. . ." (p. 11). And teacher questioning is
considered to be an important part of the monitoring process. When
interpreted as the physical movement around the classroom during
seatwork, it was noted that teachers in high-achieving classes tended
to go around the room and give help or feedback as frequently as
possible. Fisher et al. (1981) also indicated that "... good
teachers do this not only to keep students on-task, but also to find
out as much as they can about how students are doing so they can plan further instruction." (p. 12). Although these results do not use the term "active supervision", they do seem to support the basic notions about its importance in instruction in classrooms and gymnasiums.

Thus, the results of the above reported research indicated that when teachers were working with a few students at a time, they were unable to closely supervise the remaining students, who, as a result, were less often academically engaged and more off-task. Management of students in seatwork settings has been found to be dramatically different from other instructional situations. Working with a large group of students often will not permit one-to-one interaction between the teacher and student for extended periods of time.

In pedagogical research in physical education, some initial findings have become available that further support the importance of "active supervision". Using ethnographic strategies, Tousignant (1982) studied the accountability systems that operate in gymnasiums. Data were reported by Tousignant and Siedentop (1983), that indicated an interaction between teacher monitoring and student behavior. It was found that silent and distant observation mostly prevented misbehavior, and that making permanent records of student performances was related with higher levels of on-task behavior of students. It was indicated that teacher monitoring plays an important role in the degree to which the stated task is performed by students in actuality. Earlier Tousignant and Brunelle (1982) argued that for learning conditions to improve teachers need to improve their monitoring strategies to implement the appropriate accountability system.
In Chapter 3, a brief overview will be provided on the development of the scanning variable, and how it was conceptualized.

Summary

In this chapter, the reader was introduced to literature dealing with past and present purposes of educational supervision. Improvement of instruction has been considered the major purpose of supervision since the 1950s. Two models of supervision were presented, namely the clinical supervision model, as developed by Cogan (1973), and the counseling model of supervision, as proposed by Mosher and Purpel (1972). Both were discussed in terms of their objectives, characteristics and procedures, and research base. Neither was found to have strong empirical support. The one area where the counseling model has support is the notion that teachers pass through certain developmental stages when learning to teach. In the discussion of supervision research in physical education, three areas were outlined. The traditional paradigm of supervision was described as depending heavily on the weaknesses of teachers while using highly subjective observational tactics. The interaction analysis model of supervision has been used successfully in pre-service training of physical education teachers. Behaviors of teacher trainees were changed in that following instruction, feedback, and in some cases training in the actual use of interaction analysis, they showed more acceptance of student's ideas, they praised students more often, made more use of questions, and allowed more initiation on
part of students. Furthermore, initial studies have shown that the established effects have lasting effects. The behavior analysis model of supervision was also discussed. Developed at the Ohio State University, this model, which uses the principles and strategies of Applied Behavior Analysis, has repeatedly shown that behavior of student teachers can be changed dramatically and rapidly. Furthermore, the changes that were established, were produced with different people in the role of change agent (i.e. supervising teacher, cooperating teacher, and peer interns).

A brief discussion was presented on the use of "packaged" intervention as used in the Behavior Analysis Supervision Research program at Ohio State University between 1973 and 1977.

Following a brief definitional outline, research on prompting was presented. Prompting has been used both as a means of implementing treatments, and as the primary treatment. When used as a treatment, it contributed to changes in on-task behavior, social behavior, pollution behavior, verbal imitation, and teacher praise.

The use of wireless communication systems has been characteristic of research in the area of counseling and psychotherapy. In education, wireless communication devices have been used as early as 1964, but its use in teacher training remains lacking despite the availability of numerous systems.

Active supervision was described as a group of teaching behaviors aimed at keeping track of student behavior. Research has indicated that monitoring (i.e. silent observation of students) constitutes a
the large proportion of physical education teachers' time spent during classes. In classroom research, active supervision has been found to contribute to student achievement. Findings in the BTES studies showed that students spend more time in off-task behavior and transitional activities when in seatwork conditions as compared to large group settings. In research on teaching physical education, the importance of active supervision has been noted in terms of the relationship between teacher monitoring and student behavior.
Chapter 3

METHODS AND PROCEDURES

In this chapter, the reader will be introduced to the methodological and procedural aspects of the investigation. The chapter will be divided into four sections. The first section will focus on the arrangement of the experimental setting and include information on a) selection of setting; b) gaining entry; c) selection of subjects; d) observation schedule; e) location of prompter and camera; f) daily observation procedures; g) instructions to subjects regarding use of equipment; and h) instructions for camera operators.

In the second section, information will be presented regarding the treatment that was applied. This will include coverage of a) equipment used during observation and data collection; b) communication system used; c) controlling the environment; d) treatment of subjects; and e) experimental design.

The third section will introduce the reader to the strategies used to collect and analyze data. This will include information on a) observing and recording; b) qualitative data collection; c) quantitative data collection; d) accuracy of data; and e) analysis of data.

In the final section, a brief overview will provide information pertinent to the development of the dependent variable labeled as scanning.
ARRANGEMENT OF EXPERIMENTAL SETTING

Selection of Setting

During the Fall of 1982, the investigator contacted two physical education teachers at a middle school in a suburban school district in the Columbus, Ohio area. Previously, the investigator had been assigned to this school for supervisory duties with physical education student teachers, and as such, was familiar with the physical education program. During the first meeting between the investigator and the two teachers, a brief overview of the study was provided to both teachers. Both agreed to make their facilities available for the purpose of this study.

Gaining Entry

On a later date, a written outline of the study was presented to the principal of the school and both teachers. This was followed up with a formal presentation to the principal regarding the purpose of the study. Following the approval from the school district's superintendent office, observation commenced during the winter of 1983.

The two (both male and female) teachers had been teaching at the school for eight and ten years respectively. The teachers utilized a team-teaching approach. The student population, which included sixth, seventh, and eighth grade students consisted of 774 students. The socio-economic background of the students in the school was described
as lower to upper middle class. Eighty percent of the students was bussed. Black students constituted 37 percent of the total student population. Students of Hispanic, Asian, Indian, or Caucasian origin constituted 3, 9, 2, and 49 percent of the total student population respectively.

Selection of Subjects

Four physical education majors enrolled in the School of Health, Physical Education, and Recreation at the Ohio State University were used in the study. All four students were to complete student teaching requirements during the Winter Quarter of 1983. The investigator was assigned as University supervisor to the students. Prior contact between the investigator and majors had occurred with all but one during previous practicum experiences. During a first meeting (Fall, 1982) between the students and investigator, the former were provided with an overview of the student teaching objectives and a general explanation of the study. Informed consent forms (see Appendix A) were provided to all student teachers. All four students agreed to participate as subjects in the study. The age of the subjects ranged from 20 to 24, two of which were males and two were females.

The proposed study was exempt from review by the Ohio State University's Human Subjects Review Committee (see Appendix B for review of exemptions). The study was conducted in an established educational setting involving regular educational practices. Any
adjustments in the setting, requested by the investigator, were to be reviewed and approved by the cooperating teachers.

During the first day of observation, one subject withdrew from student teaching. This necessitated an adjustment in the daily schedule of observations. Initially, daily observations were to be distributed between morning and afternoon classes. Following the loss of one subject, all observations were made during afternoon classes.

**Observation Schedule**

This study was undertaken to study the effects of periodic prompting on selected teaching behaviors of student teachers in a physical education setting, and to investigate the feasibility of using a wireless communication system as a supervisory tool. The schedule of observation consisted of a total of 33 observations for one subject, 32 observations for the second subject, and 31 observations for the third subject. Within the context of a "normal" visitation schedule of a University supervisor, the number of observations made during this study was well above average. However, continuous observation, as recommended by Johnston and Pennypacker (1980), allowed the possibility of experimentally explaining the relationship between the independent variable (i.e. periodic prompting) and the dependent variables (i.e. selected teaching behaviors) based on a sufficiently large number of observations. Furthermore, it allowed the opportunity to examine the degree to which the wearing of communication equipment added variability to any observed changes in the dependent variables.
Another aspect which prompted the observations to be as continuous as possible was that of the use of videotape equipment in settings where such equipment was not part of the natural environment. This constituted another potential source of added variability (i.e. subject reactivity). Although all subjects previous to this investigation had been in clinical practicum experiences which included the use of videotaping, the context of the current investigation was dramatically different. Johnston and Pennypacker (1980) suggested the repeated measurement of target behaviors before any planned intervention would be commenced. Within the context of student teaching, the first two weeks of this experience often constitutes a period of "limited" responsibility on the part of the student teacher. In this particular setting, the subjects entered the program when the cooperating teachers were in the last three weeks of their semester. This situation provided the opportunity to, what Kazdin (1977a) called, "habituate" the subjects to a setting where videotape equipment was more a part of the setting.

As indicated earlier, the physical education program in which the subjects did their student teaching was organized using a team-teaching approach. This concept was continued by the subjects. All three subjects taught simultaneously. However, only one of the three was linked to the communication system per class period.

The decision to terminate observations was guided by the fact that the major unit of instruction taught by all subjects was ending. During the final week of the unit, students were evaluated in
their skill performance. Of the six days spent in student evaluation, the observation of the first three was regarded as adequate.

**Daily Observation Procedures**

Three consecutive class periods were videotaped in the afternoon. The first period to be recorded officially started at 1:05 pm. The preceding 30 minutes constituted a part of the students' lunch period. The investigator arrived in the gymnasium at approximately 12:30 pm. Any equipment not needed for human data collection procedures at night was stored in the school. Arrangements were made by the cooperating teachers for students in the final morning class to place the stored equipment in the gym immediately following the final morning class.

Upon arrival in the gymnasium, the investigator positioned all equipment atop the bleachers. All equipment, once in place, was checked. This included a) measurement of the battery power levels; b) adjustment of the frequency on the FM receiver worn by the subjects, when necessary; c) the functioning of both the Vega, and Realistic microphones; and d) the functioning of the videotape equipment. The subject scheduled to be the target subject during the first afternoon class period entered the gymnasium at approximately 12:55 pm., and collected the Vega microphone, the AM/FM receiver, a mini-earphone, and a waistbelt to which both the transmitter and receiver were clipped. After putting on all equipment, a second check of the communication quality was made. The subject would walk to the furthest point in the gymnasium, away from the prompter and engage in casual conversation. Actual recording of events was commenced at the
start of the official class periods, either at 1:05; 2:05; or 2:50 pm. for the three class periods respectively. The following instructions were given to each subject with regard to the turning on/off of either the Vega transmitter or the AM/FM receiver during the supervision of locker rooms:

1. Leave the Vega microphone on at all times, unless your conversation deals with a private, personal matter.

2. Depending on the amount of static interference produced by the FM receiver, you may turn it off while in the locker room. However, do not forget to turn it back on when returning to the gymnasium floor.

After re-entering the gymnasium with the students, communication quality between the prompter and target subject was determined by way of quick "checks". During the teaching episodes, if/when a subject could no longer discriminate the prompts from the prompter/investigator, he/she had been taught to adjust the frequency.

At the end of each lesson, the last student to leave the gymnasium served as the cue for the camera-operator to cease recording, unless indicated otherwise. The target subject would hand over all equipment to the next scheduled target subject, with the exception of the earphone, which was returned to the investigator/prompter.
Location of Prompter and Camera Operator

All classes observed were held inside the gymnasium. Prior to the machine recording phase of the study, the investigator visited the gymnasium several times to test for potential camera locations. The location chosen was atop the bleachers on the eastside of the gymnasium in the south-east corner. This elevation of approximately 15 ft. reduced the risk of the camera operator not being able to capture the target subject in the camera's viewfinder.

The location of the prompter/investigator was also atop the bleachers, approximately 25 ft. from where the camera operator was located. During the field-testing of the communication equipment, it was found that the location of the transmitter used by the prompter slightly influenced the quality of the signal that was produced. Although not verified experimentally, it was contended that both the quality of the transmitter and the physical structure of the building contributed to the variability in the signal quality of the Realistic microphone used by the prompter.

Furthermore, being on top of the bleachers allowed the investigator to communicate with the camera-operator more easily when necessary. And students in the observed classes appeared less inclined to seek interaction with either the camera-operator or the investigator. On two occasions (both during the first 10 days of observation), students did approach the camera-operator and asked questions about the equipment.
Instructions to Subjects Regarding Use of Equipment

The following directions were given to all subjects regarding the use of the equipment worn:

1. Leave the Vega transmitter on at all times, including the time spent in the locker room, unless the interaction is of private, or personal nature.

2. Depending on the amount of static interference produced by the AM/FM receiver, it may be turned off when in the locker room. Remember to turn it back on when leaving the locker room.

3. If/When you lose contact with the investigator/prompter ("off-station"), use the tuning control switch to adjust the frequency on your receiver.

4. You may engage in any demonstration of skills, or spotting behaviors that will not involve physical pressure on either the Vega transmitter, or the FM receiver.

5. If any equipment is accidentally damaged, return it to the investigator when the opportunity arises within the context of the instruction. Back-up units are immediately available for use.

Instructions for Camera Operators

The following instructions were given to the camera operators that were used throughout the study:

1. The signal to start machine observation and recording of events will be provided by the investigator.
2. The signal to stop machine observation and recording is constituted by the last student leaving the gym floor at the end of a class period, unless indicated otherwise by the investigator.

3. The image of the target subject should be kept in the viewfinder of the camera at all times, unless indicated otherwise.

4. Where possible include those students who are in the direct vicinity during skill-practice episodes.

5. The angle of view should be kept as wide as possible except for episodes when student groups are engaged in skill-practice, at which time the zoom lens on the camera should be used to produce as large an image of the target subject as possible.

In order to limit the instances and amounts of time where the image of the target subject was not kept in the viewfinder (i.e. "off-camera") by the camera-operator, the following two adjustments were made following the tenth day of observation:

1. Four camera-operators were used on a daily rotation, instead of using only one operator.

2. By adding a Y-adapter and an earphone, the camera-operator was able to monitor the interaction between the target subject and the prompter more closely.

The purpose of these changes was to ensure that the videotape recording made of each lesson had the highest level of accuracy possible.
DESIGN OF TREATMENT

Equipment Used During Observation
and Data Collection

The following equipment was utilized to a) produce a permanent record of 97 classes; and b) allow communication between the target subjects and the prompter/investigator:

1. Twenty-nine two-hours, and six one-hour Scotch videotapes (VHS-cassettes).

2. One Panasonic WV3300 videocolor camera with c-mount 17mm.-105mm. zoom lens.

3. One Panasonic Omnivision II WV8400 portable video cassette recorder.

4. One Vega Orator wireless FM transmitter/microphone (model number 88, 11 x 6.9 x 2.4cm.), and receiver (model number 89), at a frequency of 154.600 M/KHz. The Vega receiver was connected to the videotape recorder (#3) allowing the subjects' verbal behavior to be recorded on the videotape recordings.

5. One T.E.L. video time-date generator (model TD 414, serial number 201). This equipment was used following the initial recording of the lessons, to produce a running digital readout across the bottom of the television. Dates and a running count of hours, minutes and seconds were displayed.

6. One "Realistic" FM wireless microphone (Catalog number 33-1075, Radio Shack, ($19.95). This microphone functions on the regular
FM broadcasting band (88-108MHz). The indoor range was listed at 100 ft. (Outdoor range: 200 ft.)

