THE MECHANICAL THIRD EAR DEVICE:
A STUDENT TEACHING SUPERVISION ALTERNATIVE

A DISSERTATION

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

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The Ohio State University
1993

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ACKNOWLEDGEMENTS

I am sincerely grateful for the advice, encouragement, and assistance provided throughout my graduate program and in this dissertation inquiry by my major advisor, Dr. Josue Cruz, Jr. I also appreciate the assistance and guidance given by Drs. Donald Haefele and John Kennedy. In addition, I am thankful to have been associated with the Teacher Education Program at The Ohio State University under the guidance of Dr. Donald R. Cruickshank. Their collective efforts have contributed greatly to my professional growth and development.

I would also like to express gratitude to my fellow graduate students who provided collegial support and friendship throughout my doctoral program. A special thanks is extended to my close friends, Linda Morrow and Theresa Stahler. In addition, I would like to thank several graduate students in the Teacher Education Program for the assistance they provided as raters in this study: Jeff Peck, Doug Smith, Donald Williams, and Cheryl Worthington.

Finally, I am grateful to my family for their support and patience throughout my graduate program. I am especially thankful for the love, support, interest, and assistance of my husband, Stephen.

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TABLE OF CONTENTS

ACKNOWLEDGEMENTS	ii
VITA	iii
LIST OF TABLES	vi
LIST OF FIGURES	viii
CHAPTER I	
Introduction	1
Problem Statement	1
Need for the Study	3
Background of the Study	4
Purpose of the Study	8
Definitions	8
Limitations of the Study	10
Research Hypotheses	13
Methodology of the Study	13
Summary	21
CHAPTER II	
Introduction	23
Selected Research Studies In:	
The Wireless Communication System	24
Teacher Clarity	38
Supervision	44
Summary	52
CHAPTER III	
Introduction	56
Sample	57
Research Design	60

Instrumentation	66
TSOS	67
COI	69
Cooperating Teacher Reflective Log.....	73
Student Teacher Response Form	74
Data Analysis	75
Summary	78
CHAPTER IV	
Introduction	79
Study Hypothesis One	83
Study Hypothesis Two	90
Overall Clarity Measures	91
Discrete Skill Analyses	99
Clarity Skill Clusters	104
Effect Size	109
Study Hypothesis Three	111
Summary	113
CHAPTER V	
Introduction	114
Summary of Results	118
Study Hypothesis One	118
Study Hypothesis Two	119
Study Hypothesis Three	121
Conclusions	122
Recommendations	132
LIST OF REFERENCES	137
APPENDICES	
A. Teaching Skills Observation Instrument	145
B. Clarity Observation Instrument	147
C. Teacher Clarity Behaviors	150
D. Cooperating Teacher Reflective Log	155
E. Student Teacher Response Form	159
F. Additional Summary Tables	163
G. Letters	172

LIST OF TABLES

TABLE	PAGE
1. Overall Teacher Clarity Skill Raw Scores Pre-, Post- and Delayed Measures Rater 1	81
2. Overall Teacher Clarity Skill Raw Scores Pre-, Post- and Delayed Measures Rater 2	82
3. Overall Frequency of Cues Given By Cooperating Teacher	85
4. Overall BIE Effectiveness Ratings By Cooperating Teacher	88
5. Descriptive Summary of Overall Clarity Measures by Groups	92
6. Descriptive Summary – Overall Clarity Measures Correlation/Covariance Matrix	93
7. Descriptive Comparison of Overall Clarity Measures by Groups	94
8. One-way Analysis of Variance on the Covariable Overall Pre-Test Measure	95
9. One-way Analysis of Variance on the Response Variable Overall Posttest Measure	97
10. Analysis of Covariance Pre- and Posttest Measures	98
11. Descriptive Summary – Discrete Clarity Skills Rater C	100

12. Descriptive Summary – Discrete Clarity Skills Rater 1	101
13. Analysis of Covariance – Posttest Measures Discrete Clarity Skills F Test	103
14. Overall Descriptive Summary Clarity Skill Clusters	106
15. Analysis of Covariance – Posttest Measures Clarity Skill Cluster F Tests	108
16. Effect Size on Posttest Scores	110
17. Analysis of Covariance – Delayed Follow-up Measure Overall Clarity Measure	112
18. One-Way Analysis of Variance on the Covariable Overall Pre-Test Measure	164
19. One-way Analysis of Variance on the Dependent Variable Overall Posttest Measure	165
20. One-between, One-within Analysis of Variance Overall Clarity Measures	166
21. One-between, Two Within ANOVA Summary Discrete Clarity Skills	167
22. Univariate ANOVA Summary Discrete Clarity Skills F Test	168
23. One-between, Two Within ANOVA Summary Clarity Skill Clusters – Rater C	169
24. One-between, Two Within ANOVA Summary Clarity Skill Clusters – Rater 1	170
25. Univariate ANOVA Summary Clarity Skills Clusters F Test	171

LIST OF FIGURES

FIGURE	PAGE
1. Experimental Design for the Study	61
2. Clarity Skills/Cues for the Study	68
3. Clarity Skill Clusters	105

CHAPTER I

INTRODUCTION

In recent years, the supervision of student teachers has become a growing concern for teacher educators due to the increased emphasis placed on field experiences in the professional development of teachers. The common assumption is that people can learn to teach, or at least teach better, and that student teaching can afford such an opportunity. In order to improve practice, student teachers listen to what others, such as their cooperating teacher or university supervisor, say about their teaching. Therefore, the potential for constructive and helpful feedback during student teaching is great.

Problem Statement

In supervision generally, regardless of the field, the learning process is often constrained by the inability of traditional supervision strategies to provide simultaneous and immediate reinforcement to the trainee. Traditional supervision strategies lack an effective means for providing intervention, feedback or reinforcement opportunities during the ongoing process. Instead,

the supervisor is bound by the delayed and often cumbersome retrospective approach of post-conference supervision.

A search for more effective methods of communicating in supervision experiences has led to an interest in and use of technology, including the use of computers, interactive video, and audio- and video-recordings.

Another use of technology during the supervision process has been audio-cuing via a wireless communication system, the "bug-in-the-ear" (BIE) device. This non-traditional supervision strategy is a process whereby concise verbal assistance via a small transistorized ear phone is employed to induce specific behavioral changes. A prompter can view the situation through videotape or in person and simultaneously direct the trainee who is connected or "bugged" to attend to specific behaviors. Nyquist and Staton-Spicer (1979), after reviewing available "bug-in-the-ear" studies, concluded that the basic assumptions underlying the use of a technique which would allow for simultaneous feedback are:

1. "... that intervention in the midst of an
interaction is preferred to intervention
after the fact"...
2. "... that verbal messages can enable
individuals to adapt or modify their
behavior instantaneously"... and

3. "... that individuals can attend to two sets of verbal stimuli in rapid succession."
(p.10)

Need for the Study

While there have been a number of studies and articles over the last thirty years which examined the feasibility of applying this technology in various supervisory situations, only four studies have been identified which investigated the use of the BIE technology in preservice teacher education (van der Mars, 1984, 1988; O'Pry and Pease, 1987; Giebelhaus and Cruz, 1992). Therefore, several questions emerge:

1. Would the BIE technology applied in the supervision of student teachers enable student teachers to effect changes in teaching behaviors immediately?
2. Would intervention during the teaching process be more effective in producing change than intervention after the fact?
3. Would such intervention episodes affect lasting changes in teacher behaviors?
4. Would intervention using the BIE device provide for greater overall proficiency of a targeted behavior than intervention after the fact?

Background of the Study

Student teaching, or practice teaching as it is often referred, is defined as that part of preservice teacher education which provides practical teaching experience under the close supervision of an experienced teacher. It is considered by many to be the most influential aspect in the education of prospective teachers; certainly its longevity as a component of teacher training would suggest its impact or perceived importance.

The need to provide a systematic method of corrective and constructive feedback, as well as reinforcement, during the supervision of student teachers has long been recognized. In 1973, Cogan developed a clinical supervision model which constituted the first systematic approach to the improvement of classroom instruction. Basically, Cogan's clinical model of supervision includes the following eight phases:

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; and
8. renewed planning.

Reavis (1976) noted two more aspects upon which the clinical supervision model is based: first, the necessity of direct feedback to the teacher on aspects of his or her teaching; and second, that the focus of the observation be an area of concern to the teacher. Cogan's eight-phase cycle of supervision, or one of many adaptations to include the Reavis model, is followed by universities across the country in order to provide more effective field experience supervision for preservice teacher education students. However, the field experience component of teacher training using the clinical model of supervision, especially the student teaching phase, has not always lived up to its potential due to a number of factors, including the lack of an effective communication strategy.

According to Hoover, O'Shea and Carroll (1988) one major limitation to successful development of pedagogical skills by the student teacher is the communication among the teacher educator, cooperating teacher and the student teacher (the student teaching triad) with regard to planning, observation, analysis of the teaching-learning process, and conferencing. The lack of clear communication among members of the supervision triad accounts for problems currently associated with the clinical supervision model. Griffin, Barnes, Hughes, O'Neil, Defino, Edwards, and Hukill (1983) reported that the university supervisor and cooperating teacher rarely agreed upon or even articulated policies and practices which would guide student teaching. This

lack of communication extends to a disunity regarding the nature and development of essential pedagogical skills (Zeichner, 1980).

One essential pedagogical skill which is well documented in the literature is teacher clarity behaviors (Bush, 1976; Bush, Kennedy and Cruickshank, 1977; Cruickshank and Kennedy, 1986; Hamilton, 1988; Hines, 1981; Hines, Kennedy and Cruickshank, 1985; Metcalf, 1989; Roshenshine and Furst, 1971; Williams, 1983 and others). Teacher clarity behaviors are defined as a "cluster of teacher behaviors that result in learners gaining knowledge or understanding of a topic, if the learners possess adequate interest, aptitude, opportunity, and time" (Cruickshank and Kennedy, 1986, p. 43). These teacher behaviors include skills such as use of examples, working examples, use of demonstration, explanation, repetition, and questioning, among others. The line of inquiry regarding teacher clarity behaviors has been shown that specific low-, moderate-and high-inference behaviors are both observable and measurable (Hamilton, 1988; Hines, 1981; Hines, Kennedy and Cruickshank, 1985; Larsen, 1985; Metcalf, 1989, Williams, 1983).

An attempt to provide more effective communication and feedback between supervisor (the cooperating teacher, for example) and supervisee (the student teacher, for example) is the wireless communication device, the bug-in-the-ear (BIE). The literature which is available on the use of such a wireless microphone system in supervision is very limited; the bulk of what is

available is scholarly writing rather than empirical evidence. This literature describes audio-prompting as a viable means of intervention and providing immediate feedback in a variety of professional supervision experiences. Among such uses cited are: the training of clinical psychologists (Korner and Brown, 1952; Sanders, 1966, cited in Nyquist and Staton-Spicer, 1979); teaching parenting behaviors (Johnson and Brown, 1969; Gordon and Kogan, 1975; Krapfl, et al, 1969); training of mental health professionals (Boylston and Tuma, 1972); training counselors (Bubenzer, et al, 1986; Baum and Lane, 1976); training teachers as mediators (Bowles and Nelson, 1976); and training graduate teaching assistants (Nyquist and Staton-Spicer, 1979). Additionally, the mechanical third ear or bug-in-the-ear (BIE) device has been utilized in the field of medicine (Ward, 1960; Hunt, 1980), teaching third year medical students interviewing techniques, and in pediatrics (Domoto, Weinstein & Getz, 1979), training third and fourth year dental students in behavior management techniques during a pediatrics summer clinic. Further, limited inquiry has been completed using the BIE device with preservice teacher education.

The bug-in-the-ear device has been the subject of at least four studies of preservice teachers (van der Mars, 1984, 1988; O'Pry and Paese, 1987; Giebelhaus and Cruz, 1992) to reinforcing effective teaching and management skills, skills which can be learned, during the supervision process. In each

study, immediate and simultaneous intervention, feedback, and reinforcement was provided to participants.

Purpose of the Study

The purpose of this study is to determine the effects of audio-cuing or prompting as a means of providing immediate correction, reinforcement and/or feedback on specific teaching skills through the use of the bug-in-the-ear (BIE) device with student teachers. A secondary purpose of this study will focus on the acquisition of the specific teaching skill known as teacher clarity behaviors (skills) as identified in studies reviewed by Rosenshine and Furst (1971) and later investigated by Metcalf (1989). Finally, the retention of the targeted teaching skills will be measured.

Definitions

For the purpose of this study, the following definitions will be used:

audio-cuing or prompting: a concise verbal message (one or two words) via a small transistorized ear phone employed to induce specific behavioral changes.

prompter/observer: an individual located away from the trainee, views the situation in person and simultaneously directs the trainee who is "bugged" to attend to the specific behaviors. This individual in this investigation was the

cooperating teacher and participated in training sessions where both recognition of clarity behaviors and appropriate cuing strategies were discussed and demonstrated.

bug-in-the-ear (BIE) device: a small transistorized wireless microphone device. The *Realistic* FM Wireless Video Camera Microphone System (cat. no. 32-1226) was utilized in this study.

student teacher: a preservice teacher in the last required practicum field placement before being granted state certification.

cooperating teacher: the designated classroom teacher who was assigned jointly by their school district and the university to oversee and supervise the day to day practicum experience of a student teacher.

teacher clarity behaviors: "A cluster of teacher behaviors that result in learners gaining knowledge or understanding of a topic, if the learners possess adequate interest, aptitude, opportunity, and time" (Cruickshank and Kennedy, 1986, p. 43).

Independent variables to be considered were two levels of treatment:

- a) periodic audio-cuing or prompting of student teachers with the BIE device on specific teacher clarity behaviors; and
- b) no periodic audio-cuing or prompting with the BIE device.

Dependent variables were three measures of target skill (teacher clarity skills) acquisition, pre-test, post-test, and delayed observation.

Limitations of the Study

For the purpose of this study the following limitations should be considered: the naturalistic setting; the lack of control over content area taught while video-taping; the limited number of subjects; the cooperating teacher with whom the student teacher was placed; time constraints which limited the treatment period; and the cost of the study.

This study was conducted in a naturalistic setting. Various confounding variables, such as class size, classroom management skills, curriculum, may come into play which could affect the demonstration of the measured skill, clarity behaviors. This researcher attempted to utilize the student teaching experience to reveal information about the kind and quality of feedback student teachers receive and examine one method focused on improving feedback and thus learning about teaching. With the exception of some limited training of the cooperating teacher, neither the participants nor the teacher preparation program were geared especially for this particular inquiry.

The content which student teachers chose to teach during the three video-taped sessions was not controlled. Although the dependent variable, teacher clarity skills or behaviors, was not found by Hamilton (1989) to be dependent on the content, some of the teacher clarity behaviors may be more evident within some content areas. This researcher, however, believed that to

examine the effects of the intervention strategy in a naturalistic setting, constraints on the content area taught might limit generalizability.

Selection of subjects was conducted in a two-stage random sample process. A sample of cooperating teachers assigned student teachers was obtained from The Ohio State University. The sample was limited to subjects in one strand of the Early and Middle Childhood Education Program. From that list, cooperating teacher–student teacher dyads were randomly assigned to treatment groups. This student teacher sample of 22 was nested within the cooperating teacher sample. The control of numbers (22), as well as sampling population, may limit generalizability.

The cooperating teacher with whom the student teacher completes student teaching has a significant influence on the student teacher's growth and development (Boydell, 1986). The cooperating teacher is required by the state to be certified in the same area that the student teacher with whom he/she is working would be eligible to be certified. This insured that the student teacher and the cooperating teacher came from similar preparation background, elementary education. Further, each cooperating teacher did participate in two in-service training sessions to become familiar with several aspects of the student teaching experience: the university expectations for student teaching; the role of the student teacher, cooperating teacher, and the university supervisor; the general supervision process using Cogan's model of clinical

supervision; and this investigator's study, including the target behavioral skill, teacher clarity. Despite these efforts, this investigator could not ensure that each cooperating teacher completed their role of supervisor in the same manner. Therefore, variability between and among supervisors and the supervision practices they employed was evident and could impact findings.

The time constraints of the study may limit findings. A two week treatment period may not be long enough to provide clear evidence of acquisition of the target skill.

The biggest single expense of the study was the purchase of ten BIE devices which will cost approximately \$69.95 each. In addition, each subject was video-taped three times (two times in the study period, once as a follow-up observation). A small gift in appreciation for the subjects involved in the study was also provided.

BIE device 10 @ \$69.95	=	\$ 695.50
Subject compensation gifts	=	\$ 396.00
44 video-tapes @ \$3.00 each	=	\$ 120.00
Printing	=	\$ 210.00
9-volt batteries 44 @ 1.89	=	\$ 83.16
Stationary	=	\$ 15.00

The approximate costs total:	\$1,509.66
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Research Hypotheses

The following research hypotheses are posited:

1. Student teachers who receive audio-cuing or prompting during the teaching process can effect immediate change in their teaching behaviors;
2. Student teachers who receive audio-cuing or prompting during the teaching process will demonstrate greater acquisition of the target behaviors than those who do not receive such assistance; and
3. Student teachers who receive audio-cuing or prompting during the teaching process will retain the target behavior to a greater degree than those student teachers who do not receive audio-cuing.

Methodology of the Study

This section of the proposal provides a description of the methodology which will be implemented to attain the objectives of the study. An overview of the purpose of the study is followed by six major sections: a) sample; b) design; c) instrumentation; d) time factors; e) data analysis; and f) general considerations.

Overview: The primary purpose of this study is to determine whether or not the BIE technology can be used effectively during student teaching as a means to provide more effective feedback to student teachers. The study will be an initial attempt to quantify:

1. the feasibility of providing immediate and simultaneous feedback to student teachers; and
2. the effect of this direct intervention strategy.

Sample: The target population for this study was student teachers, regardless of grade/subject field placement assignment. The accessible population was student teachers enrolled in their last practicum experience required for state certification during the autumn quarter, 1992, in the Early and Middle Childhood Education Program at The Ohio State University.

A list of cooperating teachers who would supervise student teachers during autumn quarter, 1992, was obtained. From that list, prospective participants were contacted first by letter and then personally to obtain a convenience sample of at least 20 supervisors. Participating cooperating teachers and their student teachers were randomly assigned to one of two treatment groups, an experimental group and a control group.

Design: The experimental research design was a one-between groups, one-within subjects repeated measure design. The treatment had two levels, experimental and control.

Control Group (A₁) – Student teachers who did not receive periodic audio-cuing via the wireless communication device (BIE) with regard to teacher clarity behaviors from their cooperating teachers, but received the same intensity of observation. Cooperating teachers received the same instruction in the target skill, clarity behaviors as Experimental Group.

Experimental Group (A₂) – Student teachers who received periodic audio-cuing via the wireless communication device (BIE) with regard to teacher clarity behaviors from their cooperating teachers. Cooperating teachers received instruction in both the target skill, clarity behaviors, and the use of the BIE.

The outcome measures (dependent variables) considered in this investigation were:

- a) the pre-test observation score (B₁);
- b) the score received on the posttest observation, indicating acquisition of the target behavior (B₂); and
- c) the score received on the delayed follow-up observation test, indicating retention of the target behavior (B₃).

Further, both the immediate acquisition during supervision of targeted skills and the overall proficiency in presentation of the target behavior by the student teacher in the treatment group (A_2) as rated by trained observer was measured.

