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Examination of a site-based peer coaching inservice model

Barbara Lee Davis Licklider
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EXAMINATION OF A SITE-BASED, PEER COACHING INSERVICE MODEL

Iowa State University

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Examination of a site-based,
peer coaching inservice model

by

Barbara Lee Davis Licklider

A Dissertation Submitted to the
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Requirements for the Degree of
DOCTOR OF PHILOSOPHY

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Iowa State University
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1986

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CHAPTER I. INTRODUCTION

Inservice training for teachers is a primary concern of today's educational leaders (60). The goal of inservice education programs in local schools is to improve the achievement of learners by helping the instructional staff to develop and utilize skills that will make them more effective (43). But do traditional inservice days comprised of presentation of theory enhance teachers' abilities to be more effective in their classrooms?

In an analysis of more than 200 studies in which researchers investigated the effectiveness of various training methods, Joyce and Showers (29) found traditional inservice (theory presentation) raised awareness and increased conceptual control of an area to some extent, but it seldom resulted in skill acquisition or transfer of skills into the classroom situation. Wood and Thompson (68) identified other problems associated with traditional inservice education: 1) Negative attitudes are held by educators toward inservice education. The most common complaints include: inservice activities are unrelated to the day-to-day problems of the participants, lack of participant involvement in planning and implementation, inadequate needs assessment, unclear objectives, and lack of follow-up in the classroom after training. 2) Inservice training has a district-wide focus and does not meet the actual needs of teachers and administrators. There is increasing evidence that the appropriate unit for successful change in education is the individual school, not the district. 3) Sound

pedagogy is not modeled. Trainers often do not effectively model desired teaching behaviors, yet they expect teachers to use them in their classrooms. Changes in the delivery of inservice education are necessary if skills are to be acquired by teachers and transferred to the classroom.

A review of current literature suggested that inservice programs for teachers can be effective and positive change within a school can be implemented and maintained. Successful programs flow from careful planning, presentation, practice, implementation, and maintenance. They are not one day dog-and-pony shows masterfully presented by an expert but programs carried out step-by-step over a longer period of time. The successful programs evidence practical application of adult learning theories, stages of planned change, participative decision-making, and a well-known concept only recently applied to the classroom: "coaching." Coaching is a relatively simple concept. It involves developing teacher teams who observe one another's teaching and provide helpful information, feedback, and support to each other. The major functions of coaching include provision for companionship, providing technical feedback, analysis of application, adaptation to students, and personal facilitation (30).

Training for coaching is labor-intensive. It need not, however, necessitate additional financial resources. Training systems focusing on developing coaching skills for teachers and principals create cadres of trained coaches at school sites (31). If teachers are able to organize themselves into coaching teams, they are able to help train themselves and each other and to facilitate the transition from teacher skill development to transfer to teaching behaviors (30).

Although Wade (65), in a meta-analysis of ninety-one studies related to the effects of staff development, found no evidence that coaching greatly enhances instructional effectiveness, other research supported the concept. From a review of research studies, Joyce and Showers (29) identified five components common to successful inservice training: 1) presentation of theory; 2) modeling or demonstration; 3) practice under simulated conditions; 4) feedback; 5) and coaching. They concluded that all five components, with special emphasis on coaching, were necessary to reach the application level. Berliner suggested that presentations to teachers relative to research usually have little long-term impact; the research findings were applied only when someone worked with the teachers in their classrooms (6). Mohlman, Kierstad, and Gundlach (39) proposed a cyclical process of inservice education that involved the use of coaching: 1) workshop; 2) peer-observation in the classroom that is student-centered, non-threatening, and based on a problem-solving format; 3) post-observation conference concentrating on analysis and problem-solving; 4) teaching in the classroom, with emphasis on modifying practices, experimenting, and applying; 5) back in workshop focusing on all that has happened in the cycle and proceeding from there.

Although inservice training for teachers has not typically been well-received nor highly regarded, providing effective inservice education for today's teachers may be one of the biggest challenges now facing principals as instructional leaders (43). While citizens and parents are demanding increased student competence in reading, writing, mathematics, and science, many of today's teachers have been on the job a long time and

hold certification that does not necessitate retraining. If the principal is the instructional leader and gives on-site assistance, the principal plays a major role in successful inservice programs. This, too, was supported by recent research. In a study designed to investigate the effects of the principal delivering inservice training for student academic motivation, Walker (66) found "inservice training held at the building level and delivered by the principal was an effective way of improving both teachers' classroom motivational behaviors and student academic motivation." There appears to be a pressing need for developing systematic ways for principals to assist teachers with acquiring new knowledge, developing the skills that knowledge calls for in their teaching assignments, and transferring those skills to the classroom situation.

Statement of the Problem

The data related to educational change, studies of effective training, and research on skill transfer support the concept of coaching as a training device. Although there is some evidence that differences in inservice procedures, designs, and settings do have an impact on efficacy of the training (6, 29, 30, 31, 39, 41, 65, 66, 68), little is known about the effects of on-site coaching by peers on classroom implementation of effective teaching behaviors, and there is a lack of evidence that traditional inservice is effective. Research that examines the relationship of on-site peer coaching to transfer of new content and skills to teaching behaviors is clearly needed (31).

Purpose of the Study

The overarching purpose of this study was to examine a Site-Based, Peer Coaching (SBPC) inservice model to assist secondary teachers with the development of selected effective teaching behaviors. The proposed study was to be quasi-experimental in nature. The design was to be an interrupted time series with 1) a multiple baseline across situations, 2) a nonequivalent no-treatment control for teachers, 3) a nonequivalent no-treatment control for schools, and 4) a nonequivalent traditional treatment control for schools. Because it was not possible to secure enough participants to utilize control groups, the design of the study was changed. The study was exploratory in nature, designed not to test hypotheses but to guide further research. The study was designed to answer the following questions:

1. Is there a difference in teacher implementation of the selected effective teaching behavior resulting from the inservice training model?
2. What are the teacher perceptions of their own improvement in implementation of the selected effective behavior as a result of their participation in the inservice training model?
3. What are the effects of the components of the inservice training model on teacher implementation of the selected effective teaching technique?
4. What are the teachers' perceptions of the inservice training model?
5. Are there significant changes in teachers' perceptions of each of

the following as a result of participation in the inservice training model:

- a. willingness to be observed by a colleague while teaching?
 - b. inclination to observe a colleague teach?
 - c. improving one's own teaching skills?
 - d. inclination to seek advice from a colleague?
 - e. value of inservice in helping teachers improve?
 - f. willingness to try a new teaching technique?
6. How should the model be revised and refined to be most useful for future study and/or practical application?

Objectives of the Study

The objectives of the study were:

1. To identify one key effective teaching technique for the secondary level explicated from research on effective teaching.
2. To identify key components of effective inservice education from the literature on inservice education and staff development.
3. To develop a model for inservice education which incorporates the key components of effective inservice education.
4. To develop one workshop which will address the selected effective teaching technique.
5. To train principals to conduct the workshop.
6. To field test the materials and delivery systems of the workshop.
7. To field test one cycle of the SBCC inservice model.
8. To determine the extent to which skills acquired during training are transferred to classroom teaching behaviors.

9. To examine the feelings and perceptions of participating teachers about improving their teaching skills, observing a colleague teach, being observed by a colleague while teaching, value of inservice education for improving teaching skills, willingness to try a new or suggested technique, and seeking advice from a colleague about one's own teaching after participation in the SBPC inservice model.
10. To determine which part(s) of the model (theory, principal delivery, practice, feedback, or observing a colleague) most influenced any noted change in teacher use of the selected effective teaching behavior.
11. To make recommendations for improvement and further testing of the SBCC inservice model.

Basic Assumptions

The study was predicated on the following assumptions:

1. Teachers need inservice education and/or retraining throughout their careers.
2. Traditional inservice programs are generally ineffective at enhancing teachers' abilities to be more effective in the classroom.
3. Teachers are motivated to learn when they have some control over their learning from preplanning through maintenance and are free from threat.
4. Inservice education should focus on improving the quality of school programs and instruction.

5. Teachers want to improve their effectiveness.
6. Teachers can and will learn on the job.
7. A carefully designed and structured inservice program can help teachers improve their effectiveness.
8. Significant improvement in teaching behaviors requires practice and feedback.
9. The most successful inservice training programs are those associated with school-based rather than district-wide efforts.
10. Professional growth requires commitment to new performance norms.
11. The principal plays a major role in the most successful inservice education programs.

Delimitation of the Study

The amount of information about effective teaching and effective inservice education is considerable; review of all possible data was not practical. The focus in this study was the effects of peer coaching and counseling relative to appropriate use of a selected effective teaching technique. From the wide range of important constructs about effective teaching techniques, questioning technique was chosen as the content of the inservice workshop. The scope of the investigation was limited to two Iowa secondary schools and included eleven teachers who volunteered to participate, two from one school and nine from the other. The inservice workshops were conducted by the principals of the respective schools. The treatment was limited to a five week period. Because no control nor comparison groups were utilized, results have limited

generalizability; the research is designed to elicit information to guide further research rather than to test hypotheses.

Definition of Terms

The following definitions of terms are presented to give clarity to their use and meaning to this study.

1. Coaching--activity in which both teacher and peer observer analyze some aspect of the teacher's performance or behavior in the classroom for the purpose of change, maintenance, or improvement.
2. SBPC inservice model--Site-based, Peer Coaching inservice model.
3. Traditional inservice workshop--a presenter from outside the district conducts a two or three hour presentation and demonstration to the entire faculty of a school concentrating on discussion of the theory base of the selected effective teaching behavior; teachers participating in the workshop receive no follow-up assistance.

CHAPTER II. REVIEW OF LITERATURE

Introduction

This study investigated the effects of a site-based peer coaching and counseling inservice training program on teacher use of effective questioning techniques in the classroom. While the literature is replete with references to inservice education and effective teaching behaviors, it was necessary to limit the literature review to two principal categories with several subtopics essential to the essence of the study. The review of literature will explicate:

1. Inservice Education for Teachers
2. Effective Questioning

Inservice Education for Teachers

Researchers and educators generally held that inservice education for teachers offers one of the most promising paths for the improvement of instruction. Although the necessity for inservice education is generally recognized, many educators believe inservice teacher training, as it has generally been constituted, is beset by many problems. While it was clear that successful inservice is not easily accomplished, an important assumption of this study was that a carefully designed and structured inservice program can help teachers improve their effectiveness. This section of the literature review is limited to: (a) clarification of terms, (b) teacher inservice, (c) trends and issues in teacher inservice education, and (d) peer coaching.

Clarification of terms

Researchers and practitioners use a variety of terms to refer to the professional growth of staff members. The most commonly used terms include: on-the-job training, continuing education, staff development, inservice training, and inservice education. More precise meanings have been suggested for some of these terms. Continuing education is usually referred to as those educational endeavors beyond the usual sequences of school and colleges. Nadler (as cited in Harris, 26, p. 29) differentiated the meaning of training as learning which is job related from education, which is individual related, and development, which is organization related. Harris (26) offered the following definitions of inservice education and staff development:

Inservice education is a part of staff development which means any planned program of learning opportunities afforded staff members of schools, colleges, or other educational agencies for purposes of improving the performance of the individual in already assigned positions (p. 21).

Staff development has two distinct aspects: staffing - having the best person in the appropriate assignment at the right time, and training - inservice (described above) and, advanced preparation for new, advanced, or different job assignments (p. 24).

Regardless of the special meanings attached to the various terms to describe professional growth, each of these learning conditions constitutes change in staff knowledge, attitude and behavior.

Throughout this study, both the terms "inservice training" and "inservice education" were used to denote a structured program of learning activities designed to improve on-the-job performance. Both were also used interchangeably during the review of the literature.

Teacher inservice

This subsection focuses on the impact, components, and effectiveness of inservice training for changing teacher classroom behavior. Researchers and educators have generally supported the theory that inservice training can improve the competency needs and classroom performance of teachers.

While researchers have generally found that inservice programs that achieve a balance between knowledge (theory) and performance (practice) show a high degree of success, they have taken different approaches to identify those factors which contribute to an effective inservice program. For example, Lawrence et al. (33) reviewed and evaluated 97 studies and reports of teacher inservice education and generalized about the characteristics of successful programs. He categorized the inservice theories as the "seven dichotomous approaches" to the management of inservice activities. They are described as:

1. Individualized versus common activities.
2. Active teacher role versus receptive role in inservice design.
3. Supervised trials and feedback versus storing up information and behavior prescriptions for a future time.
4. Teacher mutual assistance and sharing versus separate individualized work.
5. Emergent design versus preplanned design.
6. Self-directed and initiated versus other-directed and initiated activities.
7. Programmatic or common approach versus a single-shot design, not linked to a general effort of the school.

Lawrence et al. (33) concluded that findings support these seven features:

1) individualized activities; 2) active teacher role; 3) supervised trials and feedback; 4) teacher mutual assistance; 5) emergent design; 6) self-directed activities; and 7) a programmatic approach. Education programs that report significant positive changes in teacher behavior incorporate a higher mean number of the seven desirable features than do programs reporting no significant changes. School based programs incorporate more of the features than do college-based programs.

Joyce and Showers (29) examined inservice programs by looking at how training components contribute to the influence of training outcome. In an analysis of more than 200 studies in which researchers investigated the effectiveness of various kinds of training methods, they found the major components of training were:

1. Presentation of theory--the rational, theoretical base, approach to instructional technique and potential use.
2. Modeling or Demonstration--enactment of the teaching skill or strategy through live demonstration or media.
3. Practice in simulated or classroom settings--trying out a new skill or strategy.
4. Structured or open-ended feedback--information about performance following an observation.
5. Coaching for application--hands-on, in-classroom assistance with the transfer of skills and strategies to the classroom.

Joyce and Showers reported that no inservice effort used all training components. Programs that combined presentation, practice, and feedback (Edwards, 1975; Hough, Lohman, and Ober, 1969); presentation, modeling, practice, and feedback (Borg, 1975; Borgg, Langer and Kelly, 1971); and presentation, modeling, and feedback (Friebel and Kallenbach, 1969) were heavily investigated with respect to skills acquisition and transfer

(as cited in Joyce and Showers, 29, p. 381). They reported fewer research efforts which focused on "coaching to application."

Whether the inservice was theory-based as suggested by Lawrence or included the components discussed by Joyce and Showers, the real question concerned the level of impact. Joyce and Showers (29, p. 380) classified the outcome of training into four levels of impact:

1. Awareness--a realization of a concept or area and begin to focus on it.
2. Concepts and organized knowledge--intellectual control over relevant content.
3. Principles and skills--tools for action. Teachers learn the skills to help them adapt to differences in students.
4. Application and problem-solving--transfer of concepts, principles and skills to the classroom.

This process must be understood in terms of the interdependence of each level on the other. It is only after the awareness of the area can one think effectively about it, possess the skills to act, and finally transfer all of these into action in the classroom to impact upon the education of children. In assessing the impact of inservice training, Joyce and Showers (29, p. 384) concluded:

If the theory of a new approach is well presented, the approach is demonstrated, practice is provided under simulated conditions with careful and consistent feedback, and that practice is followed by application in the classroom with coaching and further feedback, it is likely that the vast majority of teachers will be able to expand their repertoire to the point where they can utilize a wide variety of approaches to teaching and curriculum--if any of these components are left out, the impact of training will be weakened in the sense that fewer number of people will progress to the transfer level (which is the only level that has significant meaning for school improvement).

Berman and McLaughlin (4), researchers with the Rand Corporation

Study of Educational Change Project, discovered the staff development activities which had "major positive effects" on project outcomes were "concrete, ongoing, teacher specific and hands-on." The training allowed teachers to try out new techniques and to have access to assistance when needed. They also reported that the successful principals were trained in the areas and were, therefore, prepared to coach for application and give feedback (as cited in Mazzarella, 36, p. 182).

Whether the objectives are refining old skills or mastering new teaching strategies, the real purpose is changing the way teachers perform in the classroom. Lawrence et al. reported that programs directed toward improving teachers' knowledge tended to be more successful than those directed toward teachers' performance, which in turn succeeded better than those attempting to modify teachers' attitudes (33, p. 13). His research further suggested that the success rate of inservice education programs was substantially higher when change in teaching behavior was measured. According to Nicholson et al. (42), changing teacher performance is easier proportionately than changing student performance, and changing the performance of a group is easier than changing the performance of an individual teacher. In other studies of the impact of inservice education on teacher classroom behaviors, some researchers found a significant difference between pre- and posttest measures with regard to teacher perceptions of their own classroom behaviors and practices (70), while others found that the results indicated that inservice alone had little effect upon the perceptions of behaviors of experienced teachers (25).

Findings from research on the impact and/or effectiveness of in-

service education on teacher classroom performance and subsequently student performance provide a clear message: inservice education must address the needs of the building teachers; theory and practice should be combined; and finally, participation of teachers and principals in planning and training should be included.

Trends and issues in teacher inservice education

Traditionally, teacher training institutions have devoted their energies and resources to preservice and inservice programs for teachers. However, Collins' study of trends in inservice education suggested the trends are changing (9). The most significant changes were:

There is a shift to local responsibility. Schools are now defining their own needs rather than leaving this task to the universities.

Staff development is becoming more school-based than job embedded. This means more inservice is going on while people are performing their usual jobs, in their usual places.

The school building is defined as the "critical mass." The building has become the meaningful unit for effective and efficient delivery of inservice education.

School-based inservice programs were widely supported. Howey et al. (27) contended there are two primary reasons for planning inservice at the building level. First, many professional growth activities can be infused into instructional programs and, therefore, focus more directly on the problems of the school and the teachers who need to find solutions to those problems. Second, it is less costly to provide school-based inservice in terms of time, travel, and money needed for teacher participation in inservice outside of the school building.

Additional support for school-based inservice education was found in

separate reviews of the literature on inservice education as indicated in reports by McLaughlin and Marsh (38), Lawrence et al. (33), and Nicholson et al. (42). As a result of their reviews, the researchers concluded that the school seems to be a better place for inservice teacher education than the higher education institutions. For example, Lawrence et al. noted that although both school-based and college-based programs affected teacher behavior, attitudes were influenced more by school-based programs. They found that 23 of 27 school-based programs reported significant changes in attitudes. Marsh and McLaughlin concurred with Lawrence and associates.

Wade (65), in a recent meta-analysis of research on inservice education, reached conclusions that vary from earlier reported trends. She contended that no "magic formula" for effective inservice programs exists and offered six suggestions for staff developers who wish to plan programs for maximum effectiveness (p. 53):

1. Plan programs in which elementary and secondary teachers can participate in training together whenever appropriate.
2. Encourage teachers to become involved in state-, federal- or university-initiated programs.
3. Offer incentives for participation, such as enhanced status or college credit, whenever possible.
4. Encourage independent study and self-instruction as alternatives to the traditional workshop format.
5. Suggest that instructors set clear goals and take major responsibility for the design and teaching of the class rather than encouraging participants to assume these roles.
6. Use instructional techniques such as observation, micro-teaching, video/audio feedback, and practice as alternatives to lecture, discussion, games/simulations and guided field trips.

Wade's findings suggested some diversion from what appeared to be trends reported in earlier reviews. Her suggestions seemed to point back toward district-wide rather than school-based inservice, toward outside agency initiation rather than school-based responsibility, less participant involvement in planning, and more independent study and self-instruction rather than collegiality.

Recent researchers disagreed, however, with some of Wade's suggestions. In cautioning about discouraging teachers from becoming involved in school- or district-initiated programs, Sparks (59) cited the success of effective schools and school improvement programs as examined by Eubanks and Levine (16). Wood, McQuarrie, and Thompson (67) suggested not only that the school is the most appropriate unit or target of change in education, but also that school districts have the primary responsibility for providing the resources for inservice training. Lawrence (32) noted that school-based programs conducted by local supervisors or administrators appeared more effective than those run by outside personnel. Sparks (59) also cautioned the interpretation of Wade's suggestions that the leader rather than the participants take on the role of designing and teaching. She suggested the recommendation should not be interpreted to mean "that teachers should never get together in small groups to perform highly structured tasks or that group discussions are never a good idea" (p. 58). Sparks agreed with the inservice strategies recommended by Wade (observation, microteaching, feedback, and practice).

Sparks (58) provided the following recommendations for improving staff development from her own review of the research on staff development

for effective teaching (p. 71):

1. Select content that has been verified by research to improve student achievement.
2. Create a context of acceptance by involving teachers in decision making and providing both logistical and psychological administrative support.
3. Conduct more than one training session two or three weeks apart.
4. Include presentation, demonstration, practice, and feedback as workshop activities.
5. During training sessions, provide opportunities for small-group discussions of the application of new practices and sharing of ideas and concerns about effective instruction.
6. Between workshops, encourage teachers to visit each others' classrooms, preferably with a simple, objective, student-centered observation instrument. Provide opportunities for discussions of the observation.
7. Develop in teachers a philosophical acceptance of the new practices by presenting research and a rationale for the effectiveness of the techniques.
8. Lower teachers' perception of the cost of adopting a new practice through detailed discussions of the "nuts and bolts" of using the technique and teacher sharing of experiences with the technique.

There seemed to be general agreement among the researchers about the trend toward presentation, demonstration, practice, and feedback as inservice strategies (6, 29, 37, 39, 41, 58, 67). Most researchers also agreed that training should be conducted in several sessions over a period of time. Lawrence (32) found that inservice programs consisting of a single session are largely ineffective. Stallings, Needels, and Stayrock (62) utilized a series of four to six three-hour workshops spaced one or two weeks apart that resulted in teachers improving their behavior on 25 out of 31 classroom management and instructional practices. Anderson, Evertson, and Brophy (1) found impressive teacher changes resulting from

two or more training sessions separated by at least one week. The Rand researchers (4) discovered most staff development programs that have an impact on teaching behavior are spaced over time.

The role of the principal in inservice education is not as clear. Corbett (11), in his examination of the role of the principal in maintaining classroom change, found that innovations will not be maintained long enough to become habits if incentives are not continued. He concluded the principal has the primary role in providing those incentives. Wood, McQuarrie, and Thompson (67) found that practitioners and professors agree the principal is the key element for adoption and continued use of new practices and programs in a school. Dupuis and Askov (15), in describing the success of a statewide program in Pennsylvania to help teachers teach reading skills, reported that principals support the program and demonstrate that support by participating and giving reinforcement.

Berman and McLaughlin (4) and Lawrence et al. (33) concluded school-based programs conducted by local supervisors or administrators appeared more effective than those presented by outside personnel. Walker (66), in a study designed to investigate the effects of the principal delivering inservice training for student academic motivation, found "inservice training held at the building level and delivered by the principal was an effective way of improving both teachers' classroom motivational behaviors and student academic motivation." Joyce and his associates (as reported by Mazzarella, 36, p. 194) interviewed 1016 teachers, administrators and college faculty, however, and found only two percent of the respondents preferred local education agency personnel (administrators and curriculum

supervisors) as trainers. Mazzarella (36) concluded that principals ought to be a part of staff development programs and show their knowledge and support of the program but should not have full responsibility for planning programs.

Another issue in teacher inservice education appears to be the use of coaching as a part of inservice education. Since peer coaching was a focus of this study, the concept was dealt with as a separate subsection of the inservice education for teachers section of the review of the literature.

In summary, it appeared the strongest trend in teacher inservice education focused upon the strategies involved. There was general consensus the most effective programs included: (1) presentation of theory; (2) demonstration; (3) practice; and (4) feedback. Although there was not total agreement, most researchers also contended:

1. There should be local responsibility for inservice.
2. Programs should be school-based.
3. Inservice should be conducted over a period of time rather than in a single session.
4. Participants should have involvement in planning inservice.
5. Principals play an important role in the success of teacher inservice training.

The primary issues in teacher inservice education appeared to be:

1. Who should conduct the training?
2. What is the role of coaching in teacher inservice education?

Peer coaching

The world of athletics and research on the transfer of skills learned in a workshop to teacher classroom behavior may, at first glance, appear to be strange bedfellows. Nevertheless, the concept of coaching is being used to increase the effectiveness and acceptability of teacher inservice education (54).

Coaching, as defined by Joyce and Showers (30), is in-class follow-up by a supportive advisor who helps a teacher correctly apply skills learned in training. It is a relatively simple concept involving the development of teacher teams who regularly observe one another's teaching. The major functions of coaching include provision of companionship, giving of technical feedback, analysis of application, adaptation to students, and personal facilitation.

Showers (54) identified these purposes of coaching:

1. To build communities of teachers who continuously engage in the study of their craft.
2. To develop the shared language and set of common understandings necessary for the collegial study of new knowledge and skills.
3. To provide a structure for the follow-up to training that is essential for acquiring new teaching skills and strategies.

Despite its potential for increasing effectiveness of inservice training, few programs incorporate coaching as a component of training. Servatius and Young (52) suggested typical training programs neglect to provide coaching possibly because it is perceived to be logistically impractical, expensive, or threatening to the participant. Although coaching is a labor-intensive approach to training, it need not necessitate additional financial resources. The "threat" of coaching may be

minimized if peers do the coaching rather than supervisors or outside personnel. In fact, Joyce and Showers (31) suggested that training systems focusing on developing coaching skills for teachers and principals would create cadres of trained coaches at school sites. If teachers organize themselves into coaching teams, they may be able to help train themselves and each other and to facilitate transfer of training (30).

Showers (54) stated the first step in the process of coaching is for teacher organized coaching teams to study the rationale of new skills, see them demonstrated, practice them, and learn to provide feedback to each other as they experiment with the skills. From then on, Showers noted, coaching is a cyclical process designed as an extension of training whereby coaches assist with transferring new behaviors into effective classroom practice. During this aspect of the process, coaching conferences take on the character of collaborative problem-solving sessions. Team members begin to operate in a spirit of exploration: searching for and analyzing curriculum materials for appropriate use of strategies, hypothesizing student responses and learning outcomes for specific strategies, and designing lessons. The process becomes cyclical with the "teacher" experimenting with a new lesson while the "coach" observes and a new cycle of analysis, study, hypotheses-forming, and testing continues.