7. One "Realistic" AM/FM stereo receiver (Catalog number 12-112, Radio Shack, $39.95), with Automatic Frequency Control (AFC).

8. One "Realistic" MC 1000 microphone (Catalog number 33-990, Radio Shack, $15.95), linked to the WV 8400 videotape recorder. This allowed the recording of the verbal behavior of the prompter/investigator onto the videotapes.

9. Two "Realistic" Y-adapters (Catalog number 42-2154, Radio Shack, $1.99 each) allowing a) simultaneous recording of both target subjects' and prompter/investigator's verbal behavior; and b) simultaneous monitoring of target subjects' verbal behavior by both the prompter/investigator and camera operators.

10. Four shielded plug adapters (Catalog number 274-326, Radio Shack, $1.39 each).

11. Five mini-earphones (Catalog number 33-175, Radio Shack, $1.49 each) allowing any verbal behavior on the part of the subjects and the prompter/investigator, to be monitored by both the subjects, prompter/investigator, and camera operators.

12. One Micronta battery tester (Catalog number 22-030A, Radio Shack, $9.95). This was used to check the power levels of all batteries used in the study.

13. One rechargeable 9 Volt battery (Malleroy NC1604), used to operate the Vega FM transmitter.

14. One wall-unit battery charger (Malleroy NC2200) for overnight recharging of NC1604 battery.
15. Four 1.5 Volt microbatteries (Catalog number 23-147, Radio Shack, $1.49).

16. Ten regular "AA" size batteries, used to operate the FM receiver worn by the target subjects.

17. One Panasonic 19-inch television, used to replay recordings of previously-recorded classes for data collection.

Back-up units were purchased and placed in the gymnasium during the observations. Used as a guard against equipment failure or damage, each was immediately operable. Back-up units included a) two "Realistic" wireless FM transmitters; b) two FM stereo receivers; c) two 9 Volt Mallory rechargeable batteries; and d) four Alkaline 1.5 Volt microbatteries.

Communication System Used

Communication between the prompter/investigator and target subjects was established with the use of two different wireless communication systems. A subject, when linked to the system, wore a belt on which both a transmitter (8.8 x 6.9 x 2.4cm.; 0.3kg.), and a receiver (12.2 x 7.8 x 3cm.; 0.17kg.) were clipped. Through a mini-earphone, which was connected to the receiver, the subject could monitor the prompts (and any other verbal statements) made by the prompter/investigator. Before the first day of observation, the investigator tuned the receiver worn by the subject to the frequency at which the microphone used by the prompter/investigator was operating. This frequency level (101.6MHz) was kept constant
throughout the remainder of the observations. This constituted the channel of communication from the prompter/investigator to the target subject.

The channel of communication from the target subject to the prompter/investigator was established by way of the Vega transmitter (worn by the subjects) and the Vega receiver (154.600MHz). The Vega receiver was connected to the videotape recorder. This produced a permanent record of all verbal behavior by the subjects on the videotape recording. By way of a mini-earphone, which was also connected to the videotape recorder, the prompter/investigator could simultaneously monitor the subjects' verbal behavior.

In addition, the verbal behavior on the part of the prompter/investigator was recorded by way of a second microphone, hand-held by the prompter, which was connected to the videotape recorder.

Explaining the Presence of the Observer and Videotape Equipment

Prior to the start of videotaped observations the investigator had visited the gymnasium several times to test various pieces of equipment. During those visits, the videotape equipment was also completely set up. Therefore, it was assumed that the students in the classes (the same students who were to be videotaped during the actual recording sessions) were somewhat accustomed to the presence of the videotape equipment and investigator. Furthermore, one of the cooperating teachers indicated that the students were used to being observed for extended periods of time.
During the first day of observation, all students in classes taught by subjects were informed about the purpose of the equipment worn in general terms. In the initial weeks of observation, students in classes taught by the subjects were found to come up to the subjects occasionally and ask questions about the equipment. For the purpose of those instances, all subjects were told to merely restate the purpose of the equipment, and return to their major activity.

Controlling the Environment

In any setting where a functional relationship is sought between an independent variable and (a) dependent variable(s), it is the investigator's task:

... to so arrange the various features of the experimental environment that an orderly relation between manipulations of a single feature of the environment and variations in the measures of the chosen response class is convincingly demonstrated. This requires that only one feature of the environment at a time be allowed to impose variations in responding with other features being held as constant in their influence as possible. (Johnston & Pennypacker, 1980, p. 253)

However, in most applied settings, an investigator is faced with the logistical problem of having to deal with the management of a multitude of extraneous sources of variability. Two alternative approaches are available to deal with these extraneous sources of variability: a) Variables could be held constant; or b) they could be eliminated (Johnston & Pennypacker, 1980).

To the extent that the investigator had control over certain variables in the experimental environment, the following measures were taken to hold those as constant as possible, or determine the degree to which they possibly affected the subjects' behavior:
1. The unit of instruction taught by all subjects was the same throughout all observations.

2. All subjects wore the Vega transmitter and the FM receiver with mini-earphone regardless of the experimental condition (prompting versus no prompting) in effect. One subject, over a span of four sessions, did not wear the earphone as a result of an ear infection. For that period the subject was also on medication for the treatment of the infection. During that time, the subject complained several times of having little energy. Johnston and Pennypacker (1980) have noted that there is a relationship between the physiological functioning of the organism and its behavioral variation over time. The four sessions where no earphone was worn were regarded as "no prompt" sessions.

3. All subjects were linked to the communication system during a different class period each day. Table 1 shows the number of times that each subject taught the various class periods while linked to the communication system.

4. The camera operators and the prompter/investigator were located in the same position throughout all observations.

5. Static interference in the channel of communication going from the prompter/investigator to the target subject was measured on two separate occasions in terms of its stability of location in the work setting. This tactic was utilized to determine whether the variability in the quality of communication was influenced by the quality of the system used.
Table 1

Class periods taught by subjects across grade

<table>
<thead>
<tr>
<th>Subjects</th>
<th>1 (7th)</th>
<th>2 (8th)</th>
<th>3 (9th)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>9</td>
<td>6</td>
<td>9</td>
<td>24</td>
</tr>
<tr>
<td>2</td>
<td>9</td>
<td>8</td>
<td>7</td>
<td>24</td>
</tr>
<tr>
<td>3</td>
<td>7</td>
<td>6</td>
<td>11</td>
<td>24</td>
</tr>
</tbody>
</table>

6. As indicated in number 1., all subjects wore both pieces of equipment regardless of the treatment condition in effect. This allowed the investigation of whether the changes in behaviors could be attributed to the prompting of these same behaviors. However, Campbell and Stanley (1963), while discussing issues related to external validity, pointed at the concept of "reactive effects of experimental arrangements". Behavior exhibited during the experiment may be affected by the specific experimental arrangement. Therefore, it had to be considered that being linked to the communication system, and being videotaped could be potential sources of behavioral variability. In an attempt to determine the presence and the degree of influence of these factors, each subject in the study was
videotaped even though he/she was not linked to the communication system. Subjects were not notified about this tactic. Three of the four original dependent variables could not be used in this analysis because they were verbal in nature. A fifth variable was selected that was nonverbal in nature. The variable selected was labeled "Supervision of skill performance", and operationally defined as: Time spent where a subject is silently observing (i.e. looking at) skill attempts by a student, and/or interacting with (a) student(s) regarding the subject matter (e.g. additional instruction, prompts, feedback), while at a teaching station or approaching a teaching station.

Since it was not the primary purpose of this study, observations of subjects who were not linked to the communication system were stopped following a subject's questioning with regard to being videotaped without carrying any equipment. Consequently, the investigator was able to obtain two, two, and one observation(s) for subject One, Three, and Two respectively.

Treatment of Subjects

This investigation was conducted to study the effects of periodic prompting by way of a wireless communication system on selected teaching behaviors of physical education student teachers. Prompting was described by Nelson (1977) as a shaping procedure for developing stimulus control. As explained in Chapter two, it is a procedure where a prompt (i.e. a supplementary stimulus) is paired with the
original environmental cue (Whaley & Malott, 1971). Graphically, prompting can be explained as follows: Graph a. in Figure 1 shows the cumulative frequency of occurrence of a hypothetical target behavior during a 36-minute lesson. Each vertical break constitutes the occurrence of the behavior. In this graph, the behavior was recorded as having occurred five times in a 36-minute period, or at a rate of 0.13 times per minute. In order to increase the occurrence of this behavior, one could provide prompts. For the purpose of clarity, several possible patterns that might result are shown in Figure 1. Graph b. shows the pattern would be best described as "No effect". The provision of prompts did not increase the occurrence of this behavior. Graph c. provides an example of what has been called "prompt dependence". That is, the behavior will be emitted only when a prompt is presented. Graph d. shows how stimulus control is established. Following presentation of the prompt, the behavior is emitted at a higher rate of occurrence (i.e. comes under the control of naturally occurring antecedents in the environment). The leveling-off in the occurrence could be a signal for additional prompts.

In this study, prompts were provided to the subjects on four target behaviors: a) Positive skill feedback; b) positive behavior feedback; c) use of pupils' first names; and d) scanning. Other interaction between the prompter/investigator and subjects focused on such aspects as managerial behaviors and events, safety, students, and the skill performance of various students. In a few cases, subjects
Figure 1. Cumulative frequency of sample behavior with and without prompting.
were given positive feedback about their performance in specific instances.

During observations where subjects were scheduled to be prompted on (a) particular behavior(s), the prompter/investigator would alert the target subject about various events occurring around him/her. For example, if a subject was approaching a student in the class, he/she would be provided with the following prompt: "That was a nice straddle vault."; or "She kept her legs nice and straight on that kip.". A prompt aimed at the use of positive behavior feedback would be for example "They sat down quickly following your signal."; or "Tell the three girls in the back they're really working hard." When the use of first names of students was prompted, a subject would hear a statement such as "I think her name is Marsha.", or "What's his name?", or "Don't forget to use her first name." When scanning was the focus of the prompts, subjects would receive prompts such as "What's going on at the balance beam?", or "When you get a chance, take a look at the trampoline."

**Experimental Design**

At the onset of this investigation, it was contended that strict adherence to a particular experimental design might prove to be a limitation. The decision regarding the initiation of treatment, the selection of dependent variables, and intensity of treatment (i.e. the number of prompts within one observation, and the number of sessions in prompting condition), therefore, were derived inductively.
The first four sessions used in the final analysis were randomly selected from the first 12 observed sessions. These first 12 sessions constituted a period where subjects gradually experienced a full teaching responsibility. Classes were primarily directed by the cooperating teachers. During these sessions, no prompts were provided that were focused on any of the dependent variables. Any communication that did occur was related mainly to either the quality of the communication or general matters. During these sessions, the dependent variables were selected. The four randomly selected sessions, and any session where no prompt was provided prior to the first prompted session for each dependent variable constituted the baseline sessions. Throughout the remaining sessions, conditions were alternated across variables and subjects. In Table 2, it is shown which condition was in effect across the 24 sessions used in the analysis, across variables for each subject. For example, during session 10, subject One was prompted on the variable positive skill feedback, whereas, both subjects Two and Three were prompted on the variables: positive skill feedback and positive behavior feedback.

As indicated in Chapter two, the supervision research conducted at Ohio State University over the past ten years has used the multiple baseline research design (Hersen & Barlow, 1976). In the present investigation, treatment (i.e. periodic prompting) was initiated on separate days for each subject, focusing on different variables. As such, the basic characteristics of the multiple baseline design across behaviors for each subject emerged: "... the same treatment
### Table 2

**Treatment Condition by Sessions**

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<th>Session</th>
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*A = Pos. Skill Feedb.  C = Use of 1st Names  P = Prompted Session  
B = Pos. Beh. Feedb.  D = Scanning*
variable is applied sequentially to separate (independent) target behaviors in a single subject." (Hersen & Barlow, 1976, p. 228).

Baer, Wolf, and Risley (1968) explained that:

In the multiple baseline technique, a number of responses are identified and measured over time to provide baselines against which changes can be evaluated. With these baselines established, the experimenter then applies an experimental variable to one of the behaviors, produces a change in it, and perhaps notes little or no change in the other baselines. (p. 94)

The same experimental variable then is applied to a next behavior and changes are recorded. This procedure is continued until all target behaviors have been exposed to the experimental variable (Hersen and Barlow, 1976).

**COLLECTION AND ANALYSIS OF DATA**

In this section, a brief overview will be presented of the distinction between observing and recording of natural events, and the use of humans and machines in the two respective processes. Then, the procedures followed in the collection of both qualitative and quantitative data will be reported. Furthermore, an overview will be given of the strategies used for the purpose of measuring the accuracy of the data. This section then concludes with an explanation of the tactics used to analyze the data.

**Observing and Recording**

The need for sound observational and recording methods in any research effort was explained by Johnston and Pennypacker (1980):

Recording is the terminal event of a complex series that begins with defining the response class of interest, proceeds through
observing, and culminates in creating a permanent record of the behavior. It is imperative that the events that constitute the recording procedure in no way be allowed to vitiate attainment of the high standards of accuracy and precision that invariably characterize good scientific measurement. The permanent record that remains after defining, observing and recording have taken place is the only evidence that measurement actually occurred, and the quality of that entire process cannot exceed the characteristics of that record. (p. 170)

The distinction between observing and recording is best explained by their respective purposes, as described by Johnston and Pennypacker (1980): "The goal of observation is to arrange conditions so that man or machine will react sensitively to the defined dimensions of the subject's behavior." (p. 146). Accurate data (i.e. data that represent the closest approximation possible to the "true" state of nature) can be generated only if both the observation and recording strategies meet certain basic criteria. Johnston and Pennypacker (1980) argued that the major principle for ideal observation is for it to be continuous and complete. Sampling across and/or within observation sessions will add "noise" to the variability in the data.

The major purpose of recording is to create a permanent and accurate history of observations for future examination (Johnston & Pennypacker, 1980). Most often the description of the ongoing behaviors under study take the form of numbers and units.

Both the observation and recording procedures can be completed by humans and machines. When using machines for observation purposes, the major concern for any investigator is the calibration of the instruments used (Johnston & Pennypacker, 198). With calibration ensured, a major advantage of using machines for observations is that it can detect reliably a single event over and over again without any
random influence modifying this detection. Human beings, as noted by Johnston and Pennypacker (1980) are very poorly qualified to fulfill this requirement as a result of their conditioning history. Jacob Kounin (1970) also addressed this very issue while discussing the use of videotape equipment in the study of classroom management:

We decided to use videotapes. The combination of a lens and videotape recorder meets the criteria of a good observer and recording. The lens has no biases, theories, preconceptions, needs or interests. It takes in all that is occurring in its field and makes no distinction between what is boring or interesting, major or minor, important or unimportant, outstanding or ordinary, good or bad. And the videotape records it all without forgetting, exaggerating, theorizing, judging, interpreting, or eliminating. (p. 62)

In this study, machines as well as human beings were used in both the process of observation and recording. Two stages of both observation and recording constituted the quantitative data collection phase. Initial observation and recording was completed by machines. The camera observed and the videotape recorder produced a permanent record of the ongoing behavioral events. The second phase was completed by the investigator. Using pencil, paper, and a remote control picture freeze switch, the investigator recorded instances of the target behaviors. The qualitative data collection phase also included the use of both machines and human beings. The microphone "listened" and an audio cassette recorder produced a permanent record of the exit interviews. A human being transcribed the recordings.