The study was conducted during eight weeks in four phases. Prior to the initiation of the study, however, several meetings were held with cooperating teacher participants to acquaint them with roles, expectations, and procedures generally, and specifically with the instruments and procedures for the investigation. During the first phase of the study – PRE-TEST – each subject was observed for thirty minutes during the teaching of a teacher centered lesson without intervention by the trained observer. This initial observation was conducted and video-taped during the week prior to the treatment period, the second week of the student teaching experience. It was conducted in order to gain baseline information on the observed proficiency of teacher clarity behaviors (PRE-TEST).

Phase two, the treatment period, was conducted during the third and fourth week of student teaching. During that period, all students were observed each day for a minimum of thirty minutes by their cooperating teacher. After each observation, a traditional post-observation conferences was conducted. Also, it was during phase two that the treatment group was periodically cued or prompted on specific teacher clarity behaviors a minimum of seven times

during the ten period; the type of cue as well as the frequency of cues were recorded on an observation instrument by the cooperating teacher.

Phase three was conducted the week following the treatment period, the fifth week. This 25 to 35 minute observation of a teacher centered lesson was video-taped for later review by trained raters to determine the outcome of the treatment (POSTTEST). During this observation, as well as during subsequent weeks, BIE intervention was not administered.

Phase Four was conducted during the eighth week of the investigation, nine weeks into the student teaching experience. During this final follow-up observation, a teacher centered lesson chosen by the student teachers was video-taped for later review by trained raters. Presentation of the lesson was observed and rated by cooperating teachers.

Each of the 25 to 35 minute lesson observation sessions were to be conducted in the same basic manner by the cooperating teacher:

1. The lesson to be observed was determined prior to the actual observation session (pre-conference). The pre- and post-test lesson, as well as the follow-up observation lesson, were selected on the basis of two guidelines; first, it was to be a lesson which would take between 20 and 35 minutes to teach and, second, it was to be primarily teacher-centered/directed;
2. For the treatment group only, the frequency of audio-cues or prompts utilized was during the treatment period; and

3. A traditional post-observation conference utilizing a specified format which does not necessarily focus on the specific teacher clarity behaviors was to be conducted with all subjects.

All video-tapes were viewed and scored by two independent rater pairs, trained in the field of teacher clarity behaviors and instrumentation.

Instrumentation: Several instruments were used to collect the data.

1. The Teaching Skills Observation Sheet (TSOS) which indicates time intervals and specific clarity behaviors (Appendix A). This instrument is a modification of one utilized by Metcalf (1989) and later redesigned to incorporate interval sampling measures (1992, in press).

2. The Clarity Observation Instrument, Section I and II modified from Hines (1981) and Hamilton (1988) to incorporate those specific clarity skills which would be the focus of cues or prompts using the BIE device.

3. Cooperating Teachers Reflective Log was used by the cooperating teacher to record the content of post-observation feedback sessions with regard to the focus of the conference topics, the types of feedback given, and outcomes and/or suggestions made. The post-observation conference format was to follow the general clinical observation guidelines put forth by Glickman (1990), Cogan (1979) and others. Generally, the cooperating teachers and student teachers would discuss an analysis of the observation, to include:

- a) what was observed – lesson content, activities, interaction with and among students, etc.;
- b) what strengths the student teacher displayed; and
- c) areas where improvement may be warranted, using specific examples and/or suggestions.

4. Student Teacher Response Form was used after completion of the study to gain some insight as to the overall impressions student teachers had of the intervention strategy. Reactions were recorded through responses to several Likert-type questions, as well as narrative responses to several open-ended questions.

Time Factors: The study was conducted during the second through ninth week of a student teaching intern program, autumn, 1992. A follow-up observation and videotaping was implemented during the ninth week of these student teachers' program. Reminders by mail, telephone, and in person were given to all participants in the study regarding when and how each aspect of the study should be conducted. Collection of the instruments (data) from cooperating teachers occurred at the end of each phase of the study. Trained raters viewed tapes after all data had been collected.

Data Analysis: The study was comprised of a one between, one within repeated measure experimental design. Descriptive data gathered from interviews, self-reporting instruments, as well as scores on the repeated measure (clarity behavior skills) from trained raters were used to examine the effect of the BIE intervention strategy. Three datasets were examined: the overall clarity skill score; the fourteen discrete clarity skill scores; and the four clarity skill subsets or cluster scores. In addition, two sets of rater scores were utilized to examine the data. The specific analyses of the repeated measurement was conducted using the analysis of variance (ANOVA) and analysis of covariance (ANCOVA).

General Considerations: Internal validity concerns have been considered through the use of the random sampling and assignment to treatment procedures employed. Further, video-taping all test observations allow independent trained observers to rate each subject and thereby increasing the internal validity of the study.

Although a completely random sample of cooperating teachers and student teachers would be preferred, it was determined that a convenience sample of cooperating teachers was the only feasible way to obtain the student teacher sample. In addition, following Cogan's supervision model (1973), the first phase to be established in clinical supervision is the teacher-supervisee

relationship; therefore, utilizing the actual supervisor of the student teacher seemed warranted. Random assignment of subjects to treatment groups was utilized in lieu of random selection.

Current thinking also suggests the necessity of specific training of cooperating teachers for their role in the supervision of student teachers; the training of cooperating teachers in both the treatment and control groups in this study would support that reasoning.

Given the procedural information delineated above, replication of the study seems plausible. Replication using a larger sample, or from different teacher preparation institutions would likely offer more generalizability of findings.

Summary

This investigation attempted to examine the potential use of the wireless communication system (the bug-in-the-ear – BIE) with student teachers and their supervising cooperating teachers in a naturalistic setting. Of interest was the effect and effectiveness of the BIE device on the communication and feedback student teachers receive during their last practicum field experience prior to state certification. While this technology has been applied in other professional clinical training experiences, only limited documentation can be

found in the professional preparation of teachers. As such, this experimental design study lays the foundation for future research in the area of student teaching supervision.

CHAPTER II

REVIEW OF RELATED LITERATURE

Introduction

The purpose of this study is to determine if student teachers and their cooperating teachers can use a wireless communication system (BIE) to provide feedback regarding teacher clarity during the teaching process and thus improve the effectiveness of the feedback process. The intent of this chapter is:

- 1) to thoroughly review the available research and scholarly literature on the use of the wireless communication system (BIE) to provide feedback in supervised practicum experiences which this study seeks to further;
- 2) to examine the research related to the extent to which teacher clarity behaviors can be observed and measured; and
- 3) to review the scholarly literature and research related to the nature and effect of feedback during student teaching.

The Wireless Communication System

The "bug-in-the-ear" device (BIE) has been mentioned in the literature from a variety of professional sources; from that literature, scarce as it is, several features emerge: first, the bulk of the literature is polemic writing rather than empirical evidence; second, most of the literature comes from areas outside teacher education, most notably counseling; third, discussions of the use of the BIE were frequently not in the context of live (in vivo/naturalistic) sessions; and finally, little has been published on the use of the BIE since 1987. Of the BIE literature which can be described as empirical studies, few revealed evidence of experimental controls and most were conducted with small sample sizes. Still, this body of literature describes the use of the BIE as a viable means of intervention and providing immediate feedback in a variety of professional supervision experiences.

Although the bug-in-the-ear systems described vary in degree and kind, audio-prompting through the BIE device is commonly referred to as a process whereby a concise verbal cue is given via a small transistorized ear phone to induce specific behavioral changes. The prompter, located away from the trainee, views the situation and simultaneously directs the trainee who is "bugged" to attend to specific behaviors. Various modifications of commercial equipment have been attempted and noted (Pierce, 1960; Schwitzgebel and

Bird, 1970; Stumphauzer, 1971; Miklich, et al, 1974; Morris, 1974; Baum and Lane, 1976; Salvendy, 1984), but the commercial equipment currently available seems to provide the needed flexibility of movement for the trainee and the observer, as well as the relative inexpensive cost of implementation (Goslan, 1975; Giebelhaus and Cruz, 1992). Further, Herold, Ramirez and Newkirk (1971) reported that the BIE "system appears to be particularly well-suited for clinical training programs in which supervisory personnel must direct trainees without interrupting the process under observation," (p. 32).

The following review provides a review of articles and research relative to the BIE device as discussed above in a variety of supervised practicum experiences.

Interview Training. The first reported use of a wireless communication system employed in supervision was in the training of students and interns in clinical psychology at Utah University (Korner and Brown, 1952). Searching for a more effective method of supervision than the usual detailed notes or audio-recordings of observation and delayed post-conference, Korner and Brown initiated the use of a wireless communication system. They found that this method allowed the supervisor to make brief comments during the observation, allowing the student to redirect, correct, and see immediately the effects of the

supervisors suggestions. Both students and supervisors were satisfied with the learning experience using the "bug-in-the-ear" (BIE) device.

Ward (1960) reported his impressions of the BIE system of supervision in interview training of therapists. Amazed at how easily the device was adapted to by both student and supervisor, Ward indicated student preference for nodal intervention (supervisor reaction at only important junctures) and dynamic formulations (students are left to formulate dialogue and action in response to prompt). Further, he reported that the device provided an increase in the involvement relative to the student-teacher aspect of training. "We feel no longer bound to the passive agony of mere listening and can now effectively direct, focus, and teach creatively in *status nascendi*" (p. 358).

Goslan (1975) cited efforts by Sanders (1966) and Carlson (1974) using the BIE device in counselor training. Sanders found the bug to be a useful aid in training for interviewing, testing, and psychotherapy techniques. It was particularly useful at the early stages of training and when specific techniques were being taught. Carlson found that significant change occurred in his experimental group of counselor trainees trained via the BIE to increase verbal empathy.

Boylston and Tuma (1972) and Cohn (1973) discussed advantages and disadvantages of using the BIE device in counselor training situations. Both the Boylston and Tuma and the Cohn articles addressed several advantages,

most significantly the aspect of additional support to the trainee in the clinical setting. They concur in the belief that since the supervisor is immediately available to a therapist–trainee when the BIE device is used, the supervisor provides support so that the trainee is able to be more relaxed, spontaneous, and communicative. Further, it was suggested that the trainee was aided in dealing with difficult situations which he might otherwise mishandle. Cohn states, "In those tense moments when he (the trainee) cannot think of anything to say or any direction to take, the supervisor, if he chooses, can help" (p.62). In their discussion of disadvantages, Boylston and Tuma included the need by the trainee to have confidence in the supervisor or the trainee will resist either by not following the instruction offered or by following them in a robot–like manner. Further, with the use of the "bug", the trainees tend not to develop their own style, but emulate that of the supervisor. Finally, it was indicated that use of the BIE device increases demand on supervisory time.

Goslan's 1975 investigation revealed that the BIE device facilitated counselor growth on four measures – empathy, concreteness, confrontation, and immediacy. Goslan reported that the BIE can aid the instructor/supervisor in the training of students during the practicum process. In addition, it was reported that supervisors were positive toward the use of the BIE and preferred to utilized short statements to provide direction, reinforcement and to enhance the extent of counselee exploration.

Baum and Lane (1976) reported that the BIE system permitted the instructor to provide both corrective feedback and reinforcement to students learning to administer the Wechsler Intelligence Scale for Children at the very moment they believed it was likely to be most effective. In addition, these corrected behaviors were then more fully developed during a second observation and completely developed by the third observation. Students reported that the support and reinforcement provided by their instructor diminished their initial anxiety and helped them pinpoint the skills they needed to further develop.

An experimental study was conducted by McClure and Vriend (1976) with fourteen master's degree students training in guidance and counseling and two trainers using the BIE device. This study revealed the following results:

- 1). both abbreviated and extended cues are effective;
- 2). there was no preference for either cues translated or repeated word-for-word by the trainee – both were appreciated as helpful;
- 3). frequency of cues was regulated by the context of the counseling session;
- 4). adverse affects upon the clients who were exposed to the absentee-cuing system were negligible – five of the 84 sessions reported some client inhibition which

was concluded to be more a response to trainee behaviors than the absentee-cuing system; and

- 5). the subjects displayed no important reluctance or resistance to being absentee-cued and the actual experience of being absentee-cued during six counseling sessions produced no meaningful dependence upon the system.

Medical educators, according to Hunt (1980), have come to place increasing importance on the need for explicit training in interviewing strategies. Traditional methods of teaching these skills (observation, simulation, programmed instruction) have left a gap between the simulated experience and the first live patient interview. In order to address this deficiency in the interview skill training of doctors, Hunt studied the impact of a BIE system on both patient and student. He found that the technique allowed for immediate feedback and corrective suggestions. The BIE was found to be not overly disruptive in the interview experience and provided a useful bridge between simulation and reality.

The findings of Hunt were echoed by Salvendy (1984), who discussed the advantages and disadvantages of using the BIE to improve interviewing techniques of psychiatric residents (mostly juniors). Salvendy reported that the

single most decisive factor in the efficacy of the BIE teaching method is the quality of the relationship between the interviewer and the supervisor.

Behavior Modification. In each of the articles which discuss the BIE in parent-child communication and/or behavior modification, the device was described as being used to permit immediate therapeutic intervention, based on direct observation of an on-going relationship.

Welsh (1966) provides a case study where he applied the BIE in a parental counseling context. He reported a list of advantages to using the BIE system which included: permitting immediate reinforcement of appropriate behavior; allowing the therapist to immediately correct distortion of his message; control of parent-appropriate behavior is optimum; and change is rapid – the technique is highly efficient.

Wimberger, et al. (1974) suggests that the one-way communication system does not interfere with the basic qualities of the parent-child communication and, in fact, produces increased interaction between the therapist and the mother. Further, it was reported that the most effective use of the "bug" was through three types of intervention: reinforcement, modeling, and teaching.

Gordon and Kogan (1975) studied the effect of the BIE with a group of 30 mother-child dyads. Although the investigators reported mixed results,

some of the mother-child dyads did make significant behavior changes. The inconclusive results were explained by the authors as perhaps resulting from the clinical aspects of the research; namely, each dyad was in essence dealt with individually with the program tailored to each one's unique needs.

What appears to be most interesting to this investigator in the Gordon and Kogan study was the inclusion of the pre-observation conference, followed by an observation, and then the post-observation conference format, similar to that found in teacher training. In 10 weekly sessions, the investigators conducted a "pre-session" meeting where concerns expressed by the mothers were revealed and specific alternate behaviors were outlined. Then, through a one-way mirror, the investigator observed an on-going interaction between mother and child giving specific guidance to the mother via the BIE device. Later, the goals of the training session were reviewed and clarified with the mothers and opportunities for using the same procedures at home were discussed.

Domoto, Weinstein, and Getz (1979) investigated the value of remote broadcasting equipment (BIE) in instruction in pedodontics. The focus of the study was teaching child behavior management techniques to junior and senior dental students. Although results were inconclusive due to the small sample size, they did indicate the usefulness of the strategy. Students, initially fearful that the "bug" might be distracting and interfere with their work, found the BIE

helpful; confidence in child management increased. Of significance, the authors note the importance of the immediacy of feedback permitted using the BIE technique.

In-Service Teacher Training. Training teachers in effective behavior modification strategies most frequently consists of in-service workshops or classes where training is conducted in groups rather than individually. Bowles and Nelson (1976) conducted a study to investigate the impact of the BIE technique used in conjunction with the workshop approach. The study revealed that classroom teaching behaviors – praise and contingency statements – were enhanced in those teachers who received direct intervention, two-hours of BIE training in their own classroom. The authors concluded that the BIE was an effective means for providing immediate feedback to teachers.

More recently, van der Mars (1988) replicated an earlier study which focused on the use of positive feedback by a physical education student teacher (van Der Mars, 1987). In this study, prerecorded cues (at a mean rate of 2 per minute) were heard during a teaching session via a microcassette recorder; the investigator was not present. The study included a single subject, an experienced physical education teacher, who was cued for two target behaviors: positive behavior feedback and specific positive skill feedback. Van der Mars concluded the following:

1. audio-cuing as a primary intervention strategy can change significantly the use of positive behavior feedback and positive specific skill feedback by an experienced physical education teacher;
2. lasting effects are variable across verbal teaching behaviors;
3. changes in verbal teaching behaviors can be established quickly and efficiently using audio-cuing; and
4. audio-cuing can alter at least two verbal teaching behaviors simultaneously.

Pre-Service Teacher Training. The concerns which prompted the studies and articles cited above from areas outside of teacher education, are repeated within the halls of colleges, schools and departments of education as well. In teacher education, the training and supervision of student teachers has become a focal point for teacher educators due to the increasing emphasis on clinical and field experiences.

The bug-in-the-ear device has been the subject of just three studies of pre-service teachers (van der Mars, 1984, 1987; O'Pry and Paese, 1987; Giebelhaus and Cruz, 1992) to reinforcing effective teaching and management skills, skills which can be learned, during the supervision process. In the first

van der Mars study (1984) and in the O'Pry and Pease (1987) studies, immediate and simultaneous intervention, feedback, and reinforcement was provided to participants in very specific pedagogical areas.

The van der Mars study (1984), using three subjects, investigated the effect of periodic prompting via the wireless radio on physical education student teachers. The focus was to increase specific teacher behaviors in a gymnasium, team-teaching environment. During this initial study by van der Mars, the prompter gave the verbal cues to the student teacher and all sessions were video-recorded. Student teacher participants noted that: an increased awareness of what was happening around them while teaching; receiving cues to attend to "marginal aspects of the lesson" was very useful; and receiving praise while teaching made them "feel good, and feel "more confident". They also noted that sometimes cues confused them when they were thinking about matters other than those which the cue addressed. Further, van der Mars reported that periodic prompting resulted in limited increases in the rate of positive skill feedback used and the rate of pupil's first name used by student teacher. Further, some prompted student teaching behaviors did not increase. Finally, it was reported that the BIE did make student teachers attend to organizational aspects of teaching and made student teachers more aware of the total classroom environment. Various limiting factors were noted including sample size and the team-teaching situation.

The O'Pry and Paese study (1987), utilized a single subject design across behaviors. The subject was first observed to provide baseline information regarding the target skills. An intervention phase followed which consisted of regularly spaced auditory beeps. The subject had been previously instructed to provide the class or student with either specific or general positive feedback at the sound of the beep. Finally, seven days following the intervention phase, a two day post check was conducted to determine maintenance data. Results indicated an increase in the use of specific teacher process skills with the audio-cuing intervention strategy, but could not report statistical significance.

The 1987 Van der Mars study examined the effect of periodic prompting with the use of positive feedback by a physical education student teacher. In this study, just as in the latter study previously noted, prerecorded cues (at a mean rate of 2 per minute) were heard by the student teacher during a teaching session via a microcassette recorder; the investigator was not present. The study included a single subject, a physical education student teacher, who was cued for two target behaviors: positive behavior feedback and specific positive skill feedback.

Finally, an exploratory study by Giebelhaus and Cruz (1992), examined the effect and effectiveness of the BIE intervention strategy using two elementary education student teachers and their cooperating teacher where the

BIE device daily for a period of seven weeks. No predetermined areas of focus were targeted in this investigation. During the seven week period, it was reported that student teachers were prompted for instructional behaviors, classroom management skills, and content information. Student teachers reported greater self-confidence while using the BIE, as well as better communication before, during, and after lessons where the BIE intervention strategy was used. The cooperating teachers reported greater involvement in the student teaching-learning process, noting that more focus and direction was achieved in both pre-observation and post-observation conferences as a result of using the BIE device. Although time considerations limited the amount of use the university supervisor had with the BIE, all members of the student teaching triad reported satisfaction with the device.