Showers (54) contended teachers should coach each other. To do so, they need "(1) familiarity with the new skill or strategy to be mastered and transferred into the teacher's active repertoire; (2) access to other teachers in their classrooms for purposes of observation, feedback, and conferences; and (3) openness to experimentation and willingness to persist

and refine skills" (p. 45).

Showers (54) reported coaching appears to contribute to transfer of training in several ways. She found that coached teachers generally practiced new strategies more frequently and developed greater skill in a new teaching strategy than did uncoached teachers who had experienced identical initial training. Two of her studies (53, 55) revealed that teachers involved in coaching not only used the new strategies more appropriately in terms of their own instructional objectives but also exhibited clearer cognitions with regard to the purposes and uses of the new strategies as revealed through interviews, lesson plans and classroom performance than did uncoached teachers. Coached teachers were also much more likely than uncoached teachers to teach the new strategies to their students, ensuring that students understood the purpose of the strategy and the behaviors expected of them when using the strategy (53). Baker (3) found that coached teachers exhibited greater long-term retention of knowledge about and skill with strategies in which they had been coached. Those teachers also tended to increase the appropriate use of new teaching models over time.

Servatius and Young (52), in their report about the outcome of the EDC Teacher Advisor Program (an inservice program utilizing coaching), stated the most productive outcome has been that teachers who received both training and coaching implemented the trained skills correctly and consistently. They felt several factors interacted to produce successful implementation through coaching: (1) classroom visitations promoted accountability; (2) support and companionship developed between advisor

and advisee; and (3) teachers were provided with specific feedback, so they truly learned whether or not they were implementing the skill correctly. In addition, teachers who participated in the EDC Teacher Advisor Program reported overwhelming positive feelings about the experience, especially about receiving positive feedback. Showers (54) also reported coaching appeared to facilitate professional and collegial relationships, although her current data in this area was less formal than her data on skill acquisition and transfer.

Although a number of researchers supported the concept of coaching (6, 30, 39, 58), Wade (65) raised the issue of effectiveness of coaching in her recent meta-analysis of the research on inservice teacher education. She found no evidence that coaching greatly enhanced instructional effectiveness. Even though her analysis revealed that coaching was moderately effective, Wade suggested "the evidence is beginning to point to the fact that coaching, as an instructional technique, does not have the potential to alter teacher behavior" (p. 53). Even though Sparks (57) found that workshops plus trainer-provided coaching were not superior to workshops alone or to workshops plus peer observation, in her reply to Wade (65), she contended that coaching may not be as ineffective as the meta-analysis might suggest. Sparks suggested consideration of who the coach is may be important. She, as well as Showers (54), suggested coaching by peers may be more effective than coaching by trainers, outsiders, or supervisors. If coaching is ineffective, it may be because of problems cited by Levinson (as reported by Wade, 65, p. 54):

1. the coach and trainee rarely have the "psychological time" to develop the kind of relationship based on mutual respect that is

necessary for effective coaching;

2. the coaching relationship may be impaired by pressure from supervisors to get information from coaches that might be used against the trainee;
3. coaches often do not know how to foster independence;
4. the coaching situation is in danger of being blocked by the universal feeling of rivalry and its accompanying fears.

Clearly, the concept of coaching remained an issue to researchers of effective inservice education for teachers. Results of research were certainly not conclusive, either in proving its effectiveness or ineffectiveness. Although coaching is labor-intensive and time-consuming, there was not enough evidence to prevent further research. The concept continued to be a potentially effective training device, especially if the inherent problems can be identified and addressed. Additional research may help to further define the potential of coaching.

In summary, this section of the literature review focused on inservice education for teachers as structured learning activities designed to assist teachers with developing and utilizing skills that will make them more effective. Researchers tended to agree that the most effective inservice programs evidenced presentation of theory, demonstration, practice, and feedback. Most, although not all, researchers also contended there were trends toward local responsibility for and school-based delivery of inservice education. The most effective inservice tended to be carried out over a period of time with participants involved in the planning of content and delivery. Principals played an important role in the success of inservice programs, although at issue was whether principal delivery of the workshop is part of that role. The effectiveness of peer

coaching as a part of inservice training also appeared to be an issue.

Effective Questioning

This section of the review of the literature focuses on questioning, the teaching skill which served as the subject of examination in the study. The review includes: (a) overview of questioning, (b) components of effective questioning, and (c) applications of research findings.

Overview of questioning

Questioning has been considered important in learning from the times of early Greek philosophy as formulated by Socrates and recorded by Plato. Gall (21) stated that it is a truism for educators that questions play an important role in teaching. Aschner (2) called the teacher a "professional question maker" and said the asking of questions is "one of the basic ways by which the teacher stimulates student thinking and learning." In fact, in a study just after the turn of the century, Stevens (1912) found that a sample of high-school teachers asked a mean number of 395 questions per day. He estimated that four-fifths of school time was occupied with question-and-answer recitations (as cited in Gall, 21, p. 707).

Recent investigators also found high frequencies of question use by teachers. Floyd (18) found each of ten primary-grade teachers asked an average of 348 questions each during a school day. In a study of twelve elementary school teachers, Moyer (40) found that an average of 180 questions were asked in each science lesson. Fifth grade teachers asked an average of 64 questions each in a thirty-minute social studies lesson in an investigation conducted by Schreiber (51).

The hundreds of questions the typical American teacher asks on a typical day serve a number of purposes. One of the most traditional uses of questions has been to determine whether or not students have done their homework (5). Questions can, however, serve purposes other than checking on student preparation. In reviewing research on teaching behavior and classroom interaction, Carin and Sund (8) found teachers use questioning to:

1. Arouse interest and to motivate children to participate actively in the lesson.
2. Evaluate a student's preparation and to check comprehension of homework or previous assignments.
3. Diagnose student's strengths and weaknesses.
4. Review and/or summarize what has been presented.
5. Encourage discussions.
6. Direct children to new possibilities in the problem being explored.
7. Stimulate students to seek out additional data on their own.
8. Build up an individual student's positive self-concept.
9. Help children see applications for previously learned concepts.
10. Assess the degree of success in achieving the goals and objectives of the lesson.

Groisser (24) listed eight purposes and functions of questioning:

1. To test a pupil's preparation for the lesson.
2. To arouse interest.
3. To promote understanding.
4. To develop new insights.
5. To develop ideals, attitudes, and appreciations.

6. To strengthen or consolidate learning.
7. To stimulate logical or critical thinking.
8. To test for achievement of objectives.

Teachers themselves report various purposes for questioning students. Pate and Bremer (44) asked 190 elementary-school teachers to respond to the question: "What are three important purposes of teachers' questions of pupils?" Most of those teachers (68 percent) said an important purpose of teachers' questions was to check on the effectiveness of teaching by checking on what students had learned. The next two most frequently stated purposes for questioning were diagnosis (cited by fifty-four percent of the teachers) and checking students' recall of facts (forty-seven percent). Other purposes indicated by teachers included meeting individual needs (seventeen percent), determining grades (sixteen percent), requiring students to use facts in generalizing and making inferences (ten percent), checking student progress (nine percent), providing for students to check their own learning (eight percent), and motivation (seven percent). Cunningham (12) suggested questions are used more often by teachers to give directions, correct misbehavior, manage classroom activity, initiate instruction, create learning situations, and evaluate learning than they are to stimulate thinking--even though most teachers perceive developing the ability to think as the major goal of education.

Just as there are many purposes for questioning students, there are a number of classification schemes that categorize questions into types and many studies that relate types of teacher questions to student achievement (23). Despite well-publicized and accepted claims that

divergent questions are better than convergent questions, several reviews concluded that measures of type or level of questions did not necessarily correlate with learning gains (14, 48). Brophy and Evertson (7) reported inconclusive results in a similar study. From studies of instruction of disadvantaged students in the early elementary grades, Stallings and Kaskowitz (61) suggested that low-level factual questions were preferable to more complex or abstract questions. From her review of research on teachers' questioning, Gall (20) concluded that "(1) emphasis on fact questions is more effective for promoting young disadvantaged children's achievement, which primarily involves mastering of basic skills; and (2) emphasis on higher cognitive questions is more effective for students of average and high ability, especially as they enter high school, where more independent thinking is required" (p. 10). Although several studies agreed in showing that a higher frequency of questioning is related to higher student achievement (6, 56, 61), Gall (20) concluded from her review that research findings argued against the common practice of rapid-fire questioning.

In addition to her conclusions about level and rate of questioning, Gall (20) concluded that research suggested:

1. Teacher questioning provides an opportunity for students to practice and receive feedback.
2. Students perform better on end-of-unit tests following recitations including questioning.
3. Students who listen to others' responses or answer silently to themselves learn as much as respondents.
4. Teacher acceptance of student responses to questions is positively correlated with student gain.

5. Redirecting questions may be effective.
6. High level questions generally facilitate better book learning and thinking.
7. Most teachers rely on fact questions; sixty percent of their questions are factual, twenty percent higher level and twenty percent procedural.
8. Student responses are often at lower levels than questions.
9. To provide an accurate response, a student must have relevant information and appropriate cognitive ability.

Although much advice about developing good questions and effective questioning techniques is available, much of it is based not on research but on logical analyses of the strengths and weaknesses of different questions with reference to instructional goals. The appropriateness of questions depends upon characteristics of the students and the purpose of the activity (23). Although the definition of a good question depends upon context, Groisser (24) suggested guidelines that can be applied to most questions. Good questions are (1) clear, (2) purposeful, (3) brief, (4) natural and adapted to the level of the class, and (5) thought provoking. Elaboration of those descriptions as well as discussion of effective questioning technique follows in the next sub-section of the review of the literature.

Components of effective questioning

Effective teacher questioning depends upon proper use of two components of questioning: (1) question development and (2) questioning procedures. Development of good questions generally includes four steps: (1) deciding on the purpose of the questions, (2) considering the students to whom the questions will be addressed, (3) phrasing the questions, and

(4) formalizing the questions. Effective questioning procedure includes techniques used by the teacher in asking questions in the classroom such as use of a conversational tone, directing questions to the entire class, wait-time, random selection of respondents, teacher response to student response, and redirecting questions.

Each of these facets of effective questioning is elaborated upon in this subsection of the review of the literature. Some of the suggestions are based upon outcomes of research studies; others are recommended by experts in the field.

Question development

Groisser (24) suggested that good questions are (1) clear, (2) purposeful, (3) brief, (4) natural and adapted to the level of the class, and (5) thought provoking. Before suggesting how each of those criteria fit into the four-step process of developing good questions, each of the criteria will be elaborated upon.

Clear questions precisely describe the specific points to which students are to respond (23). Clear questions should leave no questions in the pupil's mind as to what they mean. Vague or ambiguous questions may confuse students. A vague question is one that is not definite in statement or meaning. An ambiguous question is open to various interpretations. Elliptical or "what about" questions; general questions, such as "Tell us what you know about. . . ."; and multiple or overlaid questions also are confusing to students (24). In experimental situations, Wright and Nuthall (69) and Rosenshine (47) found clear and highly focused questions caused students to respond along specific lines.

Questions, to be effective, must be purposeful in two ways according to Groisser (24). Individually, each question should aim to channel the discussion along paths suggested by the teacher. Collectively, the achievement of the lesson should be the net effect of all questions asked. Question series that are not planned in advance are seldom purposeful. Teachers will ask many irrelevant and confusing questions that work against achievement of their goals if most of their questions are "off the cuff." Therefore, questions should be planned in advance and asked in carefully thought-out sequences. This does not mean prepared question sequences should hold teachers to rigid courses. Student questions may open worthwhile side roads that should be pursued if they help to reach the goal of the lesson (23).

Good questions should be as brief as possible. Shorter questions are more easily understood than longer questions. Therefore, brief questions tend to move the lesson along smoothly. The wordy question is usually characterized by repetition, circumlocution or unnecessary introductory statements, all of which tend to confuse (23).

Questions should be phrased in natural, simple language (as opposed to textbook language) and should be adapted to the level of the class. This is important because it will prevent the language of the question from interfering with the course of the discussion. Words should be used which all students, not just the brighter ones, can understand, for if students do not understand, they cannot do what the teacher wants (23).

Good questions are thought-provoking. According to Grossier (24, p. 26):

Thought questions require mental effort in the form of the making of judgments, the drawing of inferences or deductions, the determination of cause and effect, the description of a situation, the classification and categorization of a set of data, the giving of proof, the showing of relationships, the evaluation of facts or ideas, the summary of topics or subtopics, or the making of generalizations.

The teacher ordinarily asks both fact and thought questions in the same lesson often with a series of fact questions being the basis for a thought question (24). The purposes of the lesson and the nature of the learners may guide the predominance of either thought or fact questions as evidenced by Gall's (20) conclusion in her review of the research on questioning:

Emphasis on fact questions is more effective for promoting young disadvantaged children's achievement, which primarily involves mastering of basic skills; emphasis on higher cognitive questions is more effective for students of average and high ability, especially as they enter high school. (p. 41)

The previously discussed criteria of good questions guide the development of effective questions. Development of effective questions may be viewed as a four-step process. An examination of those four steps follows:

Step 1. Decide the purpose of the questions.

Before questions can be developed, the teacher must know two things: (1) the teaching objective for the lesson and (2) the goal or purpose for each question. The teacher must decide for each question whether the purpose is review, diagnosis, checking for understanding, generation of discussion, assessment of higher level reasoning, motivation or some other goal. After the purpose is decided, the teacher moves to the second step of developing effective questions by thinking about the students.

Step 2. Consider the students.

After deciding the purpose of the questions, the teacher must consider the students to whom the questions will be posed. The teacher must first consider what ability levels are present among the students and then think about ways to involve and challenge students at each level. To challenge all levels, careful attention must be given to the terms and the vocabulary to be used, as well as to the background and previous learning of all the students. In addition to considering ability levels and ways to work with those levels, the teacher must decide how to distribute the questions while considering the students. With those general considerations of the students in mind, the teacher is ready to phrase the questions.

Step 3. Phrase the questions.

"The phrasing of a question refers to the way the question is worded. Wording in this sense relates to the terminology used in the question, the number of words used, and the order in which they occur" (12, p. 107). The wording of the question sets the criteria for the kind and number of responses that can be given, therefore influencing the function of the question. A good question not only does a good job of conveying its function, but it is also clearly posed. The grammatical arrangement of the question influences its clarity. Questions that are too wordy, have an illogical word order or use words that do not offer suitable criteria for a response are considered poorly phrased (12).

Groisser (24) identified several question-phrasing habits to avoid:

(1) Excessive use of yes-no and simple choice questions should be avoided because they typically are asked only as warm-ups for other

questions, they encourage guessing, and they have low diagnostic power. Choice questions are sometimes useful for low-achieving and/or sensitive students who have a hard time responding. Warm-up of that kind may help those students, but yes-no and simple choice questions should be avoided for most instructional purposes.

(2) Tugging is a question or statement often following a partial or incomplete student response. Tugging, according to Good and Brophy (23), is often ineffective. Brophy and Evertson (7) found it was best for teachers to give students the answers to factual, lower level questions when they were unable to respond and unwise to try to elicit it by pumping them. They concluded that when students have responded to the initial question, teachers will be more likely to get additional information if they ask new, more specific questions.

(3) Some questions encourage guessing or speculation rather than constructive thinking. Good and Brophy (23, p. 365) stated "guessing questions are useful if they are tied to teacher strategies that help students think rationally and systematically and if they are designed to arrive ultimately at a thoughtful response." Generally, however, according to Groisser (24) guessing questions should be avoided because they are aimless and waste time. They also promote choral responses that can break down classroom discipline. Guessing questions also encourage one-word answers rather than reflective thinking.

(4) When the teacher asks leading questions he or she gives part of the answer away or sways opinion before the facts are in. Since these questions tend to smother independent thinking, they should also generally

be avoided.

In addition to suggesting that yes-no questions should be avoided, Cunningham (12) identified three other question phrasing problems:

1. Ambiguous questions lack adequate criteria for the pupil to form a meaningful response. These include "What about. . . ." kinds of questions, statements intoned as questions, commands, and fragmented questions. These questions are vague, unclear, purposeless and unfair to the pupil. They fail to communicate the intent of the question and neither demand nor imply a complete answer.

2. In contrast, spoon-feeding questions give too much guidance for a response. Sometimes the answer to such a question is so obvious that it is hardly worth the time to answer the question. This type question encourages students to become lazy and inexact in their thinking.

3. Stacking or overloading questions include too many factors for the pupil to consider at one time and are confusing. They may do more harm than good. A question phrased effectively will present one idea. It is usually better to ask two or more questions that are clear and brief than to phrase a question with more than one idea or to phrase it with vocabulary that is beyond the understanding and experience of the students.

In summary, a question that is properly phrased "will contribute to a clear understanding, serve as a model for pupils, and insure accurate communication of the question's purpose. When properly phrased a question will employ clear wording, contain vocabulary suited to the group with which it is used, employ wording appropriate to the level of thinking

sought in the question, be grammatically correct, and possess content relevant to the purpose of the question" (12, p. 113).

When questions are effectively formulated and phrased, the teacher then moves to the last step of the question development process.

Step 4. Formalize the questions.

The first step in formalizing questions is to write each question on an index card or record it in some manner. The questions should then be organized and sequenced considering: (1) the number of questions and (2) the placement or chronology in the lesson dependent upon the purposes and levels of the questions.

In general, the teacher should progress from fact questions to those that generate higher level thinking. The occasional use of thought-provoking questions early may stimulate student interest.

Although several studies agreed that a higher frequency of questioning is related to higher student achievement (7, 56, 61), Gall (20), from her review, concluded that research findings argue against the common practice of rapid-fire questioning. Cunningham (12) suggested:

A question-asking strategy that employs a large number of questions deters the development of the ability to think. The emphasis on quick, factual recall answers may bring many answers, but it represents a neglect of individual differences, for it is a denial of the opportunity for the pupil to develop skill in verbal expression. It also lessens his time to evolve complete and thoughtful responses necessary to the development of his ability to think. (p. 120)

In summary, effective questions are developed through a four-step process:

1. Decide on the purpose of the questions.
2. Consider the students to whom questions will be posed.

3. Phrase the questions.

4. Formalize the questions.

The process, however, must be used as a flexible guide rather than a set of rigid rules. Groisser (24) emphasized that it is not practical to prepare all the questions in a lesson. To do that would be both impossible and inadvisable for the lesson would then be forced into a rigid pattern. In a typical lesson, many questions are framed in response to what students do and say. Therefore, much questioning is of an extemporaneous or impromptu nature. It is important, though, that key questions are drawn up in advance and are logically and sequentially ordered.

Developing effective questions is only half the battle of effective questioning technique. As Grossier states (24, p. 38), "a teacher who asks questions with a specific purpose and in challenging fashion will undoubtedly spark thought and response if his questions are designed carefully. Additional dividends will accrue if the teacher asks these questions artfully as well. Certain questioning procedures and mechanics can contribute to this artistry."

Effective questioning procedures

Techniques or a process for asking questions effectively are adapted largely from the work of Loughlin (35) and Groisser (24). Common sense and logical analyses underscore the reasonableness of the guidelines. Several of the suggestions are supported by empirical data. Questioning techniques and procedures that are generally judged to be effective include:

1. Ask the question in a non-threatening conversational tone.

2. Direct the question to the entire class.
3. Pause, generally three to five seconds, before calling on someone.
4. Randomly select or carefully choose a student to answer, with careful attention to widely distributing response opportunities.
5. Pause, again three to five seconds, after calling on the student and again after the student responds.
6. Respond to the student in one of the following ways:
 - (a) provide evaluative feedback,
 - (b) modify the student answer,
 - (c) apply or compare the answer to previous learning,
 - (d) summarize the student response,
 - (e) repeat the student response, or
 - (f) probe for clarification.
7. Redirect questions occasionally but systematically.

Each of these ideas will be examined in more detail. Supporting empirical findings for each technique are provided where empirical research has been conducted.

1. Ask the question in a non-threatening, conversational tone, carefully refraining from repeating the question.

Good and Brophy (23) suggested that questions that are interesting challenges and friendly exchanges of information are likely to generate maximum motivation and produce the most rewarding answers. Groisser (24) asserted it is most essential that teachers ask questions conversationally because students are apt to think more clearly and respond more easily when psychologically at ease. Teachers who often shout contribute to

tension and mental fatigue. If the teacher's tone dares, students are discouraged from answering. Grossier (24, p. 45) stated:

Conversational questioning should become part of the overall classroom climate. It is the normal way of communication between individuals and will contribute to rapport between class and teacher. The teacher who challenges his pupil in clear, low, engaging terms becomes a helper and friendly leader.

2. Direct the question to the entire class.

Generally, according to Groisser (24) teachers should direct questions to the class as a whole rather than to a single individual. Teachers should get better student attention if they do not call on a student until after they ask the question. If a student's name is mentioned first, less attentive students are likely to ignore the proceedings. When the question is asked of the entire class, each student is responsible for formulating an answer and all are invited to contribute. This keeps the students alert and constantly thinking. Gall (20) suggested that covert responses evoked by teachers' questions may be most critical for learning. If so, the student who is very attentive during the recitation and answers each question covertly may learn as much from each question whether or not the student had the opportunity to respond out loud.

Groisser (24) identified several situations in which a teacher may deliberately call on a student first and then pose the question. A question posed directly to an individual can serve as an attention-getting device for an inattentive student. Follow-up questions used by a teacher calling on a student to correct, clarify or extend the student's response are clearly intended for that student alone. The third occasion where it

may be advisable to set aside directing the question to the entire class is when the teacher seeks to draw a student who is ordinarily upset or startled when called upon without some form of advance notice into the conversation.

Groisser (24) offered a caution to teachers in asking group-directed questions. The class should not be encouraged to answer en masse. A question such as "In which place is the vowel written, class?" invites choral answers. This should be avoided because no one is accountable for the answer and the ability for the teacher to diagnose learning is severely limited.

3. Pause both before calling on someone to respond and after the response.

Since most questions should cause mental activity, students should be allowed time to think. The pause used by a teacher before calling on a student to respond and after the student responds is called "wait-time." Several researchers have examined the results of a longer wait-time on student responses.

Rowe (49) investigated the effects of increasing teacher wait-time on the verbal behavior of children in elementary science classes. She found that if teachers prolong their average wait-time to five seconds or longer, the length of student responses increases. The answers were also more likely to be in whole sentences, the confidence as expressed by tone was higher, and students tended to shift from teacher-centered show-and-tell kinds of behavior to child-child comparing of differences. Longer wait-time also tended to encourage students to ask questions. Rowe also

found that teachers tended to use longer wait-time for brighter students. She suggested this sends messages of low expectations to lower achievers. Using longer wait-time for all students sets high expectations for all.

Swift and Gooding (64) conducted a study designed to investigate the interaction of wait-time feedback and questioning instruction on middle school science teaching. They found that it appeared that any real change in wait-time was sufficient to change a large number of measurable classroom variables. When teachers increased wait-time, they also used greater numbers of higher level questions. There were also more contributions from students as measured by length of answers, frequency of volunteered contributions, numbers of relevant student words, and percentages of student talk.

In her review of the research on teachers' questioning, Gall (20) noted several researchers found similar results from increasing wait-time. She suggested that longer wait-time is imperative because students must progress through a four or five step process to answer a question. After a question is asked, students must: (1) attend to the question, (2) decipher the meaning of the question, (3) generate a covert response, (4) generate an overt response, and perhaps (5) revise the response. Students must have time to think to be able to proceed through the question-answering process.

Dillon (13) suggested effective use of teacher silence or wait-time in questioning has been found to be positively related to: (1) frequency of response, (2) length of response, and (3) cognitive level of response. He suggested that if teachers wait at the moment a student stops speaking,

they would likely hear further expression of higher thought. Rowe (50) found that as teacher increased pausing time during and after student response from one to three or more seconds, mean response increased from seven to twenty-eight words.

Rowe (49) posed several advantages for teachers who learn to control wait-time. First, she suggested, teachers provide themselves the opportunity to hear and think when they increase wait-time. Second, controlling wait-time can change teachers' expectations about what some children can do. For example, teachers who have learned to use silence report that children who do not ordinarily say much start talking and often have exciting ideas. Teachers who increased wait-time for all students found increased responses from perceived lower achievers. A third advantage identified by Rowe was the change in teacher questioning behavior. As wait-time increased, teachers began to show much more variability in the kinds of questions they asked. Students received more opportunities to answer thought, rather than straight-memory, questions.

4. Randomly select or carefully choose a student to answer with careful attention to wide distribution of response opportunities.

Grossier (24) and Loughlin (35) both suggested teachers should distribute questions as widely as possible. Students who take part in discussions are more likely to develop sharper habits of thought and response than those who continually sit quietly without participating. Non-volunteers should be called upon as well as volunteers to cut down on teacher reliance on a small group of volunteers. Teachers who bring all or nearly all students into the discussion are better able to diagnose

learning and perceive individual differences. Good and Brophy (23) found that teachers who restrict their questions primarily to a small group of active and usually high-achieving students are likely to communicate undesirable expectations to students who do not get response opportunities (usually lower achievers). They also found teachers who do not give careful attention to wide distribution and random selection of respondents are generally less aware and less effective. Jackson and Cosca (28) found inequitable distribution of response opportunities where teachers did not consciously practice wide distribution of questions and careful or random selection of respondents. Teachers of ethnically mixed classes were more likely to address questions to white students than to Mexican-American students. The white students also responded more often and more frequently initiated remarks of their own.

Groisser (24) offered one note of caution for teachers who try to draw all students into the discussion. If emotional factors or language difficulties are the cause of a student's non-response pattern, the teacher must be sensitive to choosing the right moment when calling upon the student.

5. Respond to the student's answer.

Gage (19) concluded from his review of the research that teacher acceptance of student ideas is positively correlated with student learning gains, emphasizing the importance of teachers responding to students' answers to questions. A teacher may respond to the student's answer in a number of ways: providing evaluative feedback, modifying the student answer, applying or comparing the answer to previous learning, summarizing

the response, repeating the response, or probing.