Qualitative Data Collection

With this investigation being an initial attempt of using a) periodic prompting as the major intervention; and b) a wireless
communication system to change teaching behaviors of pre-service physical education teachers, it appeared useful to question the subjects regarding the various aspects of the project, as a means of capturing their perceptions and experiences. At the halfway point of the student teaching experience, a brief (i.e. approximately 30 minutes in length) interview was held between the investigator and all subjects. However, it was contended by the investigator that the information provided by the subjects during the student teaching experience could be influenced by the context within which the information was gathered (i.e. the dual role of the investigator). In view of that, a formal interview was scheduled between the investigator and each individual subject following the completion of student teaching. The purpose of this interview was to enable the subjects to provide background information that would go beyond the quantitative realm of this study.

The interview took place in a setting familiar to all subjects. Each subject was notified of the possibility of being contacted at a later date for the purpose of clarification and/or additional questions. All three interviews were recorded on audio-cassettes and afterwards transcribed for analysis, using a Sony (UB-30) transcriber.

Quantitative Data Collection

Johnston and Pennypacker (1980) noted that since behavior is a continuous interactive process, the standard for a science of behavior is continuous and complete observation. This notion was supported by Springer, Brown and Duncan (1981):
Recording methods that have emerged, such as time sampling and interval recording, are considered discontinuous (despite the possible occurrence of an observed response), and time-based. The passage of time, rather than the occurrence of a response governs the act of observing and recording. (p. 20).

Alexander (1982) explained that as a result of using such observational strategies, many instances of an occurrence of a target behavior are allowed to go unobserved, and, therefore, unrecorded.

In the present study, two stages of observations were completed to gather data on the selected dependent variables and independent variable. The observation by the camera, creating a permanent record of each lesson taught, constituted the first stage. Following this first observation, the permanent records were re-recorded at which time the date and a running count of hours, minutes, and seconds were superimposed on the videotape. This procedure was used following every fifth day of machine (i.e. camera) observation. The second observation was then started as the investigator observed the videotapes and recorded events pertaining to this study. Tapes were replayed with the use of a remote control picture freeze switch. This allowed the videotape to be stopped at any point without losing the actual picture. Data were recorded on paper by marking their temporal location as identified by the superimposed running time count. The events that were observed and recorded included:

1. Changes in class context, and the type of class context.

2. Positive skill feedback statements of subjects made to their students during the warm-up (P-wu)-, and skill practice (P-s) episodes.

3. Positive behavior feedback statements of subjects made to
their students.

4. Instances where the subjects used the first name(s) of (a) student(s).

5. Instances where the subjects scanned (parts of) the gymnasium during skill practice episodes.

6. Any prompt provided to the subjects for the purpose of their responding with either a positive skill feedback statement, a positive behavior feedback statement, the use of a pupil's first name, a scan around the gymnasium, or a combination thereof.

7. Any cue regarding the establishment and/or quality of the wireless communication system.

**Accuracy of Data**

In any scientific endeavor, it is of primary importance that the measurements made approximate the "true" value of the observed events or dimensions as close as possible. Johnston and Pennypacker (1980) refer to this as the concept of accuracy. Accuracy is distinct from reliability, in that reliability deals with the capacity of an instrument to obtain the same values across repeated observations over time.

The degree of accuracy established in the process of observing and recording is influenced by a) the response class definition; b) the dimensional quantity chosen for the measurement of each response class; and c) the observational act itself. For example, the use of vague and broad definitions presents enormous problems of detection, particularly if/when humans are used as observers (Johnston &
Pennypacker, 1980). The choice of inappropriate dimensional quantities (e.g. using a frequency/rate measurement where a duration measurement would be more appropriate) also may reduce the accuracy of the data.

In the measurement of accuracy, the following criterion was noted by Johnston and Pennypacker (1980): "... the extent to which observational data are accurate can be assessed only if the 'true' values of the observed behavioral events are known." (p. 194). In this study, the 'true' values were known to the investigator, in that the camera observed them and the videotape recorder produced a permanent record of these same events. As such, the degree of accuracy could be assessed by merely comparing the true values (displayed on the videotapes) with the measured values (recordings made by the investigator).

In the current study, a second independent observer was utilized to evaluate the accuracy of the collected data. Although Johnston and Pennypacker (1980) argued that the use of a second observer to judge stability (i.e. reliability) of the first observer is improper, it can be used to evaluate the believability of data:

Believability is the propensity of the experimenters and their colleagues to accept as true any features of the data under examination. In the case of measurement variability, believability refers to the extent to which the data are assumed to be accurate representations of what really occurred. (p. 166)

The following procedures were completed to confirm the accuracy of the quantitatively collected data:

1. Three observation sessions of each subject were randomly selected.
2. The original coding sheets of the nine selected sessions were retrieved. The data on these coding sheets were then transposed onto supplementary coding forms and placed in chronological order for ease of review.

3. For each subject, one observation session was randomly selected. The remaining two sessions for each subject were available in case accuracy of the initially selected observation was found to be insufficient.

4. The independent observer was provided with the response class definitions of all variables and the ground rules used for coding the class contexts. Following a brief explanation and an opportunity to ask initial questions to the investigator, the independent observer commenced observation of the tapes. The task for the independent observer was to report any discrepancy equal to or greater than one second between the recorded codings made by the investigator and the projected time on the TV screen.

5. To ensure that projected time on the TV screen was representative of "real" time, the independent observer randomly selected one five-minute episode from each of the three selected videotaped classes. With the use of a chronometer (Citizen Seven), known to be accurate within .05 second per 6 months, the independent observer compared the elapsed time projected on the TV screen with the elapsed time on the chronometer.

6. Following the completion of each session, the independent observer signed the coding sheets acknowledging their accuracy.
The concepts of accuracy and stability take on a critically
different meaning when used within the realm of qualitative research.
The expectation of consistency of observations over time by one or
more observers does not exist (Bogdan & Biklin, 1982). One of the
assumptions of qualitative research is that there are multiple
realities. Therefore, it is possible that:

. . . two researchers studying a single setting may come up with
different data, and produce different findings. Both studies can
be reliable. One would only question the reliability of one or
both studies if they yielded contradictory or incompatible
results . . . (Bogdan & Biklin, 1982, p. 44)

Lincoln and Guba (1982) have proposed the use of dependability
audits and confirmability audits to judge the "trustworthiness" of
qualitative data. The use of audits provides a means of public
examination of such data. The dependability audit refers to the
process of inquiry for reliability of data, whereas, the
confirmability audit focuses on the absence of bias in the product
(i.e. data, interpretations, and conclusions). Lincoln and Guba
(1982) noted that the issue is not:

. . . whether the investigator carried out the processes or
reached the conclusions in the same way that the auditor would
have, but whether they were carried out in a reasonable manner.
Thus, replicability is not a criterion, but rather rationality
is. In this context, 'reasonable' and 'rationality' are taken to
mean that the methods chosen for data collection are appropriate
to the problem studied; that the techniques of analysis utilized
are those consonant with the form in which the data are collected
and assembled; that reports of the data are coherent, credible,
and exhibit structural corroboration; and that all assertions
about the context (save for the inquirer interpretations) may be
traced to the authentic data, units or categories. (p. 4)

In the current investigation, the two procedures proposed by
Lincoln and Guba (1982) were utilized to examine the accuracy of the
qualitatively collected data:
1. An independent observer reviewed the transcripts of the interviews while listening to the taped audio-recording. This constituted the dependability audit.

2. Subjects were asked to review the reported synthesis and determine if any of the statements made regarding the interview results were congruent with the original comments. Furthermore, they were asked to identify any passages they felt might be a threat to their anonymity.

**Analysis of Data**

A brief overview follows of a) the rationale behind the experimental design; and b) the criteria used to evaluate the data of this study. As indicated in an earlier section, this study utilized the multiple baseline design across behaviors, or what Sidman (1960) called the intrasubject replication design. The logic behind this design is to determine operations that are functionally related to the performance of behavior (Kazdin, 1973). One could conceptualize its pattern (i.e. baselines followed by some treatment) as separate A-B designs with the A-phase further extended for every succeeding behavior until the treatment is applied to all behaviors (Hersen & Barlow, 1976). Control over a behavior is considered established when a selected treatment variable is applied to one of the dependent variables, resulting in a change in occurrence of the latter, whereas, the remaining untreated behavior(s) remain(s) at approximately the same rate of occurrence. This is similar to Campbell and Stanley's
(1963) notion of internal validity, which was explained as the degree to which the results of the experiment can be attributed to the experimental manipulation. Kazdin (1973), and Hersen and Barlow (1976) pointed out the one major concern with the use of this particular design, namely the need for the target behaviors (i.e. dependent variables) to be independent. Particularly in a study where new variables are studied, the lack of independence between dependent variables would pose strong limitations on the effect(s) of the independent variable. With the available research in the area of physical education supervision, it was assumed that the behaviors studied in the current investigation were independent.

The strategy used in the multiple baseline to determine treatment effects is distinct from the more traditional between groups comparison approaches, where differences between groups of subjects (usually expressed in group means) are studied. By way of statistical procedures, data are compared whereby the focus is on differences between group averages rather than differences or changes in behavior.

In the discussion on the evaluation of applied behavioral research, Risley (1970) proposed two types of criteria by which behavioral research findings can be judged on their significance, namely the experimental and clinical criterion. The former addresses the reliability of the changes, whereas, the latter focuses on the importance of the change. The experimental criterion is explained as the comparison of behavior which has been intervened upon with what it would be had the intervention not been applied. Hersen and Barlow
(1976) explained that when a multiple baseline across behaviors is used, experimental significance of results can be determined by a) the degree of overlap between scores of the baseline phase and treatment phase: "The data points of baseline may not extend to the levels achieved by the data points during the intervention. If this is replicated... across behaviors (multiple baseline design), there can be little question that the results are reliable." (p. 268); and b) the divergence of slopes or trends in baseline and treatment conditions. The important characteristic here is to establish a stable baseline before treatment is commenced (i.e. absence of a trend). "If there is a trend, it should be opposite from the direction that is to be achieved with the intervention." (p. 268)

To determine the relative strength and reliability of the behavioral changes achieved, graphs were visually analyzed. Use was made of the concepts proposed by Parsonson and Baer (1978): a) Stability of baseline; b) variability within experimental phases; c) variability between experimental phases; d) overlap of scores of adjacent experimental phases; e) changes in trend within experimental phases; f) changes in trend between experimental phases; and g) changes in level between phases.

The use of visual analysis of graphic data has been prevalent in the analysis of data produced in research using time-series designs (Kratochwill, 1978). Sidman (1960) has argued that with this type of analysis "success" (i.e. significance) of the treatment is achieved only by large effects through experimental manipulations. While there
is a general tendency to reject the use of inferential statistics in
applied behavior analysis research (Kratochwill, 1978; Michael, 1974),
it should be noted that some of the concepts used in the visual
analysis do, in fact, possess certain statistical properties.

In determining differences between groups on selected variables
two concepts play an important role, namely within-group variance, and
between-group variance. These two have their analogs in the concepts
"variability within experimental phases", and "variability between
experimental phases", as proposed by Parsonson and Baer (1978). If,
for example, in a single subject research design both the variability
within experimental phases and variability between experimental phases
are either large or small, judgments about any treatment effect(s) are
hard to make. On the other hand, if variability between experimental
phases is large, along with little variability within phases such
judgments can be made more readily, as would be the case with the
opposite situation. The concept of overlap of scores is obviously
highly related, in that, it is an expression of "between groups
variance".

Baer (1977) has noted that, while visual analysis of graphic data
tends to be less sensitive in detecting behavioral changes than the
statistical procedures utilized in group design research, that same
insensitivity may prove important in the analysis of behavior. Stated
differently, judgments made through visual analysis of graphic data
tend to be more conservative than those made on the basis of
inferential statistics. As such one could expect to look for more
Type II errors (i.e. claiming "no difference", while there was one) to be made, but fewer Type I errors (i.e. claiming "difference", while there was none) (Baer, 1977).

The clinical criterion for evaluating changes in behavior has been explained as a comparison between achieved behavior change and the degree of change needed for the subject's adequate functioning in society (Risley, 1970). Thus, it is possible for a behavioral change to be experimentally significant but not clinically significant. The difficulty of specifying precise clinical criteria for evaluating behavioral change was noted by Hersen and Barlow (1976). For the purpose of this study, the following considerations were given to the determination of a clinical criterion of significance: a) The financial cost of the equipment used to establish communication from an observer/prompter to a teacher, and its correlating quality (i.e. Is the technical quality of the equipment of sufficient level given the financial expenditures?); and b) the ease with which the system can be used. For its users (i.e. an observer and a teacher-trainee), the system would have to be operational in but a few seconds so as not to disrupt the normal flow of a teacher-trainee's preparatory behaviors. Given these factors, the question of the clinical criterion of significance was stated as follows: Given the behavioral changes to be reliable, are the changes achieved a) large enough in magnitude, and b) rapid enough over time for prompting by way of a wireless communication system to be used in physical education supervisory settings?
Scanning Variable Conceptualization

In an attempt to study one aspect of what has been labeled "active supervision" (Siedentop, 1983), the variable of scanning was developed. For the purpose of this study, it was operationally defined as the body-, and/or head-movement to one or more other areas in the gymnasium while attending to one or more students at the same time during skill-practice episodes.

The rationale for this variable is related to Kounin's (1970) concept of overlapping (and to a degree also the concept of with-it-ness). Kounin (1970) pointed out that "Overlapping is present at the time of a desist event when the teacher is occupied with an ongoing task with children at the time that she desists a deviancy" (p. 85). The critical aspect of this variable is that the teacher has to be attending to a (group of) student(s). In the Kounin (1970) study, the coding categories for overlapping were (a) some overlapping; and b) no overlapping. However, the categories were not behaviorally defined. It appeared that for a teacher to be able to attend to a second classroom event (e.g. a deviancy) while engaged with a group of students, he/she would have to be able to see/hear the additional event. On the basis of this assumption, the above mentioned definition was derived. As is the case with the original definition of overlapping by Kounin (1970), the teacher must be engaged with a (group of) student(s). For example, when a teacher is interacting with a few students and briefly looks to the other end of the gymnasium to see if other students have commenced their activity,
and comes back to the original group of students, he/she has scanned. Also, when spotting handsprings for a small group of students, the teacher has the opportunity to briefly look elsewhere between each handspring performed by the group of students that the teacher is physically attending to.

At this point, it should be reiterated that the behavior of scanning as defined on the previous page is not the same concept as Kounin's (1970) overlapping. Rather, it could be interpreted as a prerequisite for an overlapping event to be present. Furthermore, scanning would allow the teacher to let students know that, although he/she is not in the direct vicinity of certain students, he/she is still aware of what is going on.

**Summary**

In this chapter the reader was introduced to the various strategies used to a) arrange the experimental setting; b) the treatment that was applied; c) collect and analyze the gathered data; and d) a brief overview of the development of the scanning variable.