Conclusion In each of the cited studies and articles there seems to be a thread that runs throughout: in the context of supervision, regardless of the field, the learning process is constrained by the inability of traditional supervision strategies to provide simultaneous and immediate feedback and reinforcement to the trainee. Nyquist and Staton-Spicer (1979), after reviewing available "bug-in-the-ear" studies, concluded that the basic assumptions underlying a technique which would allow for simultaneous feedback are:

1. "... that intervention in the midst of an interaction is preferred to intervention after the fact"...
2. "... that verbal messages can enable individuals to adapt or modify their behavior instantaneously"... and
3. "... that individuals can attend to two sets of verbal stimuli in rapid succession." (p.10)

Teacher Clarity

Introduction

Numerous current thorough reviews of the literature related to teacher clarity are available, including those done by Cruickshank & Kennedy (1986), Hamilton (1988), Hines (1983), Metcalf (1989), Williams (1983) and others. Each begins by describing the earlier reviews of Rosenshine (1971) and Rosenshine and Furst (1971) and then traces the development of research linking teacher clarity as a tenable variable related to desirable student outcomes. This review of teacher clarity research, however, does not look at the genesis and development of teacher clarity research which has been well documented, but rather will focus on research related to just one aspect of the teacher clarity research: the usefulness of teacher clarity as an observable and measurable instructional variable in natural classroom settings. Therefore, the question which will guide this review of the teacher clarity literature is, Can teacher clarity behaviors be observed and measured?

Can teacher clarity behaviors be observed and measured?

Metcalf's (1989) thorough review of the literature regarding teacher clarity research considers, in addition to numerous other study questions, an

examination of whether or not instructional clarity can be observed and measured. His search of the literature revealed five studies which directly or indirectly addressed the issue of observability and measurability (Hamilton, 1988; Hines, 1981; Hines, Kennedy, & Cruickshank, 1985; Larsen, 1985; and Williams, 1983), as well as instrument development. A search of the literature by this author revealed no additional studies which address this issue either directly or indirectly.

The Hines (1981) investigation contains the development and reliability of several instruments, including the Clarity Observation Instrument (COI) used by two trained observers as they viewed 23 videotaped teaching sessions. These teaching sessions, using controlled content via Reflective Teaching Lessons (Cruickshank et al., 1981), are clinical, laboratory peer teaching sessions. The observation instrument is divided into two parts to record both frequency of use (Section I) and item ratings (Section II). The instrument contains 29 statements describing teaching behaviors, 28 of which were derived from specific low-inference behaviors identified in previous clarity research (Bush et al., 1977; Kennedy, et al., 1978). In Section I, frequency counts are obtained for eighteen low-inference behaviors, while in Section II, ratings on a Likert-type scale are determined on eleven low-inference and three moderate- to high-inference clarity behavior statements.

Results indicated that the Clarity Observation Instrument was highly reliable. Observer measures disclosed a generalizability coefficient of .97 for both frequency and ratings.

Overall, the reliability estimates for the observed measures contained in the Observation Instrument were high, indicating the high level of consistency of the measures in differentiating between teachers and their generalizability over teachers, behaviors, and observers. (p.239)

Similar reliability estimates were replicated for the Clarity Observation Instrument by Hines, Kennedy and Cruickshank (1985).

In a study of the stability of teacher clarity, Williams (1983) uses trained observers and an adaptation of the Clarity Observation Instrument developed by Hines (1981). Like Hines (1981) and Hines et al. (1985) controlled content via Reflective Teaching Lessons (Cruickshank et al., 1981) are taught by preservice teachers to small groups of their peers. The observation instrument was adapted to the specific lesson content taught. Williams found that the overall reliability estimates for the instrument indicated a high level of consistency over teachers, behaviors, and observers.

Using a greatly modified version of the Hines (1981) instrument, Larsen (1985) attempted to reduce the time needed to train observers. This study

looked at the relationship between teacher clarity and student achievement in natural classroom settings with 32 mathematics student teachers. Unlike the Hines (1981) instrument in which the frequency of eighteen low-inference behaviors was recorded, Larsen's instrument included a five point Likert scale to rate each of the eighteen behaviors and all moderate to high inference behaviors were eliminated (Section II). This modified version, used with student teachers in natural classrooms, was also found to be a reliable method of evaluating teachers' use of clarity behaviors.

Hamilton (1988) investigated the observability and measurability of teacher clarity using a modified version of the Clarity Observation Instrument (Hines, 1981). This study differed from those previously mentioned in that the video-taped lessons viewed by trained observers represented all grade levels and all subject areas in natural classroom settings. The modified instrument contained 35 items in two parts; while Part Two remained basically intact, Part I was changed to incorporate seven additional low-inference behaviors identified as prime discriminators from Kennedy, et al. (1978). Hamilton reports high internal reliability of the modified instrument, coefficients ranging from $r=0.75$ on low-inference frequency measures to $r=0.91$ on moderate- to high-inference ratings. Further, using log-linear analysis, Hamilton reports that subject matter (content) had no significant effect on clarity.

Conclusion

The study of teacher clarity has become very productive in the past twenty years. Contributions to the line of inquiry include Armaline (1985); Bush (1976); Bush, Kennedy and Cruickshank (1977); Gloeckner (1983); Hamilton (1988); Hines (1981); Hines, Kennedy and Cruickshank (1985); Kennedy, Cruickshank, Bush, and Myers (1978); Larsen (1985); Metcalf (1989); Rosenshine (1971); Rosenshine and Furst (1971) Williams (1983) among others. These studies reveal that teacher clarity "has been found to bear a significant, positive relationship to student learning and satisfaction from elementary grades through the university" (Metcalf and Cruickshank, 1991).

This review of clarity research, however, has taken a much more narrow focus. It examined studies which looked either directly or indirectly at whether or not teacher clarity behaviors can be observed and measured. This analysis examined five studies (Hamilton, 1988; Hines, 1981; Hines, Kennedy, and Cruickshank, 1985; Larsen, 1985; and Williams, 1983) first identified by Metcalf (1989). This analysis confirmed Metcalf's conclusion that, on the basis of these studies, teacher clarity behaviors can reliably be observed and measured. No additional studies could be found that addressed this issue in teacher clarity research.

Each of the studies indicate that reliability holds across low-, moderate-, and high-inference measures of clarity using either the Hines (1981) instrument

or adaptations of it. Modification of the Clarity Observation Instrument (Hines, 1981) has been executed to facilitate training of observers (Larsen, 1985), to assimilate different content (Williams, 1983), and to make it more useful in the context of the natural classroom (Hamilton, 1988).

Although most of the research has been conducted in clinical, laboratory settings using controlled content lessons, precedent was established that such observations and measurements can be conducted in the context of the natural classroom (Larsen, 1985; Hamilton, 1988). Hamilton's (1988) investigation consisted of an analysis of 116 video-taped recordings of teaching sessions in natural classrooms. Among other findings, Hamilton reported that teacher clarity is not dependent on content; the data analysis revealed no significant difference due to subject area.

Supervision

Introduction

The intent of this section is to provide the reader with an overview of the literature related to instructional supervision by the cooperating teacher during the student teacher field experience. This supervised teaching experience, as the culmination of the preservice teacher education program, is considered by many to be the most influential aspect in the education of prospective teachers. The need to provide a systematic method of corrective and helpful feedback, as well as reinforcement, during the supervision of student teachers has long been recognized.

In 1973, Cogan developed a clinical supervision model which constituted the first systematic approach to the improvement of classroom instruction. Basically, Cogan's clinical supervision model includes the following eight phases:

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; and
8. renewed planning.

Reavis (1976) noted two more aspects upon which the clinical supervision model is based: first, the necessity of direct feedback to the teacher on aspects of his or her teaching; and second, that the focus of the observation be an area of concern to the teacher. Traditionally, Cogan's eight-phase cycle of clinical supervision, or one of many adaptations to include the Reavis contributions, is followed by colleges and universities across the country in order to provide effective supervision.

Student teaching has been viewed as critical in the development of preservice teachers' pedagogical skills. As Cruickshank and Armaline (1986) noted, "Even where teacher education has been under direct attack in states such as Arizona, California, Florida, Georgia, New Jersey, South Carolina and Texas, critics maintain the value of teaching practice prior to certification" (p.35). Preservice teachers hold practice teaching in high regard and as Silberman (1971) noted that teachers generally are among the strongest proponents of student teaching. Still, student teaching has not lived up to its potential.

According to Hoover, O'Shea and Carroll (1988) one major limitation to successful development of teaching skills by the student teacher is the

communication among the teacher educator, cooperating teacher and the student teacher (the student teaching triad). The lack of clear communication among members of the supervision triad accounts for problems associated with the traditional supervision model. Griffin, Barnes, Hughes, O'Neil, Defino, Edwards, and Hukill (1983) reported that the university supervisor and directing teacher rarely agreed upon or even articulated policies and practices which would guide student teaching. This lack of communication negatively impacts the nature and the development of essential pedagogical skills (Zeichner, 1980).

Further, the bulk of research on influencing factors during student teaching point to the cooperating teacher as the strongest influence on the student teacher's learning (Boydell, 1986) even to the extent of "negating what students have learned from their college courses when it runs contrary to the judgements of the cooperating teacher" (Emans, 1983, p.14–15). Additional research indicates that cooperating teachers have the greatest influence on student teachers success or failure in the classroom. Funk and Long (1982) reports that student teachers indicate cooperating teachers as "most significant", while Yates (1982), in a survey of over 500 student teachers in England and Wales, reports that cooperating teachers are not only of greater help than college supervisors, but that the evaluations by cooperating teachers are more valid.

These studies and others suggest that the relationship between the cooperating teacher and the student teacher is critical. Two questions, therefore, emerge: What cooperating teacher behaviors and skills are necessary to provide an effective formative experience for the student teacher? and What do we know about the nature of feedback from cooperating teachers during student teaching? These two questions will be addressed specifically in this section of the review of related literature.

What cooperating teacher behaviors and skills are necessary to provide a formative experience for the student teacher?

Despite the importance of and focus on the cooperating teacher, well documented in the literature, there has been little research conducted examining the role and performance of the cooperating teacher as an instructional supervisor. Some reports have shown that student teachers look for empathy and understanding first (Karmos and Jacko, 1977), leading one to infer that survival in the complex context of student teaching enters the picture before acquisition and mastery of specific teaching skills. Although this aspect still comes into the picture, other cooperating teacher characteristics and skills have surfaced as more important to student teachers in their professional development.

The O'Neal (1983) study examined the feedback of and evaluation by cooperating teachers. It was reported that cooperating teachers tend to describe and explain teaching, focusing on how to use specific instructional materials and methods. The concern was towards guiding student teachers towards competence in lesson planning, classroom management, and lesson delivery.

Copas (1984) conducted a study of critical events observed and reported by 476 elementary education student teachers gathered from 31 southern institutions. These events were to focus on the role of the cooperating teacher to determine the requirements which impact the development of student teachers, both positive and negative. The analysis of these 1,490 incidents resulted in 28 categories – concrete behaviors found to be critical in the professional development of student teachers. More than half of the total critical behaviors of cooperating teachers reported are in two sub-categories "Guiding Behaviors" (29.3%) and "Cooperating Behaviors" (27.1%). These two categories include such behaviors as working with student teacher to develop skills in planning, presentation, and classroom management, and guiding student teacher learning by conferencing and giving appropriate feedback during and after a lesson. Copas concludes that "cooperating teachers need to provide performance evaluations and correction to student teachers under their supervision" (p.54).

Similar results were reported by Seiferth and Samuel (1984) after a three year informal study to determine what student teachers saw as effective behaviors of cooperating teachers. The positive characteristic mentioned most frequently was "offered constructive criticism and honesty in positive/negative feedback", and following closely, the second most mentioned characteristic, gives "helpful suggestions in a tactful and polite way".

The need for meaningful feedback on one's performance to promote growth is necessary in any learning experience, including student teaching. Despite evidence to suggest that student teachers want and need constructive and critical feedback, it has been reported that cooperating teachers generally do not review the work of student teachers critically and avoid critical evaluations and negative remarks (Andrews, 1967; Lipke, 1979; Melnick, 1989; Tabachnick, Popkewitz, and Zeichner, 1980; and Zimpher et al., 1980). As the capstone experience in any teacher preparation program, student teaching is the time when prospective teachers are encouraged to demonstrate what they have learned about teaching and to continue to learn the "how" of teaching. Under the guidance of an experienced teacher, and to a lesser degree a university supervisor, student teachers become a member of the teaching force. Central to the process of professional development is the feedback student teachers receive, serving as both a vehicle for instruction and later evaluation (O'Neal, 1983).

What do we know about the nature of feedback during student teaching?

The feedback student teachers receive is considered critical in the student teaching process, yet little systematic investigation has been conducted. Just as previously noted, communication among the triad members, although important, is often missing. In addition, cooperating teachers and student teachers identify lack of communication as their most frequent problem (Southall and King, 1979; Seiferth and Samuel, 1984)). From the perspective of the student teacher, communication is feedback and such feedback is either directive (task-oriented) or non-directive (inquiry-oriented). Although these orientations are referred to using a variety of labels, the distinction between the two approaches to supervision feedback are noted throughout the literature (Copeland, 1982; Zeichner, 1983; May and Zimpher, 1986; among others). A cooperating teacher who takes a directive approach offers opinions and suggestions as he or she perceives are needed. "The intent ... is to offer immediate and useful advice for overcoming instructional difficulties" (Copeland, 1983. p. 32). Conversely, the non-directive approach uses questions to solicit information and opinions from the student teacher and to encourage the student teacher to make reflective suggestions.

Empirical evidence to support conclusions that one of these approaches to supervision over the other is more effective could not be found, but research does indicate that student teachers appear to have a preference for the manner

in which feedback is delivered. Copeland and Atkinson (1978) and Copeland (1980) report that student teachers have a clear preference for directive supervisory approach. This finding is supported by Griffin, et al. (1981) who suggested that student teachers, being required to demonstrate teaching competencies within a specified period of time in various contexts, need and want concrete, professional advice. They suggest that asking students to self-analyze, self-diagnose and self-evaluate using a non-directive approach to supervision is premature.

In a study of fifth year student teachers, Copeland (1983) reports that the more directive approach is preferred early in the student teaching experience (October), while later in the experience (MAY), student teachers prefer the more non-directive strategies. Copeland (1983) concludes that individual preference for supervisory behavior are determined by experience and level of confidence felt by the student teacher.

Conclusion

It appears from these cited studies, that the nature of feedback preferred by student teachers is directive – giving explicit, concrete suggestions and correction. If this is the preferred approach, then it follows that it will impact the professional development by changing behaviors. Cooperating teachers who

demonstrate skill in providing direct feedback in a helpful and "tactful" manner are important to student teachers in their professional growth and development.

SUMMARY

The intent of this study was to determine whether student teachers and their cooperating teachers can use a wireless communication system (BIE) to provide feedback on specific teaching skills during the teaching process. The immediate and simultaneous feedback on the teaching skill, teacher clarity behaviors, it is believed, will enhance communication and thus, improve the effectiveness of the feedback process. This chapter has reviewed the literature in three areas in an effort to present the background, rationale, and importance of the study. First, literature and research which described the use of the wireless communication system (BIE) in instructional supervision conditions was reviewed. The second section looked at the observability and measurability of teacher clarity, the outcome variable in the present study. The final section described what is known about the feedback which cooperating teachers' give to their student teachers. Several important conclusions can be drawn from this review.

Regarding the literature and research on the wireless communication system: The BIE system has been found to be an effective means of providing immediate and simultaneous feedback to supervisees during the practicum experience. Generally, what is perceived through the review of literature is that the learning process is constrained in the context of supervision, regardless of the professional field, due to the inability to provide meaningful, simultaneous, direct feedback and reinforcement. Although the BIE studies, drawn from various professional programs, have been small, each has described successful outcomes utilizing the bug-in-the-ear device, both in terms of the professional growth and the supervisor-supervisee satisfaction. The BIE literature has revealed that:

1. supervisees can attend to two sets of verbal stimuli
in rapid succession;
2. supervisees can adapt or modify their behavior
immediately upon receiving a verbal cue or prompt; and
3. an effective means of intervention in the midst of an
interaction rather than using the traditional delayed
feedback strategies is the wireless communication system
(BIE).

The second section of the literature review focuses on teacher clarity. The study of teacher clarity, very productive for the past twenty years, has revealed that teacher clarity has a significant, positive relationship to student learning and satisfaction at all grade levels and subject areas. This review of clarity research has examined studies which looked either directly or indirectly at whether or not teacher clarity behaviors can be observed and measured. The analysis examined five studies (Hamilton, 1988; Hines, 1981; Hines, Kennedy, and Cruickshank, 1985; Larsen, 1985; and Williams, 1983) first identified by Metcalf (1989) and has confirmed Metcalf's conclusion that teacher clarity behaviors can reliably be observed and measured. The studies indicate that reliability holds across low-, moderate-, and high-inference measures of clarity using either the Hines (1981) instrument or adaptations of it. On this basis, it has been determined that clarity behaviors can be used in the present study as the outcome measure.

Although most of the clarity behavior research has been conducted in clinical, laboratory settings using controlled content lessons, precedent has been established that such observations and measurements can be conducted in the context of the natural classroom (Larsen, 1985; Hamilton, 1988). Most recently, Hamilton (1988) analyzed of 116 video-taped recordings of teaching sessions in natural classrooms for occurrence of and skill with clarity behaviors. Among other findings, Hamilton reported that teacher clarity is not dependent

on content and the data analysis revealed no significant difference due to subject area. It is on the basis of these findings that it has been concluded that the context of present study will be the natural classroom with only limited control on content.

Finally, the last section describes literature which described the nature of feedback preferred by student teachers as being directive rather than non-directive, at least in the initial stages of student teaching. Students, it was shown, want and need explicit, concrete suggestions and correction. The impact of this preferred supervisory approach is changing teacher behaviors. In addition, the literature review revealed that cooperating teachers who demonstrate skill in providing direct feedback in a helpful and "tactful" manner are important to student teachers in their professional growth and development. Through this literature review, it was determined that the sample population for the present study should focus on only the cooperating teacher–student teacher relationship in the student teaching triad with regard to communication and feedback.

CHAPTER III

RESEARCH PROCEDURES

Introduction

The purpose of this study is to determine the effects of audio-cuing or prompting as a means of providing immediate correction, reinforcement and/or feedback on specific teaching skills through the use of the bug-in-the-ear (BIE) device to student teachers. A secondary purpose of this study will focus on the acquisition of the specific teaching skill known as teacher clarity behaviors (skills) as identified in studies reviewed by Rosenshine and Furst (1971) and later investigated by, among others, Hamilton (1988), Hines (1981), Larsen (1985), Metcalf (1989), and Williams (1983). Finally, the retention of the targeted teaching skills will be measured.

This chapter will provide a description of the research procedures used to achieve the general objectives listed above and to answer specific research questions submitted in chapter one. The research procedures are addressed under four major headings: a) sample; b) research design; c) instrumentation; and d) data analysis procedures.

Sample

The target population for the study was student teachers, regardless of grade/subject field placement assignment. The accessible population was student teachers who were enrolled in their last practicum experience required for Ohio state teacher certification in the Early and Middle Childhood Education Program during autumn quarter, 1992, at The Ohio State University.