According to Grossier (24) most student responses to questions fall into three categories: (1) correct answers, (2) incorrect answers, and (3) answers that are partially correct. Therefore, the teacher may often respond to a student's answer by providing evaluative feedback or apprising the student of the correctness of the response. Good and Brophy (23) contended feedback is important both for motivating interest and for producing learning. Although it is obvious feedback lets students know how they are doing, Good and Brophy found teachers sometimes fail to give feedback, especially to lower achievers, even though lower achievers are least likely to know if their answers are correct. Wright and Nuthall (69), investigating the relationships between teacher behaviors and pupil achievement in three experimental elementary science lessons, found that teachers' use of thanks and praise following a student's correct response was clearly positively related to achievement.

A teacher may also respond to a student answer by modifying the answer or stating the answer in different words that still convey the same meaning. This not only gives all students feedback on the correctness of the answer but also demonstrates to students that there is not always "one" correct answer. Such a response encourages students to think and formulate answers expressed in their "own words."

Another way for a teacher to respond to a student question is to apply or compare the student answer. This allows the teacher to draw associations with previous learning or to transfer learning to new situations. This type of teacher response encourages higher level thinking.

Student answers may occasionally be wordy or contain several thoughts. In such instances, the teacher may choose to respond to the student by summarizing the student's answer, drawing a conclusion, or making a point. This type of teacher response provides feedback to all the students while again promoting higher level thinking.

Occasionally a teacher may respond to a student answer by repeating the student answer to the class. Groisser (24), Loughlin (35), and Good and Brophy (23) urged caution with this approach. Frequent use of this response to student questions wastes time and teaches students that they need not pay attention to what classmates say because the teacher will always repeat it. It lessens the value of student responses, and fails to hold students responsible for what others say. As with most techniques related to questioning, there are exceptions to the guideline of not repeating. If a teacher wants to have an answer repeated for emphasis, it may be most productive to have another student repeat it. In the case of exceptional answers, the teacher can occasionally call for their repetition as a form of praise. In general, stated Good and Brophy (23), repetition of answers is also appropriate when teachers are working with young children, when the questions deal with rote memory of factual material, or when answers are short.

Another method by which a teacher can respond to a student answer is probing. Probing is the label given to questions a teacher asks a student to draw additional information from the student or to get the student to clarify an answer. Probing may promote learning by providing students with practice in organizing their facts and ideas into overt responses and

by providing for responses to be "shaped" by their teachers. Wright and Nuthall (69) found that asking a probing question at the same or higher cognitive level as the initial question was only slightly correlated with student achievement. Gall et al. (22), in a study of the effects of questioning techniques and recitations on student learning, concluded the presence or absence of probing had no effect on student learning. Perhaps the best use of probing, suggested by Carin and Sund (8), is as a technique to avoid a negative teacher response to a wrong or incomplete answer.

6. Redirect questions to another student.

Redirection of a question refers to the teacher reacting to a response by asking another student to respond to the same question. Groisser (24) suggested redirection tends to produce sustained responses, variety, and enrichment. It encourages volunteering, contributes to group cooperation, and approaches a more realistic social situation. Wright and Nuthall (69) found that teachers who redirected questions to other students during science lessons got better achievement than those who did not. Gall et al. (22), however, concluded from their investigation of questioning techniques and recitation on student learning that presence or absence of redirection has no effect on student learning. Occasionally redirection of questions may be important, according to Good and Brophy (23), because redirecting models teacher interest in the exchange of information about the topic area and indicates there is not always one right answer. In addition, students are likely to listen more carefully to one another if they are called on occasionally to respond to one another's answers.

In summary, Groisser (24) suggested that questions should: (1) be planned, (2) be logical and sequential, (3) be addressed to the class, (4) allow students time to think, (5) be balanced between thought and fact, (6) be distributed widely, (7) be asked conversationally, and (8) not be repeated. Improving the art of questioning is important because questioning is used more frequently by teachers than any other single teaching technique (8). Question-asking will be effective only if it serves the teacher's purposes and facilitates learning (12). The major considerations and basic procedures of effective questioning in the classroom are recapitulated below for quick reference to practical applications of effective questioning techniques.

Practical applications

As Groisser stated (24, p. 60), "good discussion hinges on effective questioning. Questions give direction and purpose to discussion. They provide a means of interaction among pupils. They enable the teacher to unobtrusively guide the flow of thought." Since questions are undoubtedly basic tools for the teacher, mastery of effective questioning is essential for the effective teacher. The major components of effective questioning are outlined below.

Purposes and functions of effective questioning (adapted from Groisser, 24, pp. 6, 61).

1. To test a student's preparation for the lesson--diagnosis or review of learning.
2. To arouse interest--bring students into the lesson by motivation.
3. To promote understanding--give students input for learning.

4. To develop insights--cause students to see new relationships.
5. To develop ideals, attitudes, and appreciations--cause students to get more knowledge in the classroom.
6. To strengthen learning--review and summarize what is taught.
7. To stimulate critical thinking--develop a questioning attitude.
8. To test achievement of objectives--check to see what has been learned.

Levels of questions.

1. Higher use of fact questions is more effective for promoting young disadvantaged students' achievement.
2. Emphasis on higher cognitive questions is more effective for older students of average and high ability.

Characteristics of good questions.

1. Purposeful--asked to achieve a specific purpose.
2. Clear--students understand precisely the specific points to which they are to respond.
3. Brief--contain as few words as possible to be clear and purposeful.
4. Natural--phrased in simple conversational words, not textbook language.
5. Thought-provoking--stimulate student thinking and response.
6. Adapted to the level of the class--phrased so that all students can understand.

Development of good questions.

Purposes of questions, levels of questions, and characteristics of

good questions must all be considered in the four-step process of development of good questions.

1. Decide on the purpose of the questions. Decide on the teaching objective for the lesson and the goal for each question considering whether the question is for:
 - a. review,
 - b. diagnosis,
 - c. checking for understanding,
 - d. generating discussion,
 - e. higher level reasoning,
 - f. motivation, or
 - g. some other goal.
2. Consider the students.
 - a. What ability levels are there in the classroom?
 - b. How can students be involved and challenged at all levels?
 - c. What terms and vocabulary should be used?
 - d. How should questions be distributed?
3. Phrase the question. Choose the terminology, number of words used, and the order of the words considering the characteristics of good questions. Avoid:
 - a. yes-no and simple choice questions (low diagnostic power),
 - b. tugging questions (students respond if they know),
 - c. guessing questions (low diagnostic power),
 - d. leading or rhetorical questions (foster student dependency and inattention),

- e. ambiguous questions (provide little useful information),
 - f. spoon-feeding questions (do little to promote learning), and
 - g. overloaded questions (considering more than one factor at once causes confusion and frustration).
4. Formalize the questions. Record the questions in some manner and sequence them considering:
- a. purpose of the question,
 - b. number of questions,
 - c. placement or chronology in the lesson,
 - d. level of questions.

Effective questioning procedures.

1. Ask the question in a non-threatening, conversational tone.
2. Direct the question to the entire class.
3. Pause, generally three to five seconds, before calling on someone.
4. Randomly select or carefully choose a student to answer.
5. Pause, again three to five seconds, before expecting a student response and again after the response.
6. Respond to the student by:
 - a. providing evaluative feedback (appraising of correctness),
 - b. modifying (stating the response in different words while conveying the same meaning),
 - c. applying or comparing (tying the response to a situation or event),
 - d. summarizing (drawing a conclusion or making a point),

- e. repeating the response (occasional use only), or
 - f. probing (asking further questions to draw out additional information or clarifying a response).
7. Redirect questions occasionally but systematically by asking another student to comment on or repeat another's response.

Questioning techniques to avoid.

1. Asking questions in a tone that dares, embarrasses, or intimidates. Students are apt to think more clearly and respond more easily when psychologically at ease.
2. Calling on someone before asking the question. This promotes inattention and discourages student accountability.
3. Calling on someone immediately after asking the question. Longer wait-time enables students to think.
4. Calling only on students who raise their hands. This encourages inattention and disinterest.
5. Constant repetition of questions or student answers. This encourages student inattention.
6. Not responding to a student answer. Ignoring or not accepting a student idea discourages students and causes inattention and non-participation.

Summary

The review of the literature chapter focused on two areas: (1) inservice education for teachers, and (2) effective questioning. Those two areas served as the basis of the research problem. Can an on-site peer coaching inservice model be utilized to help teachers transfer new content

and skills to teaching behavior? A significant body of research supports the notion that effective inservice programs evidenced presentation of theory, demonstration, practice, and feedback; there were trends toward local responsibility for and school-based delivery of inservice education; most effective inservice tended to be carried out over a period of time with participants involved in the planning; and that principals played an important role in the success of inservice programs. The effectiveness of peer coaching as a part of inservice training appeared to be in question.

Questioning is a tool used by virtually all teachers. A significant body of literature clearly identifies a number of effective questioning techniques and procedures. Improvement of teachers' questioning behaviors was a logical focus in the investigation of the effects of peer coaching and transfer of new content and skills to teaching behavior. This study examined that relationship--the effects of a site-based peer coaching inservice program on teacher use of effective questioning strategies in the classroom.

CHAPTER III. METHODS AND PROCEDURES

The purpose of this chapter is to describe the methods and procedures used to investigate the effects of a site-based peer coaching inservice training program. The chapter is divided into eight sections: (1) re-search design; (2) the sample; (3) research questions; (4) the treatment; (5) description of the inservice; (6) instrumentation; (7) collection of the data; and (8) analysis of the data.

Research Design

The model for the Site-based Peer Coaching (SBPC) inservice program, devised by the researcher, is shown in Figure 1. The model assumes that: (1) the principal is the catalyst in effective inservice programs; (2) there are essential components of an effective inservice workshop; (3) effective inservice is carried out over a long period of time; and (4) practice and feedback are an integral part of effective programs. Therefore, inservice training on effective teaching behaviors (questioning strategies) begins with trained principals who then train their teaching staffs. Teachers use new content and practice skills in their own classrooms while being observed by a colleague who provides feedback.

The paradigm suggests that the interaction between teachers via the observation or peer coaching cycle will result in positive change in teacher classroom behavior. It further presumes that a series of workshops and peer coaching cycles presented over a period of time will be

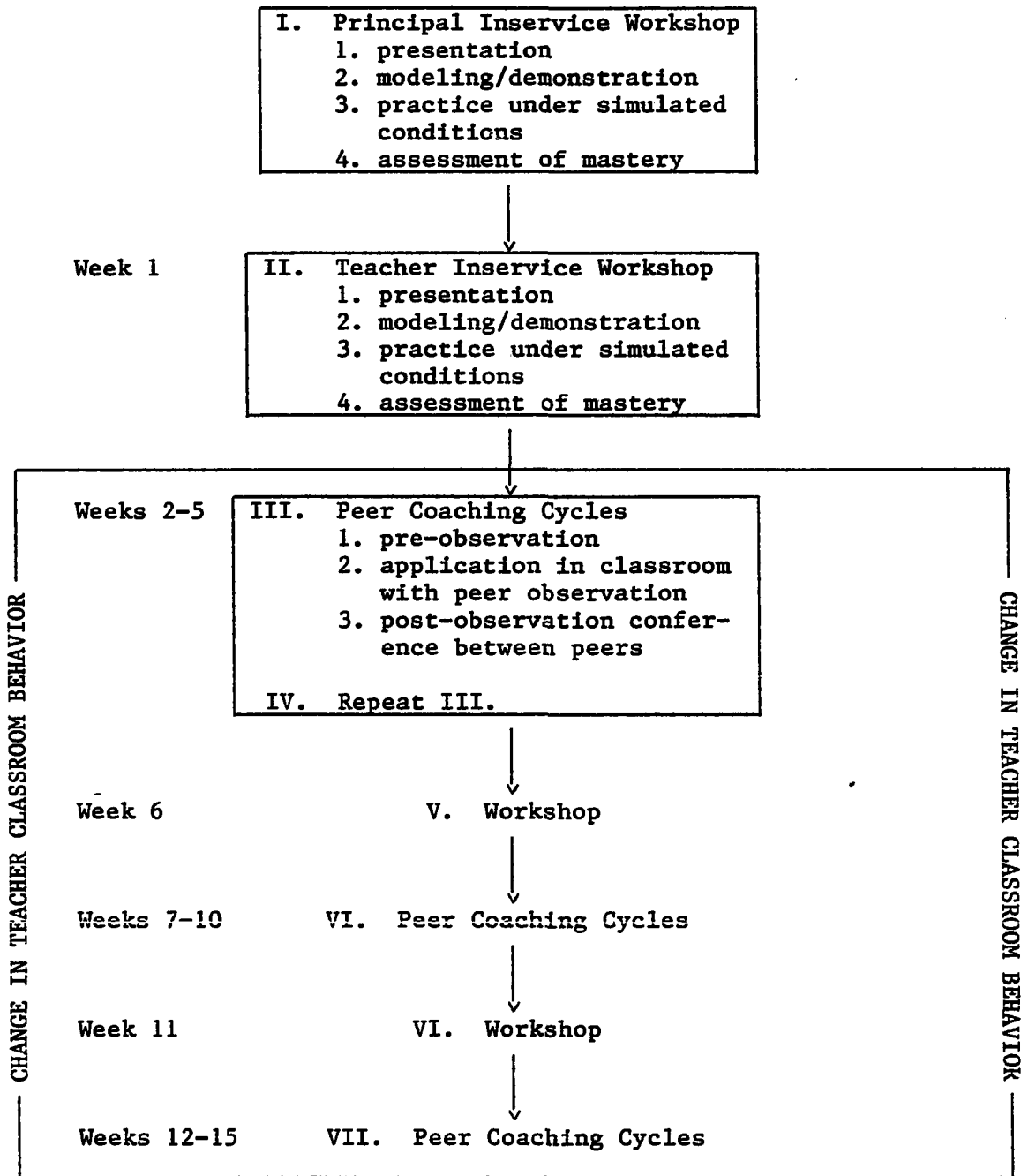


Fig. 1. The Site-based Peer Coaching (SBPC) inservice model

more effective in producing change in teacher classroom behaviors than either a single workshop or a single cycle of workshop and peer coaching.

Initial research design

The initial research design was not used in the study. It is included here, however, because it provided the framework for the study and can serve as a guide for further research.

The initial quasi-experimental research design for this study is shown in Figure 2. This design was an interrupted time-series design (10) with: (1) a multiple baseline across situations, (2) a nonequivalent no-treatment control for teachers, (3) a nonequivalent no-treatment control for schools, and (4) a nonequivalent traditional treatment control for schools. This quasi-experimental design was chosen because randomization of schools and teachers was not possible. The interrupted time-series with various controls was chosen to minimize the threats to internal and external validity.

The research was initially designed to include at least sixty teachers in fourteen groups from nine schools. At least four teachers from each of five schools (Groups 1-5) were to be part of the experimental groups, audiotaping lessons, completing attitude assessment surveys, and participating in the SBCC inservice model as illustrated in Figure 2. At least five teachers from each of the experimental schools (Groups 10-14) would also have served as a nonequivalent, no treatment control group for school influences, audiotaping lessons and completing attitude assessments only. At least five teachers from each of two schools (Group 6-7) were to be part of the non-equivalent no-treatment control group for teacher

	Group	September	October	November	December
1.	School A	A 0 0	▣ t 0 0	t t t 0 0 0	A 0 t ^A 0 t ^A 0
2.	School B	A 0 0	0 0	0 0	t t ^A 0 t ^A 0
3.	School C	A 0 0	0 0	0 0	▣ t ^A 0 t ^A 0
4.	School D	A 0 0	0 0	0 0	A 0 0
5.	School E	A 0 0	0 0	0 0	A 0 0
6.	School F	A 0 0	0 0	0 0	A 0 0
7.	School G	A 0 0	0 0	0 0	A 0 0
8.	School H	A 0 0	0 0	TW 0 0	A 0 0
9.	School I	A 0 0	0 0	TW 0 0	A 0 0
10.	School A	A 0 0	0 0	0 0	A 0 0
11.	School B	A 0 0	0 0	0 0	A 0 0
12.	School C	A 0 0	0 0	0 0	A 0 0
13.	School D	A 0 0	0 0	0 0	A 0 0
14.	School E	A 0 0	0 0	0 0	A 0 0

A = attitude assessment survey
 0 = rate audiotaped lesson
 ▣ = initial workshop of SBCC inservice model
 t = peer coaching and counseling observation cycle
 TW = traditional inservice workshop

Figure 2. Schematic presentation of the interrupted time-series design proposed for the study

influences; they would have audio-taped lessons and completed attitude assessments. The last two schools (Group 8-9) involved would have had at least five teachers each as part of the non-equivalent, traditional treatment control groups. Those teachers would have audio-taped lessons, completed attitude assessments, and have taken part in a traditional inservice workshop. They would not have done any peer coaching.

During the early course of the study, it was decided that utilizing the entire SBCC model was not practical because:

1. the treatment was too powerful when compared to the control groups to draw meaningful conclusions about what component of the model may have most influenced differences among the groups.
2. development of three workshops carried out over an entire school year was too costly in both time and money for the investigator.

Therefore, it was decided to conduct the investigation utilizing only one workshop-observation cycle sequence. A total of sixty teachers from nine different schools was needed to conduct the quasi-experimental research. The researcher contacted more than forty Iowa secondary school principals seeking volunteers to participate in the study. Information was sent to all of them detailing activities and time commitments for both teachers and principals (see Appendix A).

Difficulty in securing participating schools and teachers was encountered for various reasons: involvement in NCA self-studies, school reorganizations studies, TESA inservice, McGrel inservice, clinical supervision, central office administration declined participation, and principals willing to participate but could not get teachers to volunteer. Six

principals did volunteer their schools for participation, but when activities were ready to begin, four of the six principals were not able to secure enough teacher volunteers to participate. Therefore, the study was redesigned and the nature of the research was changed from quasi-experimental to exploratory.

Research Design

This study used the single group interrupted time-series design shown in Figure 3 (10). This design was chosen because the study was exploratory in nature, designed not to test hypotheses but to develop hypotheses for further research. Therefore, no control groups were utilized. The researcher took the following steps to implement this design: (1) identified two schools to participate; (2) identified teachers to participate; (3) collected information about the schools, the principals, and the teachers involved; (4) administered the attitude assessment survey; (5) gathered base-line data; (6) administered the treatment; (7) gathered data after the treatment; (8) administered the attitude assessment survey; and (9) conducted structured interviews with participants.

time (week):	1	2	3	4	5	6	7	8	9
	AO	O	O	X	O	O	O	O	AI

O = observation (audiotape of lesson)

X = workshop

A = attitude assessment

I = structured interview

Figure 3. Single-group time-series design

The Sample

The data for this investigation were gathered from two secondary schools in central Iowa. The schools are located in small, rural and agricultural towns. At the time the study was conducted, the enrollment in one school was 150 and the other 174. School levels in both schools were a combination of junior and senior high (grades 7-12). The subjects were:

Principals

The principals of the two schools received principal inservice training on the Site-Based Coaching and Counseling (SBCC) inservice model and Questioning Techniques Workshop at Iowa State University. Both principals managed grades 7-12, one supervising eighteen teachers and 150 students, the other fifteen teachers and 174 students. Both principals had less than five years total administrative experience, and all of that experience was in their present positions. Both principals had conducted prior inservice training sessions about various topics for their teachers. Demographic data for school principals is presented in Table 1.

Teachers

Two teachers from school A and nine teachers from school B participated in the investigation. Pertinent demographic data about the teachers are presented in Table 2. Six teachers were male and five female. The average number of years they have spent in classroom teaching was 9.82. All taught more than one grade level, most in both junior and senior high. The average number of students per class was 22.86 with a range of 2-28.

Table 1. Demographic data for school principals, N = 2

School	School Level	Years of Administrative Experience	Years in School Present Position	Enrollment	Number Teachers Supervised	Conducted Prior Inservice
A	Jr./Sr. High	4.5	4.5	174	15.2	yes
B	Jr./Sr. High	2	2	150	18	yes

Table 2. Demographic data for teachers participating in the study, N = 11

Teacher Code	Gender	Number of Years of Classroom Teaching	Grade Levels Teaching	Average Number of Students per Class	Subjects Teaching	Previous Questioning Instruction
APC25	male	10	7,8,9	28	math, social studies	no
APC81	female	24	7-12	17	home economics	no
BPC59	male	6	7-12	19	social studies	some
BPC25	male	23	9-12	12	math	no
BPC47	female	7	8-12	12	home economics	no
BPC81	male	8	10-12	12	business education	no
BPC18	female	3	8-12	20	science	some
BPC13	male	3	7-12	2-3	multicategorical special education	no
BPC63	male	3	8-12	12	industrial arts, math	no
BPC36	female	15	9-12	15	English	no
BPC72	female	6	7-12	20	language arts, Spanish	no
		$\bar{X} = 10$		$\bar{X} = 23$		

Subjects taught by the teachers included mathematics, science, English, social studies, home economics, business education, special education, industrial arts, and Spanish. Only two teachers had any previous instruction in questioning techniques.

Tables 3-6 present the distribution of teachers by school grade levels, years of teaching experience, subjects taught, and size of classes. School levels in both schools were a combination of junior and senior high (grades 7-12). One teacher taught grades 7-9, one grades 10-12, two grades 9-12, three grades 8-12, and four grades 7-12. The number of years of teaching experience ranged from three to twenty-four. The largest number of teachers (5) had six to ten years of teaching experience. Three teachers had three years of experience, and three teachers had more than ten years of teaching experience. While two teachers were home economics teachers, there was a wide range of secondary subjects represented. Class size ranged from two to twenty-eight with most teachers teaching eleven to twenty students per class.

Table 3. Distribution of teachers by school grade levels, N = 11

School Grade Levels	Teachers N = 11
7-9	1
7-12	4
8-12	3
9-12	2
10-12	1

Table 4. Distribution of teachers by years of teaching experience, N = 11

Range in Years of Teaching Experience	Teachers	
	Number	Percent
Under 5 years	3	27.3
6 to 10 years	5	45.4
11 to 15 years	1	9.1
16 to 20 years		
21 to 25 years	2	18.2

Table 5. Distribution of teachers by subjects taught, N = 11

Subjects	Teachers
Business Education	1
English	1
Home Economics	2
Industrial Arts/Math	1
Language Arts/Spanish	1
Math	1
Science	1
Social Studies	1
Social Studies/Math	1
Multicategorical Resource (Special Education)	1

Table 6. Distribution of teachers by average number of students per class, N = 11

Average Number of Students Per Class	Teachers
1-5 students	1
6-10 students	
11-15 students	5
16-20 students	4
21-25 students	
26-30 students	1

Research Questions

The study was designed to gather data to examine the following research questions:

1. How did participation in the SBCC inservice model affect teacher use of effective questioning techniques in the classroom?
2. What did teachers report about the influence of participation in the SBCC inservice model on their use of effective questioning techniques in the classroom?
3. How do teachers rate the influence of each of these parts of the model on their use of effective questioning techniques in the classroom:
 - a. theory base presented in the workshop?
 - b. principal leading the workshop?
 - c. practice using the skills in the classroom?
 - d. feedback from a colleague about use of the skills?
 - e. observing a colleague using the skills?
4. How do teachers rate their skill transfer from workshop to implementation in the classroom using the SBCC model as compared with traditional inservice education?
5. Are there changes in teachers' feelings or perceptions of each of the following after participation in the SBCC inservice model:
 - a. willingness to be observed by a colleague while teaching?
 - b. willingness to observe a colleague teach?
 - c. seeking advice from a colleague?
 - d. value of inservice in helping teachers improve?

- e. improving one's own teaching skills?
 - f. willingness to try a new teaching technique?
6. How should the model be revised and refined to be most useful for future study and/or practical application?

The Treatment

In September 1984, forty secondary principals in Iowa were presented the proposed research plan and the objectives of the study. Although most of those principals expressed interest, only six agreed to participate in the study. Several reasons were given for not participating: inservice time committed or already planned; NCA or reorganization studies involvement; teacher contract-related problems with the time commitments; and too little time available. By November 1984, four of those principals declined participation because they could not secure enough teachers to volunteer to participate. The nature of the study was then changed from experimental to exploratory and conducted with teachers and principals from two schools.

The treatment for this study was a structured inservice training unit focusing on effective questioning strategies and peer coaching to facilitate effective teacher use of questioning skills in the classroom. In February 1985, the two principals received training in effective questioning strategies and peer coaching during a 3-hour workshop at Iowa State University. It was designed to enable them to present the training unit to their teachers. The inservice unit was developed by the researcher and provided to the principals in the form of a training packet. The training, conducted by the researcher, focused upon use of the training packet

(see Appendix C for content); questioning theory, demonstration and practice; and peer coaching theory, demonstration, and practice.

Teachers were administered the teacher opinion survey to assess attitudes about change, collegueship, closed autonomy, improvement of teaching skills, value of inservice education, and ability of their principal to assist with improvement of instruction during the week following the principal's inservice training. Once each week for the first three weeks before the inservice workshop, teachers audio-taped a classroom session in which questioning was used. These tapes yielded baseline data about teacher use of effective questioning strategies in their classrooms. During the first district-scheduled inservice day following principal training (early March), principals conducted the inservice workshop for their teachers. During each of the four weeks following training, the teachers completed the SBPC peer coaching cycle with a colleague and audio-taped a classroom lesson once each week. At the end of the investigation period, the teacher opinion survey was again administered by principals and a structured interview was conducted with each teacher via telephone by an independent interviewer.

Description of the Inservice

Site-based Peer Coaching (SBPC) inservice model

The major thrust of the SBPC inservice model was to facilitate transfer of skills and knowledge gained by teachers in inservice workshop to teaching behavior in their classrooms. More explicitly, in this study, the model was utilized to facilitate more frequent teacher use of effective questioning techniques in the classroom. The ideas and strategies

were intended to identify and strengthen, through practice and feedback via peer coaching, teaching behaviors which relate to and influence the effectiveness of teacher questions in the classroom. The objectives of the training were to enable teachers to:

1. develop effective classroom questioning;
2. identify techniques and strategies associated with effective questioning;
3. adapt effective questioning techniques for use in their own classrooms;
4. facilitate use of skills and knowledge gained by participating in a peer coaching relationship.