The experiment took place in a middle school in a suburban Columbus, Ohio school district. Three physical education majors enrolled in the School of Health, Physical Education, and Recreation at The Ohio State University served as subjects while completing their student teaching requirements. Observations were made from January 5 through February 24, 1983. A total of 97 observations were made across all three subjects, 72 of which were used in the analysis.
During the observations, the camera operator and the prompter/investigator were positioned atop the bleachers on the east side of the gymnasium, approximately 25 ft. apart from each other. Subjects were observed, when linked to the communication system, every day on a rotating basis. Both the subjects and the camera operators were given specific instructions regarding the use of their respective equipment.

The equipment used to implement the treatment included two separate wireless communication systems (Vega-Orator, and Realistic), that were used simultaneously to establish a two-way communication between the subjects and the prompter/investigator. For the purpose of collecting permanent records of the teaching episodes, videotape equipment was used. By way of an additional microphone, the verbal behavior of the prompter was recorded on the videotape recordings, in addition to the verbal behavior of the subjects. Prior to the start of the observations, all subjects were given instructions regarding the strategy to be used in explaining the presence of the equipment, and of the two observers on top of the bleachers. In order to manage certain variables in the environment, the following measures were taken: a) All subjects taught the same unit of instruction; b) equipment was worn by the subjects when videotaped, regardless of the experimental condition in effect (i.e. prompting versus no prompting); c) all subjects were linked to the communication system during a different class period every day; d) prompter/investigator and camera operator were located in the same position during each observation; e) static interference in the communication channel from
the prompter/investigator to the target subject was measured on two separate occasions; f) subjects were observed when not linked to the communication system to study the influence of the wearing of the communication equipment and the presence of the videotape equipment. Treatment of the subjects consisted of the prompting of the variables a) use of positive skill feedback; b) use of positive behavior feedback; c) use of students' first names; and d) use of scanning. The multiple baseline design across behavior, was used as the experimental design.

Both machines and human beings were used for both observation and recording of data during the data collection phase. Following the completion of all student teaching requirements, each subject was interviewed to gather information on his/her experiences with the use of the communication system. The interviews were transcribed for analysis of similarities and differences. Quantitative data were collected from the videotapes by the investigator. Data that were collected included a) Types of class contexts, and changes thereof; b) positive skill feedback statements c) positive behavior feedback; d) uses of pupils' first names; e) instances where the subjects scanned the gymnasium or parts thereof; f) any prompt by the prompter/investigator for the subjects to respond to with either a positive skill feedback statement, a positive behavior feedback statement, using a pupils' first name, a visual scan around (parts of) the gymnasium, or a combination thereof. Accuracy of quantitative data was established by a comparison of the known "true" values, as
displayed on the videotape and the measured values (recordings made by the investigator). A dependability audit and a confirmability audit were utilized to determine whether the qualitatively collected data were managed properly. With the multiple baseline design across behaviors, experimental control is judged by the degree to which behavioral changes occurred in the treated behaviors as compared to the levels of behaviors that remained untreated. Experimental significance of behavioral changes was judged through visual analysis of graphs, utilizing concepts such as stability of baseline, variability within and between experimental phases, trend within and between experimental phases, and overlap of data between baseline and treatment conditions. Clinical significance was judged by the degree to which the changes in behaviors across subjects were established rapidly and were of large enough magnitude.

The variable "scanning" was derived from the concept of overlapping, as developed by Kounin (1970) and defined as a body-, and/or head-movement to one or more areas in the gymnasium while attending to one or more students at the same time during skill-practice episodes.
Chapter 4

RESULTS AND DISCUSSION

This chapter is divided into two sections. In the first section the reader will be provided with an overview of the major results. Attention will be given to a) accuracy and stability of the data; b) quality of the wireless communication system; c) experimental setting as a source of behavioral variability; and d) relationship between the independent variable and dependent variables. Furthermore, an overview will be provided of the major outcomes of the interviews held with the subjects following the completion of their student teaching.

The second section will consist of a discussion of the major results of this study. This will include a brief reference to the accuracy and stability of data, and the communication system quality. Furthermore, attention will be given to the analysis made of the experimental setting as a source of behavioral variability, and the effects of prompting on selected teaching behaviors. In the latter, attention will be given to the experimental significance of the results, and a comparison will be made of the results of this study with those of previous studies completed in the supervision research program at The Ohio State University. The results of the variable scanning will be discussed separately. The section will be concluded with a discussion of the exit interviews, and the clinical significance of the results.
RESULTS

Accuracy of Data

In experimental research, the major objective in determining the functional relationship between the independent and dependent variable(s) is to explain the variability in the latter that can be attributed to the experimental intervention. As indicated in Chapter Three, one of the factors that will influence behavioral variability are measurement aspects such as response class definition, the selected units of measurement, and/or the respective acts of observing and recording. In order to evaluate the accuracy of data, an independent observer reviewed a random selection of the quantitative data. Another person, unfamiliar with the study, performed a dependability audit, to evaluate the accuracy of the transcripts made of audio-recordings of interviews held with the subjects following their student teaching. Subjects were asked to review sections of the synthesis of the interviews to be reported and determine whether any incongruence existed with the original statements made, and whether their anonymity had been preserved.

The review of the quantitative data resulted in the finding of three incongruencies between the actual behaviors, as shown on the videotapes, and the reported measures of behaviors. In one instance, the temporal location of the occurrence of a positive skill feedback statement was incongruent with the reported location by one second. In the second instance, the occurrence of a scanning behavior was not reported. The third discrepancy consisted of an omission of a
positive skill feedback statement in the human recording of this behavior. All other measured values were found to be congruent with the "true" values as displayed on the TV screen.

The review of the transcripts of interviews by an independent observer resulted in the finding of no inconsistencies between the audio-recordings and the transcripts. The subjects who reviewed the information to be reported from the interviews found no discrepancies with the original statements, and anonymity was reported to be preserved in all cases.

**Quality of the Wireless Communication System**

The purpose of the wireless communication system was to enable the investigator to implement the independent variable (i.e. periodic prompting). For the system to be functional in the work setting, it had to be lightweight, be put in place (i.e. clipped on a waistbelt) with little loss of time, and the transmitted signal had to be received in an area of 5250 square feet. The weight of the FM receiver with mini-earphone was .17 kg. and did not appear to inhibit the subjects' general behavior. Furthermore, putting on the equipment before each class did not take more than approximately 1 minute. Figure 7 (Appendix C) depicts those areas in the gymnasium where static interference was present on two separate occasions. A comparison of the two observations indicated that the location where static interference was present, varied slightly. During observation
One, 13 locations were recorded where static interference was present, whereas 14 locations were found during the second observation. Between the two observations, six were found to be in the same location. This would indicate that the quality of communication from the prompter/investigator to the target subject was influenced by the quality of the system to a certain extent.

Verbal behavior of the subjects was recorded on the videotape recorder via the Vega Orator wireless microphone. This system functioned reliably throughout all sessions. The only instances where no record of verbal behavior could be obtained was a) during periods where subjects communicated privately in locker rooms; and b) in cases where the subject wearing the equipment accidentally hit the on/off switch on the microphone, at which time he/she was cued by the prompter/investigator to turn the microphone back on.

Throughout all sessions, the investigator checked with each subject linked to the system, whether the system was functioning properly. Table 3 shows the percentage of instances where communication was checked and found to be a) received; b) impossible due to either the aforementioned static interference or the frequency dial on the subject's receiver being slightly off; and c) impossible due to the subject's earphone not being in place or the power of the subject's receiver being off. As indicated, in the righthand column (i.e. checks not received, adjusted) the instances where the communication check was not received due to either static interference or the subject's receiver not being accurately tuned ranged from 11.5
### Table 3
Communication Quality Control Across Subjects

<table>
<thead>
<tr>
<th>Subject</th>
<th>Total number of communication checks</th>
<th>Checks received (%)</th>
<th>Checks not received (%)</th>
<th>Power off/earph. out (%)</th>
<th>Checks not received (% adjusted)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>59</td>
<td>71.1</td>
<td>28.8</td>
<td>13.5</td>
<td>15.2</td>
</tr>
<tr>
<td>2</td>
<td>52</td>
<td>67.3</td>
<td>32.6</td>
<td>21.1</td>
<td>11.5</td>
</tr>
<tr>
<td>3</td>
<td>51</td>
<td>70.5</td>
<td>29.4</td>
<td>3.9</td>
<td>25.4</td>
</tr>
</tbody>
</table>
percent to 25.4 percent. The percentage for subject three is somewhat inflated as the result of one session where the subject neglected to adjust the frequency dial on the receiver. The decision was made to consider that session as one in the "no prompt" condition.

**Experimental Setting as a Source of Behavioral Variability**

As noted in Chapter Three, the management of extraneous sources of behavioral variability is an intrical part of conducting experimental research. In an effort to study the effects of being linked to a communication system, and being videotaped, each subject was videotaped while another subject was linked to the wireless communication system. The subjects were not notified of the use of this tactic beforehand. It was contended that, within the constraints of this project, this would approximate closest the condition of how a subject would behave when not wearing communication equipment and not being videotaped. Figure 2 shows a comparison of the percentage of skill-practice time spent in skill performance supervision across all subjects, between the following two conditions: a) Subject linked to communication system, and thus videotaped; and b) subject not linked to communication system, and thus supposedly not videotaped. It should be noted that this variable was measured only during episodes coded as skill-practice (P-s). Thus, if no skill practice time was available to students, by definition, no skill performance supervision could occur. This aspect is important to the
Figure 2. Percentage of skill-practice time spent in supervision of skill performance with and without communication system across subjects.
extent that variability in this behavior is partially dependent on the opportunity for this behavior to occur.

As indicated in the top graph (tier a) in Figure 2 the percentage of time spent in skill performance supervision by subject One ranged from 100 percent to 64 percent. The two sessions where this subject was observed while not wearing the communication system (i.e. sessions 17 and 19) showed percentages of 76 and 57 percent respectively. In view of the overlap between the data of the two conditions, the difference in behavior appears minimal.

Subject Two could only be observed once while not wearing the communication system (tier b, Figure 2). During that session, skill performance of students was supervised 67 percent of the available skill-practice time. This is not appreciably different from sessions where the subject was linked to the communication system, since when linked to the communication system, the percentage of skill-practice time spent in skill performance supervision ranged from 100 to 46 percent.

Subject Three (tier c, Figure 2) was videotaped twice while not linked to the communication system. During these two sessions, the percentage of skill-practice time spent in supervision of skill performance was 96 and 51 percent respectively. When linked to the communication system, the percentages ranged from 10 to 60. The overlap of the data between the two conditions tends to indicate little difference in the subject's behavior.
Since scanning is nonverbal in nature, it was possible to include this dependent variable in the analysis of the effects of wearing the communication system and being videotaped. Figure 3 depicts the rate of scanning per minute during skill-practice episodes for all subjects across the following three conditions: a) Communication system worn (thus videotaped), not prompted; b) communication system worn (thus videotaped), scanning behavior prompted; and c) no communication system worn (supposedly not videotaped).

For subject One, scanning behavior (Figure 3) during the two sessions where no communication system was worn (i.e. sessions 17 and 19) occurred at rates of .32 and .57. During sessions where communication equipment was worn, but no scanning prompts were provided, this behavior occurred at rates ranging from .66 to .00. Scanning behavior during sessions where it was prompted, occurred at rates ranging from .91 to .20. These data would indicate that subject One did not change the scanning behavior appreciably, whether the communication equipment was worn or not.

The scanning behavior of subject Two (Figure 3) when not linked to the communication system could be observed only once. During that particular session (#21), scanning occurred at a rate of .43 per minute. With the exception of two sessions (i.e. 5 and 12), this is a higher rate when compared to sessions where the communication system was worn, but no prompts for scanning were provided. When prompted, scanning occurred at a rate ranging from .66 to .52. Within the limitation of having only one session for comparative purposes,
Figure 3. Variability in scanning behavior across experimental conditions for all subjects.
scanning behavior of subject did not seem to be influenced critically by the wearing of the equipment and being videotaped.

Subject Three was videotaped twice while not being linked to the communication system. During these sessions, scanning occurred at a rate of .13 and .37. During the sessions where no prompts were provided but communication equipment was worn, scanning occurred at a lower rate with the exception of the fifth session. Sessions where the equipment was worn and the behavior was prompted, produced rates of .09, .07, and .26 respectively. These findings tend to indicate that scanning behavior (while low in occurrence regardless of which condition was in effect) was exhibited at a slightly higher rate when this subject was not linked to the communication system.

Relationship Between Independent Variable and Dependent Variables

Each subject was prompted on four selected teaching behaviors. The teaching behaviors included a) use of positive skill feedback; b) use of positive behavior feedback; c) use of pupils' first names; and d) scanning. The results will be displayed for each subject across behaviors. In the graphs on the following pages, the initiation of the treatment is depicted by the vertical dashline.

The experimental criterion of significance (Hersen & Barlow, 1976) refers to the degree to which data of the treatment phase(s) does not overlap with baseline data or show divergent trends, from one phase to another. When a multiple baseline is used as a research
design, the (lack of) experimental control can be determined by comparing the patterns of behavior that have been intervened upon with those that have not yet been intervened. To judge the degree and relative strength of any treatment effects, the following concepts were utilized: a) Stability of baseline; b) variability within experimental phases; c) variability between experimental phases; d) overlap of scores of adjacent experimental phases; e) changes in trend within experimental phases; and e) changes in trend between experimental phases; and f) changes in level from the final baseline session to the initial treatment session.

Subject One

The results of the effects of periodic prompting on selected teaching behaviors for subject One are displayed in Figure 4. Treatment was commenced simultaneously for the use of positive skill feedback and the use of positive behavior feedback. Changes in the use of positive skill feedback occurred to the extent that 11 of the 12 sessions where this behavior was prompted, resulted in rates of occurrence higher than those found in baseline conditions. During sessions where no prompts were provided, the rates of occurrence remained within the baseline range of variability, with the exception of session 11. It should be noted that variability in the treatment phases of tier one is somewhat inflated. During sessions 6, 7, 9, and 16, no skill-practice time was provided to students. Consequently, no skill feedback occurred during those sessions.
Figure 4. Rate of occurrence of selected teaching behaviors across baseline and treatment conditions for subject one.
Changes in the rate of occurrence for positive behavior feedback from baseline to treatment conditions were minimal. During baseline conditions, supportive comments regarding students' general class behavior were nearly nonexistent. After the treatment was started, some initial increase was established. However, as the treatment continued, the already few supportive comments were made at rates not different from those found in the baseline phase.

The absence of change in the use of students' first names and the scanning of other areas of the gymnasium indicate that the change in the treated variable (positive skill feedback use, see tier one) can be attributed to the use of periodic prompting. Both untreated behaviors occurred at a rate that tended to decrease (i.e. countertherapeutic trend) through the first seven sessions.

Use of pupils' first names was the next behavior treated, starting with the eighth session. As indicated, during baseline conditions, a downward trend emerged. When treatment commenced, this trend was reversed. All sessions where first names were prompted produced rates of occurrence that were increasingly higher than those found in the baseline phases, with the exception of session 13. The degree of overlap of scores between baseline and treatment conditions diminished gradually.

During the treatment phases of the third variable (tier 3), a change occurred in the rate of occurrence of the scanning behavior by way of increased variability. Although this change in variability did not occur simultaneously with the start of periodic prompting of
student first names, it could make a functional relationship between periodic prompting and the use of first names somewhat questionable.