For the purpose of this study, student teachers and their cooperating teachers selected for random sampling came from the elementary education program area. A list of cooperating teachers who would supervise student teachers during autumn quarter, 1992, was obtained from the College of Education. From that list, prospective participants were contacted by letter and personally in order to secure a sample from which 20 cooperating teacher supervisors and their student teachers could be drawn. Specific demographic information (i.e. teaching experience, previous student teaching supervision experiences, existence of course work related to student teaching supervision) was obtained from each cooperating teacher participant.

From the available sample, a random selection of 22 cooperating teachers and their student teachers was drawn. Cooperating teachers were stratified based on the employing school district. Participating cooperating teachers and their student teachers were then assigned through stratified random selection to one of two experimental groups, treatment or control.

The sample of student teachers included 21 females and one male. All were participants within the same elementary education cohort group and, therefore, had identical preservice field experiences and course work prior to student teaching. All but two of the student teachers intended to continue through the student teaching quarter in their respective school placement with a full year internship.

The cooperating teacher sample also included 21 female teachers and one male. Of the 22 teachers, three were assigned to sixth grade classes in middle schools, five to upper elementary self-contained classrooms (grades 4 and 5) and fourteen to primary self-contained classrooms (grades K-3). Thirteen of the teachers involved in the study were employed in one of two suburban school districts, while the remainder taught in an large urban school district. Teaching experience ranged from four years to twenty-two, with the mean of fourteen years. The student teaching supervision experience of the cooperating teachers ranged from no previous student teachers to nine, with a mean of two and the mode of one previous student teacher. Sixty percent of the cooperating teachers had no previous training in the supervision process used with student teachers while the remainder had some "in-service" training.

An important aspect of this study was student teachers working with children in the natural classroom settings. In order to ascertain an accurate picture of the affect of the BIE intervention with student teachers during their

final practicum experience, it was essential to observe real teaching situations. For the purpose of this study, therefore, student teachers were video-taped while presenting three lessons of their choice at spaced intervals in their student teaching experience: the first at two weeks; the second at five weeks; and the third at eight weeks. Student teachers were directed to choose for video-taping expository lessons, that is, those lessons which are primarily teacher centered and directed, lasting from 20–35 minutes.

The sampling procedure was conducted as efficiently and effectively as the usual constraints of experimental research in a naturalistic setting would allow. This sampling procedure represents a considerable deviation from earlier studies by Hines (1981), Williams (1983), and Metcalf (1989) where the focus was clarity behaviors of college students working with small groups of peers in controlled laboratory environments. This departure from previous study methodologies was prompted by two exploratory studies (Giebelhaus and Cruz, 1992; and Giebelhaus, 1992). These studies indicated the feasibility of BIE use in the natural classroom. In addition, the Hamilton (1988) study gave precedent to using a natural classroom context and lesson content when measuring clarity behaviors. Finally, it was the expressed purpose of this study to examine the effect of the BIE intervention strategy with student teachers while engaged in their final practicum experience.

Research Design

The experimental research design of this study can be described as a one-between groups, one-within subjects repeated measure design and is represented using the design notation of Kennedy and Bush (1985) shown in Figure 1 below.

Using this notation, A represents two levels of treatment, S represents 10 levels of subjects (cooperating teachers) with one student teacher and B represents repeated measure (three omnibus clarity measures – pre-, post-, and delayed).

The critical research question for the study was whether or not student teachers who receive audio-cuing via the BIE device demonstrate greater acquisition of clarity behaviors than those who do not. The primary (manipulated) independent variable was the treatment effect observed at two levels, A_1 and A_2 .

A_1 : Student teachers (S) who do not receive periodic audio-cuing via the wireless communication device (BIE) with regard to teacher clarity behaviors, but undergo the same intensity of observation.

Figure 1
EXPERIMENTAL DESIGN FOR THE STUDY

Cooperating teachers receive the same instruction in the supervision process and in the target skill.

A₂ : Student teachers (S) who receive periodic audio-cuing via the wireless communication device (BIE) with regard to 14 specific teacher clarity behaviors. Cooperating teachers, who administer the cues, and received instruction in both the target skill (the 14 clarity behaviors) and the use of the BIE, as well as the supervision process.

Cooperating teachers were contacted prior to the arrival of their student teachers. Initial meetings were conducted in the week prior to the start of the school year and during the first week of school. During these meetings, cooperating teachers received approximately two and one half hours of training in the areas of university expectations for student teachers, procedures for the student teaching experience, cooperating teacher responsibilities, and the supervision process. In addition, the treatment group cooperating teachers received specific instruction in the target skill (observation and identification of clarity behaviors) and the use of the "bug-in-the-ear" system.

Prior to BIE intervention period, the first of three video-taped lesson observations was obtained (B_1). These scores represent the pre-test score for each subject.

Following this observation, the experimental group of 11 cooperating teacher/student teacher dyads (B_2) began the treatment phase. This phase of the study was conducted over 10 days, where the dyads were instructed to use the BIE intervention a minimum of once a day for 7 of the 10 days. During this treatment period, the cooperating teacher noted the number of times (when) the BIE device was used, what cues were given, and if those cues were responded to by the student teacher (The Teaching Skills Observation Sheet, Appendix A). The control group conducted business as usual, no special instructions were given for this period, except for routine observations. Both groups of cooperating teachers completed a reflective journal entry during the treatment period.

This two week period was followed by the second video-taped lesson observation (B_2) of all student teachers in the study.

The null hypothesis for this research question was that for the dependent variable (teacher clarity), no significant difference could be attributed to the BIE intervention. The intention of this study was to contradict the null in favor of the treatment group (A_2); that is, the clarity behaviors of student teachers in

the context of the natural classroom can be enhanced with the use of BIE intervention.

An additional measure was taken to determine whether or not the clarity behaviors were lasting when the BIE intervention was withheld. The score received on the delayed observation video-tape (B_3), indicates retention of the target behavior.

Proficiency in presentation of the target behavior by the student teachers serve as scores for all subjects. These measures (B_1 , B_2 , and B_3) represent the mean of two independent rater scores for each moderate- and high-inference score for each subject.

The study was conducted during seven weeks, in four phases. During the first phase – PRE-TEST – each subject was observed for 20 to 35 minutes during the presentation of a teacher centered lesson. This initial lesson observation was conducted and video-taped during the second week of the student teaching experience, one week prior to the treatment period. It was conducted to gain baseline information on the observed proficiency of teacher clarity behaviors (PRE-TEST).

Phase two, the treatment period, was conducted during the third and fourth week of the student teaching experience (10 days). During that period, all students were observed each day for approximately 20–45 minutes by their cooperating teacher. After each observation, a traditional post-observation

conferences was conducted. In addition, the BIE intervention group (A_2) was cued on the 14 specific teacher clarity behaviors during seven of the ten observation days; the type of cue as well as the frequency of cues were recorded on an observation instrument by the cooperating teacher.

Phase three was conducted the week following the treatment period, the fifth week of student teaching. This 20 to 35 minute observation (a teacher centered lesson), was video-taped for later review by trained raters to determine the outcome of the treatment (POSTTEST). During this observation, no intervention using audio-cuing was used. No further BIE intervention was utilized.

Phase four was conducted during the eighth week of the student teaching experience, seven weeks after the initial observations. During this final follow-up observation, a teacher centered lesson chosen and taught by the student teacher was video-taped for later review by trained raters. Presentation of the lesson was observed and rated by cooperating teachers.

Each of the lesson observation sessions was conducted in the same basic manner:

1. The cooperating teacher conducted each observation;
2. The lesson to be observed was determined prior to the actual observation session (pre-conference). The pre- and post-test lesson, as well as the follow-up observation

lesson, were selected on the basis of two guidelines. Student teachers were directed to select for observation and video-taping lessons which:

- a) would take between 20–30 minutes to present; and
 - b) were primarily teacher-centered/directed;
3. For the treatment group only, the frequency of audio-cues or prompts utilized during the treatment period and the student teacher's response would recorded; and
 4. A traditional post-observation conference utilizing a specified format which did not necessarily focus on the specific teacher clarity behaviors were conducted with all subjects.

All video-tapes were viewed and scored by two independent rater pairs, trained in the field of teacher clarity behaviors. The mean of those scores were the overall clarity skill measures analyzed (B_1 , B_2 , and B_3).

Instrumentation

The development and modification of instruments was a critical component of this study. Four instruments were used to collect the data, two

of which had been tested for validity and reliability in previous teacher clarity investigations. The clarity behaviors employed on the original observation instruments (Hines 1981, Hamilton, 1988) were not all included on the instruments used in this investigation. The modification addressed fourteen of the original 28 clarity behaviors which would accommodate the use of short, concise cues (Figure 2). In addition, the wireless communication device (BIE) was used as the intervention strategy. Each of these instruments will be discussed below.

The Teaching Skills Observation Sheet

The Teaching Skills Observation Sheet (TSOS) indicates time intervals and specific clarity behaviors (Appendix A). A similar instrument was first utilized by Metcalf (1989) and later redesigned to incorporate interval sampling measures (1992, in press). The modification of these original instruments which resulted in the TSOS used in this study incorporated the both interval sampling and codes used in Metcalf (1989) and added the capability of noting kind and quantity of cues employed. Further, the TSOS eliminated those teacher clarity behaviors which did not accommodate short, precise cues via the BIE device.

Code	Cue	Description
C1	Give Objective	Informs students of the lesson objective
C2	Important Points	Points out what is important for students to learn
C3	Repeat _____	Repeats things which are important
C4	Use Board	Writes important aspects on the board, chart, etc.
C5	Summarize	Summarizes material presented to the class
C6	Give Example	Makes use of verbal, written or practical examples
C7	Demonstrate	Works through examples on the board and demonstrates the procedure to be used
C8	Explain	Tells students the meaning of the word/words with which the students may be unfamiliar
C9	Rephrase	Repeats things students do not appear to understand
C10	Pause	After explaining some aspect of the instructional content, the teacher pauses to allow students to think about it
C11	Ask Questions	Asks questions to check students' understanding
C12	Wait Time	Allows students time to ask questions
C13	Practice Time	Provides opportunities for students to practice or work examples
C14	Check work	Examines students' work

Figure 2
CLARITY SKILLS/CUES FOR THE STUDY

The TSOS provided descriptive information only. It was utilized by the treatment group during phase two, the treatment period, to record the quantity and kind of cues given during BIE intervention. Cooperating teachers were introduced to the instrument and trained in its use during the initial BIE training session. No reliability or validity was needed due to the purely descriptive nature of the information it yielded for the study.

The Clarity Observation Instrument: Sections I and II

Teacher clarity behavior ratings are the measurements used for analysis in this study. Although not the main focus of this study, teacher clarity was selected as the tool to measure the effect of the BIE intervention. This decision was based on the record of research into teacher clarity as an aspect of effective teaching and to the long-standing tradition of inquiry into teacher clarity conducted at The Ohio State University. The following discussion, therefore, is provided as explanation for selection and adaptation of the Clarity Observation Instrument (COI) first developed by Hines (1981) and later modified by Hamilton (1988). Appendix B presents the modified form of the Hamilton (1988) instrument, itself adapted from Hines (1981), and different only in Section I and II where certain low- and the corresponding moderate-inference behaviors were eliminated. Appendix C provides an operational

definition for the behavioral items included on the Clarity Observation Instrument and the appropriate cues for each.

The original COI (Hines, 1981) was developed for use with trained raters of video-taped lessons of preservice teachers working with a small group of peers in a laboratory setting using controlled content lessons. Several studies followed the Hines study and incorporated the same instrument with little or no modification (Hines, Kennedy and Cruickshank, 1985; Williams, 1983).

Rather than counting frequency of occurrence on each of 18 dimensions of teacher clarity, Larsen (1985) devised a moderate-inference Likert-type scale. The original Hines instrument was modified to use with audio-recordings of a mathematics-oriented lesson (controlled content) presented by preservice teachers in the context of a natural classroom.

Hamilton (1988) took aspects of both the Hines (1981) instrument and the Larsen (1985) instrument so that both low- and moderate-inference scores could be determined from video-recordings of student teachers in natural classroom settings. Further, an additional high-inference rating of overall or omnibus teacher clarity skill was included. The video-taped recordings of lessons conducted in natural classrooms did not control for content, subject, or grade level taught.

In determining which if any of these instruments would be utilized for the present study, it was determined that the Hamilton (1988) study instrument was best suited to ascertain the desired information given the sample, context of the study, and lack of lesson content controls. Although the Hamilton instrument included frequency counts of 25 low-inference teacher clarity behaviors (up from the original 18 behaviors noted by Hines, 1981), the present study utilized just fourteen of the behaviors. The Hamilton addition of 18 to 25 behaviors was effected by the research design which looked at natural classroom teaching occurrences rather than contrived laboratory teaching experiences. For the present study, however, through informal trials, it was determined that only 14 of the 25 low-inference teacher clarity behaviors could be cued using the short, concise statements necessary for the BIE intervention strategy. Only those 14 low-inference teacher clarity behaviors which could be cued during BIE intervention, therefore, were included on the present instrument.

Rater Training: Training for use of this instrument by raters was conducted during six two hour sessions during autumn quarter, 1992. Raters, candidates for doctorate in teacher education and having similar public school teaching experiences, had some familiarity with the line of inquiry on teacher clarity behaviors and with the fourteen discrete skills prior to the initial training. In

addition, the raters had received, read and used parts of the Clarity Training Manual (Metcalf, 1989) which operationalizes the specific skills and gives recognition experiences for each of the included teacher clarity behaviors prior to the training sessions. During the training sessions definitions were discussed, Teacher Clarity Training Video-tape (Metcalf, 1989) was viewed and discussed, and sample lesson tapes were viewed, rated and compared.

Through group viewing of several student teacher tapes, these sessions provided discussions which established common operational definitions of skills listed on the instruments and guidelines for recognition of discrete behaviors exhibited by student teachers while teaching in a natural classroom context. After each of the sessions, the raters viewed and rated independently video-tapes of student teachers. These independent ratings were compared for interrater reliability on the discrete skills as well as the omnibus measure using the Harris (1986) reliability formula. Raters established a 76.33% interrater reliability rating for the fourteen discrete items and 100% interrater reliability for the omnibus measure. The interrater reliability of rater dyads was also assessed. One pair, from this point on will be referred to as Rater Pair #1, established an interrater reliability of 77.5% during the training session, while the second dyad, referred to as Rater Pair #2, established an interrater reliability level of 78.25% during the training session. As a result of

these ratings, the mean of the two scores was chosen to be the measure of analysis.

Following these training sessions, two stratified random selections which included all of the fifty six lessons gathered from the study were scored individually by rater dyads, that is two raters were randomly assigned to one set of approximately half of the lessons and two raters to the other half of the lessons. Raters scored all tapes independently. During these independent ratings, one video-taped lesson was viewed and scored by all four raters. On this common tape, Rater Pair #1 maintained their reliability level at 75% while Rater Pair #2's interrater reliability level fell to 68.7%. Because Rater Pair #2 did not maintain the acceptable level of interrater reliability of 75% (Harris, 1986), it is believed by this investigator that the more valid analysis will be that which is conducted using Rater Pair #1 measures rather than the mean or combined measures. Both the combined rater analysis, referred to from this point forward as Rater C and the Rater Pair #1, referred to as Rater 1, analyses are, however, in Chapter IV.

Cooperating Teachers Reflective Log

Cooperating Teachers Reflective Log was developed for use after the post-observation conference (Appendix D). It was designed to allow the cooperating teacher to record information regarding the focus of the

conference, the types of feedback given, and outcomes and/or suggestions made. Further, anecdotal notations could be made by treatment group cooperating teachers on the effectiveness of the BIE intervention device and strategy. This instrument was to provide supplemental descriptive information only. Although the general format was the same, two forms of the instrument were utilized: one for the experimental group which makes direct reference to the BIE intervention and one for the control group which does not make reference to the BIE intervention.

Cooperating teachers, encouraged to follow the general clinical observation guidelines put forth by Glickman (1990), Cogan (1979) and others, generally, followed the following format regarding post-observation feedback conferences:

- a) what was observed – lesson content, activities, interaction with and among students, etc.;
- b) what strengths the student teacher displayed; and
- c) areas where improvement may be warranted, using specific examples and/or suggestions.

Student Teacher Response Form

This form was developed to obtain reaction from each of the student teachers in the experimental group regarding the BIE intervention strategy.

The form was given to each student teacher who was instructed to complete it and mail it back without indicating their name, the name of their cooperating teacher, or school site placement. It was used after completion of the study to gain some insight as to the overall impressions student teachers had of the intervention strategy. Reactions were recorded through responses to several Likert-type questions, as well as narrative responses to several open-ended questions (Appendix E).

The study was conducted during the second through ninth week of a student teaching intern experience, autumn, 1992. Collection of the instruments and video-tapes (all raw data) from cooperating teachers occurred at the end of the each phase of the study.

Data Analysis

The study was comprised of a one between, one within repeated measure experimental design. Nineteen of the original twenty-two subjects were included in the analysis. This section describes the specific data analysis procedures used in the study. The results of these procedures are reported in Chapter IV.

Study Hypothesis One:

Student teachers who receive audio-cuing or prompting during the teaching process can effect immediate change in their teaching behaviors.

Since the study was conducted in a naturalistic setting, a summary of the descriptive data gathered from the Cooperating Teacher "Post-Observation Conference Log" was presented using direct quotations capturing the participants' perspective and experiences. In addition, participant self-reporting gave the researcher an indication as to the overall practicality of the BIE intervention strategy used during the supervision of student teachers. Frequency of cues during treatment observations, responsiveness to cues, and overall effectiveness of the technology as reported by cooperating teachers was reported using means and percentages. Finally, student teacher perceptions of employing the bie intervention strategy during teaching was considered using comments and direct quotations from the Student Teacher Response Form.

Study Hypothesis Two:

Student teachers who receive audio-cuing or prompting during the teaching process will demonstrate greater acquisition of the target behaviors than those who do not receive such assistance.

Findings presented regarding hypothesis two were based on three ratings (pre-, post- and delayed follow-up measures) analyzed using the

scores given by two sets of trained evaluators. Raters used a modification of the Teacher Clarity Observation Instrument (Hines, 1981; Hamilton, 1988; Larsen, 1985). Three separate sets of data were used in the analysis for hypothesis two: the overall measure of teacher clarity skill; the fourteen discrete clarity skills; and four clarity skill subsets or clusters.

To provide for greater statistical control, an analysis of covariance was conducted to attempt to explain variation in the dependent variable, the post-test measure. Since the analysis of variance conducted on the pre-test scores indicated that the groups were essentially the same, scores could be directly compared using an analysis of covariance.

Study Hypothesis Three:

Student teachers who receive audio-cuing or prompting during the teaching process will retain the target behavior to a greater degree than those student teachers who do not receive audio-cuing.

Findings for this hypothesis were based on the scores of two rater sets using the overall teacher clarity measures, pre-, post-, and delayed follow-up ratings. The analysis of covariance was determined to be the most appropriate method of analysis. It was conducted to determine whether there was a difference between groups on the delayed follow-up measure.