Instructional content

There is a considerable amount of research dealing with levels of classroom questions, developing effective questions, and effective questioning techniques. To have dealt with all of those areas as well as the concept of peer coaching in one workshop would have been an impossible task. Levels of questioning appeared to be too complex to teach in one workshop. Therefore, for the one workshop used in this study, the researcher focused attention on question development and effective questioning strategies as the teaching behaviors to be improved through a coaching relationship with a colleague. The content focused upon can be infused into all subjects via the strategies outlined in the workshop. The content of the workshop included the following:

1. Four-step process for developing effective questions;
2. Effective questioning procedures; and

3. Peer observation and coaching.

The SBPC inservice model was designed to influence teachers at four levels of understanding resulting in: (1) awareness of theory base underlying effective questioning techniques; (2) intellectual control over relevant content; (3) acquisition of skills for action; and (4) transfer of concepts, principles and skills to the classroom.

Workshop components

The workshop had five components: (1) presentation of theory, (2) modeling/demonstration, (3) practice in simulated settings, (4) feedback, and (5) coaching for application.

Presentation of theory The rationale, theoretical base, research and description of effective questioning techniques were presented. This aspect of the workshop was designed primarily to raise awareness, establish a conceptual base, and enhance application of effective questioning techniques theory in the classroom.

Modeling/demonstration As they led instruction, workshop trainers modeled effective questioning techniques illustrating the content identified earlier. Written examples of all parts of the content were also presented.

Practice in simulated settings Teachers worked in groups to examine poorly phrased questions and rewrite them to practice development of good questions. They observed a videotape of a classroom session identifying use of both effective and ineffective questioning techniques. Teachers coded questioning techniques as they observed a second portion of a classroom session to practice gathering data for coaching.

Feedback Immediate feedback was given to teachers by both trainers and colleagues about their practice in development of good questions. Feedback about identification of effective and ineffective questioning techniques was provided through group discussion among the teachers and principal following observation of the videotape.

Coaching for application The role of peer observation and feedback in transfer of skills and knowledge to teacher behavior was discussed in the workshop. The peer observation component of the SBPC inservice model was discussed and procedures for peer coaching were outlined. The peer coaching process was practiced via the coding of and subsequent analysis of a videotape of a teacher teaching a lesson.

The Effective Questioning Techniques Workshop, developed for principals to use in training teachers, contained the following:

1. Procedures checklist, materials checklist, and outline for activities and recommended time periods;
2. Introduction, definitions, questioning theories, research, objectives, teaching strategies for using effective questioning techniques, summary, and references;
3. Seven masters for handouts and eleven transparencies;
4. Coding sheet master;
5. Survey instruments;
6. Videotape of a teaching session;
7. Training evaluation form master; and
8. Workshop planner.

Instrumentation

There are virtually no instruments designed to assess questioning effectiveness. Instruments were developed specifically for this study. Instruments designed for teacher use were developed after a thorough examination of the literature pertinent to effective questioning and peer coaching. The instruments were examined by professionals knowledgeable in instrumentation, not field tested.

Teacher Opinion Survey

The Teacher Opinion Survey was designed to assess teachers' attitudes about: resistance to change, improvement of instruction, need for autonomy, inservice education, and collegial relations. A four point Likert Scale was used to provide teachers the opportunity to express their agreement or disagreement with statements that relate to those concepts. Fifteen (15) items requiring a choice of one of four responses: (1) strongly disagree, (2) disagree, (3) agree, and (4) strongly agree were provided. Reliability estimates were not computed because the survey was not used in the revised research design. There were too few response choices on the instrument to assess differences between pre- and post-treatment; therefore, changes in attitudes were assessed via interviews.

Question coding instrument

The question coding sheet was developed from the content of the inservice workshop. It was designed to help teachers observe a colleague's classroom teaching and record data for a post-observation conference. Data from the coding sheet were not included in the analysis.

Audio-tape rating instrument

The audio-tape rating instrument was developed from the question coding instrument used by teachers in the classroom. It was utilized by the independent audio-tape rater to code presence or absence of effective questioning strategies heard on the audio-tapes of classroom sessions. Ten questions (where ten were possible), chosen at random from the audio-tape, were analyzed by the rater from each classroom session. Presence or absence of each of ten effective questioning strategies for each of the ten questions was coded as plus (+) or minus (-). The percent of effective questioning strategies (+) used was computed for each of the ten techniques for each lesson, and the overall percent of effective strategies was computed for each lesson. The Audio-tape Rating instrument, including a description of each strategy, is presented in Appendix D.

End-of-study structured interview

When the design of the study was changed, it was decided that an end-of-study structured interview would yield more useful information about teacher perceptions to guide further research than would the teacher opinion survey. The interview was designed by the researcher. It was designed to yield data from which descriptive data could be computed and to allow for open-ended input for examination. Teacher perceptions about their own improvement on the ten effective questioning strategies were examined. Teachers were also asked to share their own perceptions about: (1) what part of the inservice influenced any noted improvement; (2) comparisons of the SBPC model to traditional inservice education; and (3) effects of the model on willingness to observe a colleague teach, being observed

by a colleague while teaching, improving their own teaching skills, seeking advice from colleagues about their teaching, value of inservice for improvement of instruction, willingness to try something new. They were also asked to provide general impressions and/or suggestions for improvement of their training.

The interview form (see Appendix D) was sent to participants to allow them to become familiar with the questions. An independent interviewer conducted each interview via telephone during the last week in May and first week in June. Each interview was completed in approximately thirty minutes.

Collection of Data

Inservice training for principals

Two principals were trained to use the SBPC inservice model to train their teachers. Demographic data describing the principals were collected during the inservice training. The principals were given a package containing the following: procedures checklist; workshop manual and all related handouts and transparencies; videotape; teacher demographic data form; teacher opinion survey; teacher code numbers; plans for coding, dating, and sending audiotapes to the tape-rater; and address of the tape-rater.

Survey and demographic data administration

Principals described the study to their teachers and secured volunteers. They administered the teacher opinion survey before audiotaping began. Principals asked teachers to complete the demographic data forms

at the first workshop. At the end of the study, principals again administered the teacher opinion survey. All data were then returned to the researcher.

Audio-tape rating

An Iowa State University graduate student agreed to code the audio-tapes required of all teachers. The researcher trained the rater to determine relative effective questioning strategies using a guide developed from the literature about questioning. The rater and researcher developed the tape rating instrument.

To gather baseline data, principals were to ensure that each participating teacher audio-taped one lesson in which questioning was used each week for three weeks prior to the workshop. This was done with each teacher and all tapes were sent to the rater. The audio-taping quality was so poor on several tapes that the lesson could not be heard, and there was some loss of base-line data. Three tapes provided base-line data tapes for seven teachers, two for two teachers, and one for two teachers.

After the workshop, teachers again audio-taped one lesson each week for four weeks. All tapes were sent to the rater. Several problems arose that resulted in loss of data: quality was poor on several tapes, three teachers did not complete all four tapes, two teachers sent tapes of lessons which included no teacher questioning. Four tapes were rated after the workshop for four teachers, three tapes for three teachers, two for two teachers, and one for one teacher.

The tape rater randomly selected tapes to analyze and randomly selected ten questions from each tape to rate. From lessons where there

were less than ten questions, all questions were rated. All data were sent to the researcher.

End-of-study interview administration

After being trained by the researcher, the same graduate student who rated the tapes conducted the end-of-study interview by telephone with each participating teacher who could be contacted. The interview form was sent to all teachers prior to the telephone interview so they could be familiar with the questions. The interview was conducted after school was dismissed for the year. One teacher had already left for the summer and could not be contacted. The interviewer recorded all information from each interview conducted and sent the completed interview forms to the researcher.

Use of human subjects

The Iowa State University Committee on the Use of Human Subjects in Research reviewed this project and concluded that the rights and welfare of the human subjects were adequately protected, that risks were outweighed by the potential benefits and expected value of the knowledge sought, that confidentiality of data was assured, and that informed consent was obtained by appropriate procedures.

Analysis of Data

The study was exploratory rather than experimental. Therefore, descriptive data are presented. Data are presented graphically since observations or ratings made over a period of time (time-series data) can best be examined when presented graphically if no statistical analysis is

utilized (17). Graphs are presented for:

1. the group mean of each of the ten effective questioning strategies utilized over the course of the study (computed from "% effective techniques" column of Audio-tape Rating instrument, Appendix D); and
2. the composite of group means of effective questioning strategies rated over the course of the study (derived from the "% effective techniques" row of Audio-tape Rating Summary instrument, Appendix D).

The graphs were constructed in the following steps:

1. The percentage of effective questioning strategies used was computed for every strategy for each rating; group means were computed and plotted on graphs as composites.
2. The vertical axis of the graph represents percentage; the horizontal axis represents time in weeks.
3. Using the vertical axis, outcome measure summary statistics were plotted for the times ratings were derived. Plotted points were connected by solid lines to enhance visual examination.
4. The treatment time was marked by a vertical dotted line over week 4 and labeled "TREATMENT."
5. A broken line was drawn representing the trendline of scores before treatment; another broken line represents the trendline of scores after treatment. Since drawing the trendline is not a totally objective procedure, the following precautions against bias were taken (17):

- a. A copy of each graph was made and cut in half along the treatment line.
- b. The parts were trimmed so that it could not be determined which part was before and which after treatment.
- c. Trend lines were then copied back onto the original graphs.

Where visual differences in the trendline, either in rate of change of percents or sudden increase or decrease in percent, were noted, pre-program trends were extrapolated to show what the trendline might have been without the treatment.

Data gathered from the end-of-study interview were aggregated and reported as a composite of the group.

CHAPTER IV. FINDINGS OF THE STUDY

The purpose of this chapter is to report the results of the investigation of a site-based peer coaching (SBPC) inservice training model on teacher use of effective questioning strategies in the classroom. The chapter is divided into two sections: (1) Audio-tape Ratings and (2) End-of-Study Interviews. Findings are examined using descriptive data; selected findings are depicted via graphs.

The data were collected from a sample of eleven teachers and two principals in two secondary schools located in central Iowa. All subjects were volunteers. All eleven teachers received the same treatment. Data were gathered from (1) analyses of audio-tapes of classroom teaching sessions conducted once per week for each of the three weeks before a workshop and each of the four weeks after; and (2) structured interviews conducted with teachers after completion of a peer coaching cycle. Data were then aggregated for all eleven teachers.

Audio-tape Ratings

The eleven teachers participating in the study selected and audio-taped a lesson once each week for three weeks before the workshop and one time per week for four weeks after the workshop; teacher questioning was an integral aspect of each lesson. The audio-tape was used to gather data about relative effectiveness of questioning strategies. Audio taping during the three weeks prior to the workshop provided baseline data to

compare with data gathered after the workshop was conducted.

Ten questions (where ten were possible) from each class session, chosen at random, were analyzed by a trained rater. Each question was rated for presence or absence of each of ten effective questioning strategies. The percent of effective strategies used in each lesson was computed for each of the ten strategies. The overall percent of effective strategies used was computed for each lesson.

Data gathered from the audio-taped lessons of all eleven teachers were used to compute group means for the percent effective use of each of ten questioning strategies every week. In addition to calculating group means for each of the ten questioning strategies, scores were aggregated to measure the comprehensive questioning effectiveness for the entire group of teachers for each week. These data are presented in Tables 7-17 and Figures 4-14. The comprehensive questioning effectiveness is discussed below followed by discussion of the data for each of the ten strategies.

Comprehensive questioning effectiveness

Table 7, graphed in Figure 4, shows a summary of the comprehensive questioning effectiveness for each teacher each week of the study. Examination of the group means by week indicated that although questioning effectiveness was relatively high prior to the study, there was general improvement in the use of effective questioning strategies after the workshop. During the three weeks prior to the workshop, teachers used effective questioning strategies seventy-seven, seventy-five, and seventy-seven percent of the time respectively. In the four weeks after the

Table 7. Distributions and group means of comprehensive questioning effectiveness for each week of the study

Teacher	Percent Use of Effective Questioning Techniques							
	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8
1	78			wrkshp	85		75	99
2	75	70	79	wrkshp	78		93	91
3	80	75	80	wrkshp	94		86	84
4	83	67	78	wrkshp	87	84	84	86
5	75	69	69	wrkshp	92	91	89	88
6	68	82	84	wrkshp	93	99	96	97
7	81	80		wrkshp	80	84	90	80
8		77		wrkshp	87		88	
9	79	84		wrkshp	81			80
10	79	73	74	wrkshp	86			86
11	71	71	75	wrkshp		85		
Group Mean	77	75	77	wrkshp	86	89	88	88

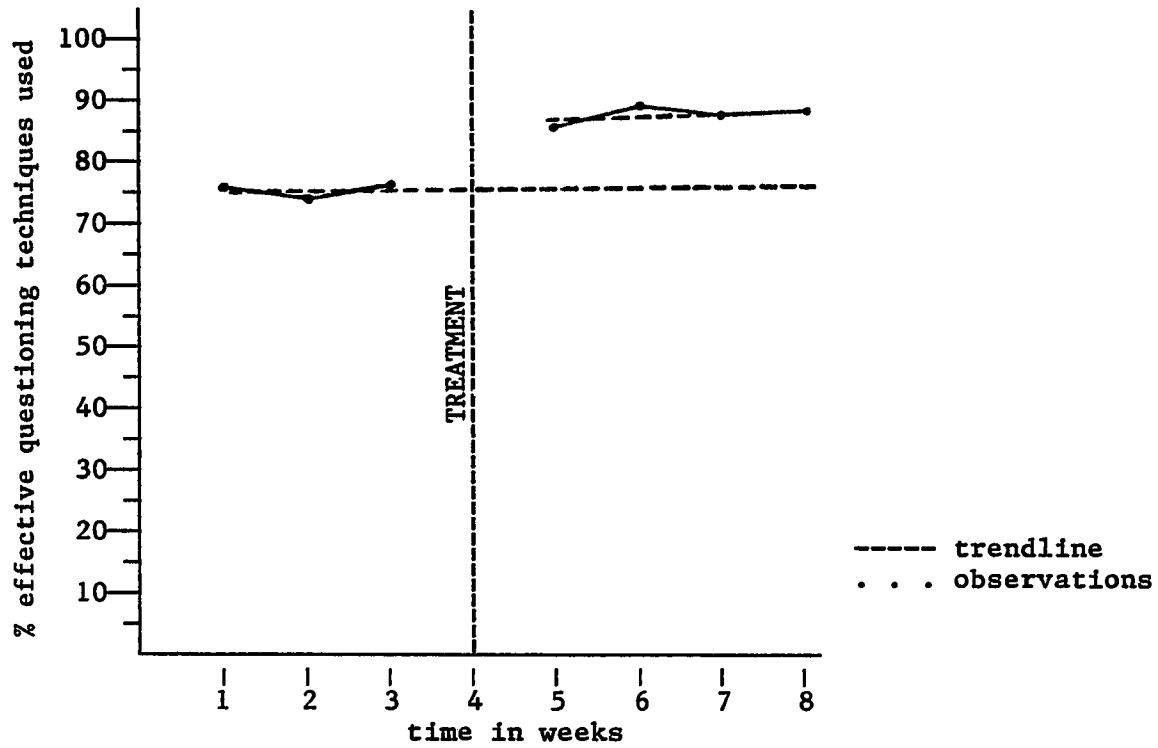


Figure 4. Mean percent of comprehensive questioning effectiveness for each week of the study

workshop, effectiveness increased to eighty-six, eighty-nine, eighty-eight, and eighty-eight percent. The graph in Figure 4 illustrates the degree of effective questioning before and after the workshop. The trendline extrapolated from the baseline trendline compared to the trendline after workshop indicates an improvement of approximately twelve percent in comprehensive questioning effectiveness.

Prior to treatment, teachers' scores indicated they were generally proficient in developing purposeful questions, developing brief questions, phrasing questions clearly, acknowledging student responses, using repetition appropriately, and asking questions conversationally. Pre-treatment scores were lower in directing questions to the entire class, using wait-time appropriately, randomly selecting students to respond, and probing for clarification. Detailed discussion of the ratings for each strategy follows.

Purposeful questions

The data in Table 8, graphed in Figure 5, show that teachers generally asked purposeful questions in their classrooms before the workshop. Ninety-six percent, ninety-three percent, and one hundred percent of their questions, respectively, were rated purposeful during the three weeks before the workshop. After the workshop, all teachers' questions, every week, were judged to have a definite purpose. Although there appears to be a small increase in use of purposeful questions immediately after the workshop, the extrapolated trendline in Figure 5 suggests teachers were effectively developing purposeful questions prior to the treatment; therefore, the possibilities for gain were slight.

Table 8. Distributions and group means of percent of purposeful questions for each week of the study

Teacher	Percent of Questions Rated Purposeful							
	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8
1	80			wrkshp	100		100	100
2	100	100	100	wrkshp	100		100	100
3	100	100	100	wrkshp	100		100	100
4	100	100	100	wrkshp	100	100	100	100
5	100	100	100	wrkshp	100	100	100	100
6	80	100	100	wrkshp	100	100	100	100
7	100	100		wrkshp	100	100	100	100
8		100		wrkshp	100		100	
9	100	100		wrkshp	100			100
10	100	75	100	wrkshp	100			100
11	100	50	100	wrkshp		100		
Group Mean	96	93	100	wrkshp	100	100	100	100

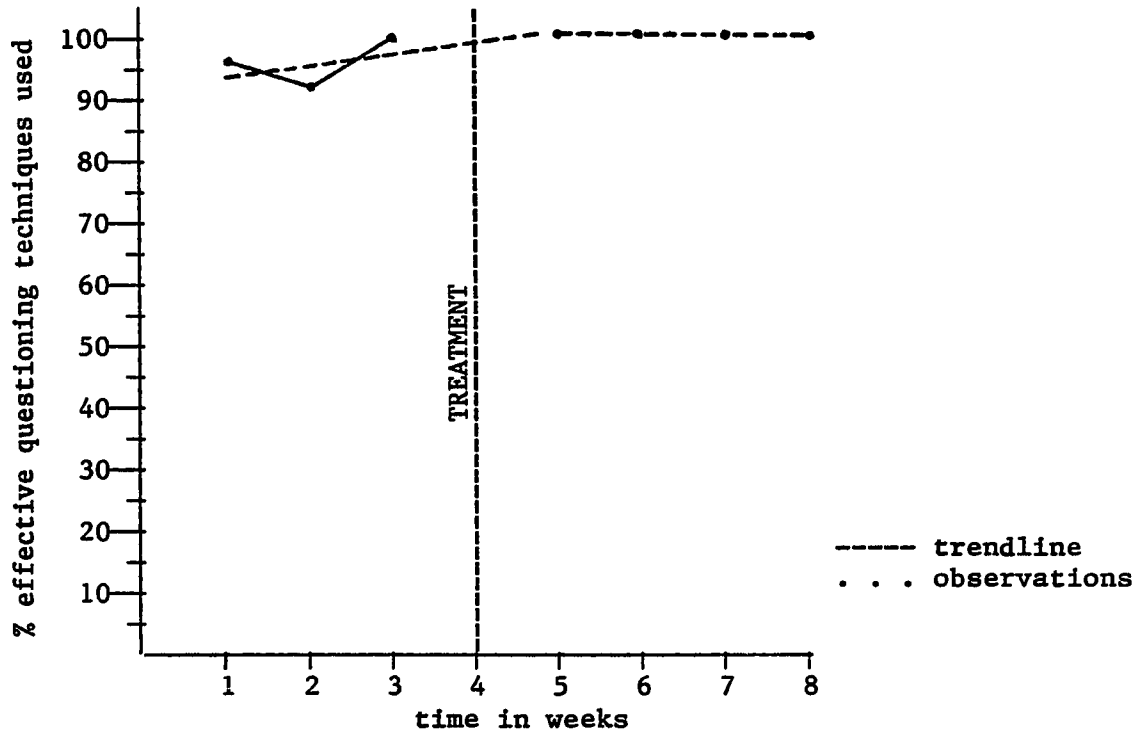


Figure 5. Mean percent of purposeful questions each week of the study

Clarity

Data in Table 9, graphed in Figure 6, present a similar picture. Teachers' questions were rated as clear eighty-nine, ninety-seven, and ninety-seven percent of the time respectively in the three weeks prior to the workshop. During the four weeks after the workshop, one hundred, ninety-eight, one hundred and ninety-nine percent of their questions were rated clear. The extrapolated trendline in Figure 6 suggests teachers were improving question clarity prior to the treatment and the trend continued.

Brevity

The data in Table 10, graphed in Figure 7, indicate ninety-three, ninety-seven, and ninety-one percent of the rated questions were brief prior to the workshop. After the workshop, ninety-eight, ninety-eight, one hundred, and one hundred percent of teachers' questions met the brevity criterion. Examination of the extrapolated trendline in Figure 7 suggests improvement after the teachers participated in the workshop.

Directed to class

In the three weeks before the workshop, teachers' questions were directed to the entire class seventy-three, seventy-three, and eighty-four percent of the time respectively, as shown by the data in Table 11. In the four weeks after the workshop, ninety-six, ninety-eight, eighty-six, and ninety-one percent of teachers' questions were directed to the entire class. The extrapolated trendline in Figure 8 suggests teachers may have improved this strategy without the workshop, but the graph shows a marked

Table 9. Distributions and group means of percent of questions phrased clearly for each week of the study

Teacher	Percent of Questions Rated Clear							
	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8
1	100			wrkshp	100		100	100
2	90	100	100	wrkshp	100		100	100
3	100	100	100	wrkshp	100		100	100
4	100	100	100	wrkshp	100	100	100	90
5	63	100	90	wrkshp	100	100	100	100
6	70	100	100	wrkshp	100	100	100	100
7	78	100		wrkshp	100	100	100	100
8		100		wrkshp	100		100	
9	100	100		wrkshp	100			100
10	100	75	100	wrkshp	100			100
11	90	90	90	wrkshp		90		
Group Mean	89	97	97	wrkshp	100	98	100	99

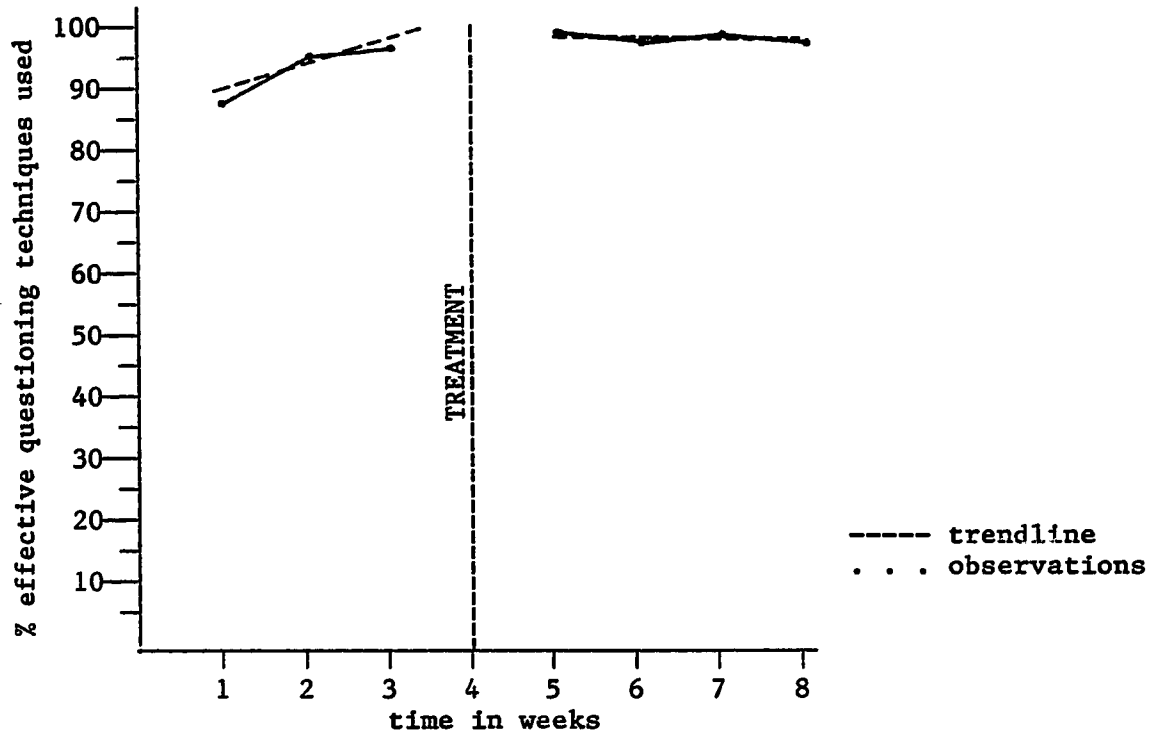


Figure 6. Mean percent of questions phrased clearly for each week of the study

Table 10. Distributions and group means of percent of questions rated brief as possible for each week of the study

Teacher	Percent of Questions Rated Brief							
	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8
1	100			wrkshp	75		100	100
2	100	100	100	wrkshp	100		100	100
3	100	100	100	wrkshp	100		100	100
4	100	100	100	wrkshp	100	100	100	100
5	50	70	50	wrkshp	100	100	100	100
6	100	100	100	wrkshp	100	100	100	100
7	100	100		wrkshp	100	100	100	100
8		100		wrkshp	100		100	
9	90	100		wrkshp	100			100
10	100	100	100	wrkshp	100			100
11	90	100	90	wrkshp		90		
Group Mean	93	97	91	wrkshp	98	98	100	100