The rate of scanning during baseline conditions was consistently lower than those of the initial four sessions in the treatment phases. However, the final three treatment sessions produced considerable overlap of baseline and treatment data, thus, weakening the potential contribution of the treatment variable, and negating a clear behavioral change from baseline to treatment conditions. As there was no fifth behavior available to compare the results of the scanning behavior rates with, the limitations of an ordinary A-B design apply. Therefore, it is possible that the initial change (sessions 18 through 21) was the result of other variables than the prompting of this behavior.

**Subject Two**

Results for subject Two are displayed in Figure 5. Periodic prompting was applied first to the use of positive behavior feedback. During baseline conditions, this behavior was nearly nonexistent. After treatment was commenced, the rate of occurrence did not increase.

Use of pupils' first names (tier two) occurred at a declining rate of occurrence during baseline conditions, as signified by the downward trend. This trend was reversed during the first five treatment sessions. Initial variability during the treatment phases was substantial, but decreased toward the second half of the treatment
Figure 5. Rate of occurrence of selected teaching behaviors across baseline and treatment conditions for subject two.
phases. Furthermore, the initial overlap between baseline and treatment data diminished during the second half of the treatment phase. As the graph indicates, there was a change in the use of pupils' first names as shown by both the change in trend from baseline to treatment, and the gradual lack of overlap between baseline and treatment data.

Whether the change in this behavior was the result of periodic prompting could be questioned only on the basis of the upward trend in the third tier baseline at the time that first names were prompted initially. Prompting the use of first names did not result in a change in the rate of scanning by subject Two.

The use of positive skill feedback during baseline conditions was highly variable. Initial treatment sessions produced a considerable increase in the rate of occurrence of this behavior. However, a subsequent downward trend followed and resulted in considerable overlap. Fifty percent of the sessions in which this behavior was prompted produced rates that were located within the range of baseline data. The simultaneous absence of a noticeable change in the rate of scanning indicates that the initial increase (sessions 9 and 10) in the rate of positive skill feedback was the result of periodic prompting. However, the downward trend in subsequent sessions negated this initial effect.

The rate of scanning behavior of subject Two did not increase from baseline to treatment conditions, as indicated by the data displayed in the fourth tier. The only change that occurred was that
of an increase in variability following baseline conditions, as was
the case with subject One.

**Subject Three**

Figure 6 shows the results for subject Three. Initially, treatment focused on the use of positive behavior feedback. During baseline conditions, this behavior was almost nonexistent. During the treatment phase, there was a minimal increase in the rate of occurrence of supportive statements regarding students' behavior. Most sessions where this behavior was prompted produced rates that were slightly higher than those found in the baseline phase. Another factor that weakens any treatment effect is the lack of changes in level from the final baseline sessions to the first treatment session. In this case, there was no change between those two sessions (i.e. sessions four and five).

During the eighth session, treatment was started on the variable use of pupils' first names. As the graph (tier two, Figure 6) indicates, the use of first names of students was almost nonexistent during baseline conditions. During the treatment phase, the rate of occurrence was increased gradually. Some overlap of baseline and treatment data occurred across the first five treatment sessions. At the point of treatment implementation, there was no change in level as was the case in the top tier. This tends to weaken the treatment effect in following sessions. The extended baselines for the variables' use of positive skill feedback and scanning remained stable
Figure 6. Rate of occurrence of selected teaching behaviors across baseline and treatment conditions for subject three.
during the treatment phase of the variable use of pupils' first names. This indicates that the change in the use of first names of students could be attributed to the prompting of this behavior.

The use of positive skill feedback during baseline conditions was most variable as compared to the remaining three variables. During treatment conditions, rates of occurrence were consistently higher during sessions where this behavior was prompted with the exception of the fourteenth session. The lack of overlap between baseline and treatment data throughout most sessions indicates a significant change in this behavior.

At the time that the treatment was in effect for positive skill feedback, scanning behavior rates did not change. This indicates that the increase in the use of supportive statements regarding students' skill performance can be attributed to the prompting of this behavior.

Scanning other areas in the work setting during skill practice episodes was almost nonexistent. During the treatment phases, the rate of this behavior did not increase, as indicated by a) the lack of a change in level; b) the continued stability of the baseline data into the treatment phase; and c) the complete overlap of baseline and treatment data.

Prompt Frequency and Behavioral Variability

In view of the exploratory nature of this investigation, variability was imposed on the frequency of prompts provided. The
purpose of this was to investigate whether an increase in the number of prompts provided would result in higher rates of occurrence for the various behaviors. In Appendix D frequencies are matched with each session's rate of occurrence for each variable across subjects.

In order to determine the degree and strength of the relationship between prompt frequency and behavior rates, Pearson r. correlation coefficients were calculated within variables across subjects. As Table 4 indicates for the variable positive skill feedback, the correlation between the frequency of prompts and the matching rate of occurrence was .19, which indicated that changes in the number of prompts per observation not necessarily resulted in changes in the behavior rates of the behavior prompted.

The correlation coefficient for the variable positive behavior feedback with its matching prompts was .28, again indicating that the relationship between the two was not appreciable. Being prompted more often per session to use first names of students was negatively related to the actual rate of behavior. The correlation between the two was -.06. As the data in Appendix D indicate, some of the sessions which produced higher rates of this particular behavior consisted of only one prompt. Furthermore, providing the same number of prompts across sessions coincided with varying behavior rates. Rates of scanning the gymnasium did not necessarily increase when this behavior was prompted more often (Pearson r = .16). None of the above correlations were found to be significant at the .05 level of significance.
Table 4

Pearson Product-moment Correlation Coefficients
of Prompt Frequencies and Behavior Rates

<table>
<thead>
<tr>
<th>Dependent Variables</th>
<th>r</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive Skill Feedback</td>
<td>.19</td>
</tr>
<tr>
<td>Positive Behavior Feedback</td>
<td>.28</td>
</tr>
<tr>
<td>Use of Pupils' First Names</td>
<td>-.06</td>
</tr>
<tr>
<td>Gymnasium Scans</td>
<td>.16</td>
</tr>
</tbody>
</table>

*p .05.
Interview Results

This study investigated the effects of periodic prompting on selected teaching behaviors of physical education student teachers. For the application of the independent variable, a wireless communication system was utilized. It was contended that the subjects would prove vital sources of information regarding the use of such a system, its strengths and limitations, as a supervisory tool. After the completion of the student teaching requirements, interviews were held with each individual subject. During this interview, the subjects were asked 20 core questions in addition to other questions that emerged from the discussion. Some of the questions asked included:

1. Looking back over the whole quarter when I was with you, can you remember what kinds of prompts I gave most often?

2. To what extent did you feel influenced by the fact that I was not only just an observer, but also served as your University supervisor?

3. At times I would ask questions such as "Isn't it time to rotate?"; "Check the runway!"; "Isn't it time to start clearing out the equipment?" Those questions were intended to be quick reminders or checks. How did you take those statements?

4. How did the wearing of the equipment influence you?

5. How were the lessons where you were not hooked up to the system different? Were they different?

6. Did you find yourself listening for me to say something?
7. How did you feel about the instances where I praised you? Should I have done this more often in your opinion?
8. How did you like being talked to while you were teaching? How did you like being able to talk to someone else while teaching?
9. How, and/or when did my talking to you throw you off? When did it throw you off most easily?
10. In your opinion what was the most bothersome and rewarding aspect of the whole project?
11. What did you find out about yourself and your teaching through the use of the communication system?

Below an overview is provided of the major responses to the above questions. The order in which the questions are listed above was not necessarily the order in which they were presented to the subjects.

The first question asked focused on the degree to which subjects were able to recall one aspect of the study, namely the prompts that were provided most often. Two of the three subjects needed at least four supplementary cues before all four types of prompts could be recalled. The third subject was able to name the four types of prompts without additional cues.

With regard to the dual role of the investigator as both observer and supervisor, one subject indicated that this was an intimidating circumstance. When this subject was asked whether the sense of being bothered (or intimidated) was present throughout the whole student teaching experience, the response was "No, I don't think it did. Although when you stopped coming I felt different." At later points
in the interview, the subject indicated that in fact it was more being observed every day: "I think when I really got tired of it was I think after a day that you didn't go. I think there was one day that you didn't go and it was just s-o-o nice that we didn't have to. . . you know, we had a lot of fun. You know, that day we were crazy and the kids were. . . you know. And we had fun, . . . we may not have gotten much work done. . . as we should have. . . but, we did some constructive things and the kids were working, but it was such a relief not to be observed. . . I was just. . . if we had one day of freedom you know."

Another subject had noted during the interview held half way through the student teaching experience, that some anxiety was present during the initial days ("The first few days it did, but now it doesn't bother me anymore."). Following the completion of student teaching when the same question was asked, the same subject indicated that having worked with the investigator during previous coursework made it "more comfortable".

When asked during the student teaching experience, the last subject explained that "It doesn't bother me. . . I know you're up there, I know you're watching, and I know it's gonna be on videotape, but I take that all as part of it. . . ." When asked the same question following student teaching, this subject responded: "Oh, I'm sure it did. I mean the fact that, you know, you were there doing your project, but then again, you know, you're the supervisor, and you were there every day. I mean you saw exactly what was going on and I guess
I kinda felt like this - everything had to be just right. It has to be just so, that kinda inhibited me that way."

The question regarding the provision of prompts that were aimed at managerial matters produced positive responses across all subjects. All subjects found those type of reminders to be helpful, as indicated by the following statements: "They're good reminders. They're really good because we had forgotten, or we wouldn't have had things set up. And after you had said for a few times 'Is the music set up?' I would - I consciously thought about it and the next few times. . ."; "I thought they helped a lot, because there were times that we forgot what we were gonna do right after. . .we forgot to decide what we were gonna do right after when the warm-ups were done. . . or about the [equipment] pack up."; "Sometimes they were helpful. Like to (being asked whether it was time to) rotate. . . 'cause I'd get involved with the kids or something and don't pay any attention to what it is."

When questioned about the effects of wearing the equipment, two subjects explained that the only nuisance was the earphone and the wire connected to the earphone. Both subjects noted that it kept popping out, particularly during spotting activities. And the wire hanging down from the ear to the lower back area was bothersome. The third subject responded: "Well, I think the only way it inhibited me was, you know, I thought about specific spotting situations or whatever. You know, like well I don't want to get this stuff kicked or whatever, but as for movement or whatever, it didn't at all."
Since all subjects were videotaped while not wearing any communication equipment, the question was posed to explain any possible differences between lessons where they were and were not linked to the communication system. One subject explained that during the initial days, the reason for being somewhat more relaxed or at ease was, in fact, not having to wear the communication equipment. However, the development of certain routines of student teaching across all classes became a stronger influence on this as time went on. Another subject noted to have been very worried in the beginning, and that it was a relief to be able to teach without being hooked up to the system. However, . . . when I got used to it, it was no big thing anymore. And I felt more compelled to try anything that was pointed out to me by you; I felt more compelled in the next few classes to try and work on it."

The last subject noted "At times, when we weren't hooked up I was a little more at ease, because you weren't listening in. And we weren't gonna be on direct video unless we were right next to the person who was hooked up. So I guess I was more at ease. . . I worked more at ease during those times."

Subjects were asked what some of the very first reactions were when the communication equipment was worn for the first few times, and whether they were consciously listening for the investigator to say something. And if so, whether this was characteristic of the whole period of observation or merely during the first few days. All subjects responded that they were actively listening for information only during the first few days. As one subject indicated: " . . .
guess I kinda expected to hear something come through. And if I didn't, I was wondering did I miss anything?; Was I off-station or whatever, 'cause I guess I kinda expected it. But as the quarter went along I just got to the point where... it didn't bother me to wear the equipment, I didn't really think about it... 'Well now, is he gonna say anything today?' If you did, that was fine. If not, that was fine, too. I just kinda took it as it came. One subject indicated being bothered "... when you gave feedback [prompts, inv.] because right when you were saying something I was getting ready to say it." Another subject explained that it felt "stupid" to say "good job" to students who already know how to do certain skills, and as a result got upset with the investigator who would prompt this behavior.

During some observations, and to a limited extent, the investigator praised the subjects for certain behaviors, while they were teaching. When asked as to what effect these statements had, the subject's reactions ranged from "It made me feel real good."; "It was a good feeling"; to ". . .feeling more confident." One subject explained that general feedback really did not sink in. However, the specific feedback did make an impression, in that, it led to a greater awareness of similar subsequent events and made the subject feel "real" good.

Subjects were asked how they experienced the opportunity of being able to communicate with an outside observer while teaching. One subject felt that on some days, it was bothersome being talked to and on other days, it wasn't, explaining that "It just depends on the kind
of mood I was in." Another subject reacted "... it was good, in that, things were said that made me feel good, like I did something right... Other times I was bothered because I... I felt I was being watched, you know, I was being supervised all the time." The same subject did not find it necessary to initiate interaction with an outside observer. On the other hand, the third subject indicated that at times, it was nice in cases where there were questions: "It gave us somebody else to go to, or at least me. I felt like, you know, if I did have a question or something wasn't quite right..." At times though this subject experienced it as a hindrance: "... if I was helping somebody spot a handspring or something on the mats and you'd say 'Now did you see what was going on over there?' At this point the subject indicated that it was hard to watch other people when the attention was centered around one or a few students.

The degree to which the prompting was confusing to the subjects was also discussed. Two subjects indicated that during skill-practice episodes, the prompts that were geared to briefly redirect (i.e. scan other areas in the gymnasium) their attention tended to be the confusing instances. When working with one or two students, subjects tended to focus all of their attention to these few students. One subject explained that one of the reasons that it was so hard to pay attention to the whole class while working with a few students was the fact that there were two other teachers in the room. The third subject explained that "I think, when I was being recorded I was very aware of what I was going to say before I said it... So on my way
over to the activity I was about to talk about, I was thinking about what I was going to say to the students, and then when you would automatically throw something in, that's totally irrelevant to what I'm trying to think about in my head, then it takes me awhile. . ."

When questioned about the most positive and negative aspects of the whole project, one subject responded that being observed every day was the most bothersome aspect. The most positive aspect for this subject was that "... even though the fact that you were there made it seem that like we were really on our own... You were there every day being able to see how we did." For a second subject, the most bothersome aspect was the routine of wearing the equipment that emerged after a while ("... after a while that tended to get a little old. At the beginning, it was kinda neat because it was something new."). The most positive aspect was the readily available positive feedback: "When it did come, it helped me build confidence a lot. It made me feel good." The last subject indicated that the earphone was the most bothersome ("It just bugged me."), whereas the positive aspect was "... being made aware of things that were going on and I wasn't..."