Summary

This chapter described the research procedures used to conduct the study. A description of the sampling procedures and the sample was presented. The research methods employed in the study including observer training and data collection were provided in the research design section. The process of selection and modification of several data collection instruments, as well as rater training was addressed. Finally, the last section of this chapter described the methods used to examine and analyze data pertaining to each of the study hypotheses. The next chapter (Chapter IV) reports the results of these analyses.

CHAPTER IV

ANALYSIS OF DATA

Introduction

The purpose of this study is twofold. One objective was to determine the feasibility of using the wireless communication system, known here as the bug-in-the-ear or BIE, in a naturalistic setting with student teachers. To address Study Hypothesis One, descriptive information was gathered and summarized from interviews with cooperating teachers and their self-reporting in the Reflective Log and through the Teaching Skills Observation Instrument (Metcalf, 1989). In addition, student teacher self-reporting on the Student Teacher Response Form was also included in this analysis.

The second objective was to analyze the differences of student teacher behaviors with respect to clarity skills. One half of the group received intervention through the BIE device and one half was supervised without such intervention. This objective was explored by analyzing the data relative to the last two of the study hypotheses.

The results of the study are based on three ratings (pre-, post- and delayed follow-up measurements) by trained evaluators. Raters used the Teacher Clarity Observation Instrument (Hines, 1981; Hamilton, 1988, Larsen, 1985). Three separate datasets are used in the analyses for study hypothesis two. First, the overall clarity skills raw scores for each participant by treatment and raters are presented in Tables 1 and 2 and utilized as the first dataset. In addition, analyses of the fourteen discrete clarity skill scores will be presented. Finally, a dataset which restructures the discrete clarity skill scores into four clarity skill subsets or clusters will also be analyzed and presented. The analysis for study hypothesis three concentrated on just the dataset of overall teacher clarity skill scores for the repeated measure.

Raters for the study had previously completed 12 hours of training in the observation, identification, and evaluation of clarity skills. An agreement ratio for interrater reliability was established at 75% (Harris, 1986). Prior to the study, video-taped lessons were rated independently by each of the four prospective raters. An interrater reliability level of 77.5% (Rater Pair #1) and 78.25% (Rater Pair #2) was established on the final training tape. During the independent viewing and evaluations of the actual study video-tapes, each of

Table 1
Overall Teacher Clarity Skill Raw Scores
Pre–, Post–, and Delayed Measures
by Treatment – Rater 1

Control				Experimental			
<u>Subject</u>	<u>Pre–</u>	<u>Post–</u>	<u>Delayed</u>	<u>Subject</u>	<u>Pre–</u>	<u>Post–</u>	<u>Delayed</u>
01	2.4*	3.0	2.0	01	1.0	3.0	3.0
02	3.0	3.0	2.0	02	3.0	3.0	2.0
03	4.0	3.0	2.0	03	2.0	3.0	2.0
04	3.0	1.0	3.0	04	2.0	2.0	2.0
05	2.0	1.0	2.0	05	3.0	1.0	2.0
06	1.0	1.0	3.0	06	2.0	2.0	4.0
07	1.0	3.0	3.0	07	3.0	2.0	3.0
08	2.0	2.0	1.9*	08	3.0	4.0	3.0
09	2.0	2.0	2.0	09	1.0	4.0	4.0
10	1.0	3.0	2.0				

Table 2
Overall Teacher Clarity Skill Raw Scores
Pre–, Post–, and Delayed Measures
by Treatment – Rater 2

Control				Experimental			
<u>Subject</u>	<u>Pre–</u>	<u>Post–</u>	<u>Delayed</u>	<u>Subject</u>	<u>Pre–</u>	<u>Post–</u>	<u>Delayed</u>
01	2.4*	2.0	3.0	01	1.0	2.0	2.0
02	2.0	4.0	2.0	02	4.0	1.0	2.0
03	4.0	2.0	3.0	03	4.0	2.0	4.0
04	3.0	1.0	2.0	04	2.0	3.0	4.0
05	1.0	1.0	3.0	05	2.0	3.0	2.0
06	1.0	1.0	1.0	06	2.0	2.0	4.0
07	1.0	3.0	3.0	07	4.0	1.0	2.0
08	2.0	1.0	1.9*	08	4.0	3.0	3.0
09	2.0	2.0	1.0	09	3.0	3.0	4.0
10	1.0	2.0	2.0				

* estimated values

the four raters viewed and evaluated one common video–tape independently. For that common tape, Rater Pair #1 maintained their reliability level (75%) while Rater Pair #2 did not (68.7%). The combined scores (mean of Rater Pair #1 and Rater Pair #2) will be referred to as Rater C. Analyses using both Rater C and Rater 1 will be presented, however, due to the greater consistency achieved by Rater Pair #1, this researcher places greater confidence in the analyses conducted using just Rater 1 scores.

Specific results for each of the research hypotheses addressed in this investigation are presented below.

Study Hypothesis One

Student teachers who receive audio–cuing or prompting during the teaching process can effect immediate change in their teaching behaviors.

As reported on the Teaching Skills Observation Form, student teachers were cued on the specific clarity skills an average of 4.846 times with a range of 0 to 22 cues per observation. Some students were cued at a consistently higher level, while others rarely received cues; the range of cues during the treatment period was from 1 to 95 total with a mean of 35 cues during the treatment period. Five of the nine student teachers in the experimental group

were below the mean of 35 cues during the treatment period. The frequency of cues for each participant can be found on Table 3. It should be noted that cues given which were not among the specific clarity skills are not included in this analysis. All of the experimental group cooperating teachers used the BIE device a minimum of seven times during the treatment period; some, however, cued more on management and other skills, than on clarity skills (those will be noted with an * on Table 3).

The disparity among cuing does not appear to be based on the skill of the student teacher, but on the willingness and/or comfort level with the technology of the cooperating teacher. This is evidenced by comments in the Cooperating Teacher Reflective Log. Those cooperating teachers who did not cue often, that is less than the mean, made comments such as:

"...the cord gets in her way..."

"...there was a lot of feedback from the aquarium..."

"...gets a buzzing sound when near the chalkboard..."

"...lesson did not lend itself to these cues..."

"...it kept coming out of her ear..."

Table 3
Overall Frequency of Cues Given
By Cooperating Teacher

Subject	Number of Cues	Cued, Then Responded	Response Rate
01	95	80	84.2%
02	26	26	100%
03	63	54	85.7%
04	21	19	90.5%
05	13	12	92.3%
06	36	36	100%
07*	1	1	100%
08	55	46	83.6%
09*	6	5	83%
Overall	316	279	88.3%

Cooperating teachers who cued at or above the mean reported that they were comfortable using the BIE device. Three cooperating teachers in the treatment group requested the opportunity to continue using the BIE device after the study concluded. Comments by these cooperating teachers include:

**"... the BIE gives focus to the conference ... useful
for quick feedback, including management skills"**

**"The BIE is good for catching instructional errors on
the spot, rather than having to go back and reteach
an entire lesson ..."**

**"When cued, he (student teacher) not only took care of the
specific incident, but also didn't have to be cued
again on that incident..."**

"I feel I have to cue him less each time ... "

"The more difficult the lesson, the more cues are needed ..."

"We're lamenting having to give up the BIE ..."

All but two of the cooperating teachers in the experimental group consistently rated the use of the BIE during the treatment period observations as effective overall, regardless of how frequently they cued their student teacher. This data was gathered from the Cooperating Teachers Reflective

Log where each participant was asked to respond to the following four statements:

- 1. The student teacher is adapting to the BIE ...**
- 2. The pre-determined cues worked ...**
- 3. The BIE can be used to provide appropriate feedback during teaching...**
- 4. The BIE gives focus to the post-conference ...**

Each statement, used to measure the cooperating teachers' overall reaction to the BIE intervention strategy, was rated using a five point Likert scale where responses ranged from 1 = not at all, to 3 = moderately well, to 5 = very well.

Specific results for each of the above statements by participant are reported on Table 4. These ratings revealed a generally positive attitude towards using the BIE device; six of the nine cooperating teachers rated the overall effectiveness of the BIE above the mean of 4.026, while only two reported overall negative responses (subjects 02=2.82 and 05=2.08). The highest single rating was "the student teacher is adapting to the BIE" with a range of 2.0 – 5.0 and a mean of 4.25 on a five point scale. In response to the statement, "The BIE can be used to provide appropriate feedback during teaching" the range was 2.5 to 5.0 with a mean of 4.19.

Table 4
Overall BIE Effectiveness Ratings
By Cooperating Teacher

Subject	Student Teacher Adapts to BIE	Cues Worked	Appropriate Feedback	Provided Focus	Overall Mean
01	4.8	4.57	4.4	4.7	4.61
02	2.66	2.16	2.66	3.8	2.82
03	4.8	3.8	4.3	4.0	4.23
04	4.75	4.75	4.75	4.02	4.5
05	2.2	2.1	2.5	1.5	2.08
06	5.0	5.0	5.0	5.0	5.0
07	5.0	5.0	5.0	5.0	5.0
08	4.28	3.42	4.14	3.57	3.85
09	4.8	3.8	5.0	3.0	4.15
Overall	4.25	3.84	4.19	3.84	4.03

Response to the BIE intervention strategy during the teaching process was reported by participating student teachers both in interviews and through responses recorded on the Student Teacher Response Form. Such comments included:

"The BIE helped me to be more confident in teaching ..."

"...it really increased communication between me and my teacher ... it was easy to use..."

"It was reassuring to know that my teacher could interrupt (in my ear) and give suggestions and comments."

"...it helped in becoming more observant and focused on student behavior..."

"This was a great experience! I found it reassuring...it gave me specific areas to work on and it increased my overall confidence about teaching..."

Finally, it was found that the student teachers, when cued, could affect immediate changes in their teaching behaviors at a mean rate of 88.29% with a range of 83% to 100% response. Results of this analysis are included in Table 3. Study Hypothesis One, therefore, failed to be rejected. Student teachers who receive audio-cuing via the bug-in-the-ear device during the teaching process can effect immediate change in their teaching behaviors.

Study Hypothesis Two

Student teachers who receive audio-cuing or prompting during the teaching process will demonstrate greater acquisition of the target behaviors than those who do not receive such assistance.

The descriptive information for both the combined rater (Rater C) measures and the Rater 1 measures is presented in Table 5 and 6. Analysis of covariance was used to evaluate this hypothesis.

This hypothesis is addressed using three configurations of data. First, the overall clarity measure analyses are presented using both the Rater C and Rater 1 scores. Summary results for the overall clarity measures are presented in Tables 7–10. Second, the discrete clarity item analyses were conducted also using fourteen separate analyses of covariance, also using Rater C and Rater 1 scores. Summary results for the discrete clarity skills or behaviors are presented in Tables 11 – 13. Finally, the data was re-structured to represent four clarity skill cluster areas (Hines, 1981, Hamilton, 1988, and Metcalf, 1989) and analyzed using four separate analyses of covariance. Again scores from Rater C and Rater 1 are used in the analyses. Summary results for the clarity skill clusters are reported on Tables 14 and 15. Effect sizes for the three configurations of data presented (overall clarity measure, the fourteen discrete skill measures, and the four clarity skill clusters) are displayed on Table 16.

OVERALL CLARITY MEASURES

The groups had been randomly assigned and therefore can be assumed to be essentially equal. The overall means of both the experimental and control groups, displayed on Table 5, reveal improvement in the overall clarity skills, with the experimental group making slightly bigger gains from pretest to the delayed follow-up measure. The correlation matrix (Table 6) revealed little if any correlation between the repeated measures.

Information presented in Table 7 provides a comparison of the experimental and control groups by rater. The mean score for the control group was 2.04, as compared with 2.56 for the experimental group using Rater C scores. Rater 1 scores were similar with the mean for the control group of 2.14, as compared with 2.22 for the experimental group. Both raters range of scores was slightly lower for the experimental group than the control group.

A one-way analysis of variance (ANOVA) on the covariable (pre-test) and the response variable (posttest) was conducted as part of the complete analysis of covariance. Using the pre-test as the covariable, the results, summarized in Table 8, indicate that the F ratio of 1.14 ($p = 0.2997$) did not exceed the critical value of F ($F_{cv}=4.45$) at the .05 level of significance with Rater C scores. The one-way analysis of variance (ANOVA) conducted on the response variable or posttest measure without considering the covariable using Rater 1 scores revealed a similar F ratio ($F = 1.12$, $p = 0.3039$) which also did

Table 5
Descriptive Summary
Overall Clarity Measures by Groups

Groups	Raters	N		Pre–	Post	Delayed
CONTROL	#1	10	MEAN	2.144	2.200	2.294
		10	SD	.9992	.9189	.4875
	C	10	MEAN	2.044	2.050	2.244
		10	SD	.9817	.8959	.4292
	#1	9	MEAN	2.222	2.666	2.666
		9	SD	.8333	1.000	.8660
EXPERIMENTAL	C	9	MEAN	2.555	2.444	2.833
		9	SD	.8819	.6821	.7905
	#1	19	MEAN	2.181	2.421	2.470
		19	SD	.8997	.9612	.6990
	C	19	MEAN	2.286	2.237	2.523
		19	SD	.9468	.8057	.6792
OVERALL	#1	19	MEAN	2.181	2.421	2.470
		19	SD	.8997	.9612	.6990
	C	19	MEAN	2.286	2.237	2.523
		19	SD	.9468	.8057	.6792
	#1	19	MEAN	2.181	2.421	2.470
		19	SD	.8997	.9612	.6990

Table 6**Descriptive Summary – Overall Clarity Measures****Correlation/Covariance Matrix****RATER C**

	Pre–	Post–	Delayed
Pre–	1.0000 0.0	0.0861 0.7261	–0.0325 0.8950
Post–	6.5643	1.0000 0.0	0.3986 0.0910
Delayed	–2.0888	21.8099	1.0000 0.0

RATER 1

	Pre–	Post–	Delayed
Pre–	1.0000 0.0	–0.0648 0.7922	–0.4079 0.0829
Post–	–5.6023	1.0000 0.0	0.1848 0.4487
Delayed	–25.6589	12.4211	1.0000 0.0

Table 7
Descriptive Comparison of Overall Clarity Measures
by Groups

RATER C

		Pre-Test Measures			Posttest Measures		
Groups	N	MEAN	SD	RANGE	MEAN	SD	RANGE
Control	10	2.04	.9817	1–4	2.05	.8959	1–3.5
Experimental	9	2.56	.8819	1–3.5	2.44	.6821	1–3.5

RATER 1

		Pre-Test Measures			Posttest Measures		
Groups	N	MEAN	SD	RANGE	MEAN	SD	RANGE
Control	10	2.14	.9992	1–4	2.20	.9189	1–3.5
Experimental	9	2.22	.8333	1–3	2.66	1.000	1–4

Table 8
One-way Analysis of Variance on the Covariable
Overall Pre-Test Measure

RATER C

Source	df	SS	MS	F
Between	1	123.9580	123.9580	1.41
Within	17	1489.6462	87.6262	
Total	18	1613.6042		

RATER 1

Source	df	SS	MS	F
Between	1	11.8441	5.9220	0.07
Within	17	1445.2337	90.3271	
Total	18	1457.0778		

not exceed the critical value of F ($F_{cv}=4.45$) at the .05 level of significance. Using either rater scores, the results, summarized in Table 9, suggest no difference among the means of the two groups on the posttest score.

The analysis of covariance, presented on Table 10, revealed no statistical significance for either Rater C or Rater 1 scores. These results suggest no statistically significant differences between the treatment groups with regard to the posttest scores. Based on the overall teacher clarity scores it can be assumed, therefore, that Study Hypothesis Two failed to be supported.

Table 9**One-way Analysis of Variance on the Response Variable****Overall Posttest Measure****RATER C**

Source	df	SS	MS	F
Between	1	73.6988	73.6988	1.14
Within	17	1094.7222	64.3954	
Total	18	1168.4211		

RATER 1

Source	df	SS	MS	F
Between	1	103.1578	103.1578	1.12
Within	17	1560.0000	91.7647	
Total	18	1663.1578		

Table 10
Analysis of Covariance
Pre- and Posttest Measures

RATER C

Source	df	SS	MS	F
Due to Regression	1	8.6522	8.6522	0.13
Adj. Treatment	1	65.3888	65.3888	0.96
Error	16	1094.3800	68.3988	
Corrected Total	18	1168.4211		

RATER 1

Source	df	SS	MS	F
Due to Regression	1	6.9791	6.9791	0.07
Adj. Treatment	1	105.7756	105.7756	1.09
Error	16	1550.4032	96.9002	
Corrected Total	18	1663.1579		

DISCRETE SKILL ANALYSES

The fourteen discrete teacher clarity skills (behaviors) employed for this investigation are described in Chapter III, Figure 2. These fourteen discrete skills were observed and cued during phase two of the study (the treatment period) and viewed on three video-tapes for each subject (pre-, post-, and delayed) and scored by the trained raters. Descriptive information in each of the discrete skills is presented on Table 11 for Rater C and Table 12 for Rater 1. Fourteen analyses of covariance (ANCOVA) were conducted to examine both Rater C and Rater 1 scores on the fourteen discrete clarity skills covarying on the pre-test score. Results of these analyses are displayed on Tables 13 and 14.

The means for each skill in both the control and experimental groups on each of the repeated measures using Rater C scores is presented in Table 11. The control group scores increased from the pre-test measure to the post-test measure in 8 of the 14 target skills or behaviors, while the experimental group increased in 7 of the 14 skills. No scores remained constant from pre- to posttest using Rater C scores. Rater 1 scores (Table 12), however, reveal a decrease in the proficiency of two skills (C2 and C5) while 4 skill scores remained constant and 8 skills increased from pre- to posttest for the experimental group.

Table 11**Descriptive Summary – Discrete Clarity Skills**

		RATER C					
Code	Skill	Control			Experimental		
		Pre–	Post	Delayed	Pre–	Post	Delayed
C1	objective	1.89	1.9	2.19	2.33	2.94	3.16
C2	important points	1.54	1.75	1.84	1.77	1.76	1.94
C3	repeats points	1.84	2.15	2.64	1.94	2.61	2.77
C4	uses board	1.69	2.3	1.49	3.00	3.11	2.55
C5	summarizes	1.39	1.25	1.29	1.27	1.22	1.55
C6	uses examples	2.19	2.45	2.09	2.44	2.77	2.77
C7	demonstrates	1.74	1.9	1.84	2.61	2.22	2.22
C8	explains vocab.	1.49	1.80	2.14	1.94	1.61	1.50
C9	repeats to explain	1.74	1.65	1.49	2.27	2.22	2.16
C10	pauses	1.74	1.40	1.39	1.33	1.44	1.61
C11	questions	2.79	3.25	3.09	4.00	4.39	3.89
C12	wait time	2.24	1.65	1.69	2.38	2.11	2.17
C13	practice time	2.59	2.55	2.34	3.16	2.94	3.17
C14	examines work	2.79	2.40	2.29	2.61	2.83	3.50

Table 12
Descriptive Table – Discrete Clarity Skills

Code	Skill	RATER 1					
		<u>Control</u>			<u>Experimental</u>		
		Pre–	Post	Delayed	Pre–	Post	Delayed
C1	objective	1.84	1.8	2.29	1.77	2.55	2.55
C2	important points	1.84	2.0	2.89	2.22	1.88	2.22
C3	repeats points	2.34	2.7	2.89	2.44	3.55	3.44
C4	uses board	1.64	2.5	1.69	3.0	3.0	2.66
C5	summarizes	1.44	1.4	1.39	1.33	1.22	1.77
C6	uses examples	1.94	2.4	2.09	2.33	2.88	2.55
C7	demonstrates	1.94	2.2	2.09	2.22	2.22	1.77
C8	explains vocab.	1.54	1.7	1.99	1.88	1.88	1.66
C9	repeats to explain	1.84	1.6	1.39	2.00	2.33	2.00
C10	pauses	1.54	1.6	1.69	1.22	1.66	1.77
C11	questions	3.14	3.3	3.09	4.00	4.44	3.88
C12	wait time	2.24	1.8	1.79	2.22	2.22	2.44
C13	practice time	2.64	2.8	2.59	2.88	3.66	3.11
C14	examines work	2.54	2.7	2.69	2.44	2.66	3.44

The analysis of covariance was conducted on each of the discrete clarity skills or behaviors with the pre-test as the covariable and the posttest as the response measure. Results, presented in Table 13, revealed statistical significance at the .05 level for only one skill using Rater C scores and none with Rater 1 scores. The F ratio ($F=7.38$) for C11, "Asks Questions", was statistically significant at the .02 level ($p=.0152$) on the adjusted treatment. An examination of the adjusted means for each group reveals that significance is in the direction of greater demonstration of the skill by the experimental group; the adjusted means of the control group was 3.1266, while the adjusted means of the experimental group was 4.5260. These results suggest that those student teachers cued using the BIE intervention strategy increased their use of questioning to a greater degree than those student teachers who did not receive the BIE treatment.