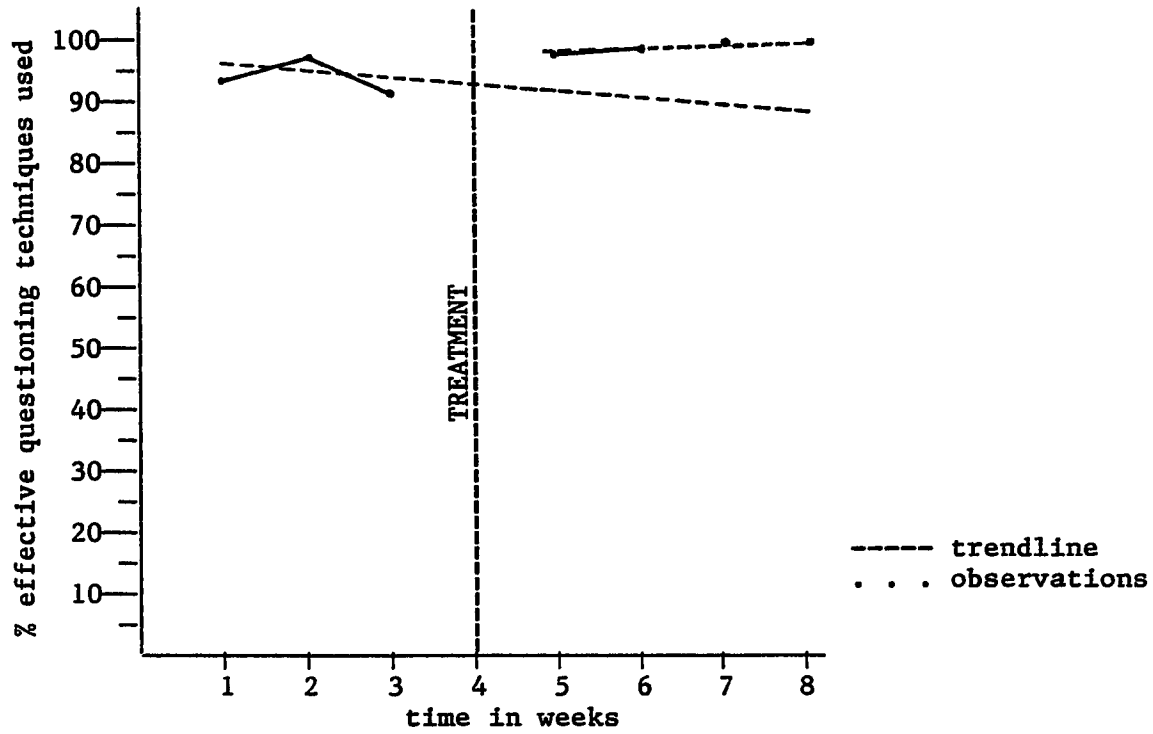


Figure 7. Mean percent of questions rated brief as possible for each week of the study

Table 11. Distributions and group means of percent of questions directed to the entire class for each week of the study

Teacher	Percent of Questions Directed to the Entire Class							
	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8
1	80			wrkshp	100		50	100
2	30	0	57	wrkshp	90		100	90
3	100	100	100	wrkshp	68		80	86
4	100	100	100	wrkshp	100	100	80	100
5	75	60	50	wrkshp	100	100	90	80
6	10	20	88	wrkshp	100	100	100	100
7	89	100		wrkshp	100	100	90	90
8		100		wrkshp	100		100	
9	100	100		wrkshp	100			75
10	50	100	90	wrkshp	100			100
11	100	50	100	wrkshp		90		
Group Mean	73	73	84	wrkshp	96	98	86	91

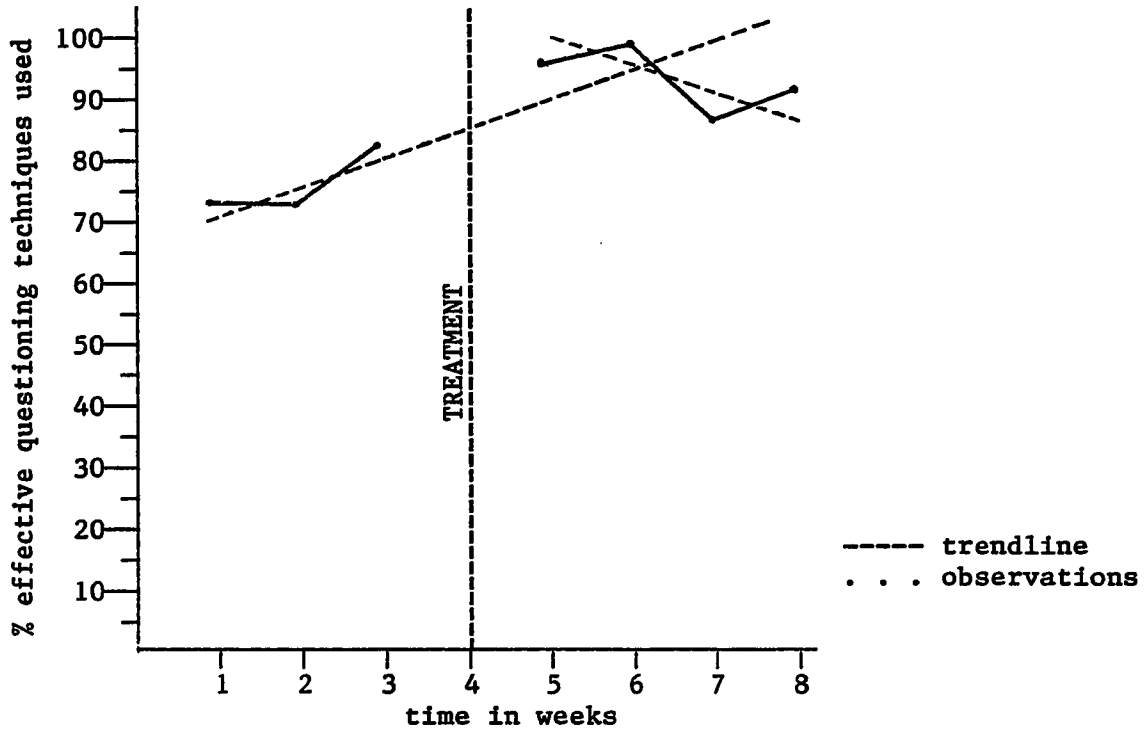


Figure 8. Mean percent of questions directed to the entire class for each week of the study

improvement during the two weeks immediately following the workshop followed by a gradual decline back to the pre-treatment level.

Wait-time

Data from Table 12, graphed in Figure 9, indicate teachers improved their appropriate use of wait-time substantially over the time of the study. During the three weeks prior to the workshop, teachers used wait-time appropriately only six, two, and eight percent of the time. Appropriate use of wait-time increased in the four weeks subsequent to the workshop to thirty-three, forty-one, thirty-two and forty-three percent. The extrapolated trendline shown in Figure 9 suggests teachers may not have improved their use of wait-time beyond twelve percent without the treatment.

Random selection of student respondee

Prior to the treatment, teachers randomly chose a student to answer a question thirty-eight, thirty-eight, and fifty-three percent of the time as shown in Table 13 and graphed in Figure 10. After the workshop, random selection increased to forty-eight, sixty-five, sixty-nine, and fifty-six percent. However, the extrapolated trendline in Figure 10 suggests teachers may have improved their use of this strategy without the treatment.

Response acknowledgement

The data in Table 14 show that teachers acknowledged student responses to questions ninety-four, eighty-one, and seventy-one percent of the time during the three weeks prior to treatment. Although response

Table 12. Distributions and group means of percent of appropriate use of wait-time for each week of the study

Teacher	Percent use of Appropriate Wait-time							
	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8
1	20			wrkshp	25		25	88
2	0	0	14	wrkshp	10		50	50
3	10	0	0	wrkshp	68		20	14
4	0	0	0	wrkshp	30	43	30	40
5	25	10	10	wrkshp	30	40	30	40
6	0	0	13	wrkshp	70	90	80	70
7	0	0		wrkshp	0	0	20	0
8		0		wrkshp	33		0	
9	0	0		wrkshp	10			25
10	0	0	20	wrkshp	50			60
11	0	10	0	wrkshp		30		
Group Mean	6	2	8	wrkshp	33	41	32	43

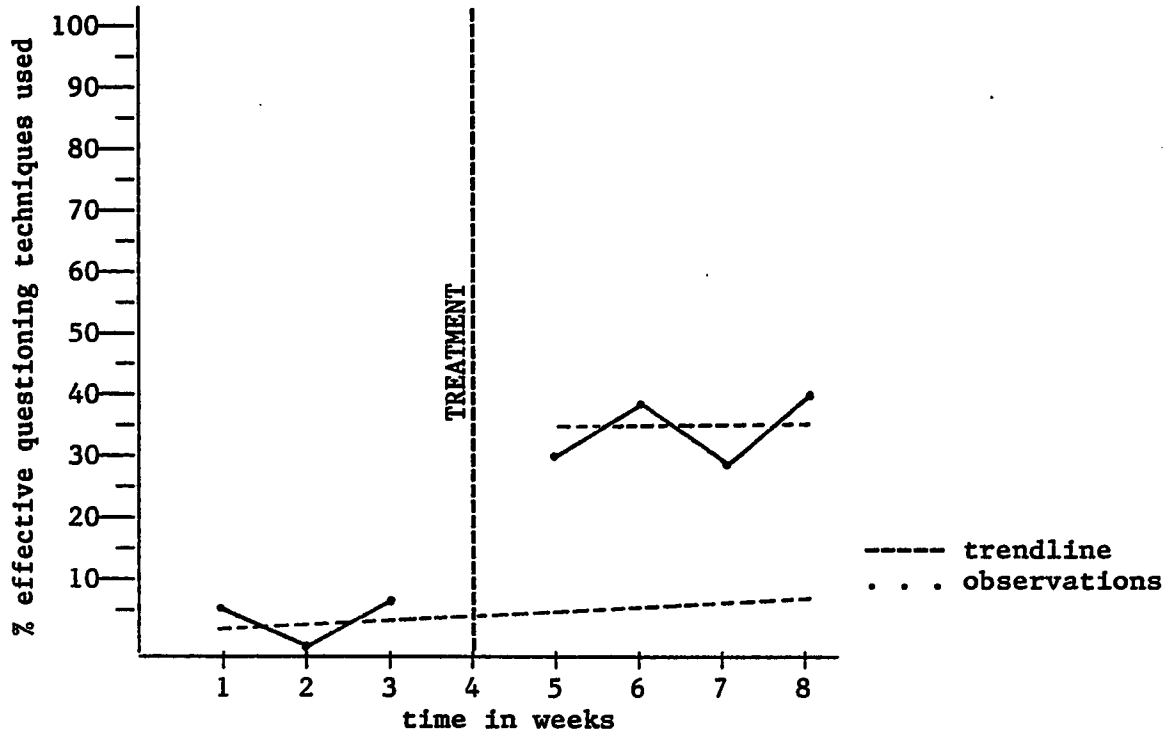


Figure 9. Mean percent of appropriate use of wait-time for each week of the study

Table 13. Distributions and group means of percent of random selection of student respondee for each week of the study

Teacher	Percent of Random Selection of Respondee							
	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8
1	50			wrkshp	50		25	100
2	70	100	71	wrkshp	0		80	70
3	10	0	0	wrkshp	100		60	71
4	30	0	80	wrkshp	50	57	50	30
5	75	30	70	wrkshp	90	70	80	70
6	40	100	63	wrkshp	60	100	90	100
7	44	0		wrkshp	0	50	90	10
8		17		wrkshp	67		75	
9	0	40		wrkshp	30			0
10	50	25	90	wrkshp	30			50
11	10	70	0	wrkshp		50		
Group Mean	38	38	53	wrkshp	48	65	69	56

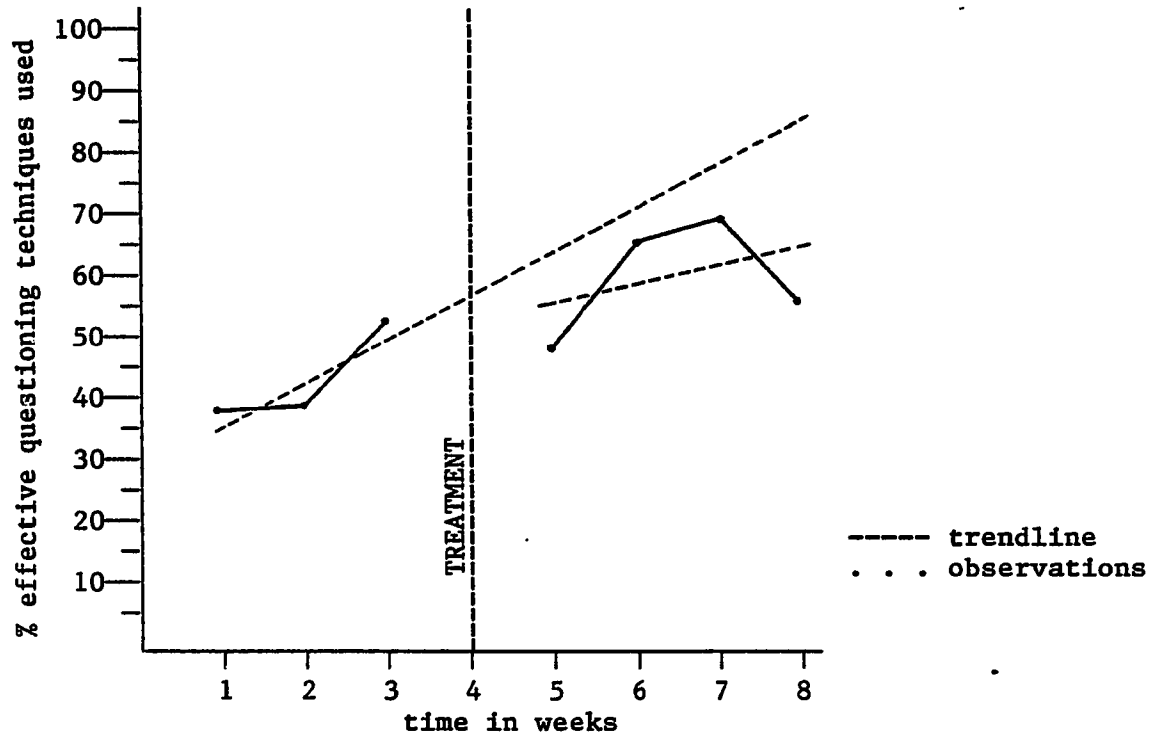


Figure 10. Mean percent of random selection of student respondee for each week of the study

Table 14. Distributions and group means of percent of student responses acknowledged for each week of the study

Teacher	Percent of Student Responses Acknowledged							
	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8
1	100			wrkshp	100		50	100
2	100	100	71	wrkshp	90		100	100
3	90	60	100	wrkshp	100		100	86
4	100	33	60	wrkshp	70	71	90	100
5	75	80	60	wrkshp	100	100	90	90
6	100	100	88	wrkshp	100	100	90	100
7	100	100		wrkshp	100	100	100	100
8		83		wrkshp	67		100	
9	100	100		wrkshp	100			100
10	100	50	30	wrkshp	90			70
11	70	100	90	wrkshp		100		
Group Mean	94	81	72	wrkshp	92	94	90	94

acknowledgement was generally good before the workshop, this strategy was improved and was more consistent after the treatment at ninety-two, ninety-four, ninety, and ninety-four percent. The graph of the extrapolated trendline in Figure 11 suggests response acknowledgement would have declined over the time of the study. The data suggest treatment affected consistency more than the technique.

Probing for clarification

The data in Table 15, graphed in Figure 12, show an improvement in teacher use of probing for clarification after treatment. Before the treatment teachers appropriately used probing for clarification of student responses eighty-two, sixty-seven, and sixty-eight percent of the time. After the treatment, appropriate use of probing was more consistent and improved to ninety-four, ninety-three, ninety-eight, and ninety-six percent. The graph of the extrapolated trendline shown in Figure 10 suggests appropriate use of probing for clarification may have declined over the time of the study.

Repetition

The data in Table 16 show that teachers generally used repetition of questions appropriately before the treatment. Inappropriate use of repetition was the exception rather than the rule. All use of repetition after the workshop was appropriate. The graph in Figure 13 suggests appropriate use of repetition may have declined without the workshop.

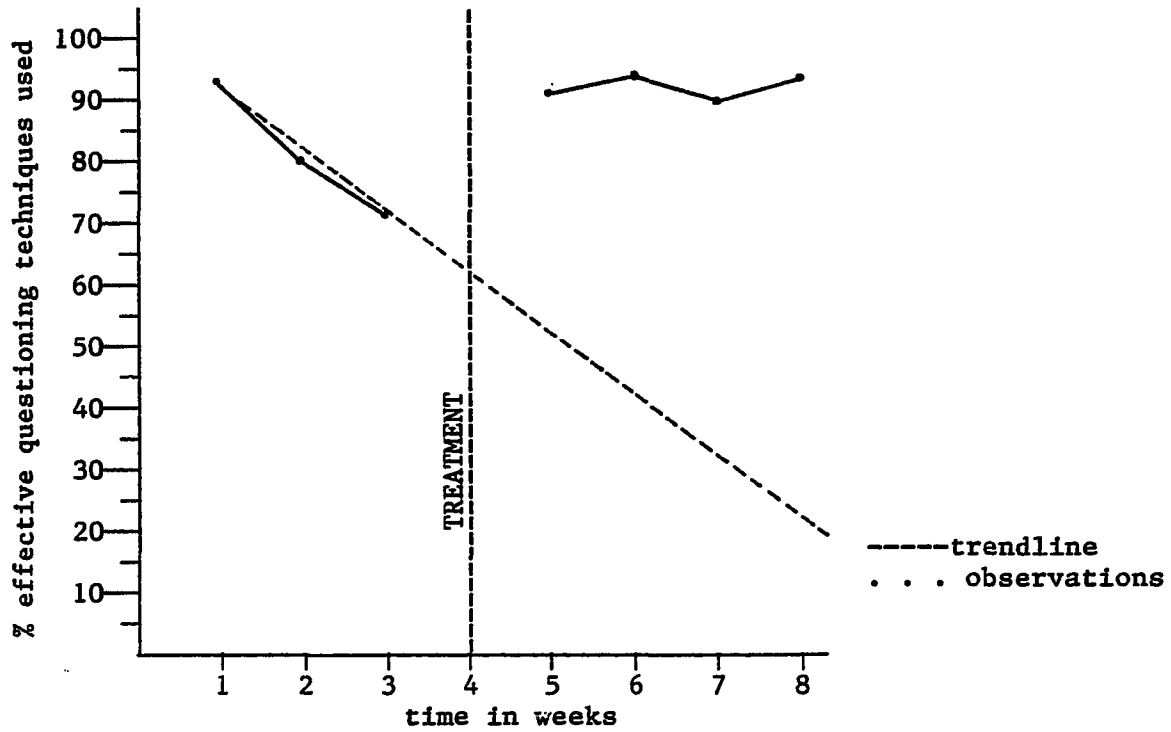


Figure 11. Mean percent of student responses acknowledged for each week of the study

Table 15. Distributions and group means of percent of appropriate use of probing for clarification for each week of the study

Teacher	Percent of Appropriate Use of Probing							
	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8
1	50			wrkshp	100		100	100
2	60	0	71	wrkshp	90		100	100
3	90	90	100	wrkshp	100		100	86
4	100	33	60	wrkshp	90	71	90	100
5	88	40	60	wrkshp	100	100	100	100
6	90	100	88	wrkshp	100	100	100	100
7	100	100		wrkshp	100	90	100	100
8		67		wrkshp	100		100	
9	100	100		wrkshp	70			100
10	90	100	20	wrkshp	90			80
11	50	40	80	wrkshp		100		
Group Mean	82	67	68	wrkshp	94	93	99	96

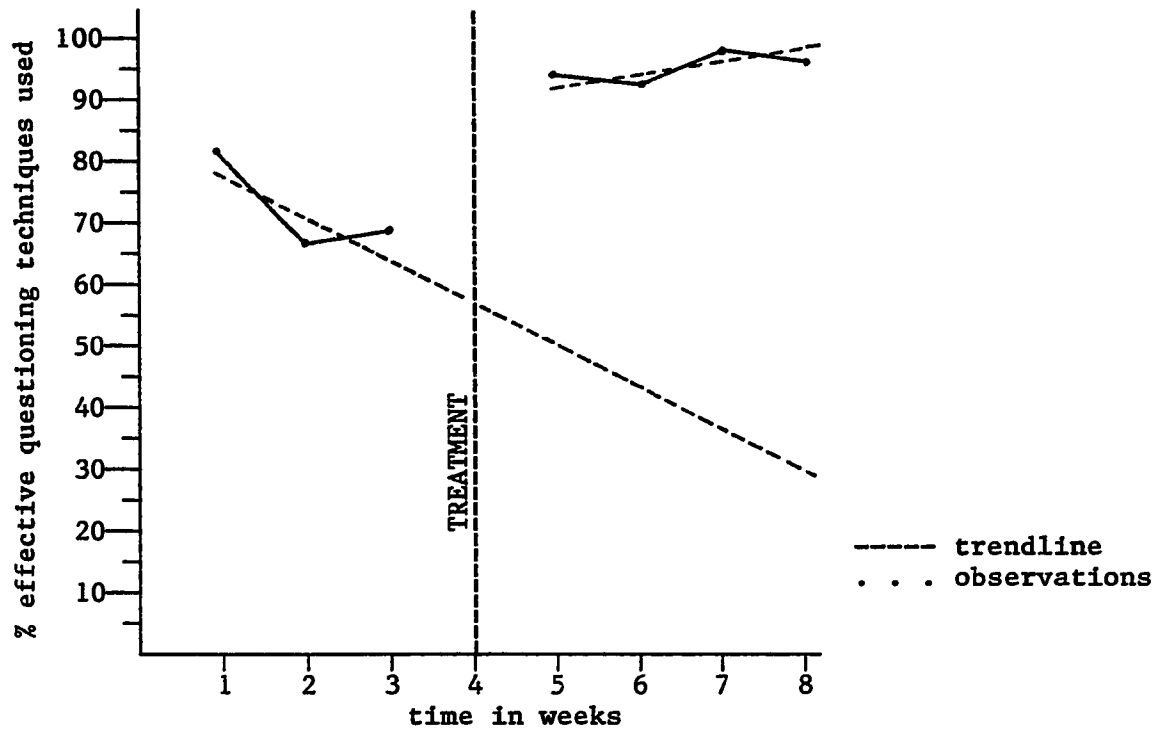


Figure 12. Mean percent of appropriate use of probing for clarification for each week of the study

Table 16. Distributions and group means of percent of appropriate use of repetition of questions for each week of the study

Teacher	Percent of Appropriate Use of Repetition							
	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8
1	100			wrkshp	100		100	100
2	100	100	100	wrkshp	100		100	100
3	100	100	100	wrkshp	100		100	100
4	100	100	100	wrkshp	100	100	100	100
5	100	100	100	wrkshp	100	100	100	100
6	90	100	100	wrkshp	100	100	100	100
7	100	100		wrkshp	100	100	100	100
8		100		wrkshp	100		100	
9	100	100		wrkshp	100			100
10	100	100	100	wrkshp	100			100
11	100	100	100	wrkshp		100		
Group Mean	99	100	97	wrkshp	100	100	100	100

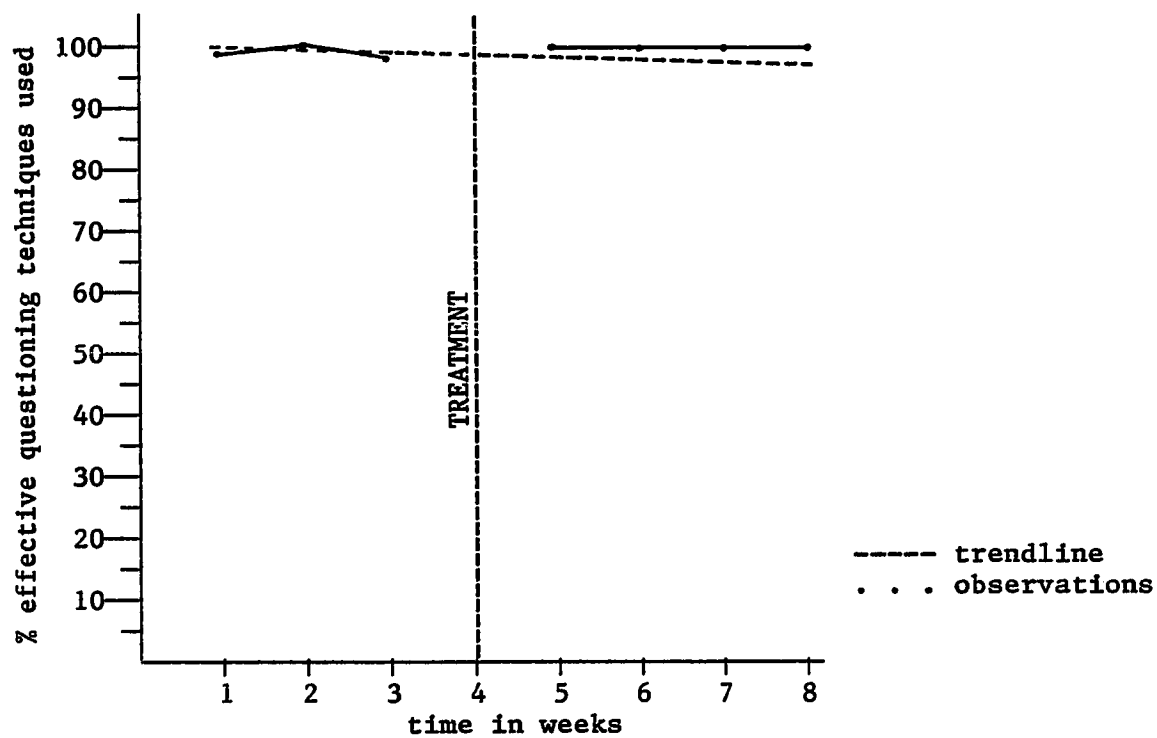


Figure 13. Mean percent of appropriate use of repetition of questions for each week of the study

Tone

The data in Table 17, graphed in Figure 14, show little difference in the tone teachers used in asking questions before and after treatment. Before the workshop, teachers asked questions in a matter-of-fact, conversational tone one hundred, one hundred, and ninety-nine percent of the time. After the workshop, all questions were asked in the appropriate tone. Little difference before and after the treatment was possible.