When asked to explain what was learned about one's own teaching as a result of the available communication system, one subject reacted as follows: "I think it made me feel more confident about my teaching... I guess it made me think about things more. But you know, like I said, the positive feedback that was there and the prompts and everything. 'Cause when I came, I wasn't really sure
about how I was doing, if I was gonna be able to really do it. And I think overall, I found out, yeah I can do it." Furthermore the same subject acknowledged the importance of good organization. When asked if the managerial prompts were helpful in keeping oneself on track, the subject responded: "Yeah, 'causc, you know, there were sometimes you get involved with the activity, what was going on, and those things [prompts, inv.] came in and we'd wheel around, look at the clock... 'cause there are times you get involved and just lose sight of things. The responses of the two remaining subjects corresponded with each other. One subject explained "I think the biggest thing was what was going on in the rest of the classroom. Really being aware of... trying to be aware of what's going on with all students, not just where you're at or what you're doing... Just because of the fact that I wasn't so much into myself, what I was doing... I was more aware of what (____) and (____) were doing, the rest of the class, because it was pointed out to me. The unfortunate thing is the fact that I think it could have been done before student teaching and that would have helped me as a teacher. Because, if I could have been pointed out to be more aware of what goes on in the other corner of the gym in Secondary Core, or be cued to give positive feedback, it would have been more natural. And the last subject explained "... like the things that we missed and you'd see it and make us aware of it." This subject also noted that it showed the importance of trying to be positive in reactions to both class behavior and skill performance of students.
DISCUSSION OF RESULTS

Discussion of Data Accuracy

The use of videotape equipment, and audiocassette recorder, a
time/date character generator provided the investigator with a
permanent product of the observed physical education lessons and
interviews. As noted in Chapter Three, one of the potential sources
of extraneous variability (i.e. variability in the dependent variable
due to influences other than the planned intervention) are the
respective acts of observing and recording. Johnston and Pennypacker
(1980) noted that as a result of their conditioning history, human
beings usually execute the requirement of accurate observation poorly.
The equipment used in this study made it possible for the investigator
to obtain an accurate and complete record of behavioral events.

The discrepancies found in the quantitative data, as detected by
the independent observer, were minimal. In two cases, the occurrence
of a behavior was not detected by the investigator, namely an instance
of a positive skill feedback statement, and a scan of the gymnasium.
The former was a case where the question focused on whether or not the
statement made by the subject conformed with each criterion in the
response definition. The latter discrepancy may have been caused by
the low frequency of occurrence of this behavior, as can be seen in
Figures 4, 5, and 6. The third discrepancy detected was an
incongruency in the recording of a behavioral event by 1 second.
The review of the transcripts by an independent observer to measure the congruency between the transcript and the original audio-recordings produced no significant differences. The only comment made was that in some instances, idiosyncratic verbal behavior by the subjects was deleted in the transcripts.

The review of the reported sections of the interviews, and any related statements made on the basis of the interviews, by the subjects produced no instances where either the content of the reported statements nor the anonymity of the subjects was questioned. On the basis of the above information it appears that, within the context of this study, the reported data were representative of the "true" state of nature at the time that these data were collected.

Discussion of Communication System Quality

On two separate occasions, the investigator charted the locations of occurrence of static interference in the communication channel from the investigator/prompter to the target subject. The purpose of the collection of this information was to determine the degree to which this part of the communication system (which is commercially available) was consistent in producing a signal of sufficient quality in a gymnasium setting. It was contended that this information would aid in determining the practical use of such a system in supervisory settings. As the information in Figure 7 (Appendix C) indicated there was slight variability in the locations where static interference was present. Although not studied any further, it was speculated that
this variability was caused, in part, by the electronic quality of the wireless microphone used. During the interviews, this was supported to the extent that one subject expressed the belief that the quality of communication from prompter/investigator to target subject slowly deteriorated as the day went on, i.e. the reception during the first lesson of the day was good but slowly became less clear toward the end of the last class period.

During most observed lessons, subjects were questioned whether they could receive the verbal statements of the prompter/investigator. This was usually done at the point when a subject would enter the gymnasium. The purpose of this check was twofold. First, it was a check to make sure that the FM receiver worn by the subject was turned on, and second, if that was the case, it was a check to see if the signal was clear to the subject. The percentage of "checks" that were not picked up by the subjects was rather substantial, namely 15.2, 1.5, and 25.4 percent respectively. Two factors may have contributed to these percentages: a) Anytime the investigator questioned a subject on the communication quality, and reception was found to be poor, the subject had been instructed to adjust the frequency dial on his/her FM receiver. At this point, the investigator would continue with verbal "checks" until the frequency had been adjusted successfully; and b) Initially, the adjustment of the frequency on the subjects' FM receiver took more time, which then resulted in more instances where the communication "checks" were not received.
Discussion of Experimental Setting as a Source of Behavioral Variability

In the present investigation, the wearing of communication equipment and being videotaped presented potential sources of behavioral variability in the dependent variables. Furthermore, the dual role of the investigator posed another potential source of extraneous variability.

In an initial attempt to determine the influence of the presence of the investigator/supervisor, each subject was videotaped while the investigator/supervisor was absent. However, this was found to be an inappropriate tactic, since the subjects were aware that the recorded lessons would be reviewed by the investigator at a later point in time. During a later interview, one subject supported this with the statement: "I kinda took the camera as being you. It was kinda the same."

It was decided that the following observation tactic might provide information on the influence of the wearing of communication equipment and the presence of the videotape equipment: Without being informed, the subjects were videotaped when not linked to the communication system. It was contended that, within the limitations of this project, this was the closest approximation possible of the condition where the subjects' behavior would not be influenced by the presence of a camera. Since verbal behavior of subjects could not be observed and recorded during this condition, observations and recordings were made of their scanning behavior and the amount of time
spent in supervising the skill performances of students. Two subjects were observed twice, and the last subject was observed once.

Although scanning rates of subject One were not significantly different when no communication system was worn from sessions when it was worn, they did tend to coincide with the "system worn, no prompt" sessions, that produced higher rates. A similar situation was found with subject Two. For subject Three, the rate of scanning during "no system worn" sessions was higher than during the sessions where the system was worn, but no prompts were provided, with the exception of the fifth session. As indicated earlier, the time spent in supervision of skill performance of students was not significantly different from "System worn" sessions to "No system worn" sessions of either subject.

The analysis made of the influence of the equipment worn, and the presence of videotape equipment was limited to using only five observations for comparative purposes. The results need to be viewed within this limitation. The data for the variable "time spent in supervision of student skill performance" would indicate that indeed the subjects were habituated into a setting that included such equipment. Responses made by subjects during the exit interviews would tend to support this notion. Subjects noted that they became used to the wearing of the equipment everyday.

The findings for the variable scanning in this analysis showed that when subjects were not linked to the communication system, the rate of scanning tended to coincide and/or exceed the higher rates
found in "System worn, no prompts" sessions. These findings will be addressed in more detail in a later section.

Discussion of Effects of Periodic Prompting on Selected Teaching Behaviors

In this section of the discussion, the experimental significance of the results will be reviewed. Furthermore, the results for the variables positive skill feedback, positive behavior feedback, and use of first names will be discussed in relation to the findings of previous supervision research projects that employed the Applied Behavior Analysis strategies. Results for the variable scanning will be discussed separately. This section of the discussion will be concluded with a review of the results from the interview held with each subject.

Experimental Significance

As indicated in Chapter Three, when utilizing the multiple baseline research design, experimental significance is determined by a) comparing the results from baseline to treatment whereby a lack of overlap of scores between the two conditions would signify experimental significance; and/or b) comparing the trends or slopes between the two experimental conditions. In this study, the criteria used to determine the degree to which the experimental criterion was fulfilled included the above two in addition to Parsonson and Baer's (1978) concepts of a) stability of baselines; b) variability within-,
and between experimental phases; c) trend within, and between experimental phases, and d) changes in level from the final baseline session to the first treatment session.

As noted earlier, behavioral changes (i.e. treatment effects) occurred in the variables positive skill feedback, and use of pupils' first names. Subjects One and Three showed changes in both variables, whereas, subject Two showed changes in the use of pupils' first names only. The changes established in these variables fulfilled certain criteria of experimental significance as proposed by both Hersen and Barlow (1976), and Parsonson and Baer (1978). First, the overlap of treatment scores with baseline scores was minimal, and where present it occurred early on during the treatment phase and slowly decreased. Second, the trends of scores from baseline to treatment showed some divergence in subjects One and Two on the variable use of pupils' first names. In addition, on that same variable, the stability of baseline scores was evident across subjects. For the variable positive skill feedback, this characteristic was not present. Of the four variables studied, this behavior was most variable during baseline conditions.

Overall, the changes established were not profound but could be attributed to the use of periodic prompting. With possibly the exception of subject Two's simultaneous increase in the use of positive skill feedback when the use of pupils' first names was prompted initially, untreated behaviors remained at or decreased in rate of occurrence at the time other behaviors were intervened upon.
The results of this study were mixed, which is congruent with earlier investigations conducted by Boehm (1974), Currens (1977), Dodds (1975), and Hamilton (1974). One explanation for the limited effect might be the context within which this study was conducted. All subjects were teaching in a physical education program that was based on a teamteaching approach. To a certain extent, this became a limiting factor in the application of the treatment. Frequently, situations arose where the prompting of one subject was influenced by the presence of two other teachers (i.e. the other two subjects) in the work setting. It posed a particular problem in the case of the variable scanning. An explanation for the lack of change in the rate of scanning across subjects was that, in the eyes of the subject who was linked to the communication system it was not really necessary to frequently scan the various areas of the gymnasium, since two other teachers were there. This speculation was supported by the responses made by one of the subjects during the exit-interview, who noted that it was hard to "... try and watch the whole group..." When asked whether the presence of two other teachers in the gymnasium was of any influence on that, the subject replied: "Yeah, ____ and ____ are there, you know, they can watch."

At other times, the subject that was linked to the communication system was simply not actively involved in an instructional role. In addition in the case of one subject, the development of an inner ear infection prevented the use of earphones. As a result, no prompts could be provided for four sessions during the treatment phase, or 20
percent of the total number of treatment sessions.

The minimal changes in the rate of positive behavior feedback were congruent with previous studies (Boehm, 1974; Cramer, 1977; Hamilton, 1974), but smaller than the changes found by Darst (1974), Dessecker (1975), Hughley (1973), and Hutslar (1975). Several reasons may account for this lack of change. First, Nelson (1977) noted that it is important that prompts not compete with other stimuli in the environment. It seems possible that the prompts which were intended for the subjects to be reacting positively to student behavior competed with other stimuli in the environment, such as less appropriate student behaviors. Student teachers do not tend to react to appropriate student behaviors frequently, whereas, reactions to inappropriate behavior occur at high rates (McKenzie, 1976). This would indicate that student teachers simply focus more on, and then react to inappropriate student behavior. Second, it could be that in terms of the type of prompts used, not enough "response" prompts were used during the initial treatment sessions on too many "attending" prompts. A response prompt directs a person to do something, whereas, the attending prompt tries to direct the person's attention to either the discriminatory stimuli or reinforcing stimuli in the situation. For example, a responding prompt would be "Get started with the warmup."; or "Tell the student you appreciate his cooperation."; or "Look over at the vaulting horse, note the spotting." Examples of attending prompts would be "They sat down quickly."; "Did you see that seatdrop on the tramp?"; or "They are very attentive aren't they?"
To start off with a more directive approach by the prompter might produce different results. Thirdly, Dodds (1975) in her discussion of treated behaviors which remained at the treatment level after treatment was terminated, pointed out that "It is possible that inherent reinforcement is strong enough to maintain such behaviors as student teachers become more aware of changes in the class due to changes in their teaching behaviors. . ." (p. 249). In the current study, it is possible that the reinforcement of using positive reactions toward student behaviors (i.e. students behaving more appropriately) did not develop to a strong enough level. It is possible that students in the classes taught by the subjects did in fact change their behavior, but that subjects failed to discriminate those changes. Although speculative, it would appear that student teachers may need a fairly "thick" schedule of reinforcement from positive changes in student behavior. This would require a heavier emphasis on prompting for positive reactions in terms of frequency of prompts of the "responding" nature.

Fourthly, it is possible that certain student teaching objectives which had to be reached to fulfill student teaching requirements (See outline in Appendix E) proved to be more powerful contingencies. In order to avoid the noncontingent use of positive reactions to student behaviors, the behavioral indicators for student teachers to reach were not stated in terms of rate per minute, but rather as ratios. Throughout the ten-week experience, the subjects were to maintain a 3:2 ratio of positive to corrective reactions to students in their classes.
Current Findings versus Previous Research Results

This investigation was different from previous studies in the area of physical education supervision research in two respects. First, in the current study the effects of a single treatment component (i.e. periodic prompting) were monitored, whereas, studies conducted between 1973 and 1977 used intervention "packages", that consisted of a combination of direct information feedback, instructions, goal setting, reinforcement, and modeling (Boehm, 1974; Darst, 1974; Dodds, 1975; Hamilton, 1974; Hughley, 1973; Rife, 1973).

McKenzie (1981) has indicated that:

Although these intervention packages have been generally successful in altering the teaching performance of the student teachers, attempts have not been made in physical education settings to examine the relative effectiveness of each individual component. (p. 48)

Second, the criteria used to determine the experimental significance of the behavioral changes in this study were different. Previous studies utilized mean rate and/or mean percentage changes from baseline to treatment conditions. These conceptual differences make a direct comparison of this study's results with those of previous efforts impossible.

In order to make a closer comparison possible with previous research findings, mean rates of occurrence were calculated for both baseline and treatment phases on the variables positive skill feedback, positive behavior feedback, and use of pupils' first names. The variable scanning was not included since this behavior was not studied in previous investigations.
Table 5 shows the ranked mean rate changes from baseline to treatment phase of five previous studies and the current study for the variable positive skill feedback. When comparing these results, one finds that the changes in previous studies tended to be larger. The same holds true for the variables use of positive behavior feedback and use of pupils' first names as shown in Tables 6, and 7 respectively. On the average, student teachers exposed to a combination of treatment techniques interacted positively with students regarding their class behavior, and used their first names at higher rates than students exposed to periodic prompting only. As noted earlier, the results of this study concur with previous efforts in that the use of positive behavior feedback by student teachers appears to be harder to modify than other behaviors. Increases in this variable tend to be lower across all studies.

The lower mean rate change in the variable use of pupils' first names (Table 7) may have been influenced by two factors. First, as of the fourth session, all subjects taught new groups of students, because of a semester change in the school. Second, the class size of all three observed classes ranged from 58 to 65. This could also explain the initial overlap between baseline and treatment data as discussed in an earlier section.

One consistent difference for each variable compared was the variability in treatment effect size when expressed as mean rate change. In the current study, treatment effects were less variable in size across subjects than those in all other studies (Note the listed range of effect size for each study in Tables 5, 6, and 7). This
Table 5
Comparison of Ranked Mean Rate Changes from Baseline to Treatment Conditions Between Previous Studies and Current Study on Positive Skill Feedback

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Table 6
Comparison of Ranked Mean Rate Changes from Baseline to Treatment Conditions Between Previous Studies and Current Study on Positive Behavior Feedback

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Range: .19, .27, .26, .32, .56, .12, .51, .55, .13, .08
Table 7
Comparison of Ranked Mean Rate Changes from Baseline to Treatment Conditions Between Previous Studies and Current Study on Use of Students' First Name

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<td>1.38</td>
<td>.74</td>
<td>.79</td>
<td>.59</td>
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would indicate that the effects of periodic prompting alone tend to be less in magnitude, but more consistent across subjects.