Other than the discrete skill "Asks Questions", Study Hypothesis Two failed to be supported using the fourteen discrete skills in the analyses.

Table 13

Analysis of Covariance – Posttest Measures

Discrete Clarity Skills F Test

RATER C[illegible]

* $p < .02$

RATER 1[illegible]

CLARITY SKILL CLUSTERS

The Teacher Clarity Observation Instrument, developed by Hines (1981) and modified slightly by Hamilton (1988) and for this study, included two sections. The first section consisted of twenty-five low inference clarity behavioral items which were measured in terms of frequency of occurrence. The second section, that modified for use in this study, incorporated these behavioral items grouped into four subsets with each of the subsets reflecting an "underlying intermediate dimension of the clarity construct" (Hines, 1981, p.116). It is these subsets or behavioral skill clusters (Figure 3) which are used for the analyses in this section.

The overall descriptive summary table for each of the skill clusters for both Rater C and Rater 1 is presented in Table 14. Analysis of covariance (ANCOVA) on the clarity skill cluster pre- and posttest measures is presented in Tables 15 and 16.

The descriptive information for each clarity skill subset or cluster in both the experimental and control groups for both Rater C and Rater 1 are presented in Table 14. Both rater scores reveal similar patterns between cluster areas. For example, the lowest overall mean (that is, across repeated measure, groups and rater) of the clarity skill cluster areas is CL3, "Provides for Assimilation/Synthesis". The highest overall mean was in the clarity skill

Code	Cue	Description
<i>CL1 Stresses Important Points of the Content:</i>		
C1	Give Objective	Informs students of the lesson objective
C2	Important Points	Points out what is important for students to learn
C3	Repeat _____	Repeats things which are important
C4	Use Board	Writes important aspects on the board, chart, etc.
C5	Summarize	Summarizes material presented to the class
<i>CL2 Explains the Content of Instruction:</i>		
C6	Give Example	Makes use of verbal, written or practical examples
C7	Demonstrate	Works through examples on the board and demonstrates the procedure to be used
C8	Explain	Tells students the meaning of the word/words with which the students may be unfamiliar
<i>CL3 Provides for Student Assimilation/Synthesis:</i>		
C9	Rephrase	Repeats things students do not appear to understand
C10	Pause	After explaining some aspect of the instructional content, the teacher pauses to allow students to think about it
<i>CL4 Assesses and Tries to Ensure Student Understanding:</i>		
C11	Ask Questions	Asks questions to check students' understanding
C12	Wait Time	Allows students time to ask questions
C13	Practice Time	Provides opportunities for students to practice or work examples
C14	Check work	Examines students' work

Figure 3
CLARITY SKILL CLUSTERS

Table 14
Overall Descriptive Summary
Clarity Skill Clusters

RATER C

Code	Skill Cluster	Control			Experimental		
		Pre-	Post	Delayed	Pre-	Post	Delayed
CL1	Stresses Important Aspects of Content	1.67	1.87	1.99	2.06	2.33	2.40
CL2	Explains Content of Instruction	1.80	2.05	2.03	2.33	2.20	2.18
CL3	Provides for Assimilation/Synthesis	1.55	1.54	1.45	1.83	1.84	1.92
CL4	Assesses/Ensures Understanding	2.61	2.47	2.39	3.05	3.08	3.19
Overall		1.91	1.98	1.97	2.32	2.36	2.42

RATER 1

Code	Skill Cluster	Control			Experimental		
		Pre-	Post	Delayed	Pre-	Post	Delayed
CL1	Stresses Important Aspects of Content	1.82	2.08	2.01	2.15	2.44	2.53
CL2	Explains Content of Instruction	1.84	2.10	2.05	2.14	2.32	1.99
CL3	Provides for Assimilation/Synthesis	1.69	1.65	1.54	1.61	2.00	1.89
CL4	Assesses/Ensures Understanding	2.67	2.68	2.57	2.90	3.28	3.26
Overall		2.01	2.13	2.09	2.23	2.51	2.42

cluster CL4, "Assesses and Ensures Understanding". It appears that the experimental group for both raters scored generally higher on all clarity skill clusters than did the control group, which is especially evident immediately following the treatment period, the posttest scores.

The analysis of covariance revealed no statistical significance on the dependent measures (posttest) in any of the four cluster skill areas using either Rater C or Rater 1. These results, displayed in Table 15, suggest no difference between groups on the posttest measure. Study Hypothesis Two using the teacher clarity skill subsets or clusters failed to be supported.

Table 15
Analysis of Covariance – Posttest Measures
Clarity Skill Cluster F Tests

RATER C

Source	df	CL1		CL2		CL3		CL4	
		F	p	F	p	F	p	F	p
Due to Regression	1	1.78	0.2005	0.05	0.8187	0.11	0.7479	0.41	0.5314
Adjusted Treatment	1	1.39	0.2559	0.31	0.5865	1.33	0.2653	1.90	0.1872
Error	16								
Corrected Total	18								

RATER 1

Source	df	CL1		CL2		CL3		CL4	
		F	p	F	p	F	p	F	p
Due to Regression	1	0.39	0.5409	0.01	0.9286	1.98	0.1788	0.57	0.4601
Adjusted Treatment	1	0.64	0.4358	0.27	0.6136	0.36	0.5545	1.42	0.2513
Error	16								
Corrected Total	18								

EFFECT SIZE

The effect size is defined by Cohen (1965) as the "degree to which the phenomenon exists". A test is considered to be more powerful when the effect size is larger. Presented in Table 16 are the effect sizes of all three data configurations discussed with regard to Hypothesis Two as determined by both rater scores. The overall clarity measure reveals an effect size in the low-medium range as defined by Cohen (.4353, Rater C and .5071, Rater 1). The discrete skills displayed reveal a wide variation of effect sizes from a low of .0223 (important points) to a high of 1.5018 (rephrase). Of the effect sizes revealed for the discrete skills, approximately half fall into the medium to large effect size range as defined by Cohen (1965) and Feldt (1973). The clarity skill clusters revealed effect size variation with "assesses and ensures understanding" having the strongest effect size (1.3919, Rater C and .6530, Rater 1).

Table 16
Effect Sizes on Posttest Scores

Skill & Description		Rater C	Rater 1
Overall Clarity Measure		.4353	.5071
Discrete Skills			
C1	Give Objective	1.1608	.8162
C2	Important Points	.0223	.1306
C3	Repeat _____	.5135	.9250
C4	Use Board	.9041	.5441
C5	Summarize	.0335	.1959
C6	Give Example	.3683	.5224
C7	Demonstrate	.3572	.0239
C8	Explain	.2121	.1959
C9	Rephrase	1.5018	.7944
C10	Pause	.0446	.0370
C11	Ask Question	1.2725	1.2450
C12	Wait Time	.5135	.4571
C13	Practice Time	.4353	.9424
C14	Check Work	.4800	.0435
Clarity Skill Clusters			
CL1	Stresses Important Aspects of Content	.5135	.3918
CL2	Explains Content of Instruction	.1674	.2394
CL3	Provides for Assimilation/Synthesis	.3349	.3809
CL4	Assesses/Ensures Understanding	1.3919	.6530

Study Hypothesis Three

Student teachers who receive audio-cuing or prompting during the teaching process will retain the overall target behavior to a greater degree than those who do not receive audio-cuing or prompting.

Analysis of covariance was utilized to determine if there was a difference between the posttest and delayed follow-up measurements for the treatment group. The measurement used in Study Hypothesis Three was the overall clarity measure by both Rater C and Rater 1.

Using the posttest as the covariable and the delayed follow-up measure as the dependent or response variable, the analysis of covariance revealed no statistically significant differences at the .05 level. The results of this analysis, displayed in Table 16, suggest no difference between groups on the delayed follow-up measure. Study Hypothesis Three failed to be supported.

Table 17**Analysis of Covariance – Delayed Follow-up Measure****Overall Clarity Measure****RATER C**

Source	df	SS	MS	F	p
Due to Regression	1	131.9030	131.9030	3.56	0.0775
Adjusted Treatment	1	105.4978	105.4978	2.85	0.1110
Error	16	592.9403	37.0588		
<hr/>					
Corrected Total	18	830.3411			

RATER 1

Source	df	SS	MS	F	p
Due to Regression	1	30.0558	30.0558	0.60	0.4498
Adjusted Treatment	1	48.5101	48.5101	0.97	0.3396
Error	16	801.1436	50.0715		
<hr/>					
Corrected Total	18	879.7095			

Summary

The descriptive data used in the analysis of hypothesis one suggest that students who received the BIE intervention during the teaching process could effect immediate change. Cooperating teachers and student teachers generally shared similar positive views both towards using the BIE device and the overall effectiveness of the BIE device. A dissimilarity of responses among cooperating teachers, however, was revealed in the instrument used to record the number of cues given both in single sessions and during the overall treatment period.

Several separate analyses of covariance were conducted to determine if there was a difference between those student teachers who received audio-cuing or prompting and those who did not with regard to the demonstration of clarity skills. The results of these analyses suggest that there was not a significant difference between groups from pre-test to posttest nor from posttest to delayed follow-up scores.

A discussion of these results and implications for further research will be presented in Chapter V.

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Introduction

In supervision generally, the learning process is facilitated by constructive and helpful feedback. Such feedback is often restricted by the inability of the supervisor to provide immediate and simultaneous reinforcement and/or intervention to the trainee. Traditional supervision strategies rely on after-the-fact discussions of what occurred and suggestions on how it might be improved given the same conditions and circumstances; they lack an effective means of providing feedback and reinforcement or intervention during the ongoing process.

A search for more effective methods of communicating during supervision experiences has led to an interest in and use of technology, including the use of computers, interactive video, audio- and video-recordings and video-teleconferencing. The mechanical third ear device, the bug-in-the-ear (BIE), is another use of technology employed during the ongoing supervision process in a variety of clinical training settings, including medicine,

psychology, counseling, dentistry, and teaching. This strategy utilizes a small, inexpensive wireless communication system to transmit short, concise, verbal cues or prompts in order to induce specific behavioral changes. The prompter (supervisor) views the situation and simultaneously directs the trainee to attend to specific behaviors.

With the current emphasis placed on field experiences in the professional development of teachers, there has also been a growing concern over the supervision of preservice teachers. The supervision of teacher education field experiences, including student teaching, currently lacks an effective means of providing constructive and helpful feedback during the learning process, practice teaching. As noted in the literature, one major limitation to the successful development of teaching skills by the student teacher is communication (Hoover, O'Shea, and Carroll, 1988; Griffin, et al., 1983; Zeichner, 1980). The bug-in-the-ear (BIE) device appears to be one strategy that has the potential of providing an effective means of communication between the supervisor(s) and student teacher during the ongoing teaching process.

To examine the potential use of the BIE device, an educational one between, one within field experiment was conducted. This inquiry investigated the potential use of the BIE device with student teachers and their cooperating teacher, in a naturalistic setting during autumn quarter at The Ohio State

University. Twenty-two elementary education student teachers in their last practicum experience before certification and their cooperating teachers participated in the study. The study was conducted in three school districts representing urban and suburban areas and included sixteen schools (fourteen elementary and three middle schools). The investigation took nine weeks to complete.

Treatment groups in the investigation were student teachers who received audio-cuing or prompting via the BIE device from their cooperating teacher (experimental) and those who did not (control). The target skill or dependent variable, was fourteen discrete teacher clarity skills documented in the literature as observable and measurable (Hines, 1981; Hamilton, 1988; Metcalf, 1989). The student teachers were video-taped at three equal intervals: a) pretest, the week prior to the treatment period at the beginning of the student teaching practicum; b) posttest, the week directly following the two week treatment period; and c) delayed follow-up, two weeks after the posttest video-taping. These video-tapes were scored by trained raters on two aspects: a) the high inference measure of overall teacher clarity skill; and b) the moderate inference measure of fourteen discrete teacher clarity skills. In addition, another moderate inference score of four clarity skill subsets or clusters was discerned from the discrete clarity scores (Hines, 1981; Hamilton, 1988) and used in the analysis. The analysis determined to be most

appropriate to examine the dependent measure, teacher clarity behaviors or skills, was the analysis of covariance (ANCOVA), where pre-tests served as the covariate.

Although there have been at least four previous investigations using the BIE technology with preservice teachers (van der Mars, 1984, 1988; O'Pry and Pease, 1987; and Giebelhaus and Cruz, 1992), this study should be considered exploratory in nature. It is the first study in teacher education where a wireless communication system has been utilized to examine the effect and effectiveness of intervention during the ongoing teaching process using a true experimental design. As such, it lays the foundation for future research in the area.

In this chapter, the research hypotheses concerning the effect and effectiveness of the BIE intervention strategy will be addressed individually, summarizing the results. Conclusions which can be determined as a result of the application of analysis will be discussed and recommendations for further inquiry offered.

Summary of Results

Hypothesis One: Student teachers who receive audio-cuing or prompting during the teaching process can effect immediate change in their teaching behaviors.

Descriptive statistics and anecdotal information were used to determine whether student teachers who were cued or prompted via the BIE device while teaching could affect immediate change in their teaching behavior. These data suggest that, although each of the cooperating teachers used the device for the minimum number of times, some were more comfortable using it and, thus, cued their student teacher on the specific clarity skill target behaviors more and more consistently.

Regardless of the comfort level of the cooperating teacher with the technology, however, the overall effectiveness of the technology was rated high by the cooperating teachers. The cooperating teachers rated highest the ability for the student teachers to easily adapt to the BIE technology. Cooperating teachers also reported that the device could effectively assist in providing appropriate feedback while student teachers were engaged in teaching. In addition, student teachers generally saw the BIE as supportive, reassuring, non-threatening, and useful.

Student teachers who were cued effected immediate change in their teaching behaviors. The range for immediate response to the cue given was 83% to 100%, with the average rate of response at eighty-eight percent. This study, therefore, offered evidence in support of the hypothesis that student teachers who receive audio-cuing during the teaching process can effect immediate change in their teaching behaviors.

Hypothesis Two: Student teachers who receive audio-cuing or prompting during the teaching process will demonstrate greater acquisition of the target behaviors than those who do not receive such assistance.

The degree to which the treatment groups differed with respect to clarity skills was examined using two sets of scores and three configurations of data. The combined scores of two rater pairs was used to form Rater C scores, while Rater 1 scores were examined independently. The three data sets consisted of a) the overall clarity measures, a high inference measure; b) fourteen discrete clarity measures, a moderate inference measure; and c) four clarity skill subsets or clusters, a moderate inference measure. Descriptive statistics were used to examine each configuration of data prior to the use of analyses of covariance to determine whether the differences between groups on the posttest measure were statistically significant.

The descriptive data suggest that the experimental group scored slightly higher on the posttest clarity measures than did the control group, regardless of the data set configuration or the rater used in the analysis. However, it should also be noted that the pre-test scores for the experimental group, although not statistically significant, were also slightly higher than those of the control group, especially evident using the Rater C scores.

On the basis of this information, several analyses were conducted to determine the most appropriate analysis. Specifically, analysis of variance (ANOVA) and multivariate analysis of variance (MANOVA) were completed and summary tables for these analyses are found in Appendix F (Tables 18–25). The analysis of choice was determined to be analysis of covariance (ANCOVA) since it enabled the investigator to examine the posttest and delayed follow-up scores subsequent to minimizing the pretest differences.

The analysis of covariance, however, revealed no significant difference between the pretest measure and posttest measure using the overall clarity skill measures with either Rater C or Rater 1 scores. A series of ANCOVAs on the posttest measure covarying on the pretest for each of the fourteen discrete clarity skills revealed statistical significance in one area, "asks questions" ($F=7.38$, $p=.0152$). An examination of the adjusted means revealed that the difference was in the direction of greater demonstration of the discrete skill by the experimental group. At least two other discrete skills approached

significance (C1, $F=3.35$, $p=.0859$; C9, $F=3.26$, $p=.0896$), also with the adjusted means indicating that greater demonstration of the targeted skill was in the direction of the experimental group. The same series of ANCOVAs addressing the four clarity skill clusters revealed no significant differences between treatment groups.

These analyses of the three data sets across two raters suggest that there were generally no statistically significant differences between groups due to treatment; it can be assumed, therefore, that hypothesis two failed to be supported.

Hypothesis Three: Student teachers who receive audio-cuing or prompting during the teaching process will retain the target behavior to a greater degree than those who do not receive audio-cuing or prompting.

An analysis of covariance was also conducted to address whether the experimental group would retain the overall target skill behavior to a greater degree than the control group. This analysis utilized the overall clarity skill score, a high inference measure. The posttest was used as the covariable and the delayed follow-up measure as the response variable. This analysis of the overall clarity skill revealed no statistically significant differences between the posttest measures and the delayed follow-up measures between treatment groups by either Rater C or Rater 1. However, the Rater C analysis does

approach significance with the adjusted treatment F ratio of 2.85 ($p < .1110$). These results reveal no statistically significant difference between groups on the delayed follow-up measure, and thus, hypothesis three failed to be supported.

Conclusions

The intent of this investigation was to examine the effect and effectiveness of the bug-in-the-ear (BIE) intervention strategy with student teachers in their last practicum experience before state certification. This study utilized previous research in teacher clarity skills and extended research efforts in the application of the wireless communication system with student teachers initiated by van der Mars (1984). While several limitations noted in Chapter I may have influenced the findings, this study provided an important foundation for future research in the area of supervision communication and feedback during the field experiences of preservice teachers.

The findings of this research supported the conclusion that student teachers can and do affect immediate change in teaching behaviors during the teaching process while receiving cues or prompts via the BIE device. Using a revised version of the original Teaching Skills Observation Sheet (Metcalf, 1989) modified to include only the fourteen selected discrete clarity skills,

cooperating teachers noted the kinds and frequency of cues given to student teachers while teaching. All of the fourteen discrete cues were addressed during the study by at least four of the cooperating teachers. The cue most frequently given was "Explain" referring to the need to explain unfamiliar words. The cue given least often was "Practice Time", referring to providing opportunities for students to practice. These results seem to support the use of teacher clarity skills as an appropriate dependent variable for this investigation, not only because were they observable, but these discrete clarity skills were successfully cued and responded to by the student teacher.