End-of-Study Interview

Ten of the eleven teachers completed a structured interview conducted by one independent interviewer via telephone at the end of the study. The interview was designed to elicit information from teachers about their perceptions in five general areas: (1) their improvement in use of effective questioning strategies; (2) the component of the SBPC inservice model which influenced any noted improvement; (3) comparisons of the SBPC model to traditional inservice; (4) perceptions of relationships with colleagues and professional growth; and (5) general impressions and/or suggestions for improvement of the training and the model. Data about each of the five components of the interview are reported separately.

Information from the interviews is presented for the ten teachers completing the interview. Group means were computed for responses to items in the first four components. Teacher comments are reported and discussed. Discussion of each of the five components follows.

Table 17. Distributions and group means of percent of questions asked matter-of-factly in a conversational tone for each week of the study

Teacher	Percent of Use of Conversational Tone							
	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8
1	100			wrkshp	100		100	100
2	100	100	100	wrkshp	100		100	100
3	100	100	100	wrkshp	100		100	100
4	100	100	100	wrkshp	100	100	100	100
5	100	100	100	wrkshp	100	100	100	100
6	100	100	100	wrkshp	100	100	100	100
7	100	100		wrkshp	100	100	100	100
8		100		wrkshp	100		100	
9	100	100		wrkshp	100			100
10	100	100	90	wrkshp	100			100
11	100	100	100	wrkshp		100		
Group Mean	100	100	99	wrkshp	100	100	100	100

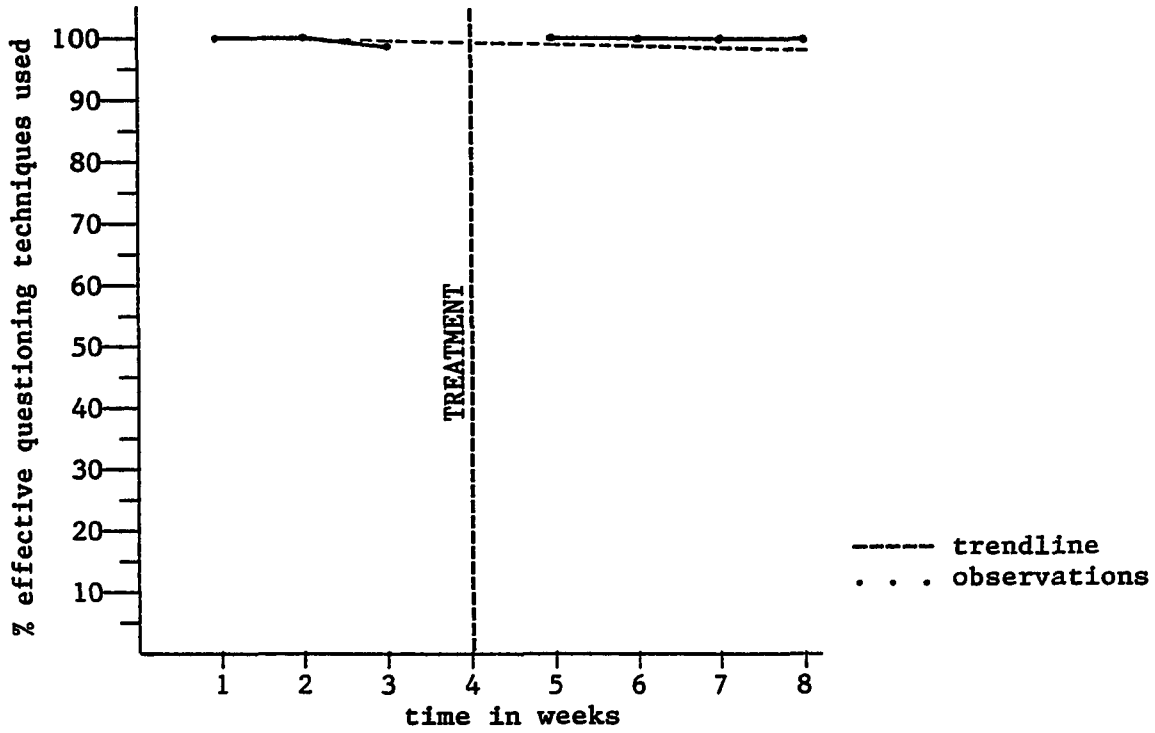


Figure 14. Mean percent of questions asked matter-of-factly in a conversational tone for each week of the study

Improvement in use of effective questioning strategies

Table 18 displays the distributions and group means of teachers' ratings of their improvement in the use of effective questioning strategies. Teachers were asked to rate their perceptions of their improvement on a scale of zero to five with zero indicating "no improvement" and five "much improvement." Teachers reported they improved in every questioning strategy. The overall improvement group mean was 2.8. Most teachers reported perceived improvement in most strategies. One individual consistently reported little or no improvement, and one consistently reported much improvement.

Teachers rated developing purposeful questions as the area of their greatest improvement with a group mean of 3.2. Although audio-tape ratings suggested little real improvement in this area, teachers' comments suggested they generally perceived their questions to be more purposeful. Teachers may be better able to judge the purposefulness of their questions than an independent rater.

Wait-time was rated second in amount of improvement with a group mean of 3.1. Teachers reported this was an area of major gain for them and that they worked hard at improving their use of wait-time. Audio-tape ratings confirmed wait-time was their area of greatest improvement.

Although audio-tape ratings suggested little improvement in the clarity of teachers' questions, teachers said developing clear questions at the appropriate level was their next most improved area, with a group mean of 3.0.

The group means for improvement in phrasing questions as briefly as

Table 18. Distributions and group means of teachers' ratings of their own improvement in classroom use of effective questioning strategies on the end-of-study interview, N = 10

Strategy	Improvement					Mean	
	none 0	1	2	3	4		much 5
a. Developing questions at appropriate level		1	1	5	3		3.0
b. Developing questions that are purposeful		1	1	4	3	1	3.2
c. Phrasing questions clearly		1	2	3	4		3.0
d. Phrasing questions as briefly as possible	1		2	4	3		2.8
e. Directing questions to the entire class	1		3	4	1	1	2.7
f. Pausing 3-5 seconds before calling on someone (wait-time)		1	3	1	4	1	3.1
g. Randomly selecting students to respond	1	1	1	3	4		2.8
h. Acknowledging student responses	1	1	1	4	3		2.7
i. Probing for clarification			5	4		1	2.7
j. Asking questions matter-of-factly in conversational tone	2	1	3	3	1		2.0
k. Overall improvement		1	2	5	2		2.8

possible and randomly selecting students to respond were 2.8. Audio-tape ratings suggested there may have been more improvement in randomly selecting students to respond than in phrasing questions briefly.

Teachers rated their improvement in directing questions to the entire class, acknowledging student response, and probing for clarification similarly with group means of 2.7. The results of audio-tape ratings suggested similar improvement in these three areas.

Teachers said their area of least improvement was in asking questions matter-of-factly in a conversational tone. Many teachers commented that they felt they did this well before the training. Data from the audio-tape ratings supported this; most teachers did this so well before training there was little room for improvement.

Component of SBPC model influencing improvement

Table 19 presents the distributions and means for teachers' perceptions of the influence various components of the model had on their improvement in the use of effective questioning strategies. Teachers rated the influence of each component on a scale of zero to five with zero indicating "no influence" and five the "most influence." Practicing using the skills in the classroom was rated as most influential (3.7), followed by observing a colleague using the skills (3.4). Receiving feedback from a colleague about use of effective questioning strategies was ranked third in influence (3.0). Teachers reported that their principal leading the workshop was fourth in influencing their improvement (2.8). The theory base presented in the workshop was rated least influential (2.3) by teachers. It was the only component to receive a zero rating by any teacher.

Table 19. Distributions and group means of teachers' ratings on the end-of-study interview of the influence of specified components of the treatment on their improvement in effective use of questioning strategies, N = 10

Component	Influence					Group Mean	
	none 0	1	2	3	4		most 5
a. Theory base presented in the workshop	1	3		4	2		2.3
b. Principal leading the workshop		1	4	2	2	1	2.8
c. Practice using questioning techniques in the classroom				5	3	2	3.7
d. Feedback from a colleague about use of techniques			3	4	3		3.0
e. Observing a colleague using the techniques			2	2	6		3.4
f. Other influence (awareness)						1	not appropriate

One teacher reported greater awareness was most influential in improvement of use of effective questioning techniques in the classroom.

Comparisons of the SBPC model to traditional inservice

Tables 20 and 21 present distributions and means of teachers' perceptions of transfer of training and time commitment of the SBPC inservice model as compared to traditional inservice. Teachers were asked to consider their ability to transfer skills presented in the theory base in the workshop to practice in their classrooms. They rated that transfer on a scale of one to five with one indicating they perceived transfer was "highest with traditional inservice" and five representing transfer "highest with the SBPC model." Table 20 shows seven of the teachers reported that the SBPC model promoted more transfer of training than traditional inservice, while three said there was no difference.

Teachers were next asked to compare the time involved with both approaches to inservice. The rating scale was again one to five with one representing "greater time commitment with SBPC and the time being non-productive"; five represents "greater time commitment but productive." Table 21 shows that eight of the nine teachers responding to the item reported that the additional time spend with the SBPC approach to inservice was productive; one teacher said the time was less productive.

Relationships with colleagues and professional growth

Table 22 shows the means and distributions of teachers' ratings of any changes in their feelings or perceptions about relationships with colleagues and professional growth as a result of their experience in the

Table 20. Distributions and group means of teachers' ratings on the end-of-study interview comparing transfer of training of the SBPC approach to inservice education with that of the traditional approach, N = 10

	Transfer of Training					Group Mean
	highest with traditional	no difference		highest with SBPC		
	1	2	3	4	5	
Transferring skills from theory base presented in the workshop to practice in the classroom			3	4	3	4.0

Table 21. Distributions and group means of teachers' ratings on the end-of-study interview comparing time commitment of the SBPC approach to inservice education with that of the traditional approach, N = 9

	Time Commitment					Group Mean
	Greater than traditional and nonproductive	no difference		Greater than traditional but productive		
	1	2	3	4	5	
Time commitment for teachers		1		4	4	4.2

Table 22. Distributions and group means of teachers' ratings on the end-of-study interview of changes in their feelings or perceptions of relationships with colleagues and professional growth as a result of their experience with the SBPC approach to inservice education, N = 10

Feelings or perceptions about:	Change					Group Mean
	more negative 1	2	none 3	4	more positive 5	
a. Willingness to be observed by a colleague while teaching			5	4	1	3.6
b. Willingness to observe a colleague teach			5	3	2	3.7
c. Improving one's own teaching skills			1	8	1	4.0
d. Seeking advice from a colleague about one's own teaching		1	4	4	1	3.5
e. Value of inservice education for improving teachers' skills		1	3	5	1	3.6
f. Willingness to try a new or suggested teaching technique			5	4	1	3.6

Table 23. Distribution of responses of teachers on the end-of-study interview indicating whether they would again participate in a SBPC approach to inservice education, N = 10

Desire to participate in SBPC inservice in the future	Teachers	
	Number	Percent
Yes	9	90
No	1	10

SBPC inservice model. Teachers were asked to rate any changes in their feelings and perceptions about each item on a scale of one to five with one representing "more negative feelings or perceptions," three "no change" and five "more positive." The data indicate changes were positive. Although most changes appear to be relatively small, the group means indicate positive changes in feelings or perceptions in every area.

Nine out of ten teachers were more positive about improving their own teaching skills; one reported no change in this area. Half of the teachers reported being more positive about willingness to observe a colleague teaching, to be observed by a colleague while teaching, and to try a new or suggested teaching technique; five teachers reported no change in any of those areas. Half of the teachers reported being more positive about seeking advice from a colleague about their own teaching, while four reported no change in this area and one teacher reported being more negative.

General impressions and suggestions for improvement

Table 23 presents teachers' responses when they were asked if they would again participate in a SBPC approach to inservice. Nine out of the ten teachers interviewed would again participate; only one would not because of the time commitment. Teachers appeared to be eager to respond to this question. Typical recorded comments included "yes, absolutely," "there is less pressure with peers," "liked teachers looking at teachers," "immediately using what you learned and getting feedback was good," and "yes, using the approach works."

When asked if there were components of the SBPC model they

particularly liked, they most frequently mentioned enjoying peer observation, both the observation of another teacher and being observed and rated by a colleague. Practicing wait-time, working together as a group, improving teaching skills, the presentation by principal, and tape recording lessons were well received.

Teachers did not appreciate the time of the year the study was conducted; they would have preferred it be done early in the year rather than toward the end. Several felt the coding sheet used in observations was difficult to use. Even though they indicated the time spent was productive, three teachers mentioned the amount of time involved was bothersome. One teacher did not like coding a colleague's teaching, while another said it was difficult arranging time to observe a colleague teaching.

When asked what recommendations for improvement they would make to someone considering using this approach to inservice, teachers most frequently mentioned that it should be done earlier in the year and the coding sheet for observations should be simplified. One teacher recommended more practice in the workshop using questioning strategies. Another felt videotaping would be helpful. One teacher strongly suggested that anyone considering using this approach "do it, try it." Another advocated that new teachers should become involved in this approach.

CHAPTER V. SUMMARY, IMPLICATIONS FOR PRACTICE, CONCLUSIONS, LIMITATIONS,
DISCUSSION, RECOMMENDATIONS FOR FURTHER RESEARCH

Summary

A primary concern of contemporary educational leaders is how to improve teacher performance through inservice training. Although traditional inservice comprised solely of presentation of theory is still utilized in many school districts as the primary means of inservice education, a review of the literature indicated that presentation of theory alone seldom results in skill acquisition or transfer of skills into the classroom. The literature also revealed that differences in inservice procedures, designs, and settings do have an impact on efficacy of training. Relatively little was found, however, about the effects of on-site coaching by peers on classroom implementation of effective teaching behaviors. This study examined the effects of an inservice model that included peer coaching. In addition to peer coaching, the model incorporates many of the effective components of inservice education including: leadership from the principal; workshop comprised of presentation, modeling, practice under simulated conditions, and assessment of mastery; building-level focus; and continuation of the strategies over a period of time.

This study investigated the effects of a site-based peer coaching (SBPC) inservice training program on teacher use of effective questioning strategies in the classroom. The major tasks to be completed for the study included: identifying a key effective teaching technique for

secondary level teaching; developing an inservice model incorporating the major components of effective inservice education; developing the training module, instrumentation, and procedural design; and training building principals to conduct building-level inservice.

Two principals received training on questioning strategies and peer coaching before conducting an inservice workshop for their teachers at the building level. After the workshop, teachers practiced questioning skills in their classrooms while coaching each other. The data for the study were gathered from audio-tapes of classroom lessons and self-reports of teachers' perceptions of their experiences with the activities of the model.

The findings explicated in Chapter IV are summarized in two parts: (1) improvement in questioning strategies and (2) teachers' perceptions--use of the model.

Improvement in questioning strategies

Teachers audio-taped one of their own lessons once each week for three weeks before the workshop and for four weeks after the workshop. An independent rater analyzed questions from the lessons and rated them for each of ten effective questioning strategies.

The data before and after the workshop showed a twelve percent increase in comprehensive questioning effectiveness. Because teacher proficiency was high before the treatment, there was little opportunity for improvement in teachers' effective use of these strategies:

1. developing purposeful questions;
2. developing clear questions;

3. appropriate use of repetition of questions; and
4. asking questions in a conversational tone.

Some improvement in effective use was noted with these strategies:

1. developing brief questions;
2. directing questions to the entire class;
3. randomly selecting a student to respond to a question; and
4. acknowledging student responses.

The most marked improvements after the treatment were shown in teacher use of:

1. wait-time and
2. probing for clarification.

Teachers' perceptions--use of the model

Ten of the eleven teachers completed a structured interview conducted by an independent interviewer via telephone after completion of the study. The interview was designed to elicit information about teacher perceptions in five areas, each of which is summarized below.

Improvement in use of effective questioning strategies Teachers felt they improved their use of every strategy examined. Teachers reported they perceived the most improvement in their use of these strategies:

1. developing questions that are purposeful;
2. using wait-time appropriately;
3. developing clear questions at the appropriate level.

Teachers reported some improvement in:

1. phrasing questions as briefly as possible;

2. randomly selecting students to respond;
3. directing questions to the entire class;
4. acknowledging student responses; and
5. probing for clarification.

Teachers said they improved least in asking questions matter-of-factly, largely because they were proficient in that strategy before the treatment.

Component of the SBPC model influencing improvement Teachers reported the activities involved in peer coaching most influenced their improvement. They rated the following three components of the SBPC model highest in influencing their improvement in questioning:

1. practice using questioning strategies in the classroom;
2. observing a colleague using the strategies; and
3. receiving feedback from a colleague.

Teachers reported the component of the principal leading the workshop influenced them to a lesser degree than practice, observation and feedback. They ranked the theory base presented in the workshop as having the least influence on their improvement; this was the only component receiving a rating of "no influence."

Comparison of the SBPC model to the traditional approach to inservice Teachers rated their transfer of skills presented in the theory base of the workshop to practice in their classes higher with the SBPC approach to inservice as compared to a traditional approach. Even though the SBPC approach required a greater time commitment from teachers, teachers felt the time was productive.

Relationships with colleagues and professional growth Teachers

reported relatively small but positive changes in their perceptions or feelings about collegial relations and professional growth. The greatest positive changes were reported for the areas of:

1. improving one's own teaching skills and
2. willingness to observe a colleague teach.

Smaller positive changes were reported for:

1. willingness to be observed by a colleague while teaching;
2. value of inservice education for improving skills; and
3. willingness to try a new or suggested teaching technique.

The area of least change, but still in a positive direction, was seeking advice from a colleague about one's own teaching.

General impressions and suggestions for improvement

Of ten teachers interviewed, nine said they would choose to participate in a site-based, peer coaching approach to inservice training if given the opportunity. They most enjoyed peer observation, both the observation of other teachers and being observed and rated by a colleague. They also liked practice, working together as a group, being "taught" by the principal and receiving feedback about their own teaching behaviors. Teachers disliked the timing of the inservice, recommending it be done at the beginning of the year rather than the end. Several suggested the coding sheet be simplified. Only one teacher had difficulty arranging time to observe a colleague teaching, although several said the time commitment was burdensome at times. Additional suggestions included "utilizing more practice in the workshop," "using videotapes," and "urging beginning

teachers to become involved in the SBPC approach."

Implications for Practice

Six research questions provided the impetus for the study. The findings supply answers to those questions and have implications for practice. Each research question is discussed below.

Research question 1--How did participation in the SBPC inservice model affect teacher use of effective questioning strategies in the classroom?

Data gathered from analysis of audio-taped lessons show teachers effectively used questioning strategies approximately twelve percent more frequently after the workshop than before. Trendlines after the workshop were level or moving in a positive direction for every strategy except directing questions to the entire class. At best, there appears to be data to support use of the model for improving teachers' questioning effectiveness. At worst, the model is worthy of future study.

Research question 2--What did teachers report about the influence of participation in the activities of the SBPC inservice model on their use of effective questioning strategies in the classroom?

Teachers felt more confident as a result of the training. They felt they improved their use of every questioning strategy examined. This, too, is a positive sign about the use of the model for improving teachers' questioning effectiveness.

Research question 3--How do teachers rate the influence of each of these components of the model on their use of effective questioning strategies in the classroom:

- a. theory base presented in the workshop?
- b. principal leading the workshop?
- c. practice using the skills in the classroom?
- d. feedback from a colleague about use of the skills?
- e. observing a colleague using the skills?

Teachers reported three components most strongly influenced their

improvement in questioning effectiveness:

1. practice using the skills in the classroom;
2. observing a colleague using the skills; and
3. feedback from a colleague about use of the skills.

They felt the principal leading the workshop had some influence on their improvement, while they said the theory base presented in the workshop had little relative influence. Teachers' perceptions support the use of practice and peer coaching following inservice training.

Research question 4--How do teachers rate their skill transfer from workshop to implementation in the classroom using the SBPC model as compared with traditional inservice education?

Teachers perceived the improvement of their skills was greater with the SBPC inservice model than it might have been with a more typical (presentation of theory only) approach to inservice. Apparently practice accompanied by peer coaching helped them to improve their questioning effectiveness.

Research question 5--Are there changes in teachers' feelings or perceptions of each of the following after participation in the SBPC inservice model:

- a. willingness to be observed by a colleague while teaching?
- b. inclination to observe a colleague teach?
- c. inclination to seek advice from a colleague?
- d. value of inservice in helping teachers improve?
- e. improving one's own teaching skills?
- f. willingness to try a new technique?

Teachers reported growth in each area with the greatest positive change reported for improving one's own teaching skills. The activities of the SBPC inservice model may have had positive influence on teachers' feelings and perceptions about some aspects of collegial relations and professional growth.

Research question 6--How should the model be revised and refined to be most useful for future study and/or practical applications?

Teachers reported three areas of concern about the activities involved in the model: (1) the coding instrument was difficult to use; (2) initiating the model late in the school year was frustrating; and (3) the time commitment involved was sometimes burdensome. Teachers reported no concerns about the activities involved in the components of the model. The following recommendations for revision of the model should be considered:

1. If the entire model is utilized, comprised of three workshops and three peer coaching cycles, perhaps the number of observations could be decreased and/or the pre-observation conferences could be eliminated.
2. The model should be initiated early in the school year.
3. Any coding instrument used by teachers when observing a colleague should be simplified.

Without further research, no other changes in the SBPC model are suggested.

Conclusions

The primary purpose of the study was to investigate the effects of a site-based peer coaching inservice model on teacher use of effective questioning strategies in the classroom. The trendlines of graphs of time-series data and the structured interviews with participants led to the following conclusions.

1. The Site-based Peer Coaching inservice model showed promise for

training teachers and increasing their effectiveness in the classroom.

2. Teachers increased their frequency of effective use of questioning strategies in the classroom.
3. Questioning strategies most improved during the treatment were appropriate use of wait-time, and probing for clarification.
4. Improvement was also shown in phrasing questions briefly, directing questions to the entire class, randomly selecting a student to respond to a question, and acknowledging student responses to questions.
5. Little change was detected in teacher use of repetition, asking questions matter-of-factly, developing purposeful questions or phrasing questions clearly; teachers were using these strategies well before the treatment.
6. Teachers reported they perceived improvement in every questioning strategy examined.
7. Teachers reported that their improvement in questioning effectiveness was most influenced by the components of the model that comprise peer coaching:
 - a. practice using questioning strategies in the classroom;
 - b. observing a colleague using the strategies; and
 - c. receiving feedback from a colleague about use of the strategies.
8. Teachers reported that the extra time commitment involved in the SBPC approach to inservice as compared to traditional approach

was productive.

9. Teachers reported their transfer of skills learned in the workshop to practice in the classroom was greater with the SBPC approach to inservice than with a traditional approach.
10. Teachers reported positive changes in their feelings and perceptions of each of the following as a result of their experience with the SBPC inservice model:
 - a. improving their own teaching skills.
 - b. inclination to observe a colleague teach.
 - c. willingness to be observed by a colleague while teaching.
 - d. value of inservice education in improving teachers' skills.
 - e. willingness to try a new or suggested teaching technique.
 - f. seeking advice from a colleague about one's own teaching.
11. Of ten teachers interviewed, nine reported they would again participate in a site-based peer coaching approach to inservice education if given the opportunity.

Limitations

The conclusions drawn from this investigation are constrained by the following limitations:

1. The sample was limited to only eleven teachers and two principals from two secondary schools in central Iowa. Therefore, the conclusions should not be generalized to students and teachers in other districts or grade levels.
2. Participants were volunteers, not randomly selected.
3. The training took place during the spring of the year as opposed

to the beginning of the school year. This could have either positive or negative effects on the results.

4. The treatment period was limited to five weeks.
5. Instruments used to collect the data were nonstandardized.
6. Audio-tapes were rated by one person; therefore, inter-rater reliability was not determined.
7. There were no control groups; therefore, cause and effect relationships cannot be concluded.
8. All teachers' perceptions were self-reports.

Discussion

The Site-based, Peer Coaching approach to inservice education may have potential for improving teacher performance in the classroom. The findings from both ratings of audio-tapes and interviews with teachers are encouraging. Teachers questioning effectiveness improved after the treatment. Teachers perceived improvement in use of every questioning strategy examined and felt that the components of peer coaching most influenced their growth. Teachers reported being more positive about several aspects of collegial relations and professional growth as a result of the activities involved in the model. Out of the ten teachers interviewed, nine reported they would choose to participate in a similar approach to inservice training if given the opportunity. At best, it appears the SBPC inservice model may be used for improving teachers' questioning effectiveness and it may promote improved collegial relations and desire for professional growth. At worst, the model is worthy of future study.

Recommendations for Further Research

In light of the findings of this investigation, several recommendations seem appropriate for further research. To aid other researchers conducting studies in this area, the following suggestions are provided:

1. An experimental study similar to that described in the initial research design subsection of the methods and procedures chapter should be utilized.
2. A large sample should be drawn representing teachers from several school districts of different size and location so that comparisons can be made by size and location in terms of urban/rural and socio-economic backgrounds.
3. Schools should be randomly selected and teachers randomly assigned to the experimental and various control groups.
4. The program should be initiated and implemented at the beginning of the school year.
5. A retention and maintenance check should be administered both in May of the school year in which the study is conducted and in the fall of the next year.
6. An instrument sensitive enough to assess any changes in teacher attitudes and opinions both before and after the program should be developed.
7. Additional observations should be made before the treatment to increase the accuracy of the base-line trends and the extrapolated trendlines.
8. Additional observations should be included subsequent to

treatment to increase the accuracy of the post-treatment trend-line.