This study constituted an extension of the study conducted by Nelson (1977), where three in-service teachers were prompted on alternating days to emit selected teaching behaviors. The current investigation was different in that in the Nelson (1977) study communication was possible only from the prompter to the subject. As was the case with previously discussed physical education supervision research, Nelson (1977) used mean rate changes from baseline to prompted sessions to show treatment effects. For purposes of a more direct comparison with the Nelson (1977) study, mean rates were calculated for this study's "System worn, no prompt" sessions, and "System worn, prompt" sessions. This was possible this study's treatment phase still included sessions where a particular variable was not prompted. This, in effect, constituted a Multi-element design (also called alternating conditions design). The nonprompted sessions in the treatment phases of this study signified periodic returns to baseline conditions. Two variables were compared. Table 3 shows the mean rates for all subjects combined in both baseline and prompted conditions along with the mean rate change. The increase in the use of positive skill feedback (.634) was more pronounced than the increase found in the Nelson (1977) study. Improvement in the use of positive behavior feedback was minimal in both studies.
Table 8
Comparison of Combined Mean Rates and Mean Rate Changes for all Subjects between Nelson (1977) Study and Current Study.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Nelson (1977) Total X Rate</th>
<th>Nelson (1977) Total X Rate</th>
<th>Nelson (1977) X Rate Change</th>
<th>Current Study Total X Rate</th>
<th>Current Study Total X Rate</th>
<th>Current Study X Rate Change</th>
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</thead>
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<tr>
<td>Positive Skill Feedback</td>
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<td>.567</td>
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<td>.633</td>
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<td>Positive Behavior Feedback</td>
<td>.239</td>
<td>.386</td>
<td>.147</td>
<td>.074</td>
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<td>.086</td>
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</table>
Scanning Behavior

The inclusion of this variable in this study constituted an attempt to study one aspect of what has been called "active supervision" (Siedentop, 1983). The observed variable was derived from a variable developed by Kounin (1970) in his study on discipline and group management in regular classrooms, namely overlapping. Overlapping refers to the ability of a teacher to attend to two events or incidents simultaneously. Kounin (1970) explained: "An overlapping issue is present at the time of a desist event when the teacher is occupied with an ongoing task at the time that she desists a deviancy." (p. 85). The act of attending to two events could be through a remark, a verbal direction, or a simple glance. In this study, the act of turning the head and/or body away to different areas in the gymnasium, while attending to one or a group of students, and then returning the attention to these students, during skill practice episodes was coded as a scan.

As the data indicated, this behavior is almost nonexistent. This is particularly interesting when considering the fact that all three subjects at various points during the exit interviews explained that they became more aware of what was going on around them while they were teaching. When one of the subjects was asked to explain what it meant "to become more aware of. . .", the response was "I guess the importance of it. . ." This would seem important to the extent that in the eyes of a student teacher being aware of certain events or incidents does not necessarily mean that he/she will react to such events.
Periodic prompting did not increase the rate of scanning by either subject. There are various speculations as to why this behavior did not change. First, as indicated earlier, the presence of two other teachers in the gymnasium may have negated the necessity for the target subjects to frequently check other areas of the gymnasium during practiced episodes. Second, the observational tactic used to produce a permanent record of the events in the classes taught by the subjects may not have been sensitive enough to capture all scan. Third, during the exit interviews two subjects explained that being prompted to look elsewhere while attending to one (or a group of) student(s) was "hard to do", and at some points confusing. And fourth, the simple wearing of the communication equipment may have had the opposite effect of what it was intended to achieve with this behavior. That is, while it was intended to use the equipment to increase the rate of occurrence of scans, it may have resulted in strengthening the focus of attention to only the immediate surroundings by the subjects. As the data indicated, with the exception of few sessions the rates of scanning during "No system worn" sessions were equal to or higher than rates during the "System worn, no prompt" sessions. Though this analysis is based on only five observations, it may well be that when the subjects did not wear the equipment, they were more inclined to look around the gymnasium, as compared to sessions where they were more closely monitored.
Discussion of Exit Interviews

The purpose of the exit interview was to utilize the subjects as supplementary sources of information regarding the experiences with the use of communication equipment while teaching. Since little is known on this subject, it was contended that through questioning of subjects in this project, some useful information could be obtained regarding the limitations of this supervisory tool.

All subjects reacted positively to the question regarding the use of managerial prompts. Each found it helpful to be reminded of certain organizational aspects. Although speculative, it may be that this tool might be useful in making student teachers attend to some of the important organizational aspects of teaching physical education classes, particularly when faced with larger groups of students.

While not part of the intervention, the use of praise through the communication system during teaching episodes appeared to function as a way of building confidence in one of the subjects. Keeping in mind that the frequency of praise statements was extremely low, it was surprising that it made such impact on this subject. Another subject noted that it was the specific feedback that made the impression. It would appear that the use of this instrument could be an effective means of providing constructive, real-time feedback and take on a coaching role much like the one suggested by Friebus (1977). Furthermore, it would provide an opportunity for a supervisor to serve as a model in terms of providing frequent feedback.
The importance of sound organization and classroom management supports the comments made by subjects regarding the usefulness of managerial prompts. Sound classroom management has been found to be related to student achievement in regular classroom settings (Brophy, 1979; Emmer & Evertson, 1980; Emmer, Evertson & Anderson, 1980; Evertson & Anderson, 1973; Sanford & Evrrson, 1981; Soar & Soar, 1979). Taking the concept of Academic Learning Time-Physical Education (ALT-PE) as a proxy for student achievement (Siedentop, Tousignant & Parker, 1982), the effects of improvement in management skill of in-service teachers has been studied with varying results (Beamer, 1982; Birdwell, 1980; Whaley, 1980). With this in mind, and with the subjects' positive reactions to managerial reminders, it seems that a communication system could be a useful tool to develop managerial skills in real settings.

The possibility of being able to communicate with an outside observer was received in different ways by the subjects. It was found to be useful to the degree that a resource of information was readily available. On the other hand, one subject noted that at times it was bothersome, in that, one was being observed intensely for an extended period of time.

A clear message from each subject was that toward the second half of the machine observation phases, the wearing of the equipment, and the daily observations became tiring. On the other hand, each subject indicated that when introduced for the first time to the communication system, it did not take very long before they became used to it. Some anxiety was present during the initial sessions, but that subsided
gradually. It seems that if pre-service teachers could be exposed to
communication equipment similar to the one used in this project during
prior field experiences (as was suggested by one of the subjects) some
of the anxiety caused by the initial wearing of it might be avoided.

The degree to which the system resulted in confusion for the
subjects was also discussed. Subjects found it hard to attend to
other areas in the gymnasium when engaged with one or a few students.
This skill of being able to quickly, and for a brief period of time
redirect one's attention appears to be a complex skill. The presence
of two other teachers (as noted by one of the subjects) may have
contributed to this confusion. Possibly, in the eyes of the subject,
the need to frequently monitor the whole group via a scan was less
apparent. Another subject brought up the notion of being involved in
thought processes that were focused on matters that were very
different from those which a prompt or a statement would be focused
on. This seems to indicate that the observer needs to remain very
sensitive to what the teacher him-/herself is attending to,
particularly in situations where a teacher is not verbally interacting
with students in the class. One way of remaining in tune with the
teacher's thought could be the use of simple questions such as "What
are you thinking about right now?" On the basis of the answer to that
type of a question the observer might provide useful, and, to the
teacher, relevant prompts.

In the eyes of the subjects, the most positive aspect of the
project centered around a) the building of confidence in one's own
teaching ability; and b) the development of an awareness of what is going on around oneself while teaching a group of students in a gymnasium. With regard to the latter, awareness of what transpires in classrooms and gymnasiums by teachers has been studied to a limited extent. With the teaching act described as being very complex (Anderson, 1978), teachers generally are not aware of many of the events that transpire in their classes (Batchelder, 1975; Kiemele, 1972; Martin & Keller, 1976; van der Mars et al., 1981; Withall, 1972). It would seem that the use of a communication system could be useful in developing some of this awareness.

Clinical Significance of Results

Various ways have been proposed to determine the clinical significance of behavioral changes established in applied behavior analysis (Baer, Wolf & Risley, 1968; Baer, 1972; Kazdin, 1977b; Risley, 1970). As noted in Chapter Three, Risley (1970) explains the clinical criterion for significance as a comparison between the behavior change that has been accomplished and the level required for the subject to be able to function in society. In this explanation "... the level required. ..." poses a problem, in that, it remains hard to specify a precise criterion that constitutes the demarcation between clinically significant and insignificant results.

In the context of the present investigation, the issue of what behavioral changes were to be considered clinically significant was guided by two criteria: a) The magnitude of the established changes.
That is, are the rates of behavior found in the treatment phase consistently higher than those found before the treatment was started, and possibly showing a trend in the desired direction?; and b) the rapidity with which the changes were established. That is, within how many sessions following the commencement of treatment were rates of behavior established that were consistently higher than those found in baseline conditions? These criteria carry with them the issue of the cost-benefit in using wireless communication systems per se, and using wireless communication to periodically prompt student teachers while they are teaching. Particularly in a supervisory process (where improvement of instruction is a primary objective), factors such as the timespan needed to establish behavioral change seem to be good indicators of how well a selected intervention works.

In the present study, the changes established were limited. As explained, experimentally significant changes were reached in the use of positive skill feedback, and the use of pupils' first names. When considering the aforementioned factors, these changes cannot be considered clinically significant. If educational supervision is focused on behavioral change, and if periodic prompting on a real-time basis is used as the intervention, such changes would need to be established more rapidly and more dramatically to be considered clinically significant. Prompting may well be effective when used in combination with other behavior change strategies. When used as the primary strategy, it does not appear to be powerful enough to induce dramatic behavioral changes. The results of the exit-interviews would
indicate that the use of a wireless communication system merits further study. First reactions of subjects, were generally positive in nature, in terms of the management of the class, the immediate (or realtime) positive feedback, and the development of a certain degree of awareness of what transpires in the gymnasium. While the use of such a system as part of a prompting intervention may not be feasible from a cost-benefit point of view, the subjects' reactions would indicate that it might be a useful tool for other purposes.

Summary

The review of randomly selected observations by an independent observer resulted in the finding of three discrepancies of the measure values and actual values of the dependent variable. In one instance, the occurrence of a positive skill feedback statement was not recorded, and in a second instance, there was a difference of one second between the actual time of occurrence and recorded time of occurrence of the same behavior. The third discrepancy was found in the measurement of the variable scanning. One instance of this behavior was not recorded.

A dependability and confirmability audit were used to judge the reliability and degree of bias in the information gathered and interpreted from the exit interviews. No discrepancies were found between the audio recordings of the interviews and the transcripts of these recordings. Subjects did not report any instances where information used in the text (and derived from the transcripts) was
inconsistent with the original statements made during the interview. Furthermore, no indication was given that anonymity had been threatened, because of the way in which the transcripts were utilized.

The quality of the transmitter used to establish communication from the prompter/investigator to the target subjects may have influenced slightly the quality of communication. Slight variability was found to exist in the location of static interference in this communication channel.

Comparisons of time spent in supervision of skill performance of students during skill-practice episodes resulted in the finding of no appreciable differences between sessions where subjects were wearing equipment and those where no equipment was worn. However, the wearing of equipment may have influenced the subjects' scanning behavior. When observed without wearing the communication equipment, subjects tended to scan the gymnasium at rates equal to or higher than those found during sessions when equipment was worn.

Periodic prompting produced experimentally significant behavioral changes in the variables use of positive skill feedback (Subject One and Three), and use of pupils' first names (all subjects). Experimental control was found to be sufficient, in that, intervention on a behavior did not result in changes in yet untreated behaviors. This supported the notion that the changes established were indeed the result of periodic prompting.

Prompt frequency was found to be unrelated to the rates of occurrence of the study's dependent variables. Increases in the
frequencies of prompts per sessions did not necessarily produce higher rates of occurrence of the dependent variables.

After completion of student teaching requirements, each subject was interviewed to gather information on the use of a wireless communication system. Findings from the interview included: a) Subjects indicated that they were influenced by the presence of their supervisor early on in the experience; b) managerial prompts were found to be helpful; c) the earphones used by subjects caused problems at times, in that, it kept falling halfway out of the ear; d) when equipment was not worn, subjects tended to feel more at ease, early on in the experience; e) praise from the prompter/investigator was received positively, when it contained more specific information; f) asking subjects to redirect their attention briefly to other areas in the gymnasium was found to be confusing; g) the most bothersome aspect of the project in the eyes of the subjects was the daily observations and/or the routine of having to wear the communication equipment each day; h) the positive aspect of the project in the eyes of the subjects was the building of confidence, and/or becoming more aware of what was going in the gymnasium.
Chapter 5

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS FOR FURTHER STUDY

Summary

Declining achievement scores and economic factors are but two influences that have prompted a series of reports that focus on the problems facing this country's educational system. One of the earlier results of these reports was the call for program design changes and more rigorous accountability measures to be used by those involved in teacher training programs. Since then, many teacher education programs in this nation have implemented various field experiences to be completed by teacher trainees before the student teaching experience. Furthermore, efforts have been made to develop more effective supervisory practices for these field experiences. Most research on supervision of teacher trainees has focused on student teaching supervision. Findings in this area remain largely inconclusive and contradictory.

In the last 12 years, teaching research in physical education has included a number of studies where student teachers were used as subjects. The supervision research conducted at The Ohio State University has shown repeatedly that student teachers' behaviors can be changed with various people (i.e. the University supervisor, the cooperating teacher, and the peer of the student intern) in the primary supervisory role.
The treatment used to establish these changes consisted of various components (Siedentop, 1981). To date, little is known about the relative effectiveness of each of the components that contributed to changes in student teachers' teaching behavior.

Nelson (1977) studied the effects of prompting on selected teaching behaviors of in-service physical education teachers. The use of positive skill feedback, positive behavior feedback, pupils' first names was successfully increased by way of prompting the teachers through a wireless communication system.

The purpose of this study was twofold. The primary objective was to study the effects of periodic prompting on the use of positive skill feedback, positive behavior feedback, students' first names, and scanning the gymnasium by physical education student teachers. Contrary to the use of a "treatment package", using various kinds of interventions simultaneously, this study's intervention consisted of periodic prompting of selected teaching behaviors.

Despite the fact that certain technology (e.g. small receivers, and miniature wireless transmitters) has been available, little effort has been put forth to implement these tools in the training of teachers. Thus, the secondary objective was to collect information regarding the use of the wireless communication system as a supervisory tool in the supervision of student teachers.

Three physical education majors enrolled in the School of Health, Physical Education, and Recreation at The Ohio State University served as subjects for this investigation, while completing the student
teaching program. Classes were taught in a middle school in the Columbus, Ohio area. The size of the classes taught by the subjects ranged from 55 to 65. Seventh and eighth grade classes were taught by all three subjects simultaneously, with one subject being linked to the communication system per class period. Observations were made from January 5th through February 24th during which time a gymnastics unit was taught. During the initial three weeks, subjects had limited teaching responsibilities. This period was used to have both subjects and students in classes become accustomed to a) the presence of the videotape equipment, and the observer; and b) equipment worn by the subjects. Of the initial three weeks of observation, four sessions per subject were randomly selected to be used in the analysis.

Treatment was applied by way of two one-way communication systems, and consisted of the periodic prompting of selected teaching behaviors. The multiple baseline design across behaviors was utilized to start the interventions across the various behaviors.

In the visual analysis of the graphic data, the following criteria were used to determine the experimental significance of the findings: a) Stability of baseline; b) trend within experimental phase; c) trend between experimental phase; d) variability within experimental phase; e) variability between experimental phases; and f) overlap of data between experimental phases. Experimentally significant treatment effects were established in two of the four dependent variables across all subjects. Use of positive skill feedback and use of pupils' first names was increased significantly
as a result of the periodic prompting. No increases were found in the use of positive behavior feedback or the scanning of the gymnasium during skill-practice episodes. Possible explanations for the absence of change in the latter included a) limited opportunity to implement treatment as a result of the team-teaching context; b) the emphasis on attending prompts as compared to response prompts; c) the prompts that were provided might have competed with other natural antecedents in the environment; d) the inherent reinforcement of emitting a behavior such as positive behavior feedback may not have been of sufficient strength (i.e. changes in student behavior were not profound enough as a result of the positive statements, to be discriminated by the subjects); and e) objectives that were set for successful completion of student teaching may have functioned as more powerful contingencies.

Calculations were made of mean rate changes from baseline to treatment condition for the variables a) positive skill feedback; b) positive behavior feedback; and c) use of first names. This allowed for a closer comparison with previous supervision research within the behavior analysis model. When treatment effects were expressed as mean rate changes between experimental conditions as had been the case in the studies completed at The Ohio State University between 1973 and 1977, changes were smaller in magnitude as compared to results of previous studies, but less variable. When compared to the Nelson (1977) study, the changes in the variable use of positive skill feedback were greater.
The study of scanning behavior of student teachers in physical education classes constituted a first attempt to systematically analyze one aspect of what has been labeled "active supervision" (Siedentop, 1983). Periodic prompting did not result in an increase in the rate of scanning behavior for either subject. It was speculated that reasons for the lack of change included a) the lack of sensitivity of the observation instrument used to produce the permanent record (i.e. the camera resulted in not being able to capture all scanning behavior instances; b) the context of team-teaching with two other teachers eliminated (or at least reduced) the need to scan the gymnasium intermittently; and c) the weaving of the communication equipment may have resulted in the subjects focusing more intensely on what they were doing with students in the immediate vicinity.

A limited analysis was made of the effects of wearing audio-equipment. Subjects were videotaped when not linked to the communication equipment. The variables used in this analysis were scanning, and time spent in monitoring student skill performance during skill-practice episodes. Minimal differences were found between the two conditions. Taking into consideration that data for this analysis was collected during the second half of the investigation, it was contended that the wearing of the communication equipment did not significantly affect the behavior of the subjects, with the possible exception of their scanning behavior as indicated earlier.
An interview with each individual subject was held following the completion of student teaching requirements. The purpose of this interview was to gather information on how the subjects experienced the use of the communication equipment as a supervisory tool. The major outcomes of the interviews included the following:

1. Receiving prompts to attend to managerial aspects of the lesson were found to be very useful.

2. Receiving praise while teaching made subjects "feel good", and feel "more confident".

3. Subjects noted an increase in their awareness of what was transpiring around them while teaching.

4. Subjects reported to be confused most often during either a practice episode when prompted to scan the gymnasium while working with (a) student(s), or when the subjects were thinking about other matters than those to which the prompt was directed.

Conclusions

Based on the analysis of the quantitative and qualitative results and within the limitations of this study, the following conclusions were drawn:

1. Periodic prompting resulted in limited increases in the rate of positive skill feedback as used by physical education student teachers.

2. Periodic prompting resulted in limited increases in the rate of pupils' first name use by physical education student teachers.
3. Periodic prompting did not increase the rate of positive behavior feedback as used by physical education student teachers.

4. Periodic prompting did not increase the rate of scanning by physical education student teachers.

5. The use of a communication system during teaching sessions was beneficial in making student teachers attend to organizational aspects of teaching.

6. The use of a communication system during teaching sessions was beneficial in making student teachers more aware of what transpires in a gymnasium while teaching.

**Recommendations for Further Study**

Recommendations for further study can be categorized in two areas. The first area would include those recommendations aimed at eliminating some of the logistical limitations of a study, whereas, the second area would include recommendations aimed at extending the conceptual basis of a study and strengthen the generality of its methods and experimental variable across subjects, behaviors and/or settings.

Based on the results of this study, the following recommendations are made aimed at eliminating logistical limitations:

1. A replication of this study where the subjects teach classes individually, as opposed to the team-teaching structure used in this study.

2. A replication of this study where the prompter does not have the dual role of investigator and University supervisor.
For the purpose of strengthening the generality of the results of this study, the following recommendations are made:

1. A replication of this study is necessary in different school settings such as the elementary schools and high schools.

2. During the interviews, subjects indicated the usefulness of prompts and cues pointed at managerial aspects of the lesson. Taking into consideration the available evidence in support of the importance of sound classroom management, the use of prompting by way of a wireless communication system appears to be a potentially effective strategy to teach management skills in pre-service field experiences.

3. With the limited effectiveness of prompting in terms of changing teacher behavior, it seems valuable to analyze its potential when combined with one other component. Feedback has a rich history of effectiveness as a dependent variable, and needs to be studied when presented during the teaching act.

4. A replication of this study where this supervisory technique is employed by other people than the supervisor, such as a cooperating teacher, or a student teaching peer intern.

5. Changes in teacher behavior need to be judged in their impact on student behavior. Thus, future research efforts in this area ought to include measures of student behavior. This will allow for an analysis of the relationship between any changes in teacher behavior and student behavior.
Informed Consent Form

Dear __________

I hope that you will be receptive towards participating as a subject in a project that I am about to undertake for my doctoral dissertation. This project will be performed under the supervision of Dr. Daryl Siedentop at The Ohio State University. In the following paragraph I will attempt to briefly discuss the goal of this project and what would be expected from you if/when you decide to participate.

Throughout your 10-week student teaching I would like to collect a series of videotapes of your lessons from which I can collect information about teacher behaviors and student behaviors. You will be asked to wear a wireless microphone with which we can record your verbal behavior. Furthermore, you will be asked to wear a small compact FM receiver with earphone. This will allow an observer (e.g., your supervisor or cooperating teacher) to communicate with you during the lesson. Neither piece of equipment should interfere with your teaching activities.

Throughout the quarter I would also like to talk to you in private about your experiences within the project. These sessions will be recorded.

Your participation in this study should result in improvements in the preparation of physical education teachers in general and the student teaching experience in specific.

You are assured that your identity will not be revealed in publications, documents and/or presentations, and that all information about you will be kept strictly confidential. Any further questions you may have regarding the participation will be answered. Furthermore, you have the right to resign as participant of this project at any time. If you do not have any questions, and if you are willing to participate in this study, please sign your name on the line below.

Name: _________________________________
Appendix B

HUMAN SUBJECTS REVIEW COMMITTEE
EXEMPTIONS (SUMMARY)
ACTIVITIES EXEMPT FROM REVIEW BY
OSU HUMAN SUBJECT REVIEW COMMITTEES

Research activities in which the only involvement of human subjects will be in one or more of the following categories are exempt from review by an OSU Human Subject Review Committee. These exemptions do not apply when deception of subjects may be an element of the research, when the activity might expose the subject to discomfort or harassment beyond levels encountered in daily life, or when individuals involuntarily confined or detained in penal institutions are subjects of the activity. A judgment that a particular activity falls within one of the categories exempted from review should be made with care, especially when children are subjects of the activity. Questions of interpretation may be directed to 422-9046, from which callers will be referred to the chairperson of the appropriate review committee.

1. Research conducted in established or commonly accepted educational settings, involving normal educational practices, such as:
   a. research on regular and special education instructional strategies
   b. research on the effectiveness of or the comparison among instructional techniques, curricula, or classroom management methods

2. Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), if information taken from these sources is recorded in such a manner that subjects cannot be identified, directly or through identifiers linked to the subjects.

3. Research involving survey or interview procedures, except where responses are recorded in such a manner that the human subjects can be identified, directly or through identifiers linked to the subjects, and either:
   a. the subject's responses, if they became known outside the research, could reasonably place the subject at risk of criminal or civil liability or be damaging to the subject's financial standing or employability, or
   b. the research deals with sensitive aspects of the subject's own behavior, such as illegal conduct, drug use, sexual behavior, or use of alcohol.

All research involving survey or interview procedures is exempt, without exception, when the respondents are elected or appointed public officials or candidates for public office.

4. Research involving the observation (including the observation by participants) of public behavior, except where observations are
recorded in such a manner that the human subjects can be identified, directly or through identifiers linked to the subjects, and either:

- (a) the observations recorded about the individual, if they became known outside the research, could reasonably place the subject at risk of criminal or civil liability or be damaging to the subject's financial standing or employability, or
- (b) the research deals with sensitive aspects of the subject's own behavior such as illegal conduct, drug use, sexual behavior, or use of alcohol.

5. Research involving the collection or study of existing data, documents, records, pathological specimens, or diagnostic specimens, if these sources are publicly available or if the information is recorded by the investigator in such a manner that subjects cannot be identified, directly or through identifiers linked to the subjects.

Exempting an activity from review does not absolve the investigator(s) of the activity from ensuring that the welfare of subjects in the activity is protected and that methods used, and information provided, to gain subject consent are appropriate to the activity.
Appendix C

VARIABILITY OF STATIC INTERFERENCE
Figure 7. Variability of static interference.
## Variable

### Use of Positive Skill Feedback

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Appendix E

STUDENT TEACHING REQUIREMENTS
OUTLINE
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On the following pages you will find an overview of the requirements pertaining to the student teaching program that you are entering. Ordinarily the student teaching experience provides the student with the final opportunity to practice the use of the various teaching skills he/she has been exposed to within the formal training program, and b) a first chance to function within the real setting for an extended period of time. It also allows the training program to formally evaluate the prospective teachers (and/or teacher/coaches) on their professional development, and ability to choose and apply the right teaching skill at the right time. In order for the program to monitor the student teacher's progress during this culminating experience, the focus of evaluation will be directed to three main areas:

1. Professional conduct
2. Unit preparation
3. In-class teaching performance

Each of the three areas will be explained in terms of general expectations and the means through which these expectations are monitored by the cooperating teacher, and visiting supervisor (i.e., indicators).

Professional conduct
General expectations:
As is the case in most other professions, there are certain expectations that deal with attire, on-time behavior, and presence. The physical education profession is no different, and being a representative of the University, student teachers are expected to act as professionals at all times.

Indicators:
1. Appropriate attire will be worn each day of student teaching. By the term "appropriate" is meant: clean and unprinted (excl. brand names, or the Ohio State University logo).
2. Depending on the agreed upon time, student teachers will be present in the school building on or before that time each day of student teaching.*
3. Presence is expected for each scheduled day of teaching.*

*Anytime you are going to be late or absent (incl. extenuating circumstances) you should notify the school and cooperating teacher first, and then notify the supervisor. During the next meeting with your supervisor following that instance arrangements will be made.

Unit preparation
For the classes taught at the secondary level, the unit plan format to be followed is similar to the one that is used in the Secondary Core program. On the attached forms the criteria for the unit plan development are specified. If all student teachers teach the same
activity, they are encouraged to combine their efforts in developing the unit(s). The maximum number of points that can be obtained is 55. Accumulation of 50 points is considered satisfactory.

For the classes taught at the elementary level, the unit plan requirements will be determined by the specialist at the elementary school, if available. He/she will specify the necessary content for the unit(s). If there is no specialist at the elementary school, the guidelines that are included should be followed. These criteria are to be adhered to completely.

The dates for handing in the unit plans will be determined verbally on a later date by the University supervisor.

Elementary level unit plan due date:
Secondary level unit plan due date:

In-class teaching performance

General expectations:

During this ten-week experience the student teacher should aim for reaching the following four objectives:

1. Establishment of class control
2. Maintaining/improving of class control
3. Development of positive class climate
4. Appropriate use of class time

Each of the four objectives will be briefly explained in general terms which is then followed by a series of indicators which will be used to monitor the progress toward reaching these objectives.

Establishment of class control

It is imperative that the student teacher, entering into the new environment, takes charge and develops some type of control over what happens in that environment when he/she is teaching. The initial days are crucial because that is when a teacher has the opportunity to set the parameters for what is and is not appropriate during his/her classes. You should therefore use those initial days for exactly that purpose. This should not be interpreted as a negative process, but rather a procedure to allow for more activity time to be available and to develop on-task student behavior in the subsequent weeks.

Indicators:

1. A signal for attention will be taught, and for the first week (five teaching days) each class will get at least four opportunities to respond to the signal.
2. Six class rules for student behavior will be explained to the students in each class. The rules will be posted on two locations in the gymnasium during the complete student teaching experience.
3. You will introduce and explain appropriate consequences with the established class rules during the first meeting of each class.
4. Previously stated class rules and consequences will be reviewed in each group for at least three days following the first class meeting.
Maintaining/improving class control

Once certain rules and class routines have been established, they need to be maintained, or, if they do not seem to function sufficiently, they need to be improved. While dealing with the students, it is very important that you behave consistent with the previously stated expectations. Maintaining may very well be even more important than establishing class control.

Indicators:
1. By the end of the fifth week you will have maintained a positive ratio of positive to corrective behavior feedback that is specific, per five class sessions in each group.
2. You will gain attention (stop-look-listen) from the students upon presenting the signal for attention within five seconds.
3. You will be consistent in applying the stated consequences throughout all class periods.

Development of positive class climate

Your task in interacting with your students is to develop an atmosphere that is positive and conducive to develop on-task behavior. Needless to say, this objective goes hand in hand with the above two areas.

Indicators:
1. You will provide a positive ratio of specific positive to corrective behavior feedback of at least 2:1 during the first five days of teaching.
2. By the end of the fifth week of your experience you should be able to correctly identify 60% of the students by first name in the secondary school and/or 40% in the elementary school.
3. See #1 under the section Maintaining/Improving class control.

Appropriate use of class time

In order to provide the maximum amount of activity/practice time, it requires clear and concise instructional episodes, minimal management time and transition. This will require thorough planning of the activities for each day in order to make as efficient as possible use of the available time.

Indicators:
1. By and after the twelfth day of teaching, time devoted to managerial tasks will constitute no more than ten percent of the official class time. Managerial tasks include:
   - taking attendance
   - dressing
   - entering/leaving gym
   - making announcement about field trip, etc.
2. When directed to perform and complete certain management and transitional tasks, the students will do so without needing more than one prompt beyond the original direction. This does not include the "hustles" you may provide.
3. You will provide an introductory activity (excluding warm-up exercises) for each class that is related to the unit being taught at the time.
4. You will have all the necessary equipment set up before each class period when all students are present.

5. The procedure you use to take attendance should take no more than 1.5 minutes of the class time by the fifth meeting of each class.

6. You will present your completed lesson plan for the lesson to be taught to the cooperating teacher or visiting supervisor, upon request. The lesson plan format to be used is congruent with those used in Elementary Core.

Grading procedure used for student teaching training program
In the aforementioned sections you will find that within those sections there are 21 indicators specified. In order for you to receive a "satisfactory" grade for student teaching, you will need to complete 80% (i.e., 17 of 21). In some cases, certain indicators need to be specified through mutual agreement between you and your supervisor, depending on certain circumstances. These specifications will be made as soon as possible following the first meeting that deals with the student teaching requirements.


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