The data collected from the Cooperating Teacher Reflective Log and the Student Teacher Response Form supported the notion gleaned from previous research (Giebelhaus and Cruz, 1992) that the BIE intervention strategy had a positive impact on both the cooperating teacher and the student teacher. Although both the student teachers and cooperating teachers communicated a favorable review regarding the effect of the intervention strategy, some technical problems occurred. These problems included such annoyances as a buzzing sound in certain areas of some classrooms, the longevity of the batteries used to operate the transistorized device, and the earphone which slipped out of the ear of some of the student teachers. As one teacher commented, "The BIE must be used enough to get past the mechanics..." Another cooperating teacher suggested, "The cooperating teacher needs to use

it (the BIE) also to learn how it operates, the noises in it, and the words most easily understood ..." This study seemed to demonstrate that using the BIE intervention strategy, although generally a positive experience, required some patience with the technological aspects. It appears that more time with the device would likely solve this dilemma.

In addition, those student teacher and cooperating teacher dyads who employed the BIE device discovered that the BIE allowed opportunities to give appropriate feedback during the teaching process. Comments from cooperating teachers to support this conclusion included, "The BIE is helpful to direct attention to specific circumstances going on in the classroom..." In addition, the impact of its use extended to the post-observation conference experience where more detailed discussion of cued situations were considered. Cooperating teachers remarks which would support this conclusion included, "The BIE does give focus to the conference ... we talked mainly about the cued areas (examples) used in her demonstration..." It is widely noted that the post-observation conference stage of the supervision process is considered to be an opportunity to provide feedback and guidance to improve the instruction by the student teacher (Hopkins and Moore, 1993). This study demonstrated that the BIE intervention could provide a means of giving appropriate feedback during teaching and add focus to the post-observation conference, both leading to the growth and development of teaching skills in student teachers.

Further, the more often and more consistently the BIE was employed during the teaching process, the better each member of the dyad felt about using it. Comments from cooperating teachers to support this statement include, "We're getting more use to the BIE, cues given and responses required...", "(The student teacher) feels she has more confidence when using the BIE ...", and "He seems to need less cues as he progresses..." However, if the cooperating teacher employed the BIE device reluctantly or less frequently, the student teacher may be less positive regarding its use. For example, one student teacher suggested that although she believed the BIE could be helpful to her during student teaching, "...my cooperating teacher was not comfortable using the BIE, therefore, neither was I." This inquiry, therefore, suggests that, with regard to the BIE technology, the cooperating teacher's attitudes and beliefs may have a decisive influence on the successful implementation.

Finally, several cooperating teachers and student teachers suggested that this intervention strategy is most appropriate when the lesson is more difficult or in situations where the student teacher is "treading on new ground". It is noted in the literature that student teachers have a clear preference for the more directive approach to supervision earlier in the student teaching experience (Copeland and Atkinson, 1978; Copeland, 1980, 1983). This study suggests that BIE intervention, a directive approach to supervision, may assist

students by providing a "safety net" which adds to a sense of security and confidence.

Generally, however, this investigation was not able to document statistically significant differences between groups: those student teachers who received the BIE treatment and those that did not. A modified version of the Teaching Skills Observation Instrument (Hines, 1981; Hamilton, 1988) which included just the fourteen discrete teacher clarity skills cued by the cooperating teachers was utilized by four trained raters. Scores were given for each of the fourteen discrete skills as well as for overall teacher clarity. All of the fourteen discrete clarity skills contained in Section I and II of the instrument were observed and rated. Each of the three data configurations utilized in the analysis had an effect size of .50 or greater indicating the relative power of the tests.

The high inference scores, overall teacher clarity, were used to address both hypotheses two and three. The means of the repeated measures for the control group varied only slightly between the three measures ($< .15$ point) pre- to delayed follow-up, while the experimental group means increased .44 points from pre- to posttest and maintained that increase through to the follow-up measure. Similar results were revealed using Rater C scores, however, statistical significance could not be established using the overall clarity measure.

When considering the moderate inference scores for the fourteen discrete teacher clarity skills and the teacher clarity skill clusters, only the pre- to posttest measures were analyzed (hypothesis two). For the fourteen discrete clarity skills, statistical significance was revealed in only one area, "ask questions to check students' understanding" (C11) by one rater (Rater C) on the posttest measure. However, there were indications in the covariate analysis (Table 13) that suggest movement towards significance in the direction of the experimental group using one or both of the raters in six additional skills: "inform students of lesson objective" (C1); "repeat things that are important" (C3); "make use of verbal, written or practical examples" (C6); "repeat things students do not appear to understand" (C9); "allow students time to ask questions" (C12); and "provide opportunities for students to practice or work examples" (C13). Hines (1981) suggested that certain behaviors may occur more frequently in a given lesson. Taking that assertion into account, as well as the indications cited above, control over the content taught during video-taped repeated measures among subjects may have produced more powerful statistical results.

The observed and measured moderate inference scores of four teacher clarity skill clusters were gleaned from the fourteen discrete skills and suggest similar results, no statistical significance from pre- to posttest measures between groups (hypothesis two). Differences which are noted with regard to

the discrete items are not as evident using the cluster analyses. As noted on Table 15, only one of the four clusters revealed movement towards significance for both sets of raters, "assesses and tries to ensure student understanding" (CL4) which includes three of the discrete skills noted above. The cluster which revealed the least promise was CL2, "explains the content of instruction". Clustering the discrete skills appears to have reduced the power of the analyses.

The results of this investigation must be interpreted with some caution since there are at least two limitations regarding the nature of the data which appeared to result in weak and restricted statistical power: the limits of the instrumentation and the number within the sample used. First, considering the number within the sample ($N=19$), the question is whether the sample was large enough to afford the experimental design with sufficient statistical power to document variability beyond that which could be attributed to chance. Although this investigator realized that a small sample size may create some limits to the generalizability, it was believed that a larger number of subjects would have been too unmanageable to maintain experimental control. The second related issue is the scoring range used on the modified Teaching Skill Observation Instrument (Hines, 1981; Hamilton, 1988) of just four points. This narrow range gave little room for variation between subjects or among skills. The previous studies which employed this instrument (Hines, 1981, Hamilton,

1988, Metcalf, 1989) found the five point Likert scale to be appropriate; this investigation, however, used a smaller sample than the other investigations, the focus was the BIE intervention not teacher clarity skills, and this investigation included a repeated measure.

Considering the overall findings of this investigation for all three study hypotheses, including the anecdotal information gathered in response to hypothesis one, the results seem contradictory. Hypothesis one seems to suggest that cooperating teachers and their student teachers enjoyed using the BIE, that the BIE was considered an effective and appropriate means of communicating with the student teacher during the teaching process, and that student teachers could attend to two sets of verbal stimuli simultaneously evidenced by an eighty-eight percent response rate on the cued skills. From these findings, one would presume that student teachers who received the BIE intervention would achieve greater proficiency than those who did not on the specifically prompted pedagogical skills. The statistical analyses presented in Chapter IV, however, demonstrated significance in only one of the discrete skills, "asking questions". Building upon the findings in this investigation, an appropriate next step for future inquiry may be to incorporate some design modifications, such as a larger sample or a wider scoring range on the rating form. Either of these modifications incorporating the foundational knowledge established in this investigation could result in greater statistical power

enhancing the opportunity to achieve significance for hypotheses two and/or three.

Other factors which may also have contributed to the findings reported concerning the repeated measures arise from the limitations previously noted in Chapter I. The naturalistic setting, for example, inherently carries with it limitations due to the variation of experience. Such considerations which apply to this study may include class size, classroom management skills both of the student teacher and the cooperating teacher, and the curriculum, each of which may impact the demonstration of specific teacher clarity skills. In addition, the content of the lesson which the student teacher and the cooperating teacher chose to use as the video-taped pre-, post-, and delayed follow-up measures could have impacted the demonstration of certain clarity skill behaviors. Future inquiry should control for the content of lessons video-taped. Such an extension of the experimental design employed in this investigation could be expected to advance the experimental power while maintaining the naturalistic setting.

Another factor which may have contributed to the findings of this investigation was when and how the audio-cuing was conducted by the cooperating teacher. Given the wide variation in frequency of cues given noted in Table 3, the propensity of cooperating teacher supervisors toward using technology such as the BIE device emerges as an aspect of future inquiry that

would add to the foundational knowledge established in this investigation. For example, information regarding the learning and/or teaching styles of cooperating teachers could reveal personality factors impacting the effective use of the BIE intervention strategy with student teachers.

In addition, some of the clarity skill cues were utilized more frequently than others. A concern expressed both by the cooperating teachers and later by the trained raters involved the difficulty of tracking all fourteen skills consistently. It may be appropriate, therefore, to consider narrowing the number of clarity skill cues used to perhaps three to six of the most distinct and observable of the fourteen skills. The determination of these skills could be accomplished by reviewing which skills were most frequently cued within this study. It may also be appropriate to consider other pedagogical concerns, such as classroom management, as a dependent variable. Again, evidence for this modification can be found in the previous study by Giebelhaus and Cruz (1992) as well as in the self-reporting cue frequency data obtained in this investigation.

Finally, the length of time used for the treatment period in this investigation may also be a limitation to the findings. Giebelhaus and Cruz (1992) suggested that "the key to effective use of the bug ... appeared to be consistent and frequent use. The more often it is used, the more effective the feedback and learning" (p.11). An appropriate progression for further inquiry

may be an extension of the treatment period beyond the two weeks established for this investigation. A longer treatment period should allow for a greater number of exposures to the technology and facilitate in the acclimation process and use of the BIE device in the naturalistic setting.

Recommendations

Based on the findings of this investigation, the following lines of inquiry are recommended for further study:

1. This study should be replicated using a modified rating instrument which incorporates a wider range of possible scores for the specific pedagogical skill, teacher clarity, used as the dependent variable, perhaps a range of 0 to 10.
2. A follow-up study should be conducted which considers greater controls over the content area to be taught during the repeated measure video-tapings and a longer treatment period, perhaps three weeks of daily BIE intervention.
3. A replication of this study could utilize a narrower focus of teacher clarity skills to include three to six discrete skills as determined by the frequency of cued skills in the current study.

4. A follow-up study should be conducted which investigates the effect of BIE intervention on other aspects of the teaching process, such as classroom management. Classroom management is an aspect of teaching in which student teachers have little prior experience and are rarely fully prepared. It was also discovered in this investigation as well as in the two previous studies conducted by this investigator (Giebelhaus and Cruz, 1992; Giebelhaus, unpublished) that classroom management is an aspect of teaching where this device appears to be useful, effective, and appreciated.
5. A follow-up study which includes the university supervisor in the BIE intervention strategy should be conducted. Since most departments and colleges of education continue to use university supervisors during the student teaching practicum experience for evaluation, both formative and summative, it would be helpful to understand their impact and/or effectiveness as part of the triad using the BIE intervention strategy.
6. The relationship between the BIE intervention strategy and the learning and teaching styles of the cooperating teacher, as well as the student teacher should be examined. The propensity or aversion to new strategies, such as the use of BIE intervention technology,

may provide insight as to the influences which impact the effective use of the BIE intervention strategy.

7. A bug-in-the-ear training manual for supervisors and the student teacher which would include discussion and description of the teacher clarity skills or behaviors, video-taped examples of the teacher clarity behaviors which could be cued, appropriate cues, and how and when to use the intervention strategy. As other aspects of the teaching process, such as classroom management, are validated as appropriate areas to intervene using the BIE, those too should be included in such a manual.
8. Future research should be conducted to determine what if any application this BIE intervention strategy may have with inservice teachers. It would appear that, with the growth in peer evaluation and mentoring programs, that the BIE may be appropriate, especially during the teacher's induction period.
9. Future research should be conducted to determine what if any application this BIE intervention strategy may have with preservice teachers prior to their last practicum experience. With the tendency for states and colleges and universities to increased the number of hours required in field experience during a teacher preparation program, earlier exposure to the BIE intervention strategy may provide

a means to remediate and develop essential pedagogical skills like teacher clarity.

10. Such research may consider using the BIE intervention strategy where the prompter includes peer relationships, especially during field experiences prior to student teaching, but also including the student teaching practicum experience. That is, preservice teachers cueing other preservice teachers on specific pedagogical skills in a cooperative effort to improve practice. This technique could also extend to the student teacher–cooperating teacher relationships where the role of prompter would vary within the dyad.

Effective supervision of student teachers has become a growing concern for teacher educators due to the increased emphasis placed on field experience in teacher preparation programs. Lacking an effective means of providing intervention, feedback, and reinforcement during the ongoing process, supervisors, both cooperating teachers and university based supervisors, have relied on the delayed and frequently awkward retrospective approach of post-observation conferencing. This investigation was initiated to address the need to provide a more systematic method of offering corrective and constructive feedback during the supervision of student teachers. As a pioneer study in the field, it has established a foundation for supervision research using the BIE

technology. This study should be considered a framework for future experimental inquiry in the field of teacher education student teaching supervision.

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APPENDIX A

TEACHING SKILLS OBSERVATION SHEET

APPENDIX B

CLARITY OBSERVATION INSTRUMENT

SECTIONS I AND II

OBSERVATION FORM
Section I - Frequency

Teacher No. _____

Rater _____

Lesson Task _____

Indicate to the right of the appropriate behavioral term the total number of times that behavior was observed in this teaching episode.

Teacher BehaviorTotal

STRESSES IMPORTANT ASPECTS OF THE CONTENT

1. Informs students of lesson objectives	_____
2. Points out what is important for students to learn	_____
3. Repeats things (terms, definitions, rules) that are important	_____
4. Writes important things on board or chart	_____
5. Summarizes material presented in class	_____

EXPLAINS THE CONTENT OF INSTRUCTION

6. Uses examples when explaining	
(a) uses verbal examples	_____
(b) uses written examples	_____
7. Works examples and/or demonstrates procedure	_____
8. Explains unfamiliar words	_____

PROVIDES FOR STUDENT ASSIMILATION/SYNTHESIS

9. Repeats things students do not seem to understand	_____
10. Explains something and then pauses so that students can think about it	_____

ASSESES AND TRIES TO ENSURE STUDENT UNDERSTANDING

11. Asks questions to find out if students understand	
(a) asks questions of entire class	_____
(b) asks questions of specific students	_____
12. Allows time for students to ask questions and answers questions	_____
13. Provides opportunity for students to practice or work examples	_____
14. Examines student work:	
(a) publicly	_____
(b) privately	_____

Section II

Please respond to the items below based on your observation of this teaching episode. On the scale provided to the right of each item, circle the number which best corresponds to your perception relative to that item.

The instructor:		Strongly Disagree		Agree		Strongly Agree
15.	adequately informed students of lesson objectives or what they would be expected to do on completion of lesson	1	2	3	4	5
16.	stressed the aspects of content which was important for students to learn	1	2	3	4	5
17.	repeated things which were important for students to learn	1	2	3	4	5
18.	used the board or chart to explain, define, illustrate, etc.	1	2	3	4	5
19.	summarized materials presented to class	1	2	3	4	5
20.	used relevant examples when explaining	1	2	3	4	5
21.	provided students adequate examples of how to do the work (demonstrated)	1	2	3	4	5
22.	explained unfamiliar words	1	2	3	4	5
23.	repeated things that the students did not seem to understand	1	2	3	4	5
24.	provided adequate "wait time" to allow students to think about information presented	1	2	3	4	5
25.	assessed student understanding of content by asking questions	1	2	3	4	5
26.	provided time for students to ask questions regarding the content	1	2	3	4	5
27.	provided opportunity for students to practice or work with information	1	2	3	4	5
28.	examined students' work publicly and/or privately	1	2	3	4	5
		Strongly Disagree		Agree		Strongly Agree
29.	Overall, the instructor demonstrated clarity skill proficiency during this lesson	1	2	3	4	5

APPENDIX C
TEACHER CLARITY BEHAVIORS
OPERATIONAL DEFINITIONS

CLARITY BEHAVIORS OPERATIONAL DEFINITIONS

An Introduction to Teacher Clarity ¹

What is teacher clarity?

Teacher clarity is a set or cluster of several teacher behaviors related to student achievement and satisfaction. These behaviors may seem very common sensical to you, and they may be, but well trained teachers who are skilled and consistent in the use of these behaviors can aid their pupils to better learn course material. By being skilled in teacher clarity, it is also possible to increase the satisfaction students feel about you and your course.

The fourteen Teacher Clarity behaviors of concern in this study have been divided into four sets or clusters. Although a teacher skilled in the behaviors makes use of them throughout the lesson, the clusters relate to the order in which the behaviors are likely to be used in lesson presentation.

The following is an outline and description of the Teacher Clarity skills/behaviors which are of concern in this study.

I. The teacher emphasizes important aspects of instruction and instructional content.

1. Informs students of lesson objectives in advance.

The teacher begins the lesson by informing students of the content material or concepts to be covered.

This brief introduction also informs students of their responsibility with respect to the material.

2. Points out what is important for students to learn.

The teacher deliberately draws students' attention to those aspects of the content of instruction it is important for them to learn. The teacher may say, for example, "It is important for you to know this..."; "You must understand this..."; "It is important for you to learn this ...", etc.

¹ The following material has been drawn from The Clarity Training Program: Instructor's Manual, part of the unpublished doctoral dissertation at The Ohio State University by Kim Metcalf (1989), *An investigation of the efficacy of a research-based regimen of skill development on the instructional clarity of preservice teachers.*

3. *Repeats things that are important.*

The teacher during the lesson, repeats (for emphasis) specific aspects of the content of instruction (e.g., point, rule, idea, etc.). This behavior may be initiated by the teacher or it may occur while he/she is elaborating on some statement/comment made by a student or during the review process. It does not, however, occur as a direct response to a student question or comment indicating the student does not understand something that has been said (taught).

4. *Writes important things on the board (chart).*

The teacher stresses important words, phrases, rules, concepts, ideas, etc. by writing them on the board (chart, overhead, etc.)

5. *Summarizes the material presented in class.*

The teacher, upon completion of the lesson or of clearly segmented portions of the lesson, provides a summary of instructional content or concepts that were presented.

II. Explains/demonstrates how to do the work by using examples.

6. *Examples are used.*

The teacher makes use of verbal, written or practical examples when explaining some aspects of instructional content.

7. *Works examples and explains them.*

The teacher works through examples or problems on the board, chart, etc. and explains the procedures involved. The emphasis is on demonstration and explanation of the application of instructional content to solve particular problems.

8. *Explains what unfamiliar words mean.*

The teacher tells students the meaning of word(s) with which the students are or may be unfamiliar. This may occur as a result of inquiry or comment by a student, or may be initiated by the teacher.

III. Provides for student understanding and assimilation of instructional content.

9. *Repeats things when students do not understand.*

The teacher repeats aspects of the content which students directly or indirectly communicate to the teacher that they do not understand.

10. *Explains something and then pauses to allow students time to think.*

The teacher explains some aspect of the instructional content and then deliberately pauses to allow time for students to think about what has been said. The teacher may say, "I want you to think about that for a moment..." or may simply pause.

IV. Assesses and tries to ensure student understanding of the content of instruction.

11. *Asks questions to find if students understand.*

The teacher, after explaining, repeating or reviewing some aspect of the instructional content, asks a direct question ("Is that clear?"; "Do you understand?") or asks questions about the content presented, to determine whether students understand what has been presented.

12. *Allows time (pauses) for students to ask questions and answers students' questions.*

After explaining, repeating or reviewing some aspect of the instructional content, the teacher deliberately pauses to provide time for students to ask questions. When questions are asked, the teacher answers content related questions.

13. *Provides opportunities for students to practice (work examples).*

The teacher, during the class period, provides specific time for students to do written or practical examples related to the content of instruction. This may take the form of individual seatwork or group work. The teacher may play an active role in the case of group work.

14. *Examines students work.*

The teacher checks a student's work either privately (at the student's desk or at the teacher's desk) or publicly (on the chalkboard, etc.)

**"BUG-IN-THE-EAR" DEVICE
AUDIO-CUING AND OBSERVATION NOTATIONS**

<u>Student Teacher Skills</u>	<u>Audio-cue/notations</u>
1. Informs student of the lesson objectives in advance	"give objective"(GO)
2. Points out what is important for the students to learn	"highlight important points" (IP)
3. Repeats things that are important	"repeat ____" (R-)
4. Writes important things on board or chart	"use board" (UB)
5. Summarizes material presented to class	"summarize" (SUM)
6. Makes use of verbal, written or practical examples	"give example"(E.G.)
7. Works through examples on the board and demonstrates the procedure to be used	"demonstrate" (DEM)
8. Tells students the meaning of word/words with which the students are unfamiliar	"explain" (EXP)
9. Repeats things students do not seem to understand	"re-explain or rephrase" (RR)
10. After explaining some aspect of the instructional content, the teacher pauses to allow students to think about it	"pause" (P)
11. Asks questions to check students' understanding	"ask questions" (?)
12. Allows time for students to ask questions	"wait time" (WT)
13. Provides opportunities for students to practice or work examples	"practice time" (PT)
14. Examines student work	"check work" (CW)

APPENDIX D
COOPERATING TEACHER REFLECTIVE LOG

Total time in conference _____ minutes

Please mark each of the following as to the **AMOUNT** of post-observation **TIME** spent discussing each of the following with your student teacher today:

Not at all		Some		A great deal	
1	2	3	4	5	Planning
1	2	3	4	5	Classroom Management
1	2	3	4	5	Classroom Environment
1	2	3	4	5	Teacher Knowledge
1	2	3	4	5	Instructional Strategies
1	2	3	4	5	Teacher Clarity Skills
1	2	3	4	5	Teacher-Pupil Interaction
1	2	3	4	5	Teacher Flexibility
1	2	3	4	5	Teacher Enthusiasm/Warmth
1	2	3	4	5	Student Participation
1	2	3	4	5	Student Achievement
1	2	3	4	5	Professionalism
1	2	3	4	5	Other (specify): _____

Briefly describe the post-observation conference as to the type of feedback and reactions.

not at all		moderately well		very well	
1	2	3	4	5	The student teacher is adapting to the BIE device ...
1	2	3	4	5	The pre-determined cues worked ...
1	2	3	4	5	The BIE can be used to provide appropriate feedback during the lesson ...
1	2	3	4	5	The BIE gives focus to the conference ...

What benefits/difficulties, if any, did you have using the BIE today?

Total time in conference _____ minutes

Please mark each of the following as to the **AMOUNT** of post-observation **TIME** spent discussing each of the following with your student teacher today:

Not at all	1	2	Some 3	4	A great deal 5	
1	2	3	4	5		Planning
1	2	3	4	5		Classroom Management
1	2	3	4	5		Classroom Environment
1	2	3	4	5		Teacher Knowledge
1	2	3	4	5		Instructional Strategies
1	2	3	4	5		Teacher Clarity Skills
1	2	3	4	5		Teacher-Pupil Interaction
1	2	3	4	5		Teacher Flexibility
1	2	3	4	5		Teacher Enthusiasm/Warmth
1	2	3	4	5		Student Participation
1	2	3	4	5		Student Achievement
1	2	3	4	5		Professionalism
1	2	3	4	5		Other (specify): _____

Please briefly describe the post-observation conference as to the type of feedback and reactions.

(over)

What potential does the BIE device have for you in the future?

Useless	Moderately Useful	Useful	Very Useful
---------	----------------------	--------	----------------

What benefits/difficulties do you see for future use of the BIE device?

Total time in conference _____ minutes

Please mark each of the following as to the **AMOUNT** of post-observation **TIME** spent discussing each of the following with your student teacher today:

Not at all		Some		A great deal	
1	2	3	4	5	
					Planning
					Classroom Management
					Classroom Environment
					Teacher Knowledge
					Instructional Strategies
					Teacher Clarity Skills
					Teacher-Pupil Interaction
					Teacher Flexibility
					Teacher Enthusiasm/Warmth
					Student Participation
					Student Achievement
					Professionalism
					Other (specify): _____

Describe the post-observation conference as to the type of feedback and reactions.

In the past few weeks, how useful could the BIE device have been?

Not at all		some		very useful	
1	2	3	4	5	
					Briefly explain: _____

APPENDIX E
STUDENT TEACHER RESPONSE FORM

Student Teacher Response Form "BIE" Study

Please take a few moments to respond to the following questions. Your response sheet may be returned using the self-addressed, stamped envelop which is attached. Thank you for taking the time to complete this reflective response form.

	Strongly Agree		Somewhat Agree		Strongly Disagree
The BIE device was easy to use	1	2	3	4	5
The prompts were easy to hear	1	2	3	4	5
The intent of prompts was clear	1	2	3	4	5
The BIE did not interfere with my teaching	1	2	3	4	5
The BIE helped to focus me on specific teaching skills	1	2	3	4	5
The BIE helped to relieve my anxiety about teaching	1	2	3	4	5
The BIE helped me improve my teaching skills	1	2	3	4	5
Use of the BIE provided focus to conferences (pre- and post-) with my cooperating teacher	1	2	3	4	5
The BIE encouraged communication	1	2	3	4	5
The BIE was useful	1	2	3	4	5
I liked using the BIE	1	2	3	4	5

For these longer answer questions, you may wish to attach additional pages.

Discuss some specific strengths of using the BIE device during student teaching.

Discuss some specific concerns or shortcomings regarding the use of the BIE device during student teaching.

What would you consider the biggest benefit of using the BIE during student teaching? _____

Overall, other comments? _____

APPENDIX F
ADDITIONAL SUMMARY TABLES

Table 18
One-way Analysis of Variance on the Covariable
Overall Pre-Test Measure

RATER C

Source	df	SS	MS	F
Between	1	123.9580	123.9580	1.41
Within	17	1489.6462	87.6262	
Total	18	1613.6042		

RATER 1

Source	df	SS	MS	F
Between	1	11.8441	5.9220	0.07
Within	17	1445.2337	90.3271	
Total	18	1457.0778		

Table 19**One-way Analysis of Variance on the Dependent Variable****Overall Posttest Measure****RATER C**

Source	df	SS	MS	F
Between	1	73.6988	73.6988	1.14
Within	17	1094.7222	64.3954	
Total	18	1168.4211		

RATER 1

Source	df	SS	MS	F
Between	1	103.1578	103.1578	1.12
Within	17	1560.0000	91.7647	
Total	18	1663.1578		

Table 20
One-between, One-within Analysis of Variance
Overall Clarity Measures

RATER C

Source	df	SS	MS	F
Between				
A	1	353.0560	353.0560	5.15*
S/A	17	1166.4920	68.6171	
Within				
B	2	91.2209	45.6104	0.74
A*B	2	9.1178	4.5589	0.07
SB/A	34	2083.7004	61.2853	
Total	56	3701.3614		

RATER 1

Source	df	SS	MS	F
Between				
A	1	132.9328	132.9328	2.32
S/A	17	974.2994	57.3117	
Within				
B	2	96.2106	48.1053	0.57
A*B	2	38.9088	19.4544	0.23
SB/A	34	2853.8041	83.9354	
Total	56	4091.0456		

* $p < .05$

Table 21

One-between, Two Within ANOVA Summary

Discrete Clarity Skills

RATER C

Source	df	SS	MS	F
<u>Between</u>				
A	1	40.0834	40.0834	39.83*
S/AB	6	34.9708	5.8285	5.75*
<u>Within</u>				
B	2	1.2047	0.6024	0.60
AB	2	0.4168	0.2084	0.21
C	13	251.7547	19.3657	19.24*
AC	13	24.3822	1.8756	1.85*
BC	26	20.2226	.7778	.77
ABC	26	12.2941	.4728	.47
CS/AB	708	717.9906	1.0141	
Corrected Total	797	1103.3200		

RATER 1

Source	df	SS	MS	F
<u>Between</u>				
A	1	25.4964	25.4964	17.58*
S/AB	6	37.9376	6.3229	4.36*
<u>Within</u>				
B	2	6.8981	3.4491	2.38
AB	2	1.1101	0.5550	0.38
C	13	236.6404	20.2800	13.99*
AC	13	18.7250	1.4404	0.99
BC	26	20.5138	.7890	.54
ABC	26	13.1280	.5049	.35
CS/AB	708	1026.6155	1.4500	
Corrected Total	797	1414.0649		

* p < .01

Table 22
Univariate ANOVA Summary
Discrete Clarity Skills F Test

RATER C

Source	df	F ₁	F ₂	F ₃	F ₄	F ₅	F ₆	F ₇	F ₈	F ₉	F ₁₀	F ₁₁	F ₁₂	F ₁₃	F ₁₄
A	1	7.25*	.20	1.21	12.70*	.10	3.36	3.77	.31	7.84*	.30	13.73*	1.94	3.08	1.97
S(A)	17	1.36	.84	1.75	2.36*	1.36	.95	1.56	1.23	.97	.97	.75	2.01*	.66	1.22
B	2	1.10	.84	4.93*	1.79	.60	.56	.09	.15	.25	.33	.82	1.17	.06	.19
A*B	2	.39	.06	.28	.23	.73	.34	.41	2.04	.04	.19	.20	.17	.13	1.34
ERROR	34														
TOTAL	56														

* P < .01

RATER 1

Source	df	F ₁	F ₂	F ₃	F ₄	F ₅	F ₆	F ₇	F ₈	F ₉	F ₁₀	F ₁₁	F ₁₂	F ₁₃	F ₁₄
A	1	.94	.48	2.58	7.29**	.03	2.21	.00	.09	2.69	.12	9.07*	1.18	1.75	.27
S(A)	17	1.42	.81	1.35	1.83	1.20	.88	1.62	2.13*	.60	1.03	.77	1.30	.43	.81
B	2	1.14	.02	2.57	.96	.71	.96	.25	.08	.31	.70	.54	.17	.46	.66
A*B	2	.52	.26	.48	.50	.85	.01	.29	.70	.33	.22	.12	.37	.19	.47
ERROR	34														
TOTAL	56														

* P < .05

** p < .01

Table 23
One-between, Two Within ANOVA Summary
Clarity Skill Clusters

RATER C

Source	df	SS	MS	F
<u>Between</u>				
A	1	10.1734	10.1734	51.00*
S/AB	34	44.5798	1.3111	6.57*
<u>Within</u>				
B	2	0.0069	0.0035	0.02
AB	2	0.1349	0.0675	0.34
C	3	35.4123	11.8051	59.18*
AC	3	0.9153	0.3051	1.53
BC	6	0.1166	0.0194	0.10
ABC	6	0.7651	0.1275	0.64
CS/AB	153	30.5178	0.1995	
<u>Corrected</u>				
Total	227	143.5325		

* $p < .0001$

Table 24
One-between, Two Within ANOVA Summary
Clarity Skill Clusters

RATER 1

Source	df	SS	MS	F
<u>Between</u>				
A	1	5.1253	5.1253	15.38*
S/AB	34	77.6873	2.2849	6.86*
<u>Within</u>				
B	2	1.4766	0.7383	2.22
AB	2	0.5428	0.2714	0.81
C	3	40.0331	13.3444	40.05*
AC	3	1.0330	0.3443	1.03
BC	6	0.0925	0.0154	0.05
ABC	6	1.0718	0.1786	0.54
CS/AB	153	50.9771	0.3332	
<u>Corrected</u>				
Total	227	204.4412		

* $p < .0001$

Table 25
Univariate ANOVA Summary
Clarity Skill Clusters F Test

Source	df	CL1	<u>RATER C</u>			CL1	<u>RATER 1</u>		
			CL2	CL3	CL4		CL2	CL3	CL4
A	1	6.97*	2.40	5.29*	7.08*	3.95	0.56	0.64	3.28
S(A)	17	1.66	1.03	1.14	0.95	0.99	1.51	0.73	0.66
B	2	1.47	0.05	0.00	0.03	0.81	0.44	0.14	0.15
A*B	2	0.02	0.51	0.15	0.19	0.08	0.28	0.31	0.25
Error	34								
Total	56								

* $p < .05$

APPENDIX G
LETTERS

August 21, 1992

Dear Cooperating Teacher:

Welcome to preservice teacher education! And welcome to teacher education research. We are currently conducting an experimental study in which we hope you will participate. The following is some general background and explanatory information.

As you are aware, future teachers participate in several formative field experiences where they learn and practice the art and skill of teaching under the guidance of a university supervisor, cooperating teacher or both. Student teaching, as the capstone formative field experience, is commonly believed to hold the greatest potential for constructive and helpful feedback. The learning process, however, is frequently restricted by an inability to provide simultaneous and immediate feedback and reinforcement to the student teacher during the ongoing process. Too often, the supervisor's hands are tied by the delayed and often cumbersome retrospective approach of post-conference supervision, losing much of the impact and potential for learning about teaching.

In this study, audio-cuing is used during the teaching process to assist student teachers. Through a wireless communication system, referred to as the "bug-in-the-ear"(BIE), the supervision of student teachers includes a strategy where verbal cues are given to the student teacher through a small transistorized ear phone to prompt specific behaviors and changes. As the prompter, the cooperating teacher views the classroom and lesson from the back of the room and simultaneously directs the student teacher to attend to specific behaviors via the BIE device. This strategy is not new to other disciplines, but is relatively untested with larger numbers, with student teachers, and in naturalistic settings.

We believe that the wireless communication technology has the potential for making a significant contribution to teacher education in an area which has been most troublesome to student teachers, university supervisors and cooperating teachers alike – providing appropriate and helpful feedback at the time when learning can most readily be achieved ... during practice. This belief has been confirmed through two smaller exploratory studies conducted with OSU student teachers during the last two academic years. The findings from both of these earlier studies have led to the current study. Support for this study comes from the following College of Education, Early and Middle Childhood Education faculty

and staff:

Mr. Dan Keller, Strand Coordinator
Ms. Terry Stahler, GAA, Assistant Coordinator, EMCE

We hope that you will agree to participate in this study. It will involve little if any "extra" work beyond that which you have already committed to with a student teacher. The study should, however, add to your skill in providing an effective formative experience for your student teacher and assist you in the summative evaluation. In addition, we have found that communication efforts with your student teacher generally, and with regard to specific pedagogical skills, can be enhanced. Comments from some previous cooperating teacher participants regarding the use of the BIE with student teachers include:

"It (the BIE) encourages more rapid communication between the cooperating teacher and the student teacher ..."

"The BIE also allows for or encourages a more formal observation during the time she's doing her 'solo teaching', rather than just running in and out casually..."

"One thing I think it is really helpful for is ... that I am alerted to areas where she (the student teacher) has concerns... it forced her to think, 'well, what would I like help with today.'"

"It helped me to really key in ... it brings more structure"

"It redefines or adds another dimension to my role as a cooperating teacher."

We will be happy to answer any other questions you may have. You may contact Carmen Giebelhaus at 292-1280 (work) or 338-1060 (home). Please take a moment to complete the demographic information on the attached page. Thank You.

Sincerely,

Carmen Giebelhaus, Principal Investigator
Josue Cruz, Associate Professor

The following demographic information will remain confidential:

Name _____

Student Teacher _____

School _____ Current Teaching Assignment _____

Total Years Teaching Experience _____

I agree to participate in the study Yes No

Gender Female Male

Current Degree Held (circle one) BA/BS MA/MEd PhD

This is my first student teacher Yes No

If NO, I have had _____ student teachers previously

I have completed (formal or in-service – circle one) training in supervision Yes No

I have previously participated in formal educational research Yes No

I have conducted my own classroom research Yes No

September 2, 1992

Dear Student Teacher:

Welcome to teaching! And welcome to teacher education research. We are currently conducting an experimental study in which you may be asked to participate. The following is some general background and explanatory information on the current study.

As you are aware, future teachers participate in several formative field experiences where they learn and practice the art and skill of teaching under the guidance of a university supervisor, cooperating teacher or both. Student teaching, as the capstone field experience, is commonly believed to hold the greatest potential for constructive and helpful feedback. The learning process, however, is frequently limited by an inability to provide simultaneous and immediate feedback and reinforcement to the student teacher during the ongoing process. Too often, the supervisor's hands are tied by the delayed and often cumbersome retrospective approach of post-conference supervision, losing much of the impact and potential for learning about teaching.

In this study, audio-cuing is used during the teaching process to assist student teachers. Through a wireless communication system, referred to as the "bug-in-the-ear"(BIE), the supervision of student teachers includes a strategy where verbal cues are given to the student teacher through a small transistorized ear phone to prompt specific behaviors and changes. As the prompter, the cooperating teacher views the classroom and lesson from the back of the room and simultaneously directs the student teacher to attend to specific behaviors via the BIE device.

This strategy is not new to other disciplines, but is relatively untested with larger numbers, with student teachers, and in naturalistic settings. We believe that the wireless communication technology has the potential for making a significant contribution to teacher education in an area which has been most troublesome to student teachers, university supervisors and cooperating teachers alike – providing appropriate and helpful feedback at the time when learning can most readily be achieved ... during practice. This belief has been confirmed through two smaller exploratory studies conducted with OSU student teachers during the last two academic years. The findings from both of these earlier studies have led to the current study. Support for this study comes from the following College of Education, Early and Middle Childhood Education faculty and staff:

Mr. Dan Keller, Strand Coordinator
Ms. Terry Stahler, GAA, Assistant Coordinator, EMCE

We hope that you will find this experience of furthering the knowledge base in teacher education an instructive and rewarding experience. You may be interested in some comments by previous study participants regarding the experience and impact of using the BIE:

"The BIE is not a threatening thing ... it's almost like a voice from above ..."

"I didn't feel like there was someone in the back judging me, just a little bird in the ear telling me something I could do ... a little information"

"It really was comforting to have it; it felt like a natural thing, it really does."

"I can think of times when it is really helpful, but I don't know when it wouldn't be ..."

"It's like having a dictionary right in my head full of content and strategies ... a reference book full of knowledge, teaching knowledge."

The study will involve little if any "extra" work beyond that which you would already do as a student teacher. It should assist you in developing certain pedagogical skills and improve the general level of communication between you and your cooperating teacher. There will be three video-taped lessons of your choice and, if you are in the experimental group, one short training session with your cooperating teacher using the "bug-in-the-ear" device (approximately thirty minutes).

We will be happy to answer any other questions you may have. You may contact Carmen Giebelhaus at 292-1280 (work) or 338-1060 (home).

Sincerely,

Carmen Giebelhaus, Principal Investigator
Josue Cruz, Associate Professor