9. In any study utilizing questioning strategies as the content of the training, a pre-test should be administered to participants to determine their strengths and weaknesses in use of the strategies. Attention should then be focused on improvement of weaknesses.
10. Coding instruments developed for teacher use when observing colleagues should be simplified to increase teacher satisfaction with coding colleagues' behavior.
11. More than one audio-tape rater should be used to ensure rater reliability.
12. Additional effective teaching behaviors should be identified from the literature and utilized as the content of training to determine if this approach would be effective in improving other teaching behaviors in addition to questioning effectiveness.

BIBLIOGRAPHY

1. Anderson, L.; Evertson, C.; and Brophy, J. "An Experimental Study of Effective Teaching in First-Grade Reading Groups." Elementary School Journal 79 (1979): 193-223.
2. Aschner, M. J. "Asking Questions to Trigger Thinking." NEA Journal 50 (1961): 44-46.
3. Baker, R. G. "The Contributions of Coaching to Transfer of Training: An Extension Study." Doctoral dissertation. University of Oregon, 1983.
4. Berman, Paul; and McLaughlin, Mibrey. Federal Programs Supporting Educational Change. A monograph; Executive Summary. Santa Monica, California: The Rand Corporation, 1978. ERIC ED 159 289.
5. Blosser, Patricia E. Handbook of Effective Questioning Techniques. Worthington, Ohio: Education, Associates, Inc., 1973.
6. Brandt, Ron, exec. ed. "On Improving Teacher Effectiveness: A Conversation with David Berliner." Educational Leadership 40 (October 1982): 12-15.
7. Brophy, Jere; and Evertson, Carolyn. Learning from Teaching: A Developmental Perspective. Boston: Allyn and Bacon, 1976.
8. Carin, Arthur A.; and Sund, Robert B. Developing Questioning Techniques: A Self-Concept Approach. Columbus, Ohio: Charles E. Merrill Publishing Co., 1971.
9. Collins, James. "Trends in Inservice Education." Nexus 5 (January 1979): 1-4.
10. Cook, Thomas D.; and Campbell, Donald T. Quasi-Experimentation Design and Analysis Issues for Field Settings. Chicago: Rand McNally, 1979.
11. Corbett, H. D. "Principal's Contributions to Maintaining Change." Phi Delta Kappan 64 (November, 1982): 190-192.
12. Cunningham, Robert T. "Developing Question Asking Skills." In Developing Teacher Competencies, pp. 82-130. Edited by James Weigard. Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1971.

13. Dillon, J. T. "The Effect of Questions in Education and Other Enterprises." Journal of Curriculum Studies 14 (1982): 127-152.
14. Dunkin, M.; and Biddle, B. The Study of Teaching. New York: Holt, Rinehart and Winston, 1974.
15. Dupuis, Mary M.; and Askov, Eunice N. "An Effective Inservice Model for Content Area Reading in the Secondary Schools." Educational Leadership 40 (October 1982): 48-52.
16. Eubanks, L.; and Levine, D. "A First Look at Effective Schools Projects in New York and Milwaukee." Phi Delta Kappan 64 (1983): 697-702.
17. Fitz-Gibbon, Carol Taylor; and Morris, Lynn Lyons. How to Design a Program Evaluation. Beverly Hills: Sage Publications, 1978.
18. Floyd, W. D. "Analysis of the Oral Questioning Activity in Selected Colorado Primary Classrooms." Doctoral dissertation. Colorado State College, 1960.
19. Gage, N. L. The Scientific Basis of the Art of Teaching. New York: Teachers College Press, 1978.
20. Gall, Meredith. "Synthesis of Research on Teacher's Questioning." Educational Leadership 42 (November 1984): 40-47.
21. Gall, Meredith. "The Use of Questions in Teaching." Review of Educational Research 40 (1970): 707-721.
22. Gall, Meredith; Ward, Beatrice; Berliner, David C.; Caher, Leonard S.; Winnie, Philip H.; Elashoff, Janet D.; and Stanton, George C. "Effects of Questioning Techniques and Recitation on Student Learning." American Educational Research Journal 15 (1978): 175-199.
23. Good, Thomas L.; and Brophy, Jere E. Looking in Classrooms. New York: Harper and Row, 1978.
24. Groisser, Philip. How to Use the Fine Art of Questioning. New York: Teachers' Practical Press, 1964.
25. Guskey, Thomas R. "Inservice Education, Classroom Results and Teacher Change." Doctoral dissertation. The University of Chicago, 1979.
26. Harris, Ben M. Improving Staff Performance Through Inservice Education. Boston: Allyn and Bacon, Inc., 1980.

27. Howey, Kenneth R.; Bents, Richard; and Corrigan, Dean, eds. School-Focused Inservice: Descriptions and Discussions. Reston, Virginia: Association of Teacher Educators, 1981.
28. Jackson, G.; and Cosca, C. "The Inequality of Educational Opportunity in the Southwest: An Observational Study of Ethnically Mixed Classrooms." American Educational Research Journal 11 (1974): 219-224.
29. Joyce, Bruce; and Showers, Beverly. "Improving Inservice Training: The Messages of Research." Educational Leadership 37 (February 1980): 379-385.
30. Joyce, Bruce; and Showers, Beverly. "The Coaching of Teaching." Educational Leadership 40 (October 1982): 4-10.
31. Joyce, Bruce; and Showers, Beverly. "Transfer of Training: The Contribution of Coaching." Journal of Education 163 (Spring 1981): 163-171.
32. Lawrence, Gordon. "Patterns of Effective Inservice Education: A State of the Art Summary of Research on Materials and Procedures for Changing Teacher Behaviors in Inservice Education." Tallahassee: Florida State Department of Education, 1974. ERIC ED 176 424.
33. Lawrence, Gordon; Baker, D.; Elzie, P.; and Hansen, B. Patterns of Effective Inservice Education. Gainesville, Florida, College of Education, December 1974. ERIC ED 176 424.
34. Levinson, H. "A Psychologist Looks at Executive Development." Harvard Business Review 40 (1962): 69-75.
35. Loughlin, R. "On Questioning." Educational Forum 25 (1961): 481-482.
36. Mazzarella, Jo Ann. "Synthesis of Research on Staff Development." Educational Leadership 38 (November 1980): 192-195. ERIC ED 189 679.
37. McCarthy, Bernice. "Improving Staff Development Through CBAM and 4Mat TM." Educational Leadership 40 (October 1982): 20-25.
38. McLaughlin, Milbrey Wallin; and Marsh, David D. "Staff Development and School Change." Teacher's College Records 80 (September 1978): 69-94.
39. Mohlman, Georgea G.; Kierstad, Janet; and Gundlach, Mae. "A Research-Based Inservice Model for Secondary Teachers." Educational Leadership 40 (October 1982): 16-19.

40. Moyer, J. R. "An Exploratory Study of Questioning in the Instructional Processes in Selected Elementary Schools." Doctoral dissertation. Columbia University, 1966.
41. Neill, Shirley B. "How to Improve Inservice Education." Tips for Principals. NAASP: Reston, Virginia, October, 1982.
42. Nicholson, Alexander M.; Joyce, B. R.; Parker, D. W.; and Waterman, F. T. The Literature on Inservice Education: An Analytic Review. Report No. 3. Palo Alto, California: Stanford Center for Research and Development in Teaching, 1976. ERIC ED 129 734.
43. Oliva, Peter F. Supervision for Today's Schools. New York: Harper and Row, 1976.
44. Pate, Robert T.; and Bremer, Neville H. "Guiding Learning through Skillful Questioning." Elementary School Journal 67 (1967): 417-422.
45. Pinkall, Joseph E. "A Study of the Effects of a Teacher Inservice Education Program on Fifth and Sixth Grade Teachers and the Students Whom They Teach in Their Knowledge of Scientific Processes, Scientific Content and Attitude Toward Science and Scientists." Unpublished dissertation. The University of Nebraska--Lincoln, 1973.
46. Reinehr, Virginia Lee. Motivation Training and Teacher Behavior--Change in and Inservice Education Program. Ph.D. dissertation. University of Houston, 1973.
47. Rosenshine, Barak. "Objectively Measured Behavioral Predictors of Effectiveness in Explaining." In N. Gage, M. Belgard, D. Dell, J. Hiller, B. Rosenshine, and W. Unruh. Explorations of the Teacher's Effectiveness in Explaining. Technical Report No. 4. Research and Development Center in Teaching, Stanford University, 1968.
48. Rosenshine, Barak; and Furst, Norma. "The Use of Direct Observation to Study Teaching." In Second Handbook of Research on Teaching. Edited by R. Travers. Skokie, Illinois: Rand McNally, 1973.
49. Rowe, Mary B. "Science, Silence, and Sanctions." Science and Children 6 (1969): 11-13.
50. Rowe, Mary B. "Wait-time and Rewards as Instructional Variables, The Influence on Language, Logic, and Fate Control. Part One--Wait-time." Journal of Research on Science Teaching 22, No. 2 (1974).
51. Schreiber, J. E. "Teachers Question-Asking Techniques in Social Studies." Doctoral dissertation. University of Iowa, 1967.

52. Servatius, Joanna D.; and Young, Shareen E. "Implementing the Coaching of Teaching." Educational Leadership 42 (April 1985): 50-53.
53. Showers, Beverly. Peer coaching and Its Effects on Transfer of Training. Eugene, Oreg.: Center for Educational Policy and Management, 1984.
54. Showers, Beverly. "Teachers Coaching Teachers." Educational Leadership 42 (April 1985): 43-48.
55. Showers, Beverly. Transfer of Training: The Contribution of Coaching. Eugene, Oreg.: Center for Educational Policy and Management, 1982.
56. Soar, R. Follow-through Classroom Process Measurement and Pupil Growth. Final Report. College of Education, University of Florida, 1973.
57. Sparks, Georgea M. "Inservice Education, Training Activities, Teacher Attitude, and Behavior Change." Doctoral dissertation. Stanford University, 1983.
58. Sparks, Georgea M. "Synthesis of Research on Staff Development for Effective Training." Educational Leadership 41 (November 83): 65-72.
59. Sparks, Georgea M. "The Trees or the Forest? A Response to Ruth Wade." Educational Leadership 42 (December 1984, January 1985): 55-58.
60. Stalling, Jane A. "Changing Teacher Behavior: A Challenge for the 1980's." Paper presented at the Annual Meeting of the American Educational Research Association, Los Angeles, California, April, 1981. ERIC ED 200 596.
61. Stallings, Jane A.; and Kaskowitz, D. Follow-through Classroom Observation Evaluation. Menlo Park, Calif.: Stanford Research Institute, 1974.
62. Stallings, Jane A.; Needels, M.; and Stayrock, N. How to Change the Process of Teaching Basic Reading Skills in Secondary Schools: Phase II and Phase III Final Report. Menlo Park, Calif.: SRI International, 1978.
63. Stevens, R. "The Question as a Measure of Efficiency in Instruction: A Critical Study of Classroom Practice." Teachers College Contributions to Education 48 (1912).
64. Swift, J. Nathan; and Gooding, C. Thomas. "Interaction of Wait Time Feedback and Questioning Instruction on Middle School Science Teaching." Journal of Research in Science Teaching 20 (1983): 721-730.

65. Wade, Ruth K. "What Makes a Difference in Teacher Inservice Education? A Meta-Analysis of Research." Educational Leadership 42 (December 84, January 85): 48-54.
66. Walker, Retia S. "Effects of Principal Inservice Training on Teacher Classroom Behaviors and Student Academic Motivation." Doctoral dissertation. Iowa State University, 1982.
67. Wood, Fred H.; McQuarrie, Frank O.; and Thompson, Steven R. "Practitioners and Professors Agree on Effective Staff Development Practices." Educational Leadership 40 (October 1982): 28-31.
68. Wood, Fred H.; and Thompson, Steven R. "Guidelines for Better Staff Development." Educational Leadership 47 (February 1980): 374-378.
69. Wright, Clifford J.; and Nuthall, Graham. "Relationships Between Teacher Behaviors and Pupil Achievement in Three Experimental Elementary Science Lessons." American Educational Research Journal 7 (1970): 477-491.
70. Yarger, S.; Howey, Kenneth C.; and Joyce, Bruce. Inservice Teacher Education. Palo Alto: Booksend Laboratories, 1980.

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An indebtedness is owed to many Iowa State University staff members who have been so helpful during my program, especially to my committee members: Dr. Norman Boyles, Dr. Mary Huba, Dr. Wilbur Layton, and Dr. Daniel Reschly. I also thank Mikie Walker for all her support.

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Special appreciation is extended to members of my family. Without the devoted love, patience, understanding, and sometimes prodding from my husband, Les, this research would not have been completed. I thank my mother-in-law, Vivian Lickliger, and my sisters, Connie Eichhorn and Janice Davis, for their love and encouragement.

Last, but not least, I acknowledge the love, sacrifices and prayers

of my dear parents, Earl and Arlene Davis, who have always been there for me. It is to them that this dissertation is humbly dedicated.

**APPENDIX A. SELECTED SAMPLES OF CORRESPONDENCES
TO SCHOOL PRINCIPALS AND TEACHERS**

In addition to being principal of Anita Junior-Senior High School, I am a doctoral candidate in Educational Administration at Iowa State University. I am planning a study designed to examine the effects of a peer-coaching inservice program. I believe peer coaching and counseling as a component of inservice education can help teachers implement effective teaching techniques. Research shows secondary teachers spend approximately seventy-five per cent of their time discussing content and asking questions. Through inservice training and receiving feedback as they practice skills in classrooms, teachers can be helped to improve their questioning techniques.

You were recommended to me, because of your commitment to improved instruction, as a possible participant in this study by Dr. Jim Sweeney, Professor at Iowa State University. Your participation in this study will be of mutual benefit. While I investigate my belief that peer coaching as a component of inservice education makes a difference, you and your teachers will receive training on effective questioning techniques and have the opportunity to improve instruction as teachers help each other in the classroom.

The information below will help you to understand the procedures for carrying out the study and your role in it.

- A. Confidentiality and Anonymity. This study involves audiotaping volunteer teachers as they present a lesson to a class. To assure confidentiality, all participating teachers will be assigned a confidential code number to use on all data gathered. A teacher will be asked to volunteer as a contact person to gather tapes, surveys, etc. from teachers and send to the researcher or rater. All data-gathering instruments and tapes will be coded and sealed in an envelope prior to giving to the contact person to assure teacher anonymity.

B. Activities and Time Commitments. Detailed descriptions of activities and anticipated time commitments for participating principals and teachers are enclosed on separate sheets. Those descriptions include meetings, with teachers, scheduling, surveys, procedures, etc.

C. Participants. All participants in this study are to be volunteers. Teachers and principals from nine schools will participate in the study. Those nine schools (A, B, C, D, E, F, G, H, I) will comprise three groups as follows:

1. Peer coaching-inservice schools. Five schools (A, B, C, D, E) will participate in the peer coaching inservice program. Eight teachers are needed from each of the schools, four to be in the inservice group and four in the control group.

Teachers in the inservice group will participate in a workshop, audiotape lessons, and participate in the peer coaching and counseling cycle. Detail of their activity is attached.

Those teachers in the control group from these schools will audiotape lessons and complete attitudinal surveys only. They will not participate in the workshop nor peer coaching. This group will serve as a same-school control group.

2. No-inservice schools. The ten participating teachers from each of schools F and G will receive no treatment. They will audiotape lessons to be rated once per week for the eight weeks of the study. They will also complete attitudinal surveys. This group will serve as the across-schools control group.

Participants from these schools will be offered the inservice after the study is completed if they so desire.

3. Traditional-inservice schools. Ten teachers from each of schools H and I will participate in a traditional inservice workshop. The workshop will be the same as the workshop the peer coaching inservice group receives without peer coaching training. These teachers will not participate in the peer coaching and counseling cycle. Teachers in this group will also audiotape a lesson once each week for eight weeks. This group of teachers will serve as another control across schools.

If more teachers volunteer than are necessary at each school, participants will be selected randomly. All those who desire training after the study is completed will receive training.

D. Length of Study. This will be an eight-week study which will begin during the second semester of this school year. To gather baseline data, each participating teacher will audiotape one lesson per week for three weeks before the inservice workshops. Teachers will also audiotape one lesson per week for five weeks after the workshops for a total of eight weeks. Principals will receive training to conduct workshops approximately one week before conducting workshops. Coaching and counseling sessions between pairs of teachers will continue for four weeks following the workshops.

- E. Assessment. The design of the study calls for independent raters to rate an audiotape of a classroom lesson once per week for each participating teacher for eight weeks. Participants will also complete attitude assessment surveys twice during the eight-week period. All data received by researcher and raters will be coded to assure confidentiality and anonymity.
- F. Feedback. To protect confidentiality of individuals, the researcher will share school, not teacher, data with each principal. Individual teachers may receive their own results after the study is completed (if they so desire) by providing the researcher with their code.
- G. Cost. The school will be asked to pay only the actual cost of the training package and be responsible for the duplication of materials for teachers. Anticipated cost exclusive of duplication is less than \$10.00.

The school will be expected to pay travel costs for principals to attend a training session. In addition, schools will be asked to provide audiocassettes for taping classroom lessons (two per teacher to be used several times) and pay one-way postage to have them sent to the rater. The tapes will be erased each time they are rated; erased tapes will become the property of the school at the end of the study.

I hope I have anticipated and addressed the critical questions concerning the study. Please let me hear from you within the next few days by completing the enclosed questionnaire and returning it to me in the enclosed, self-addressed, stamped envelop. Should you have any questions, please feel free to call me at Anita High School (712/762-3231 or 3238).

Thank you for taking the time to consider my request. I appreciate your interest and hope you will be able to participate. .

Sincerely,

Barb Lickliger
Graduate Student, Iowa State University
Principal, Anita Junior-Senior High School

DESCRIPTION OF ACTIVITIES FOR PARTICIPATING TEACHERS:

Audiotaping lessons- Teachers will audiotape a lesson in which questioning is used once every week for eight weeks. All teachers will have a code number to assure anonymity. Teachers must secure a cassette tape recorder and cassette tape, turn the recorder on at the beginning of the lesson, turn recorder off at the end, label tape with code number and turn tape in to the building contact person.

Completing attitude assessment surveys- Teachers will complete a paper-and-pencil attitude assessment survey at the beginning of the eight-week period and at the end of the study. This will also be coded and given to the building contact person.

Participating in workshops- Teachers in the experimental groups from schools A-E will participate in one workshop conducted by their principal. Teachers from schools H and I will participate in one traditional inservice workshop. Each workshop will be two to three hours in length.

Participating in peer coaching observation cycle- Teachers in the experimental groups from schools A-E will participate in a peer coaching cycle once per week for four weeks. Each cycle will involve a pair of teachers who observe one another's teaching and assist with improvement of questioning skills. Teachers will be trained to coach and counsel peers. The cycle will consist of a pre-conference to discuss strategies to be used in the classroom (approximately one-half hour), observation of a lesson in the classroom (one class period), post-conference to discuss what happened in the classroom and suggest additional ways to implement effective questioning techniques (one class period). Each teacher of the pair will be observed twice and be the observer twice. For example, Teacher A teaches and is observed by Teacher B in week one; during week two, Teacher B teaches and Teacher A observes, and so forth. Both teachers will participate in the pre- and post-conferences.

TIME COMMITMENTS FOR PARTICIPATING TEACHERS:

ACTIVITY	SCHOOLS A, B, C, D, E		SCHOOLS F, G	SCHOOLS H, I
	Experimental	Control	No-treatment	Traditional treatment
Audiotaping (10 min. x 8)	1.5 hours	1.5 hours	1.5 hours	1.5 hours
Attitude surv. (15 min. x 2)	.5 hours	.5 hours	.5 hours	.5 hours
Workshop (3 hours)	3.0 hours	-	-	3.0 hours
Coaching (3 hrs. x 4)	12.0 hours	-	-	-
Total	17.0 hours	2.0 hours	2.0 hours	5.0 hours

DESCRIPTION OF ACTIVITIES FOR PARTICIPATING PRINCIPALS:

Discussing project with teachers and securing volunteer participants -

All principals will acquaint themselves with expectations for each group of teachers. They will discuss the project with teachers and secure the minimum number of volunteers.

Securing audiotape cassettes and recorders - All principals will secure at least two 60-minute cassettes for each teacher participating and make arrangements for cassette recorders to be available to teachers. Cassettes will be used over and over by the same teacher; they will be erased at the end of the project and become the property of the school.

Determining building contact person and checking to insure tapes are sent to raters -

All principals will secure a volunteer on the staff to be the building contact person for collecting and sending cassette tapes to raters. All tapes will be coded and sealed in an envelope prior to giving to the contact person to ensure teacher anonymity. Principals will check with the contact person to determine that tapes have been sent on time.

Distributing attitude assessment surveys - All principals will distribute the attitude assessment survey to participating teachers on two occasions. Teachers will complete the survey, code, seal, and give to building contact person who will send all surveys to the researcher.

Receiving training to conduct workshops - Principals from schools A, B, C, D, and E will participate in a one-half day (plus driving time, if any) session designed to train them to conduct the inservice education workshop. The time and the place for the training session will be arranged with the researcher.

Scheduling workshops - Principals from schools A, B, C, D, and E will arrange times for one inservice workshop for their participating teachers. Principals from schools H and I will schedule a time for one three-hour workshop to be attended by all their teachers.

Conducting workshops - Principals from schools A, B, C, D, and E will conduct one workshop for their participating teachers utilizing materials and training provided by the researcher.

Arranging for teachers to observe peers teaching - Principals from schools A, B, C, D, and E will make arrangements as necessary to allow teachers to observe one another teaching.

Conducting feedback discussions with teachers and researchers - Principals from schools A, B, C, D, and E will arrange for and conduct discussions with participating teachers and the researcher as necessary.

TIME COMMITMENTS FOR PARTICIPATING PRINCIPALS:

ACTIVITY	SCHOOLS A, B, C, D, E	SCHOOLS F, G	SCHOOLS H, I
Secure volunteers	3 hours	2 hours	2 hours
Secure building contact person and check sending tapes	1 hour	1 hour	1 hour
Secure materials	1 hour	1 hour	1 hour
Distribute attitude surveys	1 hour	1 hour	1 hour
Training to conduct workshop	4 hours	-	-
Schedule workshop	1 hour	-	1 hour
Conduct workshop	3 hours	-	-
Arrange for teacher observations	varies	-	-
Conduct feedback sessions	varies	-	-
Total	approximately 20 hours	5 hours	6 hours

Please complete and return in the enclosed envelope:

Name _____

School _____

Address _____

Telephone _____

Check one response:

_____ My school will participate in the study as a part of any of the three treatment groups: peer-coaching inservice, traditional inservice, or no inservice (control).

_____ My school will participate in the study. I prefer we be a part of the peer-coaching inservice group.

_____ My school will participate in the study. I prefer we be a part of the traditional inservice group.

_____ My school will participate in the study. I prefer we be a part of the no-inservice (control) group.

_____ My school will not participate in the study.

_____ I am interested in the study but need additional information. Please call me.

If you responded that you would participate, please complete the following:

Number of full-time classroom teachers in your school: _____

The best time for me to participate in principal training is:

_____ Saturday

_____ weekday

Please note: There is the possibility that principals from more than nine schools will want to participate. If this is the case, more schools may be added to each group. Those principals whose schools are assigned to the no-treatment group or traditional inservice group will be offered training after the study has been completed.

**IOWA STATE
UNIVERSITY**

In addition to being principal of Anita Junior-Senior High School, I am a doctoral candidate in Educational Administration at Iowa State University. I am planning a study designed to examine the effects of a peer-coaching inservice program. I believe peer-coaching as a component of inservice education can help teachers implement effective teaching techniques. The content of the inservice I have planned is effective questioning techniques. The basis of the research study will be to determine if teachers are better able to implement effective questioning techniques when they take part in peer helping in the classroom than when traditional inservice education without follow-up is utilized.

I would like you to consider being a part of my study as a participant in one of three groups of teachers: peer-coaching inservice group, traditional inservice group, or no-inservice control group. Your participation will be of mutual benefit. While I investigate my belief that peer coaching as a component of inservice education makes a difference, you will receive training on effective questioning techniques and have the opportunity to work closely with another teacher to make your instruction even better.

This study involves audiotaping you presenting a lesson to your class once per week for eight weeks. To assure confidentiality, you will be assigned a confidential code to use on all data gathered. A teacher from your building will be asked to volunteer as a contact person to gather tapes, surveys, etc. from you and send to the researcher or rater. All data-gathering instruments and tapes will be coded and sealed in an envelope prior to giving to the contact person to assure teacher anonymity. Detailed descriptions of your anticipated activities and estimated time commitments are enclosed.

I hope I have anticipated and addressed the critical questions concerning the study. Please let your principal know of your intentions to participate within the next few days by completing the enclosed questionnaire. Should you have any questions, please ask your principal or call me at Anita High School (712/762-3231 or 3238).

Thank you for taking the time to consider my request. I appreciate your interest and hope you will be able to participate.

Sincerely,

Barb Licklider

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	Experimental	Control	No-treatment	Traditional treatment
Audiotaping (10 min. x 8)	1.5 hours	1.5 hours	1.5 hours	1.5 hours
Attitude surv. (15 min. x 2)	.5 hours	.5 hours	.5 hours	.5 hours
Workshop (3 hours)	3.0 hours	-	-	3.0 hours
Coaching (3 hrs. x 4)	12.0 hours	-	-	-
Total	17.0 hours	2.0 hours	2.0 hours	5.0 hours

PLEASE COMPLETE AND RETURN TO YOUR PRINCIPAL:

Name: _____

School: _____

Grades taught: _____

Classes taught: _____

Check one response:

_____ I will participate as a part of any of the three groups: peer-coaching inservice group, traditional inservice group, or no-inservice group.

_____ I prefer to be part of the peer-coaching inservice group.

_____ I prefer to be part of the traditional inservice group.

_____ I prefer to be part of the no-inservice group.

_____ I do not wish to participate in the study.

_____ I am interested in the study but need additional information.
Please contact me.

**APPENDIX B. PROCEDURES CHECKLIST FOR
PARTICIPATION IN THE STUDY**

150
PROCEDURES CHECKLIST

Date
Completed

- _____ 1. Secure volunteers.
- _____ 2. Have volunteers select code numbers from those listed.
- _____ 3. Secure at least two (2) 60-minute audiocassette tapes for each participating teacher.
- _____ 4. Secure volunteer to collect tapes and surveys to send to rater and/or researcher.
- _____ 5. Select workshop date.
- _____ 6. Distribute "Teacher Opinion Survey" and check to see that completed surveys are sent to researcher 2 weeks before workshop.
- _____ 7. Arrange for cassette tape recorders for teachers' use.
- _____ 8. Check to see that each participating teacher has taped 2 classroom sessions where questioning is used prior to workshop.
- _____ 9. Check to see that volunteer has sent tapes to rater.
- _____ 10. Participate in principal training.
- _____ 11. Schedule and prepare for workshop.
- _____ 12. Conduct workshop.
- _____ 13. Send workshop evaluations to researcher.
- _____ 14. Arrange for teachers to visit each other's classes as per schedule.
- _____ 15. Check to see that each participating teacher tapes one classroom session where questioning is used once per week for 4 weeks after the workshop.
- _____ 16. Check with volunteer to see that tapes have been coded and sent to rater each week.
- _____ 17. Distribute "Teacher Opinion Survey" and check to see that completed surveys are sent to researcher 4 weeks after workshop.

Researcher: Barb Licklider
 Anita Junior-Senior High School
 Victory Park Road
 Anita, Iowa 50020

Rater: name and address will be supplied later

**APPENDIX C. INSERVICE WORKSHOP OVERVIEW, PLANNER,
QUESTION CODING SHEET, AND EVALUATION**

QUESTIONING TECHNIQUES WORKSHOP

Materials Checklist

1. Overhead projector, screen, cord
2. Chalkboard, chalk, eraser
3. Video-cassette tape player ($\frac{1}{2}$ inch) and TV
4. Pencils or pens (enough for all participants)
5. Transparencies
6. Handouts (enough for all participants)
7. Blank paper (one sheet for each participant)

Activities and Recommended Time Periods

5 minutes	1. Refreshments
15 minutes	2. Module 1: Introduction
35 minutes	3. Module 2: Developing Effective Questions
15 minutes	4. Module 3: Using Questions Effectively
10 minutes	BREAK
20 minutes	5. Module 4: Observing Questioning Techniques
35 minutes	6. Module 5: Peer Coaching
10 minutes	7. Summary and Evaluation
<hr/>	
145 minutes total	

TIME	TOPIC	PRESENTATION PLAN	TEACHING AIDS	INVOLVEMENT OPTIONS
5 minutes	refreshments	Have coffee, doughnuts, etc. available. Allow all to make themselves comfortable.		Make any introductions of personnel necessary.
2 "	1. Anticipatory Set	1. -Place Snoopy cartoon on projector. -Say: "Think about your own classroom questioning for a moment." (Be sure to pause to give all time to think.) "Do your students ever wonder 'What kind of a question was that?'"	T1	
2 "	2. Preview of Effective Questioning Techniques	2. -Place "When questioning, do you..." on projector. Read, uncovering each line as proceed. Stress the last sentence.	T2	
2 "	3. Description of Good Questions	3. -Say: "Characteristics of good questions can be summarized in three words." -Place "Good Questions Are..." on projector. Stress each word and tell that we will learn about each as we proceed. (When finished with T3, lay it to the side because it will be used several times.)	T3	
2 "	4. Objectives	4. -Say: "There are three objectives for this workshop." -Place "objectives" on projector. Uncover each line as you read.	T4	
3 "	5. Research Base	5. -Say: "In recent years, a considerable amount of research related to questioning techniques has been completed. Some highlights gleaned from that research give us an idea why teachers should practice to become better questioners."		

TIME	TOPIC	PRESENTATION PLAN	TEACHING AIDS	INVOLVEMENT OPTIONS
	5. Research base (continued)	5. -Place "Why should teachers..." on projector. -Read through each, uncovering each as you progress. You may want to embellish each point, relating each to specific teachers, subjects, etc.	T5	5. -You may ask for teacher comments or reactions to any of these. -You may want to ask teachers to relate these to their own classrooms.
4 minutes	6. Why questions are used	6. -Ask: "For what reasons do you use questions in your classroom?" (Be sure to model pausing before calling on someone. If no one volunteers, <u>do</u> call on someone.) -Place "Most common uses..." on projector. Read. -State: "This can be changed, however, by developing skills in and practicing effective questioning techniques."	T6	6. -Divide into groups to develop answers. List on board after a couple of minutes. OR -Simply list on board as individuals list reasons.

WORKSHOP PLANNER--Module 2: Developing Effective Questions

TIME	TOPIC	PRESENTATION PLAN	TEACHING AIDS	INVOLVEMENT OPTIONS
1 minute	1. Introduce 4 Steps	1. -Say: "Let's look first at four simple steps to developing effective questions." - Place "4 Steps..." on projector. Read.	T7	
10 minutes	2. Details of Steps	2. -Say: "Let's look at the steps in more detail." -Pass out H01. -Proceed through each line on first page, explaining and embellishing as needed for your teachers. -Read through step 3., putting T3 back on the projector as you stress the characteristics of good questions. -Say: "Perhaps the best way to better understand the phrasing of good questions is to examine four question phrasing problems."	H01 T3	2. -A good way to have everyone think about these is to select a specific class, have someone state an objective, someone state a goal for a question, etc. Keep this going through steps 1. and 2. Then ask for a question that will meet the criteria. Accept any question that meets the criteria. This will lead into phrasing. 155
15 minutes	3. Question-phrasing problems: information and guided practice	3. -Hand out H02. -Read each part, providing explanations where needed. -Hand out H03. Say: "We will look at examples of all four types and then rephrase the poorly phrased questions." -Place "Examples of Question Phrasing Problems" on projector.	H02 H03 T8, T9	3. -Divide into groups of 2 or 3. Ask each group to take 10 minutes to rephrase each question avoiding phrasing problems. Also ask them to write a question that contains each type problem and then to rephrase each so the problem is avoided. -Compare the questions the groups rephrased with the suggested rephrased questions.

TIME	TOPIC	PRESENTATION PLAN	TEACHING AIDS	INVOLVEMENT OPTIONS
2 minutes	4. Summary of first 3 steps	<p>4. -Refer teachers back to H01: "4 Steps..."</p> <p>-Place T7: "4 Steps..." back on projector.</p> <p>-Say: "Now that we have examined the phrasing of questions, let's review what we have discussed so far about developing questions. We have discussed:</p> <ol style="list-style-type: none"> 1. Deciding on the purpose, 2. Considering the students, and 3. Phrasing questions." <p>"The last step in developing effective effective questions is to formalize the questions."</p>	H01 T7	<p>4. -If desired, go back to questions you were developing on the chalkboard when you were considering steps 1. and 2. To follow through, you may want to examine them for phrasing problems at this time.</p> <p>-Hand out "Changing Pressures" for a fun example of questions written unclearly. (H04)</p>
6 minutes	5. Formalizing questions	<p>5. -Refer teachers to step 4 on H01. Read through the parts of step 4, explaining as you proceed.</p>	H01	<p>5. -If you developed several questions earlier for a specific subject, you may have teachers sequence those now.</p>
1 minute	6. Transition	<p>6. -Say: "The questions are now developed. But developing good questions is only half the battle--the real pay-off comes from skillful usage. Here are some tips to make your well-developed questions most effective."</p>		

WORKSHOP PLANNER--Module 3: Using Questions Effectively

TIME	TOPIC	PRESENTATION PLAN	TEACHING AIDS	INVOLVEMENT OPTIONS
9 minutes	1. Questioning Technique Winners	<p>1. -Place "Questioning Technique Winners" on on projector.</p> <p>-Give teachers copy of same.</p> <p>-Read through each point, asking questions, explaining, giving hints as you proceed. Invite teachers to jot down hints to refer to as they begin to use these ideas in their classrooms.</p> <p>-Hints:</p> <p>For random selection:</p> <ol style="list-style-type: none"> 1. Put student names on cards in random order. Call on first name and then place that card on the bottom of the stack. Shuffle deck before every class. 2. Don't <u>always</u> call on students with hands raised. 3. Don't call on the same student again before every student has responded once. <p>For responding to students:</p> <ol style="list-style-type: none"> 1. Vary your responses. 2. Be careful of repeating questions or answers too often because you may promote inattention. 	<p>T10</p> <p>H05</p>	<p>1. -Ask questions about each point as you proceed. Be sure to model well-developed questions and pausing. For example, for the first point you could ask, "Why would it be important to ask questions in a conversational tone?"</p> <p>For the second, "Why should questions be directed to the entire class?"</p> <p>For the third, "How will pausing for 3-5 seconds before calling on someone promote learning?"</p> <p>-Hand out "Delving" for a fun example of probing. (Delving is another term used for probing.) (H06)</p>
6 minutes	2. Questioning Techniques to Avoid	<p>2. -Place "Questioning Techniques to Avoid" on projector.</p> <p>-Give copy of same to teachers.</p> <p>-Read through each point offering examples where you feel they are needed.</p>	<p>T11</p> <p>H07</p>	

WORKSHOP PLANNER--Module 4: Observing Questioning Techniques

TIME	TOPIC	PRESENTATION PLAN	TEACHING AIDS	INVOLVEMENT OPTIONS
20 minutes	1. Demonstration of Questioning Techniques	<p>1. -Say: "To illustrate what we have been discussing, we will watch a short segment of a 7th grade life science teacher conducting a class discussion that included questioning. We will see both good and poor examples of questioning techniques."</p> <p>-Pass out blank paper.</p> <p>-Say: "As we watch, jot down any examples you observe, both good and poor, of what we have discussed this morning. Be sure to consider (write on board if necessary):</p> <ol style="list-style-type: none"> 1. Question phrasing and associated problems. 2. Clarity 3. Brevity 4. Level of questions 5. Pauses 6. Directing questions to whole class 7. Random selection of respondents 8. Teacher response to students <p>-Watch about a 15 minute segment.</p> <p>-Discuss what individuals observed. (You will want to watch the segment you will show a couple of times before conducting the in-service so that you have jotted down some examples you will want to emphasize.)</p>	<p>Video-cassette tape</p> <p>blank paper</p>	<p>5. -After viewing the segment of a class discussion, have teachers work in groups to compare what they saw before the whole group discusses. You may get more involvement in smaller groups.</p>

WORKSHOP PLANNER--Module 5: Peer Observation and Coaching

TIME	TOPIC	PRESENTATION PLAN	TEACHING AIDS	INVOLVEMENT OPTIONS
10 minutes	1. Explanation of process	<p>1. -Discuss the peer observation and coaching part of the study:</p> <ul style="list-style-type: none"> A. Teachers will pair up (A and B). B. Observations will be scheduled: <ul style="list-style-type: none"> Week 1- A teaches, B observes Week 2- B teaches, A observes Week 3- A teaches, B observes Week 4- B teaches, A observes C. Teachers will arrange a time to visit before each observation to work out logistics and do any needed planning. D. Teachers will arrange a time to discuss what happened during the observation and review the coding sheet. <p>-Hand out "Question Coding Sheet" and explain how to use.</p>	HOB	<p>1. -You may either work these parts out now or have teachers do so after the workshop.</p> <p>-Demonstrate with a question or two of your own choosing and have teachers tally on the sheet. Discuss how they marked the various aspects of each question.</p>
25 minutes	2. Guided practice: observation and coding	<p>2. -Say: "We will now give you an opportunity to practice using this coding sheet before you go into one another's classrooms. The same teaching segment you viewed earlier will be played again. As you view it, use your coding sheet and mark all you observe."</p> <p>-Turn on tape and view.</p> <p>-Discuss how teachers coded, either in small groups first and then all together or in one big group. Explain what kinds of things you would want to talk about in post-conference from what was coded. Field any questions.</p> <p>-Tell teachers the tape is available for them to use if they want more practice.</p>	Video-cassette tape	

WORKSHOP PLANNER--Summary and Evaluation

TIME	TOPIC	PRESENTATION PLAN	TEACHING AIDS	INVOLVEMENT OPTIONS
8 minutes	1. Summary	<p>1. Say: "Today we have:</p> <ul style="list-style-type: none"> a. Reviewed the research about questions. b. Considered the steps to developing effective questions. (Put T7 up.) c. Shown that good questions are: (Put T3 on and read) d. Talked at length about question phrasing problems. e. Considered questioning technique winners. (Put T10 on and go over main points.)" <p>"We have also had the opportunity to observe a tape of a teacher asking questions."</p> <p>"The suggestions made today are not a recipe. You must modify them to fit you, the subject you are teaching and the students. Use them in whatever way is most effective for you."</p> <p>"You may have questions or concerns about what we have discussed today. If so, please raise those concerns now." (Be sure to <u>wait</u> before going on!)</p>	<p>T7</p> <p>T3</p> <p>T10</p>	
2 minutes	2. Evaluation	2. Hand out workshop evaluation and ask teachers to complete it before leaving.		

QUESTION CODING SHEET

Directions: For each question asked, make a tally mark (/) for every line that applies to that question. In addition, keep track of the total number of questions by tallying in number 7.

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	Winner (!)	Area For Discussion (?)
A. QUESTION DEVELOPMENT		
1. LEVEL: Mark (!) if appropriate. Mark (?) for any of these that might apply:		
a. Vocabulary too difficult		
b. Level of thought required too high		
c. Level of thought required too low		
2. PHRASING:		
a. PURPOSEFUL: Mark (!) if for review, diagnosis, understanding, discussion, reasoning, motivation, or other clear goal. Mark (?) for any of these that may apply:		
1. Question requires only "yes-no" answer		
2. Question promotes guessing (either-or)		
3. Question "spoon-feeds"		
4. Question is leading question		
b. CLEAR: Mark (!) if clear; if not clear, mark (?) after one or more of the following:		
1. Ambiguous		
2. Contains more than one thought or question		
c. BRIEF: Mark (!) if question is as brief as possible; mark (?) if question seems lengthy.		
B. QUESTION USAGE		
1. QUESTION DIRECTED TO ENTIRE CLASS: Mark (!) if yes; (?) if no.		
2. PAUSE (wait-time): Mark (!) if 3-5 seconds or longer; (?) if shorter.		
3. STUDENT RANDOMLY SELECTED: Mark (!) if appears random; mark (?) if student called on a second time before all have had opportunity to respond.		
4. STUDENT RESPONSE ACKNOWLEDGED: Mark (!) after any of following that appear; mark (?) if response not acknowledged:		
a. Evaluative feedback (indicate right or wrong)		
b. Modify (restate in different words)		
c. Apply or compare (tie response to situation or event)		
d. Summarize (draw a conclusion or make a point)		
e. Acknowledge (repeat response to class: Mark (?) if done frequently)		
f. Probing (use of more questions to draw more out of student. Mark (?) if probe beyond what student knows)		
g. Redirect (ask question of another student)		
5. QUESTION REPEATED: Mark (!) if adequate wait time and then restated; mark (?) if repeated verbatim.		
6. TONE AND MANNER: Mark (!) if presented matter-of-factly; (?) if threatening or test		
TOTAL:		

7. TALLY TOTAL NUMBER OF QUESTIONS: _____

Record any information relevant to the following:

1. Record the number of minutes you observed: _____
2. Planning:
 - a. Did questions appear to be written? _____
 - b. Were questions integrated into an orderly sequence? _____
3. Jot down any specific questions or practices that you feel would be helpful if discussed:

EVALUATION--QUESTIONING TECHNIQUES WORKSHOP

1. What did you like best about the workshop?

2. What did you like least about the workshop?

3. Do you have a clear understanding of how to develop effective questions?

Perfectly clear 4 3 2 1 Do not understand at all

 (circle appropriate number)

4. Can you identify good questioning techniques?

Can identify all 4 3 2 1 Cannot identify any

 (circle appropriate number)

5. Can you identify questioning techniques to avoid?

Can identify all 4 3 2 1 Cannot identify any

 (circle appropriate number)

6. How useful will this information be to you in your teaching?

Very Useful 4 3 2 1 Not at all Useful

 (circle appropriate number)

7. How satisfied were you with this workshop?

Completely Satisfied 4 3 2 1 Very Dissatisfied

 (circle appropriate number)

8. Additional comments or remarks:

APPENDIX D. INSTRUMENTS USED IN THE STUDY

DEMOGRAPHIC DATA: PARTICIPATING PRINCIPALS

The following information will assist the researcher with analysis of data when the study has been completed. Please complete each item.

Name: _____

School: _____

1. Number of years in present position _____
2. Total number of years as a principal _____
3. Grades currently responsible for _____
4. Total attendance center enrollment _____
5. Total number of classroom teachers _____
6. Do you conduct inservice education for your teachers? _____

DEMOGRAPHIC DATA: PARTICIPATING TEACHERS

The following information will assist the researcher with analysis of data when the study has been completed. Please complete each item. To assure anonymity, please do not put your name on this paper; use only your code number.

1. Teacher code number _____
2. Male or female _____
3. Number of years spent in classroom teaching _____
4. Grades primarily teaching _____
5. Average number of students per class taught _____
6. Have you received instruction to develop questioning skills? _____

TEACHER OPINION SURVEY

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This survey is designed to gather information about your feelings about professional growth. Please do not write your name on this paper; write only your code number at the top of it. Your answers will be kept confidential. Neither your principal nor any other teacher will know your answers unless you share them.

Please read each statement carefully and indicate the extent to which you agree or disagree by circling the number after each statement that best reflects your feelings following the scale below:

strongly agree agree disagree strongly disagree
 4 3 2 1

strongly agree agree disagree strongly disagree

- | | | | | | |
|-----|---|---|---|---|---|
| 1. | My principal should assist with my professional growth by providing inservice for me. | 4 | 3 | 2 | 1 |
| 2. | My colleagues are a good resource to help me improve my teaching skills. | 4 | 3 | 2 | 1 |
| 3. | I am likely to react negatively when changes in the way I teach are suggested. | 4 | 3 | 2 | 1 |
| 4. | I prefer to make my own decisions about how I teach, but I welcome suggestions. | 4 | 3 | 2 | 1 |
| 5. | I am likely to ask a colleague about better ways to teach. | 4 | 3 | 2 | 1 |
| 6. | I value suggestions from my colleagues to improve my performance in my classroom. | 4 | 3 | 2 | 1 |
| 7. | I want inservice training throughout my teaching career. | 4 | 3 | 2 | 1 |
| 8. | I prefer not to be given any suggestions or criticisms about my teaching. | 4 | 3 | 2 | 1 |
| 9. | I prefer to let others try a suggested teaching technique before I will try it. | 4 | 3 | 2 | 1 |
| 10. | I feel comfortable thinking about another teacher observing me teaching. | 4 | 3 | 2 | 1 |
| 11. | Inservice education is valuable in helping me improve my teaching skills. | 4 | 3 | 2 | 1 |
| 12. | I value constructive criticism about my teaching from some colleagues. | 4 | 3 | 2 | 1 |
| 13. | I want to improve my teaching skills. | 4 | 3 | 2 | 1 |
| 14. | I feel comfortable seeking advice from another teacher about a teaching concern I have. | 4 | 3 | 2 | 1 |
| 15. | I am willing to try a new teaching technique if one is suggested. | 4 | 3 | 2 | 1 |

AUDIO-TAPE RATING

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TEACHER CODE: _____
 TAPE DATE/NUMBER _____

QUESTION	1	2	3	4	5	6	7	8	9	10	% effective techniques
1. Purposeful											
2. Clarity											
3. Brevity											
4. Directed to class											
5. Wait-time											
6. Random selection											
7. Response acknowledged											
8. Probing											
9. Repeating											
10. Tone/manner											
% effective techniques											

KEY:

1. Purposeful: Code + if has definite purpose; - if yes/no, guessing, leading.
2. Clarity: Code + if clear; - if ambiguous or more than one thought per question.
3. Brevity: Code + if brief as possible; - if too wordy.
4. Directed to class: Code + if no student name used immediately before or after question; - if student name used before question or immediately after without at least 3 second wait-time.
5. Wait-time: Code + if at least 3 seconds after question before teacher calls on student; - if less than 3 seconds.
6. Random selection: Code + if student chosen at random; - if students respond as a group or the same student is called on a second time before other students have responded to a question.
7. Response acknowledged: Code + if acknowledged; - if not acknowledged.
8. Probing: Code + if used when necessary or not used if unnecessary; - if not used when necessary or used inappropriately (as in tugging).
9. Repeating: Code + if used when necessary; - if used often.
10. Tone/manner: Code + if asked conversationally; - if threatening or not matter-of-fact.

AUDIO-TAPE RATING SUMMARY

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TEACHER CODE: _____

WEEK	1	2	3	4	5	6	7	8
1. Purposeful				wkshp				
2. Clarity				wkshp				
3. Brevity				wkshp				
4. Directed to class				wkshp				
5. Wait-time				wkshp				
6. Random selection				wkshp				
7. Response Acknowledged				wkshp				
8. Probing				wkshp				
9. Repeating				wkshp				
10. Tone/Manner				wkshp				
% effective techniques				wkshp				

KEY:

1. Purposeful: Code + if has definite purpose; - if yes/no, guessing, leading.
2. Clarity: Code + if clear; - if ambiguous or more than one thought per question.
3. Brevity: Code + if brief as possible; - if too wordy.
4. Directed to class: Code + if no student name used immediately before or after question; - if student name used before question or immediately after without at least 3 second wait-time.
5. Wait-time: Code + if at least 3 seconds after question before teacher calls on student; - if less than 3 seconds.
6. Random selection: Code + if student chosen at random; - if students respond as a group or the same student is called on a second time before other students have responded to a question.
7. Response acknowledged: Code + if acknowledged; - if not acknowledged.
8. Probing: Code + if used when necessary or not used if unnecessary; - if not used when necessary or used inappropriately (as in tugging).
9. Repeating: Code + if used when necessary; - if used often.
10. Tone/manner: Code + if asked conversationally; - if threatening or not matter-of-fact.

END-OF-STUDY INTERVIEW

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1. Please consider each of the following questioning skills, and rate your own improvement on each item. Zero (0) indicates you feel you made no improvement in the area. Five (5) indicates you feel you made much improvement in the area.

	no improvement					much improvement
	0	1	2	3	4	5
a. Developing questions at appropriate level for students in your classes.	0	1	2	3	4	5
Comments: _____						
b. Developing questions that are purposeful.	0	1	2	3	4	5
Comments: _____						
c. Phrasing questions so that they are clear.	0	1	2	3	4	5
Comments: _____						
d. Phrasing questions as briefly as possible.	0	1	2	3	4	5
Comments: _____						
e. Directing questions to the entire class.	0	1	2	3	4	5
Comments: _____						
f. Pausing an appropriate length of time before calling on someone (wait-time).	0	1	2	3	4	5
Comments: _____						
g. Randomly selecting students to respond.	0	1	2	3	4	5
Comments: _____						
h. Acknowledging student response.	0	1	2	3	4	5
Comments: _____						
i. Probing for clarification of or expansion upon responses.	0	1	2	3	4	5
Comments: _____						
j. Asking questions matter-of-factly.	0	1	2	3	4	5
Comments: _____						

2. Overall, how much do you feel you have improved your questioning skills?

	no improvement			much improvement		
	0	1	2	3	4	5

Comments: _____

3. If you feel you have improved your questioning skills, any of the following may have influenced your improvement. Please rate each according to the amount of influence it may have had. Comment about any responses if you feel clarification is needed or if you have additional thoughts to add.

	no influence			most influence		
	0	1	2	3	4	5
a. Theory base presented in the workshop.	0	1	2	3	4	5
Comments: _____ _____ _____						
b. Your principal leading the workshop.	0	1	2	3	4	5
Comments: _____ _____ _____						
c. Practice using questioning skills in your classroom.	0	1	2	3	4	5
Comments: _____ _____ _____						
d. Feedback from a colleague about your use of skills in your classroom.	0	1	2	3	4	5
Comments: _____ _____ _____						
e. Observing a colleague using the skills in the classroom.	0	1	2	3	4	5
Comments: _____ _____ _____						
f. Other influence (please specify):	0	1	2	3	4	5
_____ _____ _____						

4. This approach to inservice education, teachers practicing the skills as a colleague observes and receiving feedback, differs from traditional inservice education where usually a workshop is conducted without follow-up. Please indicate your perceptions about each approach to inservice by comparing each of the following with traditional inservice education.

	transfer highest with traditional	no difference	transfer highest with this approach		
	1	2	3	4	5
a. Transferring the skill from the theory base presented in the workshop to practice in the classroom.	1	2	3	4	5
Comments: _____ _____ _____					

	greater than traditional and nonproductive		no difference		greater than traditional but productive
b. Time involvement.	1	2	3	4	5

Comments: _____

c. Other comparisons you wish to make: _____

5. Your feelings or perceptions about any of the following may have changed as a result of your experience with this approach to inservice education. Please consider each of the following and indicate the degree to which you feel your feelings or perceptions have changed either positively or negatively. Comment whenever you think clarification may be needed.

	more negative 1		no change 3		more positive 5
a. Having a colleague observe you as you teach.	1	2	3	4	5
Comments: _____ _____					
b. Observing a colleague teach.	1	2	3	4	5
Comments: _____ _____					
c. Improving your teaching skills.	1	2	3	4	5
Comments: _____ _____					
d. Seeking advice from a colleague about your teaching.	1	2	3	4	5
Comments: _____ _____					
e. Value of inservice education in helping you improve.	1	2	3	4	5
Comments: _____ _____					
f. Willingness to try a new or suggested teaching technique.	1	2	3	4	5
Comments: _____ _____					

6. Are there any parts of this approach to inservice that you particularly liked?_____

If so, what are they?_____

7. Are there any parts of this approach you particularly disliked?_____

If so, what are they?_____

8. Would you participate in this approach (peer observation and feedback) to inservice education again if you had the opportunity?_____

Please explain:_____

9. What recommendations would you make for anyone considering using this approach?_____

10. Please make any other comments or suggestions you wish: