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A Pilot Training Program for Improving Resident Physicians' Teaching Skills

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A PILOT TRAINING PROGRAM FOR IMPROVING RESIDENT PHYSICIANS' TEACHING SKILLS

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by

Barbara K. Lawson

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APPROVAL

This is to certify that the Advanced Graduate Committee of

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met on the

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Abstract

A PILOT TRAINING PROGRAM

FOR IMPROVING RESIDENT PHYSICIANS' TEACHING SKILLS

by

Barbara Kindernay Lawson

The purpose of this study was to design, implement, and evaluate a pilot training program on teaching skills and determine if such a program could significantly improve the teaching behavior of resident physicians in the East Tennessee State University College of Medicine.

A total of 20 subjects, which included 13 resident physicians from the Department of Internal Medicine and seven from the Department of Family Practice, participated in the study. The majority of physicians were in their first year of residency and were divided among four hospitals and one family practice center. The subjects did not know they were part of a study.

A training program was developed which was based upon goals and objectives designed to meet the needs of the particular residents involved in the study. For 13, weekly, one-hour sessions, the program coordinator met with each group of residents at their respective, assigned locations. Emphasis was placed upon an effective evaluation of the program, which included a videotaped, independently-rated pre- and posttest teaching performance by each resident. A special form, the Instructional Skills Evaluation Instrument (ISEI), was designed for use in the ratings. At the conclusion of the program, residents were asked to complete a written evaluation of the training experience. Six null hypotheses were tested for significance beyond the .05 level. The *t* test, the Pearson Product-Moment Coefficient of Correlation and the chi-square tests were utilized.

As a result of the intensive analysis of the data collected, it was found that: (a) there was a very significant mean gain score from the pre- to the posttest of the residents' independently-rated, videotaped teaching performances; (b) the mean gain score for delivery skills was significantly lower than those for the organization, explaining, and use of audiovisuals categories; (c) a positive, but not significant, correlation was exhibited between the residents' post-program attitude toward a teaching skills program and their total gain score; (d) at the conclusion of the program, a highly significant number of residents experienced a positive change in attitude, from that originally held, toward participating in a teaching skills program; (e) no significant correlation existed between residents' self-evaluation scores and the independent raters' scores assigned to the same posttests; (f) when residents were asked to rank the four types of evaluative feedback received on teaching during the program, instructor critique and self-evaluation via videotape were ranked higher than viewing models and

peer evaluation; (g) there was a positive relationship between attitude and attendance and between residents' age and initial attitude toward the program; and (h) most physicians expressed satisfaction with, and felt they had benefited by, the training experience.

Based upon the findings of this study, the following conclusions were drawn: (a) short training programs could be conducted during the residency period which produce significant, observable changes in physicians' teaching behavior; (b) an equal gain in mastery of skills might not be manifested; (c) the post-program attitude seems to have a greater relationship to achievement than the initial attitude; (d) attitudes toward participating in a teaching skills program may be significantly changed in a positive direction; (e) residents might not evaluate their own teaching in the same manner as the independent raters; (f) preferences in type of feedback on teaching is likely to vary with individuals, but instructor critique and self-evaluation via videotape seem to be favored; (g) residents' age, achievement, and attendance seem to be positively correlated with attitude toward improving instructional skills; and (h) the residency period appears to be a good time to offer a teaching skills program. Recommendations for conducting training programs designed to improve resident physicians' teaching skills and for future research were offered.

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Dissertation prepared under the direction of Dr. Charles G. Beseda, Dr. William L. Gaby, Dr. Gem Kate Greninger, Dr. Albert C. Hauff, Dr. Leo M. Harvill, and Dr. A. Keith Turkett.

Dedication

to

my children

Patricia and Thomas

Love is . . .

accepting without always understanding

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CHAPTER 1

INTRODUCTION

Research in the field of medical education has emphasized subject-matter content and curricular organization, transition from pre-medical to medical training, selection of students, and factors which characterize medical schools. Attention to the teacher and teaching practices has been virtually ignored until the present decade, with the exception of a few studies beginning in the 1950's, which attempted to assess existing teaching practices and attitudes among medical school instructors (Jason, 1962). Results from studies such as the "Project in Medical Education" at the University of Buffalo School of Medicine in 1956 (Miller, 1957) and the comprehensive "Preliminary Report of the Faculty Development Survey" published by the Association of American Medical Colleges in 1977, support the need for continued research into and improvement in medical school educational practices. Subsequent research (Jason, 1962, 1973; Stritter, Hain, and Grimes, 1975; Arshem, 1971; Daggett, Cassie and Collins, 1979; Maddison, 1978) has reported similar findings.

Until the 1960's, almost nothing was done to promote the instructional competencies of the medical profession. The programs that have been developed are almost exclusively for the full-time faculty members of medical schools (Jason, 1973). As medical education is increasingly conducted outside the traditional university hospital setting in community hospitals and offices, however, a growing number of community practitioners are becoming involved in patient and student instruction.

Support for engaging these physicians as instructors is growing with the recognition that the university setting is inadequate as the "exclusive" base for the preparation of physicians and that a medical student's education should include contact with the limitations of the "real world" of community health (Stritter, Hain, and Grimes, 1975). These clinical practitioner-educators are beginning to question the nature of effective clinical teaching (Stritter, Hain, and Grimes, 1975).

Physicians are required to impart clinical knowledge and skill to medical students, yet in their medical education most have had little formal contact with teaching except as recipients. Considering the importance of the physician's role in patient education, medical student education, and continued self-education, physicians should be competent teachers. Competent teachers don't just happen, however, but need to be cultivated (Jason, 1973). Teacher training programs, therefore, will have to be developed to assist physicians in the process of instructional improvement. A need for such programs, designed and supervised by educational specialists, is supported increasingly in contemporary literature and is being recognized by a growing number in the medical profession. Such programs are important not only for full-time faculty but also for community practitioners who will have an increasing role in the education of medical students and for resident physicians who also assume the responsibility for some of the clinical instruction of medical students and fellow residents.

In addition to implementing training programs, more effective evaluations are needed. Most evaluations consist of pencil and paper questionnaires or related instruments whereby participants critique the program (Kahn, Cohen, and Jason, 1979). Measurement of behavioral

changes is rarely a part of the evaluation but should be if the effectiveness of the program is to be determined and reliable feedback obtained for improvement.

Statement of the Problem

The problem was to design, implement, and evaluate a pilot training program to improve the teaching skills of resident physicians in the East Tennessee State University College of Medicine.

Limitations of the Study

1. The participants in the study were limited to the resident physicians in the Departments of Family Practice and Internal Medicine, East Tennessee State University College of Medicine.

2. The duration of the program was 13 weekly sessions from April through June, 1979.

3. Student evaluations of the residents' teaching skills were not obtainable since medical students were not available for residents to teach during the period of this study.

4. The content and instructional methods selected for the program were limited to those aspects of teaching deemed most relevant to the residents based upon a review of the literature, a needs assessment, the opinion of educators, and a pretest.

Assumption

In conducting the study, the following assumption was made: The responses to the questionnaires were based upon the participants' true feelings.

Hypotheses

1. There will be a significant gain in the mean score from the pretest to the posttest independent rating of residents' videotaped teaching performances.

2. There will be significant differences in the residents' pre- to posttest mean gain scores when the four instructional skill categories measured by the Instructional Skills Evaluation Instrument are compared.

3. Attitude toward participating in the program on teaching skills will have a significant positive correlation with the residents' total gain scores from the independent ratings of the pre- and posttests.

4. At the conclusion of the program, a significant number of residents will indicate on the evaluation questionnaire that their initial attitude toward participating in a teaching skills program had changed in a positive direction.

5. Self-evaluations by residents of their own videotaped posttests will produce scores which have a significant positive correlation with the scores assigned by the independent raters to the same posttests.

6. When asked to rank the four types of evaluative feedback received on their teaching, the residents will list self-evaluating the videotapes of their own teaching as their first choice over instructor evaluation, peer evaluation, and viewing "models."

Significance of the Study

The need for training programs to improve the instructional skills of physicians and medical faculty has been recognized and is well documented (Jason, 1962, 1973; Brown, 1971; Miller, 1957; Preliminary

Report, Association of American Medical Colleges, 1977). Attempts are being made to meet this need through various types of faculty development programs (Beard, 1967; Nerup, Thomsen, Vejlsgaard, 1972; Martin, 1970; Mitchell, 1979; Anderson, Gale, Tomlinson, 1974), but there is a dearth of information on how to teach faculty in higher education to instruct their students (Gregory and Hammer, 1974). Considerable research is needed in the areas of identification of skills, exploring and developing various techniques necessary to teach these skills, scientifically evaluating the effectiveness of such programs, determining the optimal length of time for such programs, and determining where the optimal point is in a physician's training for a program on teaching skills.

Considering the limited time available to physicians for attending educational courses, along with the apparent need for such courses, efforts should be made to identify methods which will expedite the acquisition of teaching skills in the shortest time possible. Research indicates that "microteaching", a relatively new method for improving instructional skills, has much to offer (Allen and Ryan, 1969).

Most faculty development programs in medical schools have been designed for the full-time faculty members. A few opportunities for teaching experiences are being provided for medical students but physicians in residence have been largely neglected. Yet these individuals do much of the clinical teaching of medical students, along with physicians who are part-time practitioner-educators, and are the source of future clinical and full-time medical faculty. For several reasons, an opportune time to involve physicians in a program for improving teaching skills seems to be during the residency period. Logistically, the residents are easier to assemble as a group over an extended period of

time and participation can be expected on a more regular basis. Practicing physicians seldom have the time to devote to anything more than brief workshops. Medical faculty are often more reluctant to enroll in a teacher training program, pride probably being a potent factor (Prentice, Metcalf, and Hard, 1976). Since residents are expected to assume some responsibilities for teaching medical students, the opportunity exists for continued practice of newly acquired teaching skills.

Participating in a program designed to improve teaching skills should not be considered a waste of time for the residents who will not become medical faculty members or practitioner-educators. In many instances the terms "doctor/patient" and "teacher/student" contain the same elements. Patient education should be an important aspect of any medical practice and, therefore, physicians should be able to communicate effectively with their patients during the processes of listening, explaining, directing, questioning, and clarifying. In addition, physicians are often called upon to present medical information at grand rounds as well as at various professional and civic meetings and should have the necessary skills to do so effectively.

Definitions of Terms

Attitude

The term attitude was defined as "a mental and neural state of readiness, organized through experience, exerting a directive or dynamic influence upon the individual's response to all objects and situations with which it is related" (Fishbein, 1967, p. 8).

Clinical teaching

Clinical teaching was defined as a method of instruction in medical education characterized by the use of multiple instructors and the involvement of a small number of students. The instruction occurs in community hospital settings and offices removed from the university and emphasizes the basic clinical skills of history taking, physical examination, and the synthesis of all data into a differential diagnosis.

Closure

Closure was used to indicate an instructional technique which directs the learner's attention to the completion of a specific task or learning sequence (Brown, 1975).

Family Practice Center

The family practice center was designed to train physicians in the speciality of family practice. The program is community based and sponsored by the Department of Family Practice of East Tennessee State University College of Medicine.

Formative evaluation

Formative evaluation referred to the ongoing measurement of intermediate effects of the program in order to gain continuous evaluative information to help in the development of the program (Jason, 1973; Anderson, Ball, and Murphy, 1975).

Grand Round

The grand round was defined as a clinical teaching technique in medical training, usually at the postgraduate level, which occurs in most instances away from the ward and with large audiences. Patients

to be discussed are usually chosen for their rarity and research interest, and discussion between individuals of widely different interests and experience occurs.

Learning

Learning was used in this study to identify the process through which an individual acquires a new capability that may be identified as a more or less permanent change in behavior resulting from experience such as acquiring new information, a new skill, or an attitude.

Microteaching

Microteaching was used to describe a training concept which provided the residents with a scaled-down practice setting for instruction characterized by brief lessons on a narrow topic taught to a small group of residents (Allen and Ryan, 1969; Brown, 1975).

Modeling (model)

Modeling was used to define the utilization of filmed, videotaped, or "live" ideal examples of the kind of teaching behavior asked for in a specific task (Gregory, 1972).

Program coordinator

The term program coordinator was used to identify the agent who designed and managed the learning activities of the program in order to achieve greater success in learning.

Resident physician (resident)

A resident physician was defined as a medical doctor taking advanced training in a speciality area.

Self-evaluation

Self-evaluation was used to describe the process of making a judgment about some characteristic of one's teaching (Good, 1959).

Set

Set was used to identify any pre-instructional device or technique which prepares individuals for learning by directing their attention to a specific task or learning sequence (Allen and Ryan, 1969; Brown, 1975).

Summative evaluation

Summative evaluation referred to the independent, objective, final assessment of the overall effectiveness of the program. Some valid judgments were made about the degree to which the residents progressed in meeting the established goals and objectives from their entry level to their exit level (Jason, 1973; Anderson, Ball, and Murphy, 1975).

Teaching skills/behaviors

Teaching skills included those psychomotor, cognitive, and attitudinal instructional skills which could be observed and evaluated in behavioral terms.

Teaching ward round

The teaching ward round was defined as a clinical teaching technique used in the training of physicians and characterized by "bedside" instruction. A patient is selected by a student who presents the case history and physical findings at the bedside. The instructor explores with the group the patient's problem and differential diagnosis in depth.

Procedures

The resident physicians in the Departments of Family Practice and Internal Medicine, East Tennessee State University College of Medicine, participated in a program designed to improve teaching skills. The residents were not aware that they were involved in a study.

On the basis of information derived from several sources, the content of the program was developed. A review of the literature, facilitated by ERIC, DATRIX, PASAR, and MEDLINE computer searches, was conducted. A needs assessment questionnaire was developed, tested, and administered to the residents (see Appendix B). Following the needs assessment, a pretest assignment, which consisted of a videotaped teaching performance by each resident, was given and evaluated using the Instructional Skills Evaluation Instrument (ISEI) to identify strengths and weaknesses in teaching skills. The pretest assignment and evaluation instrument can be found in Appendixes A and D, respectively. In order to eliminate, circumvent, or cope with specific problems associated with resident physicians and a residency program, educational and medical specialists were consulted.

The training program was implemented in April 1979, and continued for 13, weekly, one-hour sessions. The program coordinator traveled to each of the five locations where residents were assigned and conducted the meetings during the residents' regularly scheduled conference time.

In order to assess the effectiveness of the program, intermediate and final evaluations of the residents' progress were made at the conclusion of the program. Residents were asked to reteach their original pretest assignment, making any modifications which would improve

the presentation. This posttest was also videotaped and two independent raters, whose intra- and inter-rater reliability had been established, evaluated the randomly ordered pre- and posttests. In addition, residents expressed their views about the program by completing a questionnaire during the concluding session (see Appendix C).

Organization of the Study

Chapter 1 contains an introduction to the study, a statement of the problem, the significance of the study, the limitations and assumption of the study, and the statement of the hypotheses. Definitions of terms, descriptions of the procedures, and organization of the study are also included.

Chapter 2 is a review of the literature.

Chapter 3 contains the methods and procedures by which the study was conducted.

Chapter 4 contains a statistical analysis of the findings of the study.

Chapter 5 includes the summary, conclusions, and recommendations of the study.

CHAPTER 2

LITERATURE

Areas of Research

Studies on Teaching Practices in Medical Schools

Medical schools have given little attention to the teacher and teaching practices. Pioneering studies of teaching in medical education arose largely from the work of G. E. Miller (1956), whose efforts were primarily classroom based. Studies on clinical teaching were not undertaken until the 1960's (Daggett, Cassie, and Collins, 1979). Early investigations of teaching in a medical setting found a lack of any reliable information about existing teaching practices and attitudes among medical instructors.

Studies such as the "Project in Medical Education" at the University of Buffalo School of Medicine in 1956 were undertaken to begin to provide the lacking data. Three hundred and eighty instructors at seven medical schools in the United States were observed by a six-member team composed of a combination of medical and educational faculty and doctoral students. The Medical Instruction Observation Record (MIOR) was the instrument used in the descriptive study. The results indicated a relatively large proportion of instructors lacked effective instructional skills and further research into educational practices in medical schools was recommended.

The Association of American Medical Colleges Published a "Preliminary Report of the Faculty Development Survey" in 1977. The

results of this nationwide study were based upon respondents' written self-reports and, therefore, were more likely an estimate of what faculty members thought they should be doing rather than what they were actually doing. Some of the findings described in the study were:

1. The majority of physicians taught in a clinical setting (use of multiple instructors, small groups, and often at the patients' bedside).

2. Most of the physicians (80%) had never had any exposure to a formal college course on education/teaching.

3. A large number (60%) had never attended any workshop or training session dealing with the process of instruction.

4. Most physicians (72% to 96%) never read publications such as Medical Education, Journal of Higher Education, Journal of Medical Education, or Review of Educational Research.

5. Physicians stated that their style of teaching was most influenced by (a) their own intuition/judgment, (b) the way they were taught, and (c) formal and informal feedback from students. Formal training in education and workshops on teaching were listed by most (79% and 70%, respectively) as factors which did not apply at all when considering one's teaching.

6. When teaching undergraduate medical students, over half (61%) of the faculty were frequently in a classroom/conference room setting.

7. The instructional method most used was the small group discussion (65%) followed by the lecture (56%). Clinical instruction was utilized next most frequently (44%). Methods used very infrequently, or never, included programmed instruction, self-instructional materials, and computer assisted instruction.

8. Educational resources most often used in teaching were slides, handouts, and texts, while audiotapes, overhead transparencies, motion pictures, video tapes, and simulations were seldom used.

9. For seeking assistance or advice on instructional issues and problems, faculty colleagues within the department were most often sought. The literature and students were listed next most frequently, in that order. Educational specialists were seldom called upon.

10. Types of programs in which medical faculty would be most likely to participate were listed as: (a) critique of teaching by students, (b) observation and critique of teaching by peers, and (c) programs of self-assessment of teaching with confidential feedback.

11. Concerning level of interest in receiving help with various components of instruction, most interest was expressed in (a) formulating instructional objectives, (b) lecturing, (c) leading small group discussions, (d) evaluating (student performance, one's own instructional effectiveness, and course quality), and (e) using instructional technology. Least interest was expressed in (a) interpersonal skill development, (b) computer assisted instruction, (c) individualized instruction, and (d) producing and using simulations.

Medical Teacher Effectiveness

Training needs at all levels in the medical profession are growing at an enormous rate. As Christopher J. Daggett, Josephine M. Cassie and George F. Collins (1979) stated,

> At all levels, there is a need for broadened training programs. However, the number of medical schools is limited. There are only so many spaces for incoming students and there are only so many faculty members available to train them. Hence, it is necessary that schools become much more efficient and effective in

> their work with students. Materials and facilities must be economized and roles must be examined and changed where necessary. Every aspect of training must be considered from pre-medicine courses all the way through residency training. (p. 151)

Teaching effectiveness, especially in the area of clinical teaching, is one aspect of medical training which should receive major consideration. "It is this critical phase of medical training that potentially can have the most impact on students' application of medical knowledge to patient care" (Daggett et al., 1979, p. 152). Yet there was a paucity of research on what constitutes effective clinical teaching and little emphasis on teaching skills per se. There were several articles which stated in general terms what would be appropriate skills for a clinical instructor such as the ability to formulate educational objectives (Stritter, 1972), be open and responsive to trainees, encourage student participation, and be an effective model of clinical behavior (Daggett et al., 1979). Other studies on clinical teaching practices raised some issues which implied the need for developing a systematic approach to clinical teaching and to design and implement appropriate teacher training programs (Payson, 1965; Miller, 1968; Mumford, 1970; Jackson and Mantle, 1977; Engel, 1971).

In general, researchers found clinical teaching to be haphazard, mediocre, and lacking in intellectual excitement (Daggett et al., 1979). Some of the common failings pointed out were: (a) a low emphasis on showing physician-patient interaction, (b) a lack of active participation with feedback when learning skills, (c) a failure to review basic science material on ward rounds, (d) a lack of teaching about "syndromes and concepts", (e) a lack of clarity and organization in discussions about differential diagnoses, (f) teaching information on ward rounds not

being related to the objectives, (g) a lack of preparation by attending physicians for ward rounds, (h) a failure to evaluate interns' or residents' clinical skills, and (i) case presentations often not very organized, clear, or concise, and recommendations for improvement rarely offered (Daggett et al., 1979; Elrick, 1968).

Teaching effectively requires certain skills. Most teachers at lower levels in the educational system are trained in those skills but for some reason university instructors are expected to have some divine dispensation. As M. A. Simpson (1972) expressed, "it seems to be assumed that the ability to teach will somehow appear by spiritual rapport or by chance" (p. 48). Such thinking must change if teaching effectiveness is to improve.

In a study on clinical teaching (Stritter et al, 1975), the 16 most effective clinical teaching behaviors were identified as:

1. Answers carefully and precisely questions raised by students.
2. Approaches teaching with enthusiasm.
3. Explains the basis for his actions and decisions.
4. Provides students with opportunities to practice both technical and problem solving skills.
5. Summarizes major points.
6. Corrects without belittling.
7. Demonstrates a genuine interest in students.
8. Strives to make difficult concepts easy.
9. Emphasizes conceptual comprehension rather than merely factual recall.
10. Willingly remains accessible to students.
11. Provides competent patient care.

12. Approaches teaching with dynamism and energy.

13. Prepares well for rounds and other contact with students.

14. Explains lucidly.

15. Identifies what he considers important.

16. Discusses practical applications of knowledge and skills.

The best clinical teachers were described as enthusiastic, clear, well-organized, adept at interacting with students and residents, having a broad breadth of medical knowledge, accessible, and possessing clinical competence. The worst teachers were characterized by a lack of organization, boring presentations, insensitivity to others, limited knowledge, dogmatism, and inaccessability (Irby, 1978).

Competencies required by medical instructors (Jason, 1973) include:

1. The capacity to define appropriate goals and objectives.

2. The ability to select the most appropriate strategies for achieving goals and objectives (be familiar with a range of choices and possess the different skills demanded by different instructional approaches).

3. The ability to perform effective student evaluation as well as self-evaluation.

4. The ability to use questioning techniques and lead small group discussions.

5. The ability to supervise students in a clinical setting (critiquing and giving feedback as well as demonstrating patient care).

6. The ability to organize and present a lecture.

7. The ability to use audio-visuals effectively.

Teacher Training Programs for Physicians

The need to improve standards of teaching in medical schools is being increasingly recognized. The 1973 World Health Organization's report on the training of teachers in medical schools and related training institutions "noted widespread evidence of serious deficiencies in present educational practices, some of which can be corrected by training teachers in the social application of educational principles" (Hall and Brooks, 1976, p. 183). Charles H. Bazuin and Annette M. Yonke (1978) described the lack of significant effort given to the systematic development of teaching skills in medical schools. They stated that faculty members,

> learn to teach by remembering how they were taught (usually their bad experiences), by practicing on students, and by receiving guidance from senior faculty members. Thus, those concerned with medical education recognize there is a serious need for the training of teaching faculty in medical schools, especially for the education of clinicians in the task of clinical teaching. (p. 377)

In medical schools throughout the United States clinical faculty members are being asked to assume instructional responsibilities in ever increasing number. These faculty members are expected to develop their teaching skills while maintaining their clinical and research expertise. According to Jason (1973), physicians "should" serve as instructors and, therefore, should be given the preparation and support they require to effectively fulfill such responsibilities. Few medical students are given the opportunity to learn about the teaching process during their student days. During residency periods physicians often serve as teachers of medical students, nursing staff, and other residents, but the experiences are generally without preparation and guidance (Doyle

and Balsley, 1979). Bad habits often form under these circumstances rather than skills being developed and improved (Jason, 1973). In a survey conducted by R. S. Brown (1971), residents indicated that more than 40 percent of their learning came from other house staff members. Despite the lack of training for teaching, many physicians do find themselves in an instructional setting, but seldom has help been available at any point resulting in many physicians being dissatisfied with their teaching and their efforts not well regarded by students.

In the 1970's, there has been a greater emphasis upon assessing and improving teaching skills of medical instructors. Most programs have been designed, however, for the full time medical faculty members while the clinical instructor has been relatively neglected (Irby, DeMers, Scher, and Matthews, 1976; Daggett et al., 1979; Fenley, 1979; Miller, 1979). A few programs for clinical instructors have been described in the literature but focused mainly on in-service workshop on lecturing skills (Hoban, Carroll, Agna, 1979; Byrne, Harris, and Long, 1976; Arsham, 1971; Hull and Brooks, 1976) or on training residents and graduate students in skills of classroom teaching (Lazerson, 1972; Carroll, 1977; Prentice, Metcalf, Sharp, and Hard, 1976). No systematic training programs for residents who do much of the clinical teaching have been reported. The following three plans are indicative of efforts which have been made to improve resident physicians' teaching skills.

Brian B. Doyle and Ellen Balsley (1979) described an adaptation of traditional clinical supervision to assist one chief psychiatric resident to develop her teaching skills. Under the guidance of her supervisor, the resident's task was to teach clinical psychiatry to first-year residents. The initial period of the resident's training consisted of

reading suggested articles, reviewing videotapes of teaching models, and observing and critiquing her supervisor's teaching with a small group of medical students. During the second period of the training the chief resident assumed teaching responsibility for the weekly case conference and became the discussant in one to two conferences per month. To evaluate the year's conferences, the residents were asked to complete a questionnaire. The chief resident and supervisor evaluated their experiences verbally to each other and in written reports to the department. They described their experiences as enjoyable and useful.

Another plan specifically for resident physicians in psychiatry was discussed by Alan M. Lazerson (1972). The program, designed to prepare residents to become better teachers, was based on the premise that " . . . mastery of content alone is not considered to be sufficent background for teaching" (p. 576). The program spanned the three years of residency and allowed the residents to gain teaching experience under the supervision of the School of Education faculty. The first year of residency offered the opportunity for a brief, intensive experience in teaching about adolescence to education majors. The opportunity to teach courses in regular college evening classes, which met once a week, was provided during the second and third years of residency. Additional experiences, such as teaching at the School of Medicine, could also be selected during the third year.

A third program reported for surgical residents and intern staff was at the University of Virginia Medical Center. The program consisted of eight 90-minute seminars held in place of surgery conferences to avoid an additional conference. The purpose of the program was to provide current information regarding the processes of teaching and

learning to prepare this group for teaching medical students. Participation was voluntary, and the instructors were selected primarily from the School of Education at the University of Virginia. Written pretests and posttests were administered to the program participants. The evaluation of the program indicated that the participants felt they had benefited by the experience. The major criticism of the program seminars was that they were not sufficiently practical for the clinical teaching situation. Other participants felt that too much was covered in too short a time and that the educational jargon was, at times, overwhelming (Brown, 1971).

Implications from research on clinical teaching and results from established training programs support a strong need for the continued development and evaluation of such programs along with research into the roles of clinical teachers. A summary of findings from the evaluation of implemented teacher training programs for physicians included:

1. A program for improving teaching effectiveness should be tailored to fit the particular situation in which it will be used and be responsive to each instructor's needs (Irby et al., 1976).

2. The program participants should be involved in the planning of the program (Irby et al., 1976; Kleffner, 1979).

3. Time considerations often prevent physicians from engaging in training programs. Self-instructional formats allowing for self-pacing is an alternative which may successfully overcome this problem (Foley, Smilansky, Bughman, 1978).

4. An abundance of active participation should be planned for as well as practice with prompt, nonthreatening feedback, and verbalization of what is being learned (Gregory and Hammar, 1974;

Gaff, 1975).

5. For significant and lasting change to occur, the program participants' attitude must be influenced as well as their ideas and cognition (Gaff, 1975).

6. Program participants must have the belief that change is desirable and that they can change in desired ways (Gaff, 1975).

7. The textbook is of limited value in programs of this type (Brown, 1971).

8. Major obstacles to effective clinical teaching by physicians include physical "tiredness", failure to recognize the value of their teaching role, conflicting priorities for time, and frequently changing rotations (Brown, 1971).

9. Clinical and full-time medical faculty tend to place teaching on the bottom of a list of priorities which poses as a large obstacle when attempting to implement teacher-training programs (Stritter et al., 1975); Mitchell, 1979). This negative attitude and neglect of the development of improved standards of teaching is characteristic of higher education in general. Some possible explanations for such attitudes include (a) the difficulty of demonstrating the benefits of training teachers, (b) the feeling that mastery of a body of knowledge is a sufficient qualification, and (c) the techniques used to train teachers in higher education may have been at fault since conventional courses in teaching method are viewed with hostility and are judged irrelevant. Some successful formats, however, have been reported (Elton and Simmonds, 1977).

10. Teacher-trainers have found that they helped their trainees most when they involved the trainees in the process of identifying

behaviors needing improvement, provided feedback about the trainees' teaching from observations of their teaching behavior, devised a program for bringing about the changes, provided feedback on progress, and followed up on how the trainees maintained their new behavior across time (Aspy, 1978).

11. The use of videotape for recording and providing feedback on teaching practices has been very frequently used with success (Foley et al., 1978; Bazuin and Yonke, 1978; Stritter and Hain, 1977; Hall and Brooks, 1976). The presence of a certain degree of anxiety in individuals being videotaped seemed to be consistent, however, when conducting programs in which teaching was videotaped and assessed (Foley et al., 1978). Furthermore, those with a positive self-concept, self-esteem, and self-image tend to benefit most from the observation of their behaviors (Britt, Kim, and Mynatt, 1979).

12. Rarely did reported teacher training programs extend over more than a three week period. Most were one to three day workshops. Further research is needed to determine the optimal period of time over which the sessions should extend.

13. The leadership team which seemed to function most effectively for clinical teaching programs includes an educational specialist and one health professional instructor who has given considerable thought to the dynamics of the teaching-learning process (Stritter and Hain, 1977).

Evaluation of Programs

Training programs and workshops which have been developed were often lacking one important ingredient, an adequate evaluation of the program in terms of actual behavioral changes in participants' teaching as

a result of the training program. Gathering data with questionnaires and rating scales has been the most common method of evaluation used but is not sufficient. This point was strongly emphasized in a study (Koen, 1976) which involved evaluating an evaluation of a faculty educational development program. Personal achievement was consistently overestimated when external criteria were not clearly evident. The results of this study suggested that two conditions contribute to accurate self-evaluation of learning via scale ratings. One is the accurate assessment of the learners' competence and the other is the learners' direct comparison of their performances with an external criterion.

According to Tamas Fulop (1978), teacher training programs need to undergo a systematic evaluation which should consist of:

> a pretest, followed by a built in feedback mechanism used to inform both students and teachers continuously about progress. Then there should be a final assessment which would show whether or not the objectives had been achieved, and a continuous follow-up in order to ascertain the extent to which knowledge, skills, and attitudes gained had been put into practice. The methods of evaluation should be carefully selected bearing in mind that they must make it possible to measure whether or not the ultimate goals had been reached, i.e. to change attitudes and improve skills. (p. 45)

Moreover, "failure to engage systematically in evaluation in reaching the many decisions necessary in education means that decision by prejudice, by tradition, or by rationalization is paramount" (Dressel, 1961, p. 6). "Evaluation can be most helpful if it is built into a program from the outset" (Gaff, 1975, p. 78).

In a summary of research on the effects of training programs for university teaching assistants, J. Gregory Carroll (1978) identified approximately 85 studies. The studies included pre-experimental pretest-

posttest, quasi-experimental, and experimental designs. A number of studies reported significant effects on observed teaching behavior. When assessing student variables, quasi-experimental studies generally found significant effects, whereas true experimental studies generally did not. The two types of studies, however, tended to assess different types of training programs. Carroll concluded that substantially more effort ought to be devoted to assessing the effects of training programs rather than simply describing innovative ways of conducting such programs. He also pointed out that "the considerable amount of research on observed teaching behavior does generally indicate that programs designed to promote specific teaching skills will indeed generate changes in observable teaching behavior for one or two semesters" (Carroll, 1978, p. 41). Further research is needed, however, on cognitive and affective gains of the program participants and the degree to which individuals actually implement the training.

Role of Professional Educators

Through careful planning and design, it is possible to instruct physicians in the basics of educational thought and practice so that teaching becomes purposeful rather than accidental. Clinical teachers do not require extensive training in education to be effective. They must, however, be aware of the basic principles of teaching and learning (Elrick, 1968; Stritter et al., 1975).

D. N. Aspy (1978) strongly recommended that teacher trainers develop a set of professional skills which will help teacher-physicians become more effective instructors. In support of Aspy's recommendation, the groups conducting studies such as the "Project in Medical Education" by

the University of Buffalo School of Medicine found that the most effective evaluation team in assessing medical teaching practices was one consisting of a combination of medical and educational faculty. An educational specialist, working in the field of the health professions, can assist the medical faculty and residents by providing an exposure to and experience with modern education theory and practice. This exposure must be planned to provide minimum interference with other priority items, however, and the experience must be brief, intense, and relevant to the teaching needs of the faculty members or resident physicians (Elrick, 1968; Byrne and Cohen, 1973).

There are close parallels in medicine between practice and teaching which should be put to good use in training programs. "The patient's (student's) needs must be identified, their nature and etiology assessed; a program of treatment (education) developed, based on clearly defined objectives; and the outcome of treatment (and education) assessed" (Wright and Knox, 1977, p. 48). The processes of teaching and clinical practice can reinforce one another if properly handled so as to clarify unfamiliar educational procedures by using familiar clinical methods. Such a strategy can help minimize the hostility and confusion which many training programs trigger when the language of education is not used with care (Wright and Knox, 1977).

Microteaching

There has been extensive research on the use of microteaching to improve the instructional process (McKnight and Baral, 1969; Peck and Tucker, 1973). The results, though inconclusive, indicate that micro-teaching is an effective training strategy both as to results and in

cost effectiveness.

During the summer of 1963, the Secondary Teacher Education Program at Stanford University experimented with a new laboratory experience for preparing teaching interns which was called "microteaching." The idea was to give interns pre-service teaching experience in a structured laboratory setting where the risk of failure was low and opportunities for refining teaching skills were high. The lessons were limited from five to twenty minutes, the number of students ranged from one to five, and the instructional task for each lesson was well defined. Students were videotaped at the beginning and conclusion of the program as well as periodically during the program. Through independent ratings of diagnostic teaching held at the end of the summer, it was found that "microteaching - prepared teachers performed better than those with standard preparation, even though the total time involvement in the microteaching clinic was less than ten hours per week as compared with the twenty-five-hour-a-week commitment required by the student teaching experience" (Allen and Ryan, 1969, p. v.). James L. Olivero (1970) stated that over 80 percent of time was saved in teaching activities by using the microteaching program at San Jose State University in the 1967 summer intern-teaching program compared to the conventional off-campus student-teaching experiences.

During the 1966-67 academic year, two professors at the University of Illinois, Arye Perlberg and D. C. O'Bryant, conducted a study to explore ways to improve college teaching. Higher education does not have a history of giving formal attention to the process of teaching, and most college instructors have received little or no training in how to teach. There is growing discontent over the quality of college

teaching among students, administrators, and college teachers themselves. Microteaching, in conjunction with the use of videotapes, was selected as the primary means for improving instruction and proved to be successful. A few other universities have tried microteaching to improve instruction with similar results (Allen and Ryan, 1969).

The concept of microteaching was expanded and described by Dwight Allen and Kevin Ryan (1969). These authors viewed microteaching as a training concept for the professional development of teachers which was based upon five essential propositions:

> First, microteaching is real teaching even though the setting is constructed into a practice situation. Second, the complexities of a normal teaching situation are reduced to provide a less-threatening environment for practice. Third, microteaching focuses on specific tasks which may involve the practice of instructional skills or techniques of teaching, the mastery of curricular materials, or the demonstration of teaching methods. Fourth, microteaching allows for controlled practice since time, students, methods of feedback and supervision, and other factors can be manipulated. Fifth, the use of several sources of immediate feedback provides maximum insight into the teaching performance which greatly expands the normal knowledge-of-results of feedback dimension in teaching. (pp. 2-3)

While microteaching, one is required to incorporate specific teaching strategies into short lessons ranging from five to twenty minutes in length. When not teaching, one may assume the role of a student for another teacher. In addition, one acts as observer and evaluator, providing feedback through written and verbal comments on microlessons taught by one's colleagues (Gregory, 1972).

Microteaching is designed on a teach-reteach cycle which includes six steps (Gregory, 1972):

Teach cycle:

1. Prepare a microlesson.
2. Teach the microlesson.
3. Receive feedback (oral, written, and recorded).

Reteach cycle:

4. Reorganize your microlesson in light of the feedback received.
5. Reteach the microlesson.
6. Again receive feedback particularly focusing on the improvements that have or have not been made.

The reteach phase is viewed as optional depending upon the complexity of the task and how well the teach cycle was accomplished.

The effectiveness of the described approach can be enhanced by providing ideal examples, or models, of the desired teaching behavior. The models can be presented by film or audio or videotape recordings with the instructor providing cues to focus the teacher's attention on the strategies involved in the task. This procedure aids in the development of the ability to identify the desired behaviors and improve the quality of feedback the group will give one another (Allen and Ryan, 1969). Also, research indicates that "models can be so influential that a teacher's behavior can be changed simply by observing the behavior of others and the consequences of that behavior" (Gregory, 1972, p. 8).

A change in attitude is an integral part of changing behavior and "one of microteaching's very real, though almost totally undocumented characteristics is its power to change attitudes. The self-knowledge

gained through its system of feedback has the power to alter attitudes about oneself as a teacher" (Gregory, 1972, p. 10). In other words, a teaching behavior change can occur with microteaching largely through changes in attitude and perceptions (Ford and Morgan, 1976).

Videotaping is not an essential part of the microteaching process but can strengthen the process by displaying models of the various teaching skills and providing a powerful source of feedback for understanding one's own teaching performance. Microteaching has been carried out successfully, however, without the use of this equipment (Allen and Ryan, 1969). Initially, many trainees are nervous about having their teaching performances videotaped. This reaction soon wears away, however, once the benefits of the procedure are discovered (Allen and Ryan, 1969; Gregory, 1972). The initial viewing of oneself on videotape also commonly generates what is referred to as the "cosmetic effect", a self conscious reaction and concern about one's personal appearance and mannerisms. Allen and Ryan (1969) suggested avoiding too much instruction during this initial viewing of oneself and allowing the short-lived cosmetic effect to wear off. An emphasis on the favorable aspects of the lesson during the first viewing and critique session is best.

James M. Cooper and Dwight W. Allen (1971) summarized research findings about microteaching by stating the following generalizations:

> 1. Using a microteaching format, teach-critique/reteach-critique, positive changes in teacher behavior can be achieved which result in a larger repertoire of teaching behaviors.
> 2. Trainee acceptance of microteaching as a relevant training procedure is high.
> 3. The feedback dimension of microteaching is probably the crucial one in terms of changing the trainee's behavior.
> 4. This feedback can come from several sources, but the most powerful combination seems to be one

> that utilizes supervisory comments, videotape recordings, and pupil (peer) comments.
> 5. A perceptual model that demonstrates positive instances of the desired behavior rather than a mixture of both positive and negative, is more powerful in enhancing the trainee's ability to acquire the skill in a transfer task.
> 6. For certain skills, a perceptual model is preferred over a written description of the skill, while for other skills the evidence is inconclusive. (pp. 17-18)

Some conclusions drawn by Olivero (1970) on microteaching included the following:

> 1. Trainees who received feedback changed the behaviors defined as "development of aims" and "teacher-pupil communication" more than trainees who received no feedback. Therefore, if a change in selected behaviors is to occur, trainees need to know how well they are doing on these behaviors.
> 2. Trainees who have the opportunity to see themselves perform and to receive verbal feedback from supervisors make greater changes in behavior defined as "understanding of aims" than those who receive verbal feedback only. In view of the findings, it appears that the trainee and the supervisor used the picture on the monitor to establish a common frame of reference, thereby facilitating the constructive criticisms presented by the supervisor.
> 3. The condition of observation of teaching performances from pre-recorded videotapes was not significantly superior to the live observations of teaching performance with the supervisor present in the room. Although the picture on the monitor may eliminate some irrelevant stimuli, allowing the supervisor to focus on the teaching performance, it may also eliminate some relevant stimuli that should have a bearing on the teacher's performance. (p. 11)

Microteaching should not be regarded as a panacea for solving all the instructional problems of teachers. The method is not appropriate to the acquisition of all skills and cannot miraculously transform a dull teacher into an intellectually exciting teacher. More study and research are needed before the full potentials and limitations of microteaching are known. Nevertheless, microteaching can provide a unique

setting for training and for research in teaching. "There are few teachers who would not benefit from the highly focused practice and feedback which are the basic components of microteaching" (Allen and Ryan, 1969, p. 8).

Summary

Research findings in the area of teaching practices in medical schools indicated that a relatively large proportion of instructors lack effective instructional skills and place a low priority on the improvement of these skills. The need to improve medical instruction, especially in the area of clinical teaching, is being recognized, however, by a growing number in the profession. Training programs designed to improve teaching skills and supervised by educational specialists can give physicians the assistance and preparation they require to effectively fulfill their teaching responsibilities.

Most programs that have been developed were for full-time medical faculty, whereas, resident physicians, who do much of the clinical teaching, have been virtually ignored. A few programs for residents have been reported in the literature but were not of the systematic kind.

Programs and workshops which have been developed to improve teaching skills generally lacked an adequate evaluation of the program's effectiveness. Measurement of actual behavioral changes in participants as a result of the program was rarely accomplished. Gathering data with questionnaires and rating scales was the most common method of evaluation used.

Considering the limited time available to physicians, training programs should be designed to achieve maximum success in the shortest time possible. The microteaching method for developing certain instructional skills meets these requirements. Research has demonstrated that this method can improve teaching skills as effectively as other methods but in less total time. Microteaching has also been shown to have the power to alter attitudes about oneself as a teacher.

CHAPTER 3

METHODOLOGY

The primary purpose of this study was to determine if a program on teaching skills conducted in one-hour weekly sessions over a 13 week period could significantly improve the teaching behavior of resident physicians in the Departments of Family Practice and Internal Medicine in the East Tennessee State University College of Medicine. Other factors which were considered included the residents' attitude toward improving their teaching skills in relation to the degree of improvement, the residents' perceptions of the value of self-evaluation via videotape, modeling, peer evaluation and instructor evaluation in changing their teaching behaviors, and the residents' ability to assess their own teaching performance.

Selection of Subjects

The subjects of the study included seven residents in the Department of Family Practice and 13 residents in the Department of Internal Medicine, East Tennessee State University College of Medicine. Seventeen of the 20 resident physicians were in their first year of residency training, two were in their second year and one was in his third. These residents were divided among five locations. The family practice residents were located at the Bristol Family Practice Center, Bristol, Tennessee, while the internal medicine residents were distributed among four hospitals in Johnson City, Kingsport, and Bristol, Tennessee. A sixth group, consisting of ten family practice residents, elected not

to participate in the program for several reasons. The predominant reason was a negative attitude toward being involved in a program on teaching skills. A descriptive analysis of the group of residents is given in Table 1.

Table 1

Description of the Groups of Subjects

Department	Number of Residents	Location
Family Practice	7	Bristol Family Practice Center, Bristol, Tenn.
Internal Medicine	3	Holston Valley Hospital, Kingsport, Tenn.
Internal Medicine	2	Johnson City Memorial Hospital, Johnson City, Tenn.
Internal Medicine	5	Veterans Administration Hospital, Mountain Home, Tenn.
Internal Medicine	3	Bristol Memorial Hospital, Bristol, Tenn.
Total	20	

Only resident physicians were selected as subjects for the pilot program. A regularly scheduled meeting time could be established for them over an extended period of time, and the program was incorporated into the residents' scheduled conferences with their participation expected for the duration of the program. The residents were not informed that they were part of a study.

Design of the Study

A formative and summative evaluation (Jason, 1973; Anderson, Ball, and Murphy, 1975) of the pilot training program was accomplished. Formative evaluation consisted of periodically assessing the residents' progress (see Appendixes E, F, and G for evaluation guides), obtaining oral feedback concerning satisfaction with the program, and recording behaviors related to residents' attitude toward participating in the program. Summative evaluation involved the assessment of the residents' improvement in teaching skills from pre- to posttest by independent raters whose inter- and intra-rater reliability had been established. The ISEI, with criteria based upon the objectives of the program, was used by the raters to evaluate the tests. Additional data were derived by analyzing the responses to a program evaluation questionnaire which was administered to the residents at the conclusion of the program.

Treatment of Data

The correlated *t* formula was employed to test for a significant mean gain score derived from pretest and posttest data associated with hypotheses one and two. This *t* test was appropriate since two positively correlated measures for the same subjects composed the data (Popham and Sirotnik, 1973). To test for a significant relationship between attitude and gain score for hypothesis three and between self-evaluation scores and rater-evaluation scores for hypothesis five, the Pearson Product Moment Coefficient of Correlation was utilized. The chi-square test for a significant difference between expected and observed frequencies was employed to analyze the nominal level data associated with hypotheses

four and six. For hypothesis four, the residents' stated change in attitude toward a program on teaching skills, from the beginning to the conclusion of the program, was analyzed. For hypothesis six, residents' preference for self-evaluation via videotapes of their teaching compared to three other forms of evaluative feedback received during the program was examined. The six null hypotheses were tested at the .05 level of significance, and a one-tailed test was used except for hypothesis two.

Setting of the Program

The College of Medicine at East Tennessee State University is one of the medical schools established under the Teague-Cranston Act. The first class of medical students was accepted in the fall of 1978. At the time of the program, the Departments of Family Practice and Internal Medicine had resident physicians who would assume some of the clinical teaching responsibilities of these medical students as they entered the various hospitals and Family Practice Centers for their clinical training.

The program was conducted at each of the five locations where residents were assigned, with each group having a specified time and day of the week for its meetings. The program coordinator traveled to the different locations for the weekly sessions. A conference room and any necessary audiovisual hardware were available at each site. The schedule of meetings is illustrated in Table 2.

Equipment

Videotape Hardware and Software

A sony A-V 8650 videotape recorder and Sony DXC-1600 video camera with an Altec 6898 microphone on a boom were used to record the

residents' pre- and postest teaching performances. The performances were recorded in black and white on one-hour, reel-to-reel tapes. Each performance was then dubbed onto individual videocassettes to allow for individual viewing and self-evaluation as well as the randomization of the pre- and posttest performances for the independent raters.

Table 2

Meeting Schedule for the Five Groups of Residents

Location	Day	Time
Bristol Family Practice Center	Monday	1:00-2-00 p.m.
Holston Valley Hospital (Internal Medicine)	Wednesday	2:30-3:30 p.m.
Johnson City Memorial Hospital (Internal Medicine)	Thursday	2:00-3:00 p.m.
Veterans Administration Center (Internal Medicine)	Thursday	3:30-4:30 p.m.
Bristol Memorial Hospital (Internal Medicine)	Friday	12:00-1:00 p.m.

Instruments

Needs Assessment Questionnaire

Prior to the implementation of the program, each resident completed a questionnaire which identified interests, perceived needs, and priorities regarding the improvement of teaching skills. Information about the residents' attitudes toward participating in a program for improving teaching skills, toward one's teaching being recorded on videotape, and toward spending time engaged in such a program was also obtained. Residents were asked to list any prior teaching experience or

training in educational pedagogy they may have had. A scaled response mode from one to five was provided for most responses in order to obtain interval level data for more rigorous statistical analysis (Tuckman, 1972). A copy of the questionnaire is in Appendix B.

Residents were asked to sign the questionnaire which was necessary for comparative studies of initial and follow-up data as well as for the development of the program's content. Names were not used in reporting the data and responses were kept confidential.

The needs assessment questionnaire was constructed by the investigator and reviewed by educational specialists. Before its use, the questionnaire was tested on a group of medical faculty members at East Tennessee State University.

Program Evaluation Questionnaire

The program evaluation questionnaire was constructed to gather information concerning the residents' satisfaction with various aspects of the program, such as the duration of the program and methods used, and assess their perception of the value of the skills emphasized in the program. A response scale of one to five was provided. The residents were asked to rank the four types of evaluative feedback they received according to the degree of influence each had on affecting changes in their teaching behavior. In the concluding portions of the questionnaire, constructive criticism of the program was requested (see Appendix C for a copy of the program evaluation questionnaire). The residents responded to this instrument during the program's final session. The questionnaire was designed by the investigator and validated by faculty members in the Colleges of Medicine and Education.

Instructional Skills Evaluation Instrument (ISEI)

In order to evaluate the pre- and posttest teaching performances of the residents, a rating instrument was developed by the investigator. Criteria were selected in accordance with the objectives of the program and categorized under the appropriate teaching techniques. A copy of the Instructional Skills Evaluation Instrument (ISEI) is in Appendix D. Items were scored on a four point scale, ranging from "optimal" to "unfulfilled", according to how well they were performed. A fifth option, "not applicable", was provided and was checked when the item was not relevant to the particular presentation. Directions for interpretation of each level of the scale were provided.

Face and content validity were determined by a group of educators with expertise in the area of teacher evaluation who reviewed the instrument and reached a concensus of opinion. Reliability of the instrument was established during the process of training the independent raters and determining their intra- and inter-rater reliability.

Procedures

In developing the program, a model was followed which contained the following four steps:

Step I: Identification of the goals and objectives of the program. This step involved the following activities.

1. A survey of the literature was conducted utilizing ERIC, DATRIX, PASAR, and MEDLINE computer searches. The current status of medical teaching practices, efforts being made to improve teaching in medical schools, and current research on what constitutes and how to evaluate effective clinical teaching were reviewed.

2. Individuals involved in faculty development programs in medical schools across the United States were contacted by telephone and correspondence in order to ascertain what types of programs had been implemented thus far.

3. A needs assessment questionnaire was administered to the prospective participants in the program. Assessing the physician's perceptions of his own needs was important because "a person must become aware of his own deficiencies before he will undertake to correct them through learning" (Brandt, 1975, p. 396).

4. The residents were given a pretest teaching assignment in which they were asked to select a topic and demonstrate their ability to present a lecture, use questioning techniques in a small group discussion, and use audiovisuals (see Appendix A for a copy of the assignment). One week was allowed for preparation of the assigment which was then recorded on videotape. The pretest videotaping sessions involved small groups of three to four residents, each group being taped within one session. The program coordinator evaluated the teaching performances and assessed needs. The residents were also requested to view their own tapes and evaluate them using a list of criteria characteristic of "effective" lecturing, questioning, and use of audiovisuals.

5. Two main goals were selected for the program and specific objectives were developed for each skill. A complete listing of program goals and objectives is in Appendix H.

6. After the specific objectives were selected, the final version of the ISEI, to be used by the independent raters when evaluating the pre- and posttests, was developed. The criteria in the instrument were based upon the objectives of the program.

In summary, the decisions regarding the skills to be emphasized during the program were based upon input from several sources. The sources included (a) discussions with medical faculty members regarding the nature of clinical teaching, (b) an assessment of the resident's perceived needs, (c) a review of related literature, (d) an evaluation of the residents' actual teaching ability recorded on videotape, and (e) the opinion of educators.

Step II: Design of the Program.

With the support and guidance of the Assistant Dean of Educational Resources in the East Tennessee State University Medical School and faculty from East Tennessee State University College of Education, a program on teaching skills was planned for the resident physicians. The content was selected in accordance with the stated objectives of the program. The instructional strategies and necessary instructional aids and audiovisuals were identified and related practice activities were developed for each skill.

Five instructional packages were designed for the teaching skills to be studied. The five packages were titled: (a) Objectives and Planning, (b) Delivery Techniques, (c) Discussion/Questioning Techniques, (d) Demonstration Techniques/Design and Use of Audiovisuals, and (e) Lecture Techniques. Each package contained the goals and objectives of the lesson, a complete discussion of the skill, practice activities, and a bibliography. A folder containing xeroxed copies of related articles and research reports was prepared to complement each instructional package. Folders were placed in each of the five conference rooms to be used by those residents interested in a more in-depth study of a particular skill.

The format for seven of the 13 sessions consisted of an introductory, informal lecture on the particular skill under study followed by a discussion session to clarify points, monitor understanding, and assess attitudes. Practice activities concluded the session. Videotapes and films of "model" teaching behavior were shown and other audiovisuals were incorporated into the sessions whenever appropriate. Four meetings were planned "practice" sessions and allowed the residents to try out the teaching techniques on their peers and receive evaluative feedback on their teaching performances. The last two sessions were spent videotaping and evaluating the posttest teaching performances. The organization of the program's 13 sessions is outlined in Table 3.

Table 3

Schedule of Teaching Skills Program for Residents

Session	Topic
1. April 2-6	Introduction A. Explanation of program B. Discussion of effective teaching and showing of a videotape. C. Distribution of first instructional package on objectives and lesson planning.
2. April 9-13	Objectives and Planning A. Lecture and discussion on objectives and planning. B. Complete activities in package. C. Assignment - package on delivery techniques.
3. April 16-20	Delivery Techniques A. Discussion of delivery techniques. B. Film on delivery techniques. C. Assignment - prepare a five to ten minute lesson demonstrating delivery techniques and lesson planning.

Table 3 (continued)

Session		Topic
4.	April 23-27	Practice of Planning and Delivery Techniques A. Present lesson - critique. B. Assignment - discussion/questioning techniques package.
5.	April 30-May 4	Discussion/Questioning Techniques A. Lecture/discussion of discussion/questioning techniques. B. Show videotape model on questioning. C. Assignment - prepare to lead a five to ten minute discussion with questioning.
6.	May 7-11	Practice of Discussion/Questioning Techniques A. Teaching presentations on discussion/questioning and critique. B. Assignment - use of A-V's and demonstration techniques.
7.	May 14-18	Use of A-V's/Demonstration Techniques A. Demonstration on use of audiovisuals. B. Activity on designing a visual. C. Assignment - package on lecture method.
8.	May 21-25	Lecture Method A. Lecture/discussion on lecture method. B. Film. C. Assignment - plan a ten minute lecture emphasizing giving effective explanations.
9.	May 28-June 1	Practice of Lecture Method and Critique.
10.	June 4-8	Clinical Teaching. A. Discussion and application of methods to the clinical setting. B. Practice session - giving effective patient explanations.
11.	June 11-15	Clinical Teaching A. Review and discussion of handouts on clinical teaching practices. B. Revise the pretest teaching assignment and plan to present it for videotaping.
12.	June 18-22	Posttest Videotaping and Critique
13.	June 25-29	Wrap-up and Program Evaluation Questionnaire

The teaching methods chosen for the program emphasized active participation and were based on established principles of learning, such as feedback, practice, and reinforcement. Informal lectures and duplicated material were used to present background information. Small group discussions allowed for the exchange and clarification of ideas. For models of teaching behavior, the residents viewed videotaped and live demonstrations with the instructor providing cues to focus attention on the strategies involved in the task. After the modeling activity, the residents participated in skill practice and feedback sessions using the microteaching method. This technique for skill practice usually emphasizes the use of actual students to give reality to the teaching experience. The students used, however, should be representative of those the trainees will actually contact (Allen and Ryan, 1969). Since medical students were not available during the time the study was conducted, the conclusion was drawn that the utilization of peers was superior to the selection of nonrepresentative students.

For several reasons, the microteaching method was selected as the teaching strategy for the practice sessions in this program. Previous studies indicated that microteaching as a teaching tool can accomplish what other methods achieve but in a shorter span of time (Allen and Ryan, 1969). Since the residents' time was limited, this factor was of primary consideration. A goal of the program was to develop such qualities as critical self-evaluation and the desire for continuous improvement. The microteaching strategy fosters such qualities.

Videotaped playback of each resident's teaching was utilized as one source of feedback because it has been found to be an effective teaching tool for certain delivery and interaction skills (Robbins, Heinrich,

Abrass, Kauss, Tamkin, 1978) many of which were emphasized in the program. Viewing one's performance on videotape playback has also been shown to have a strong influence on changing attitudes (Gregory, 1972).

Step III: Implementation of the Program

The program was conducted in one-hour weekly sessions over a 13 week period from April 2, through June 29, 1979. A schedule shown in Table 2 was arranged to accomodate the five groups of residents at their respective, assigned locations.

As is outlined in Table 3, lecture-discussion-activity sessions alternated, for the most part, with practice sessions. Microteaching involved a scaled-down teaching situation wherein each resident concentrated on practicing mainly one teaching skill at a time, for example, questioning, for a short duration, usually five to ten minutes. A small amount of subject matter was used to teach a small group of peers, usually three to six. Residents received feedback on their teaching from their peers, their instructor, and self-evaluation.

The first practice session was designed to improve organizational and delivery skills. The evaluation instrument for this session is in Appendix E. Leading a discussion utilizing questioning techniques was emphasized in the second practice session. Appendix F contains the evaluation instrument for discussion/questioning techniques. Practice session three provided the opportunity to develop lecture skills (see Appendix G for the evaluation instrument), while practice session four emphasized giving patient explanations and applying various teaching skills to other clinical settings.

An attempt was made to establish a nonthreatening climate providing a situation free of harsh criticism within which the residents could

work without defensiveness. The members of the group were encouraged to share information and assist each other throughout the program as well as criticize and disagree with one another in a democratic atmosphere. The utilization of such strategies has been shown to enhance critical thinking in members of the group (Zimmerman and King, 1963).

Step IV: Evaluation of the Program.

Procedures used in the evaluation process were as follows:

1. Continuous feedback from the residents was obtained throughout the program in order to identify areas requiring improvement and/or revision.

2. At the conclusion of the program, each resident was asked to revise and reteach the same topic used in the pretest according to the same criteria specified in the pretest assignment. This posttest was recorded on videotape. The pre- and posttests were transferred to individual videocassettes and were organized in matched pairs. The tapes in each pair were randomly arranged to prevent the raters from knowing which was a pre- or posttest. Using a table of random numbers, the order for viewing the pairs of tapes was determined before they were evaluated by two independent raters whose inter- and intra-rater reliability had been established. A statistical analysis of the scores was performed to test for significant gain from pre- to posttest. Following the appraisal of each pair of tapes, using the ISEI, the raters were asked to judge which tape was a pretest and which was a posttest.

3. An analysis of the residents' gain scores on the four categories of teaching skills, measured by the ISEI and evaluated by the raters, was performed in order to detect differences in degree of mastery. Objectives in the ISEI were categorized under delivery,

organizational, explaining, and use of audiovisuals skills. There was some overlapping of certain objectives into more than one category. Objectives one through 11, 13, 14, 22, and 23 were considered delivery skills, while numbers 12, 14, 16, 17, 21, 22, and 23 were grouped as organizational skills. The explaining category contained objectives 14, 15, 17, 18, 19, 20, and 22, while the audiovisuals category included objectives one through three under "use of audiovisuals." Ratings assigned to the objectives within a skill category were averaged in order to obtain the residents' pre- and posttest scores for each of the four categories. Individual gains and mean gain scores for the total sample and the two subgroups of residents were calculated.

4. The number of residents experiencing a change in attitude toward participating in the teaching skills program and the direction of the change were recorded from the program evaluation questionnaire. To measure this change, residents were asked to indicate their initial and final attitudes by circling the appropriate responses on a Likert scale.

5. The residents were asked to judge their own posttest teaching performances using the same ISEI instrument as the independent raters. Self-evaluation skills acquired by the residents during the program were assessed by comparing the residents' assigned scores to posttest teaching performances with the scores given to the same performances by the independent raters.

6. A program evaluation questionnaire was administered to the residents during the final session to ascertain the value of and their degree of satisfaction with various aspects of the program.

For the purpose of this study, the program was evaluated as a process, involving the appraisal of teaching behaviors rather than

student output. Research indicated that assessing teaching behavior is as reliable as evaluating student achievement for judging "teacher effectiveness". Positive correlations have been demonstrated between selected teacher behaviors and learning outcomes (Solomon, Rosenberg, and Bezdik, 1964). The findings were supported by other researchers (Robbins, 1977; Miller, 1974; Hildebrand and Wilson, 1970) indicating that "teacher effectiveness" is largely determined by certain teaching behaviors or skills which can be evaluated. These behaviors, in turn, are positively related to student learning.

Reliability of Raters

Two independent raters were selected to evaluate the residents' pre- and posttest videotaped teaching performances. One rater was a faculty member from the College of Medicine and the other a faculty member from the College of Education at East Tennessee State University. Both individuals had prior experience in the evaluation of instruction.

The raters were trained by the investigator to use the ISEI. Three practice sessions were held in which the instrument was explained, and videotaped teaching performances were evaluated. Raters compared and discussed their evaluations until concensus was reached. The training procedure continued until an inter-rater reliability of at least 0.80 was established. An actual inter-rater reliability coefficient of 1.0 was obtained (see Appendix I for calculations).

To determine inter-rater reliability, three videotaped teaching performances were viewed and evaluated by each rater. The statistic known as the intraclass correlation, formulated by R. L. Ebel (Guilford, 1954, pp. 395-397), was used to calculate the average intercorrelation.

To test for intra-rater reliability, the two raters viewed and evaluated, after a one-week interval, the same three videotapes using the ISEI. Each rater's second set of evaluation scores was correlated with the first set using the Pearson Product Moment Coefficient of Correleation. Two intra-rater reliabilities of 1.0 were obtained (see Appendix I for calculations).

CHAPTER 4

ANALYSIS

A pilot training program, designed to improve resident physicians' teaching skills in the East Tennessee State University College of Medicine, was conducted from April 1, to June 29, 1979. Twenty residents comprised the study group, 13 being in the Department of Internal Medicine and seven in the Department of Family Practice. The subjects did not know that they were part of a study. The program coordinator conducted the meetings at five different locations in Johnson City, Bristol, and Kingsport, Tennessee, where residents were assigned. During the program, emphasis was placed upon the improvement of stating objectives and planning for instruction, delivery skills, lecture, discussion, questioning and demonstration techniques, and the use of audiovisuals. Active participation was encouraged and a democratic, informal atmosphere was maintained throughout the sessions. The microteaching method was selected for the practice of skills, since this stragegy has been shown to accomplish, in a shorter span of time, what other methods achieve.

A formative and summative evaluation of the program was conducted. Periodic assessment of the residents' progress and satisfaction with the program was made. At the conclusion of the program, observable changes in residents' teaching behavior were measured by independent raters using the ISEI.

Data were obtained from independent ratings of videotaped pre- and posttests, from two questionnaires, and from records maintained by the program coordinator. Of the 20 residents participating in the program, 19 responded to the needs assessment questionnaire, 11 were videotaped for both the pre- and posttests, and 14 completed the program evaluation questionnaire. The variations in number were the result of vacations, schedule conflicts, and four residents who did not complete the program.

The data were computer analyzed using the Statistical Package for the Social Sciences (SPSS). The correlated t formula, the Pearson Product-Moment Coefficient of Correlation, and the chi-square were utilized to test six null hypotheses. The level of significance established for this study was .05, and a one-tailed test was used for all hypotheses except number two.

H_{01}: There will be no significant gain in the mean score from the pretest to the posttest independent rating of residents' videotaped teaching performances.

The means, standard deviations, gain scores, and t values for the independently rated, videotaped pre- and posttests of residents' teaching skills are presented in Table 4. The scores are shown for the total sample of 11 residents who completed the pre- and posttests and for the two subgroups which comprised this sample.

Examination of the test scores for the total sample revealed an increase in mean score from 2.846 on the pretest to 3.502 on the posttest with a minimum score of one and a maximum score of four being possible. The standard deviation was 0.357 for the pretest and 0.313 for the posttest. A mean gain score of 0.656 resulted in a t value of 8.05 which was significant beyond the .001 level.

Table 4

Means, Standard Deviations, Gain Scores, and *t* Values for Independently Rated Pre- and Posttests for Total Videotaped Group and Two Subgroups

Group	N	Mean		Standard Deviation		Gain		*t* Value
		Pretest	Posttest	Pretest	Posttest	Mean Difference	Standard Deviation	
Total	11	2.846	3.502	0.357	0.313	0.656	0.271	8.05****
Internal Medicine	6	2.708	3.462	0.429	0.380	0.753	0.298	6.19****
Family Practice	5	3.010	3.550	0.163	0.245	0.540	0.202	5.97***

Note. Maximum score = 4; minimum score = 1.

***$p < .005$

****$p < .001$

When comparing the two subgroups of residents' scores, the 3.010 pretest mean for the family practice group was higher than the 2.708 pretest mean for the internal medicine group. Posttest scores of 3.550 for family practice and 3.462 for internal medicine followed the same pattern. The gain score of 0.753 for internal medicine was greater, however, than the gain score of 0.540 for family practice. A calculated *t* value of 6.19 for the internal medicine subgroup and a 5.97 value for the family practice subgroup were significant beyond the .005 level.

Two independent raters were asked to view each resident's pre- and posttest, paired in random order, and to distinguish between the pair by stating which was the pretest and which was the posttest. The raters' accuracy in accomplishing this task is shown in Table 5. Rater A was able to correctly identify ten out of the 11 pairs while Rater B was able to identify nine. Both raters failed to distinguish between the same subject's pair of pre- and posttests (Subject #7). Examination of the breakdown of residents' individual scores (Table 5) into the four instructional skill categories shows that the pair of tests in question exhibited a lower posttest score in delivery skills than the pretest. The three other categories of organization, explaining, and audiovisuals, showed a gain from pre- to posttest. The second pair of tests (Subject #6), incorrectly identified by Rater B, had a very small gain in delivery skills compared to the other three subtests. Despite the errors in differentiation, subjects six and seven did obtain a gain in total score from pre- to posttest.

The first null hypothesis was rejected. A significant difference between the pre- and posttest means was obtained beyond the .001 level for the total videotaped group and beyond the .005 level for both sub-

Table 5

Rater Identifications of Residents' Pre- and Postests and Average, Assigned Scores[a] for the Four Subcategories of Skills and the Total Tests

Subject	Delivery		Organization		Explaining		Audiovisuals		Total		Identification of Pre- and Posttest	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Rater A	Rater B
1	2.15	2.81	2.22	3.17	2.50	3.00	1.00	1.00	2.30	2.88	C[b]	C
2	2.50	3.46	2.07	3.67	2.07	3.86	1.00	3.33	2.39	3.61	C	C
3	2.92	3.54	1.86	3.42	2.22	3.43	1.00	4.00	2.60	3.63	C	C
4	2.92	2.92	2.22	3.67	2.29	3.43	1.00	3.84	2.62	3.27	C	C
5	2.62	3.08	2.93	3.36	2.29	3.43	1.00	4.00	2.74	3.40	C	C
6	2.85	3.00	2.72	3.50	2.86	3.57	1.00	4.00	2.85	3.38	C	X[c]
7	2.85	2.74	2.64	3.50	3.15	3.50	3.84	4.00	2.99	3.20	X	X
8	3.08	3.58	2.57	4.00	3.00	3.93	3.33	4.00	3.06	3.80	C	C
9	3.12	3.46	2.71	3.77	3.15	3.79	3.33	3.84	3.10	3.66	C	C
10	3.08	3.50	2.65	3.58	3.15	3.79	4.00	4.00	3.16	3.69	C	C
11	3.50	4.00	3.22	4.00	3.29	4.00	3.33	4.00	3.49	4.00	C	C

Note. Maximum score = 4; minimum score = 1.

[a] Rounded to the nearest one hundreth.

[b] C = correct identification.

[c] X = incorrect identification.

groups of residents. Differences were prominent enough for independent raters A and B to correctly identify which tape was a pretest and which was a posttest in ten out of 11 and nine out of 11 cases, respectively.

H_{02}: There will be no significant differences in the residents' pre- to posttest mean gain scores when the four instructional skill categories measured by the ISEI are compared.

Analysis of the data for this hypothesis consisted of an examination of the mean gain scores on the four instructional skill categories and a comparison of the differences among these means. Table 6 contains pre- and posttest means, standard deviations, gain scores, and t values for the four instructional skill categories measured by the ISEI. Results are presented for the 11 of the 20 participants who were both pre- and posttested. Scores for the two subgroups of six internal medicine and five family practice residents are also given.

Significant gain scores beyond the .05 level occurred in all categories except in the family practice subgroup for use of audiovisuals. A gain score was exhibited in that area, but the greater variance in relation to mean difference produced a t value of 1.59 which was not significant at the accepted level. Upon examination of the audiovisual category for the total sample and for the internal medicine subgroup, a similar pattern of greater variance was demonstrated. The larger gain scores of 1.973 for internal medicine and 1.471 for the total sample, however, resulted in significant t values of 3.69 and 3.65, respectively, but at a lower level of significance than those for delivery, organization, and explaining. The most significant gain from pre- to posttest was achieved in the area of organization of content, with mastery of explaining skills following second.

Table 6

Means, Standard Deviations, Gain Scores, and *t* Values for Total Videotaped Group and Two Subgroups on Four Instructional Skill Categories

Group	N	Mean		Standard Deviation		Gain		
		Pretest	Posttest	Pretest	Posttest	Mean Difference	Standard Deviation	*t* Value
Total Population	11							
Delivery		2.872	3.281	0.357	0.394	0.409	0.306	4.43****
Organization		2.528	3.604	0.398	0.256	1.076	0.381	9.36****
Explaining		2.725	3.612	0.455	0.294	0.887	0.409	7.20****
Audiovisuals		2.166	3.637	1.356	0.897	1.471	1.337	3.65***
Internal Medicine	6							
Delivery		2.807	3.288	0.455	0.458	0.482	0.353	3.34**
Organization		2.385	3.572	0.498	0.280	1.187	0.392	7.42****
Explaining		2.538	3.548	0.459	0.355	1.010	0.470	5.26****
Audiovisuals		1.388	3.362	0.951	1.186	1.973	1.310	3.69**
Family Practice	5							
Delivery		2.950	3.272	0.213	0.354	0.322	0.249	2.90*
Organization		2.700	3.642	0.138	0.249	0.942	0.361	5.84***
Explaining		2.948	3.688	0.374	0.213	0.740	0.303	5.45***
Audiovisuals		3.100	3.968	1.212	0.072	0.868	1.221	1.59

Note. Maximum score = 4; minimum score = 1.

* $p < .05$ ** $p < .01$ *** $p < .005$ **** $p < .001$

To determine if significant differences in mastery of the four instructional skill categories occurred for the total group, t tests were computed between gain scores. A summary matrix of t values for these comparisons is presented in Table 7. Achievement in delivery skills deviated to the greatest degree from gains in organizational ($t = 5.43$, $p < .001$) and explaining skills ($t = 4.57$, $p < .001$). A significant difference was also disclosed between delivery skills and use of audiovisuals ($t = 2.59$, $p < .05$). The gain scores for delivery skills were significantly lower than those for the other three categories.

Table 7

Summary Matrix of t Values for Differences in Mastery of Four Instructional Skill Categories for Total Group

	Skill Categories		
	Organization	Explaining	Audiovisuals
Delivery	5.43****	4.57****	2.59*
Organization		1.70	0.99
Explaining			1.76

*$p < .05$ ****$p < .001$

On the basis of the significant t values for differences in mastery of the four instructional skill categories, the second null hypothesis was rejected.

H_{03}: Attitude toward participating in the program on teaching skills will have no relationship to the residents' total gain scores from the independent ratings of the pre- and posttests.

The retrospective pre-program attitude, post-program attitude, and gain score for each of the 11 pre- and posttested residents are contained in Table 8. Examination of the means for these two attitudes revealed a higher post-program mean (3.91), or more positive attitude toward a teaching skills program, than the retrospective pre-program mean (2.55). When each mean was correlated with the residents' gain scores, in both instances, a positive correlation was disclosed. The post-program attitude had a higher correlation (0.35) with gain scores than the retrospective pre-program attitude (0.17), but neither was significant at the .05 level.

Although the statistical findings revealed a positive correlation between attitude toward participating in the program and achievement of objectives (gain scores), the statistical findings were not at the accepted .05 level of significance. The rejection of the third null hypothesis could not be justified.

H_{04}: At the conclusion of the program, there will not be any residents who indicate on the program evaluation questionnaire, that their initial attitude toward participating in a teaching skills program had changed in a positive direction.

Table 9 contains listings of pre-program and post-program attitudes toward participating in a teaching skills program. The data were obtained from the responses to the program evaluation questionnaire completed by 14 residents. Initially, on a scale from one to five, two residents were very negative, four were negative, five were indifferent, three were

Table 8

Correlation of Pre- and Post-Program Attitudes Toward A Teaching Skills Program with Gain Scores from Pre- to Posttest

Subject	Retrospective Pre-Program Attitude	Post-Program Attitude	Gain[a] Scores
1	3	4	0.58
2	3	5	1.22
3	2	5	1.03
4	1	4	0.65
5	1	2	0.66
6	3	4	0.53
7	4	4	0.26
8	4	4	0.74
9	2	2	0.56
10	3	4	0.53
11	2	5	0.51
Mean	2.55	3.91	0.66
Correlation Coefficient	r = 0.17	r = 0.35	

Note: Attitude was based on a scale where 1 = very negative, 2 = negative, 3 = indifferent, 4 = positive, and 5 = very positive.

[a] The difference between the averaged pre- and posttest independent ratings, where maximum = 4 and minimum =1.

Table 9

Initial and Final Attitudes Toward Participating in a Teaching Skills Program as Viewed in Retrospect

Subject	Retrospective Pre-Program Attitude	Post-Program Attitude
1	3	4
2	3	5
3	2	5
4	1	4
5	1	2
6	3	4
7	4	4
8	4	4
9	2	2
10	3	4
11	2	5
12	3	4
13	4	5
14	2	5
Mean	2.64	4.07

Note: Attitude was based on a scale where 1 = very positive, 2 = negative, 3 = indifferent, 4 = positive, and 5 = very positive.

positive, none were very positive. At the conclusion of the program, none of the residents were very negative, two were negative, none were indifferent, seven were positive, and five were very positive.

The figures in Table 9 also reveal that, from the beginning to the conclusion of the program, all 14 residents either increased in attitude score or maintained the same one. None indicated the acquisition of a more negative attitude. These attitudal changes are summarized in Table 10.

Table 10

Summary of Residents' Attitude Changes Toward Participating in a Teaching Skills Program

Attitude	Number of Subjects[a]
Became more negative	0
Maintained same attitude	3
Became more positive	11

[a] $N = 14$

A chi-square analysis of the changes in residents' attitude toward participating in the program appears in Table 11. The initial attitude frequencies, categorized as negative, indifferent, or positive, served as the expected frequencies to which the final (observed) attitude frequencies were compared. The data yielded a chi-square value of 34.67 ($p < .001$) which indicated that a significant number of residents changed attitude in a positive direction.

The fourth null hypothesis was rejected since there was a highly significant number of positive attitudinal changes.

Table 11

Chi-Square Analysis of Initial and Final Attitude Toward Participating in a Program on Teaching Skills (N = 14)

	Negative	Indifferent	Positive
Pre-Program Attitude[a]	(6)	(5)	(3)
Post Program Attitude[b]	2	0	12
$X^2 = 34.67$****			

[a]Expected frequencies

[b]Observed frequencies

****$p < .001$

H_{05}: There will be no correlation of the residents' self-evaluation scores of their own videotaped posttests with the scores assigned by the independent raters to the same posttests.

The individual scores, means, and the correlation coefficient for the relationship between residents' self-evaluations of their posttests and rater evaluations of the same tests are given in Table 12. A positive but weak correlation of .11 was demonstrated between the two sets of figures. Residents consistently scored themselves lower than the raters did and frequently ranked themselves differently.

When the posttest was divided into the four instructional skill categories, as illustrated in Table 13, and examination of correlations

revealed one significant relationship in the area of audiovisual usage (.84, $p < .001$). Low correlations were found between rater and self-evaluations in the delivery, organizational, and explaining categories.

The fifth null hypothesis was not rejected. Statistical findings did not reveal a significant positive correlation, except in the audiovisual category, between rater and self-evaluations of videotaped posttests.

Table 12

Self-Evaluation Versus Rater Evaluation of Residents' Videotaped Posttest Teaching Performances

Subject	Total Posttest	
	Self	Rater
1	2.38	2.88
2	2.38	3.61
3	2.12	3.63
4	2.04	3.27
5	3.13	3.40
6	2.81	3.38
7	2.81	3.20
8	3.07	3.80
9	2.66	3.66
10	2.30	3.69
11	2.71	4.00
Mean	2.59	3.50
Correlation Coefficient r = .11		

Note. Maximum score = 4; minimum score = 1

Table 13

Self-Evaluation Versus Rater Evaluation on Four Skill Categories of Residents' Videotaped Posttests

Subject	Delivery		Organization		Explaining		Audiovisuals	
	Self	Rater	Self	Rater	Self	Rater	Self	Rater
1	2.42	2.81	2.33	3.17	2.57	3.00	1.00	1.00
2	2.46	3.46	2.17	3.67	2.57	3.86	2.00	3.33
3	2.00	3.54	2.33	3.42	2.00	3.43	2.33	4.00
4	1.85	2.92	3.00	3.67	2.29	3.43	2.00	3.84
5	3.23	3.08	3.29	3.36	3.14	3.43	3.00	4.00
6	2.42	3.00	3.33	3.50	3.00	3.57	3.00	4.00
7	2.78	2.74	2.71	3.50	3.00	3.50	2.67	4.00
8	3.15	3.58	3.00	4.00	3.14	3.93	3.00	4.00
9	2.92	3.46	2.43	3.77	2.67	3.79	2.33	3.84
10	2.08	3.50	2.29	3.58	2.14	3.79	2.33	4.00
11	2.85	4.00	2.83	4.00	3.14	4.00	2.33	4.00
Mean	2.56	3.28	2.70	3.60	2.70	3.61	2.36	3.64
Correlation Coefficient	$r = .16$		$r = .13$		$r = .27$		$r = .84^{****}$	

Note. Maximum score = 4; minimum score = 1.

$^{****}p < .001$

H_{06}: When asked to rank the four types of evaluative feedback received on their teaching, the residents will show no preference for self-evaluating the videotapes of their own teaching over instructor evaluation, peer evaluation, and viewing "models."

Responses to that portion of the program evaluation questionnaire, where residents were asked to rank self-evaluation via videotape, instructor evaluation, peer evaluation, and viewing models according to how helpful each was in affecting changes in teaching behavior, are shown in Table 14. A rank of one indicated most helpful while a four denoted least helpful.

Examination of the mean score for each of the four types of feedback in Table 14 discloses the preferred order. Instructor feedback ranked first, with a mean of 1.64, followed by self-evaluation via videotape, with a mean of 2.43. Viewing models was placed third with a mean of 2.89 and peer evaluation was considered least helpful with a mean of 3.07. Further inspection shows that self-evaluation via videotape ranked either fairly high (1st or 2nd) or low (4th) but never third.

To test for significant differences in preference for one of the four types of evaluative feedback, a chi-square analysis was performed. The expected frequency for each of the four cells was 3.5, or 25 percent of the 14 possible responses. The observed frequencies were derived from the responses given on the questionnaire. Table 15 presents a summary of the frequencies and the chi-square values for their distributions.

Examination of the columns in Table 15 shows self-evaluation and instructor feedback to be ranked first much more often than

Table 14

Residents' Preference in Forms of Evaluative Feedback Received on Teaching

Subject	Order of Preference			
	Instructor	Self	Models	Peer
1	2	4	3	1
2	1	2	3	4
3	2	1	3	4
4	1	2	3	4
5	4	2	1	3
6	2	1	3	4
7	1	4	3	2
8	2	1	3	4
9	2	1	4	3
10	2	4	1	3
11	1	2	4	3
12	1	4	3	2
13	1	2	3	4
14	1	4	3	2
Mean	1.64	2.43	2.89	3.07

Note. The four types of feedback were ranked from 1 to 4 with 1 representing the most helpful in affecting changes in teaching behavior and 4 the least helpful.

Table 15

Chi-Square Analysis of the Residents' Preference in Forms of Evaluative Feedback Received on Teaching

Feedback	Frequencies for Ranks[a]				χ^2
	1st	2nd	3rd	4th	
Instructor	7	6	0	1	10.57**
Self-Evaluation	4	5	0	5	4.86
Models	2	0	10	2	16.86****
Peer	1	3	4	6	3.67
χ^2	5.99	6.00	19.13****	4.86	

[a] The expected frequency in each case was 3.5 or 25% of the 14 responses.

**$p < .01$ ****$p < .001$

peer evaluations or viewing models. Self-evaluation was not the most preferred form, as hypothesized, but did rank either first or second most of the time. Instructor feedback was most preferred, having the highest frequency in both first and second place.

A chi-square analysis of the columns in Table 15 produced only one significant value which was for column three. The frequency of ten, which ranked viewing models in third place, was significantly different from the expected distribution beyond the .001 level. Although not significant at the .05 level, there was a skewed distribution in columns one and two indicating a preference for instructor and self-evaluation.

In Table 15 there are two significant chi-square values for the rows, in which the frequency distribution for each of the four types of feedback is shown. The distribution for instructor feedback, predominantly in first or second place, had a chi-square value of 10.57

which was significant beyond the .01 level. The placement of viewing models mainly in third place produced a chi-square value of 16.86 which was significant beyond the .001 level.

The sixth null hypothesis was not rejected since results did not show a significant preference for self-evaluation via videotape over instructor and peer evaluation and viewing models. Instructor feedback was the preferred mode.

Data, in addition to that related to the six hypotheses were computer analyzed to gain further information for the evaluation of the program. Some significant findings are presented.

Five Pearson Product-Moment correlations were calculated between variables which were thought to have some relationship to other factors evaluated in the program. Table 16 presents a summary of these correlations. One very significant positive relationship between residents' pre-program attitude and attendance was obtained. The residents having the most negative initial attitudes were shown to have the poorest attendance record and vice versa. Another strong positive relationship, although not significant at the .05 level, occurred between residents' age and the pre-program attitude with the older residents tending to have the more positive attitudes. No significant correlations were found between age and attitude toward being videotaped, between age and total gain score, or between the number of absences and total gain score.

A needs assessment questionnaire was administered to the residents before the program began. On one portion of the instrument, residents were asked to indicate, on a one to five scale, their interest in learning about various aspects of instruction. The residents' responses are illustrated in Table 17. Greatest interest was expressed in teaching

Table 16

Correlations Between Selected Factors and Residents' Attitude, Attendance, and Achievement

Factor	Correlation Coefficient	Probability Level
Age: Pre-Program attitude	.42	.06
Age: Attitude toward being videotaped	.27	.17
Age: Total gain	.21	.26
Pre-Program attitude: No. of absences	.53	.02*
Number of absences: Gain score	.17	.30

* $p < .05$

on rounds, with a total of 90% positive responses. Lecturing and discussion followed next, both having a total of 84% positive responses. These were succeeded by questioning and demonstration, each with 74%. Developing instructional packages, evaluation of students, and self-evaluation received the least expressed interest. Overall, there were few negative responses by the residents about any of the instructional techniques.

Five questions of importance in planning the program were posed to the residents on the needs assessment questionnaire. Their responses are contained in Table 18. In answer to question number one, most residents indicated they were willing to expend some effort to improve their teaching skills and felt the residency period was a good time for such an endeavor (question number two). Few residents expressed negative feelings in response to questions one and two. Concerning teaching

Table 17

Residents' Expressed Interest in Learning About Various Instructional Techniques as Indicated on the Needs Assessment Questionnaire (N =19)

Skill	Very Negative	Negative	Indifferent	Positive	Very Positive
Developing Objectives	0%	0%	37%	53%	10%
Planning and Organizing	0%	0%	37%	47%	16%
Instructional Packages	5%	5%	47%	32%	11%
Lecturing	0%	5%	11%	42%	42%
Questioning	0%	21%	5%	32%	42%
Discussion	0%	0%	16%	42%	42%
Audiovisuals	0%	5%	26%	48%	21%
Teaching on Rounds	0%	0%	10%	32%	58%
Demonstration	0%	10%	16%	37%	37%
Evaluation of Students	0%	21%	32%	16%	31%
Self-Evaluation	0%	0%	37%	26%	37%

Table 18

Residents' Responses to Five Questions on the Needs Assessment Questionnaire (N = 19)

Questions and Responses				
1. "How willing are you to spend one hour in a group session and one to two hours of independent study per week for 13 weeks to improve your teaching skills?"				
Very Negative	Negative	Undecided	Positive	Very Positive
0	3	3	10	3
2. "Do you feel the residency period is a good time to offer a teaching skills program?"				
Very Negative	Negative	Undecided	Positive	Very Positive
1	2	3	4	5
3. "Have you had any prior teaching experience?"				
Yes - 13		No - 6		
4. "Have you had any prior training in educational methodology?"				
Yes - 3		No - 16		
5. "How does teaching fit into your future professional plans?"				
Education of patients = 16 Presentations to professional organizations = 12 Practitioner/Part-time educator = 10 Full-time clinical instructor = 1 Teaching students in other health care professions = 3				

experience and training, elicited by questions three and four, most residents had assumed instructional responsibilites at some point in their medical education, but most never had any training for teaching. In question five, when asked how teaching fits into their future

professional plans, most residents selected education of patients, presentations to organizations, and being a practitioner/part-time educator.

At the conclusion of the teaching skills program, an evaluation questionnaire was completed by the residents. The first section obtained feedback on the residents' degree of satisfaction with various components of the program. This information is displayed in Table 19. There was a generally high degree of satisfaction with most aspects of the program and 72% of the residents were positive about having had the opportunity to participate in the program. Components eliciting noticeable dissatisfaction were in the areas of the duration of the program, the amount of time spent in practice sessions, the time required to complete outside assignments, the size of the group, and the use of videotaping.

To determine if any differences in degree of satisfaction existed between the two subgroups of residents, responses were tabulated by department. The areas exhibiting prominent variations are revealed in Table 20. Twenty-five percent of the internal medicine residents and 67% of the family practice residents were dissatisfied with the duration of the program. Concerning amount of time spent practicing skills, 12.5% of the internal medicine residents were dissatisfied compared to 34% of the family practice physicians. The situation changed, however, when the size of the group was considered, with 62.5% of internal medicine individuals being dissatisfied and none of the family practice residents indicating dissatisfaction. More family practice physicians (66%) were dissatisfied with the amount of time required to complete the outside assignments compared to the internal medicine residents (12.5%) All

Table 19

Residents' Degree of Satisfaction with Different Components of the Teaching Skills Program as Indicated on the Program Evaluation Questionnaire (N = 14)

Component	Degree of Satisfaction[a]				
	1	2	3	4	5
Duration of program	7%	36%	14%	14%	29%
Duration of sessions	0%	7%	14%	50%	29%
Time of year	7%	0%	79%	7%	7%
Skills emphasized	0%	0%	0%	57%	43%
Teaching methods used	0%	7%	7%	43%	43%
Amount of "practice" time	14%	7%	14%	43%	22%
Handouts	7%	0%	7%	36%	50%
Audiovisuals used	0%	0%	21%	29%	50%
Size of group	7%	29%	21%	29%	14%
Time required to complete assignments	14%	21.5%	14%	29%	21.5%
Use of videotaping	14%	7%	21%	36%	36%
Having the opportunity to participate in this program	0%	7%	21%	36%	36%

[a] 1 = very dissatisfied
2 = dissatisfied
3 = indifferent
4 = satisfied
5 = very satisfied

Table 20

Analysis of Responses by Department on Components of Program which Elicited Dissatisfaction

Component	Degree of Satisfaction[a] 1		2		3		4		5	
	I. M.[b]	F. P.[c]	I. M.	F. P.	I. M.	F. P.	I. M.	F. P.	I. M.	F. P.
Duration of program	0%	17%	25%	50%	0%	33%	25%	0%	50%	00%
Amount of "practice" time	12.5%	17%	0%	17%	12.5%	17%	50%	33%	25%	17%
Size of group	12.5%	0%	50%	0%	0%	50%	25%	33%	12.5%	17%
Time required to complete assignments	0%	33%	12.5%	33%	25%	0%	25%	33%	37.5%	0%
Use of videotaping	0%	0%	0%	17%	0%	50%	37.5%	33%	62.5%	0%

[a] 1 = very dissatisfied, 2 = dissatisfied, 3 = indifferent, 4 = positive, 5 = very positive

[b] I. M. = Internal Medicine Department; n = 8

[c] F. P. = Family Practice Department; n = 6

internal medicine residents were satisfied (37.5%) to very satisfied (62.5%) with the use of videotaping for self-evaluative purposes. In contrast, only 33% of the family practice residents were satisfied, the majority being indifferent (50%) or negative (17%) with the videotaping of their teaching.

The second section of the evaluation questionnaire elicited responses from the residents about the value they placed on the different skills learned in the program. Examination of Table 21 reveals that only a small percentage viewed any of the skills as having little value, and another small percentage were undecided. The large majority of residents found the new skills, as well as the entire program, to be of value.

When comparing the ratings by department, presented in Table 22, differences are again noticeable. All but one negative response about the skills learned in the program was given by a family practice resident. The internal medicine group placed "great value" on the skills more frequently than those in family practice. Overall, the internal medicine ratings for the individual skills and the program, in general, were higher than the ones from family practice.

Two questions were posed to the residents on the evaluation questionnaire regarding the continued offering of the program. The questions and answers supplied by the residents are shown in Table 23. The large majority of residents expressed the view that the program should be offered regularly, but on a voluntary basis. The internal medicine group expressed more "yes" responses for the continuation of the program, however, and was the group to have three residents who supported "required" attendance.

Table 21

Residents' Perceived Value of Skills Learned in Program (N = 13)

Skill	No Value	Little Value	Undecided	Moderate Value	Great Value
Objectives and planning	0%	8%	15%	46%	31%
Leading a discussion	0%	8%	15%	69%	8%
Questioning	0%	15%	15%	39%	31%
Use of audiovisuals	0%	0%	0%	31%	69%
Demonstration	0%	8%	15%	23%	54%
Lecture	0%	8%	8%	46%	39%
Activities and practice sessions	0%	8%	31%	46%	15%
Total program	0%	8%	8%	62%	23%

Table 22

Residents' Perceived Value of Skills Learned in Program According to Department

Skill	No Value		Little Value		Undecided		Moderate Value		Great Value	
	I.M.[a]	F.P.[b]	I.M.	F.P.	I.M.	F.P.	I.M.	F.P.	I.M.	F.P.
Objectives and planning	0%	0%	0%	20%	12.5%	20%	37.5%	60%	50%	0%
Leading a discussion	0%	0%	0%	20%	25%	0%	62.5%	80%	12.5%	0%
Questioning	0%	0%	12.5%	20%	25%	0%	25%	60%	37.5%	20%
Use of audiovisuals	0%	0%	0%	0%	0%	0%	12.5%	60%	87.5%	40%
Demonstration	0%	0%	0%	20%	12.5%	20%	12.5%	40%	75%	20%
Lecture	0%	0%	0%	20%	0%	20%	37.5%	60%	62.5%	0%
Activities and practice sessions	0%	0%	0%	20%	37.5%	20%	37.5%	60%	25%	0%
Total program	0%	0%	0%	20%	12.5%	0%	50%	80%	37.5%	0%

[a] I.M. = Internal Medicine Department; N = 8

[b] F.P. = Family Practice Department; N = 5

Table 23

Residents' Responses to Two Questions on the Program Evaluation Questionnaire About the Continued Offering of the Teaching Skills Program (N = 14)

1. "Do you think this program should be offered on a regular basis to new residents?"

	Yes	Undecided	No
Total group	10	3	1
Internal Medicine	7	1	0
Family Practice	3	2	1

2. "Should this program be offered on a voluntary basis or required of all residents?"

	Voluntary	Required
Total Group	11	3
Internal Medicine	5	3
Family Practice	6	0

Hypothesis four involved residents' attitudes toward participating in a teaching skills program. Findings revealed that there was a significant change in attitude, in a positive direction, from the beginning to the conclusion of the program, and the null hypothesis was rejected. Examining the attitude changes by department became important, however, in relation to other differences that became apparent.

The pre- and post-program attitude means toward being involved in the program are presented by department and for the total group in Table 24. Examination of the data in Table 24 discloses a slightly more positive pre-program attitude for family practice (2.83) than

internal medicine (2.50), but a much more positive post-program attitude (4.63) for internal medicine than family practice (3.33).

Table 24

Attitude Means for Total Group and Two Subgroups of Residents Toward Participating in a Teaching Skills Program

Group	Number	Attitude Means[a]	
		Pre-Program	Post-Program
Total	14	2.64	4.07
Internal Medicine	8	2.50	4.63
Family Practice	6	2.83	3.33

[a] Maximum = 5 (very positive); minimum = 1 (very negative)

The final factor to be considered was changes in residents' attitude toward having their teaching videotaped. Many were negative about such a procedure in the beginning of the program. The question was, "Would the experience of being videotaped and self-evaluating one's teaching generate more positive attitudes toward the use of this media in the program?" Inspection of Table 25 provides the answer. For many residents, attitude toward being videotaped became more positive after having the experience. For a small number, the procedure was unpleasant and negative feelings continued.

A chi-square analysis of the changes in frequency distribution, from the residents' initial attitudes toward being videotaped to their attitudes at the conclusion of the program, was performed. Table 26 illustrates the results of this analysis. The pre-program attitudes served as the expected frequencies and the post-program attitudes as the

observed ones. A chi-square value of 28.67 was obtained which was significant beyond the .001 level. The number of residents becoming more positive toward being videotaped was highly significant.

Table 25

Residents' Pre- and Post-Program Attitude Toward Having Their Teaching Videotaped (N = 14)

Attitude	Very Negative	Negative	Indifferent	Positive	Very Positive
Pre-Program	14%	29%	43%	7%	7%
Post Program	14%	7%	14%	22%	43%

Became more negative: 14%
Maintained the same attitude: 21%
Became more positive: 65%

Table 26

Chi-Square Analysis of Residents' Pre- to Post-Program Attitude Changes Toward Having Their Teaching Videotaped (N = 14)

	Negative	Indifferent	Positive
Pre-Program(e)	6	6	2
Post-Program(o)	3	2	9

$\chi^2 = 28.67^{****}$

(e)expected frequency (o)observed frequency

$^{****}p < .001$

As a result of the findings, hypotheses three, five, and six were not rejected while hypotheses one, two, and four were. The program was judged as successful by the majority of residents.

CHAPTER 5

SUMMARY

Introduction

This chapter presents the findings based on the analysis of the data, conclusions drawn from those findings, and recommendations for future study.

Findings

The data were computer analyzed and six null hypotheses were tested for significance beyond the .05 level. As a result of the intensive analysis of the data collected, the following findings were made:

1. It was found that there was a significant mean gain score from the pre- to the posttest of the residents' independently-rated, videotaped teaching performances.

2. The mean gain score for delivery skills was found to be significantly lower than those for the organization, explaining, and use of audiovisuals categories.

3. A positive, but not significant, correlation was found to exist between the residents' post-program attitude and their total gain score.

4. At the conclusion of the program, a significant number of residents were found to have experienced a positive change in attitude,

from that originally held, toward participating in a teaching skills program.

5. No significant correlation was found between residents' self-evaluation scores and the independent raters' scores assigned to the same posttests.

6. When residents were asked to rank the four types of evaluative feedback received on teaching during the program, instructor critique and self-evaluation via videotape were ranked higher than viewing models and peer evaluation. Instructor critique seemed to be the most preferred.

Additional analyses of questionnaire and related data revealed other important findings. The residents' pre-program attitude was found to have a highly significant relationship to attendance, and residents' age seemed to be positively related to their pre-program attitude toward a teaching skills program.

On the needs assessment questionnaire, residents were found to have greatest interest in learning more about teaching on rounds, lecturing, leading a discussion, questioning, and demonstration techniques. Most residents had some previous teaching experience, but no training for teaching, and seemed to feel that the residency period was an appropriate time to improve instructional skills. Plans for use of teaching skills were found to be related mainly to patient education, giving presentations to groups, and serving as a practitioner/part-time instructor.

On the program evaluation questionnaire, administered at the conclusion of the program, most resident physicians appeared to be satisfied with their training experience. Factors generating greatest

satisfaction were found to be the skills emphasized in the program (100%), the teaching methods used (86%), the instructional packages and related materials (86%), and the audiovisuals used (79%). Factors eliciting dissatisfaction were found to be: (a) the duration of the program (viewed as too long by many family practice and two internal medicine residents); (b) the amount of time devoted to practice (more seemed to be preferred by internal medicine residents and less by family practice); (c) the size of the group (seen as too small by several internal medicine residents); (d) the time required to complete the assignments (too great for some residents in family practice); and (e) the use of videotaping (seemed to be less highly regarded by the family practice group).

Internal medicine residents appeared to place greater value on the skills learned and on the program, as a whole, than did the family practice group. Eighty-five percent of all the residents, however, did appraise the program as being valuable. As indicated on the questionnaire, gaining skill in use of audiovisuals (100%) and lecturing (85%) seemed to be most appreciated by all residents.

Concerning attitude toward participating in a teaching skills program, internal medicine residents demonstrated a greater positive gain in attitude, from the beginning to the conclusion of the program, than did the family practice residents. In addition, the internal medicine group were found to exhibit more satisfaction with the components of the program, place a higher value on the skills learned during the 13 weeks, and have a larger gain score than did family practice. Most residents expressed the opinion that the program should be offered regularly but on a voluntary basis.

Attitude toward having one's teaching videotaped was found to have changed significantly in a positive direction from the beginning to the end of the program. A small number of residents were found who remained negative about being videotaped, but most seemed to view the experience as a helpful one.

Conclusions

Based upon the findings of this study, the following conclusions were drawn:

1. Short training programs could be conducted during the residency period which produce significant, observable changes in physicians' teaching behavior. Care was taken to plan a program that satisfied needs, was judged as relevant, encouraged active participation in a nonthreatening atmosphere, kept the use of educational terminology to a minimum, and was conducted by an instructor who could serve as a model of the desired teaching behaviors.

2. An equal gain in mastery of skills might not be demonstrated. Skills, such as those used in delivery techniques, seemed to require a more prolonged and concentrated effort to modify behavior. Habits may have to be changed or eliminated and self-confidence developed. Organizational and explaining skills and the use of audiovisuals seemed easier to improve. Optimal use of questioning techniques, not evaluated by the independent raters because of small group sizes during posttesting, also appeared to require greater time and effort for mastery, as noted by the program coordinator during the training sessions.

3. Attitude and achievement were positively correlated, but the post-program attitude seems to have a greater relationship to achievement

than the pre-program one. Since a significant number of residents changed their attitude in a positive direction during the program, the modified attitudes may be more likely to influence participation and expended effort. The small sample size may have been a limiting factor to obtaining more conclusive results.

4. Attitudes toward participating in a teaching skills program may be changed in a positive direction. A well-conducted, relevant program which presents educational methodology in a meaningful and practical manner was found to be accepted by the majority of residents. Some of the participants may have very negative attitudes, however, which are not alterable.

When assessing pre- and post-program attitudes, a retrospective rating of residents' initial attitude seems to be more valid than a pre-program evaluation. Records maintained by the program coordinator confirmed this position. Additional support was offered in another study (Howard, Schmeck, and Bray, 1979) which found the comparison of ratings on self-report instruments to be invalid if the standard of measurement changes between the pre- and posttest. Findings favored the retrospective posttest design in providing a measure of self-reported change.

5. Residents might not evaluate their own teaching in the same manner as the independent raters. The residents' scores were generally lower than those assigned to the same teaching performances by the independent raters, a familiar occurrence whenever self-evaluations are utilized. The lack of significant positive correlation between residents' and raters' evaluation scores may be attributed to the residents' lack of familiarity with and instruction in the use of the ISEI, compared

to the raters who received six hours of concentrated training. Residents' evaluation skills did seem to improve during the program, as evidenced by their more critical and perceptive peer and self-evaluations.

6. Preferences in type of feedback on teaching is likely to vary with individuals, but instructor critique and self-evaluation via videotape seem to be favored. Initial attitudes toward being videotaped were frequently found to be negative. After the experience, however, a significant number of attitudes were found to be much more positive and the experience viewed as beneficial. The smallness of several of the groups might partially account for the low ranking of peer evaluation. A larger sample might have produced more conclusive results.

7. Residents' achievement and attendance seem to be influenced by attitude toward participating in a teaching skills program. The residents' initial attitude was shown to have significantly influenced program attendance. Many of the beginning negative attitudes were changed to positive ones, however, if the residents elected to attend the beginning sessions and become involved in the program. Why some residents, who have a negative attitude, are not willing to participate in a teaching skills program and others are, can not be explained from the results of the data. Individual personality factors and unknown influential variables are likely to be involved. Most of the expressed, hostile attitudes were related to feelings that (a) teaching was not a priority item and the time should be expended learning "medicine", (b) first year residents had heavy patient responsibilities and had no time for such a program, and (c) prior experience with similar programs had proved to be a waste of time. The changed or post-program attitude

seemed to have a greater influence on the participants' achievement than the initial one. Changed attitudes were generally found to be reflected in an increased effort and improved attendance.

Why a low correlation between attendance and achievement was obtained when both of these variables were found to be related to attitude may be explained by several factors. The sample size was small, and attitudes changed at different intervals during the program. Other factors might include conflicts in priorities for time, prior teaching experience, innate abilities, the number of practice sessions attended, and participation in self-evaluation via videotape.

8. The age of a resident may be a contributing factor to initial attitude toward a teaching skills program. Generally, the "older" residents were found to have a more positive attitude, better attendance, and some of the greatest gain scores.

9. Most residents, having very little training in educational methodology, may require assistance, particularly with planning for instruction, organizing content, effectively using audiovisuals, using questioning techniques, improving delivery skills, and realizing that teaching isn't simply "telling". There is a low priority placed upon the improvement of such skills, however, and the residents may not be convinced of the benefits of such a program.

10. The same program may not be evaluated in the same manner by residents in different departments. Components that one group finds satisfactory may be perceived as unsatisfactory by another group. Many extenuating circumstances such as the structure of the residency program, patient responsibilities, environmental conditions, size of the group,

conflicts of time and interests, interruptions, scheduled meeting times, and attitude of senior residents might be confounding variables.

11. There appears to be no single optimal duration for a teaching skills program. The variables mentioned with conclusion number ten preclude such a judgment. Thirteen weeks seemed excessively long to one group of residents but not to the majority in the other group.

12. One-hour long sessions seem to be satisfactory. This may be the result of habit more than preference, since most conferences are scheduled for one hour.

13. Most residents may be expected to spend little time on outside assignments even though there is an expression of intent. A demanding schedule and priorities for time were found to be limiting factors for even the most interested.

14. The residency period appears to be a good time to offer a teaching skills program. Assistance with the preparation of grand rounds presentations and the development of skills necessary in clinical teaching and in instructing patients were found to be needed by most residents.

This study indicated that the need for improved instruction in medical education could be partially met by the development of teaching skills programs for resident physicians. Such programs may be successful, but many obstacles to planning, implementing, and conducting them exist.

The success of any program is, to a great extent, dependent upon the intrinsic motivation and attitudes of the participants. Individuals must want to improve their teaching skills and be willing to devote the necessary time. Such is not the prevailing attitude of most physicians.

The viewpoint persists that knowledge of content is sufficient preparation for teaching. Courses in teaching methods are generally viewed with hostility and are judged as irrelevant. Changing the residents' attitudes and motivating them might become two of the primary goals of a program coordinator. Educating the residents about the importance of their instructional role and utilizing the videotape medium for self-evaluation are two early strategies which may be employed for this purpose. Providing ample opportunity for active participation and practice in a nonthreatening, democratic atmosphere seemed to help create positive attitudes and facilitate learning.

The experience of working with resident physicians may be both frustrating and rewarding. The potential for becoming effective instructors was found to be present in many of the physicians, but unlocking that potential became a challenge. Conflicts for time and physical "tiredness" of the residents were frequent obstacles.

The program instructor need not be a physician to be effective. Educational specialists have skills which can help physicians improve their instruction. Having a biological science background did prove helpful to the program coordinator, however, in understanding the language of medicine. Having a physician educator present in some of the practice sessions may have benefited those residents who expressed particular problems with the application of educational principles to the medical setting. Most residents, however, seemed to be able to apply the new knowledge from the instruction and examples provided.

The opportunity to learn instructional skills seems to be appreciated by many resident physicians. To illustrate this point, the

following list of comments made by residents, orally and on the evaluation questionnaire, is presented:

"Using those transparencies is really easier and more effective than a blackboard."

"I feel so much more confident in preparing a grand rounds presentation since the program."

"Now when I hear a good or bad speaker, I know why it was good or bad."

"I wish we could critique the people we have to listen to in conferences."

"I had never used an audiovisual before. I didn't even know how to put slides in the tray."

"I really needed help with planning a talk."

"We really have a lot to learn!"

"This course was extremely well done and beneficial."

"Having the opportunity to speak in front of a group and then be critiqued has been so helpful."

"Thanks a lot! I needed this."

As physicians acquire an appreciation for their important instructional role, either as teachers in classrooms and clinical settings, as preceptors, or as instructors of their patients, attitudes toward developing effective teaching skills may become more positive. Educational and medical specialists, working together, could plan and conduct relevant, practical programs which may assist physicians in acquiring these skills. The residency program seems to be a good time for such an endeavor.

Recommendations

On the basis of the findings of this study the following recommendations were made:

1. A teaching skills program should become an integral part of the residency period, and cooperation from participating departments in the planning, scheduling, and implementing of the program should be obtained.

2. Participation in the teaching skills program should be voluntary but strongly encouraged. Considering the prevailing attitude toward, and low priority placed upon teaching by the medical profession, a strictly voluntary offering of such a program would probably generate very few participants. Had many of the residents followed their initial feelings and had not been encouraged to participate in the program, few would likely have done so. Since a highly significant number of residents became positive about the program, after being involved, strong encouragement for residents to participate might definitely be worthwhile. Requiring continued attendance when attitudes remain negative could create hostility which might be detrimental to the group.

3. Inasmuch as possible, the scheduling of the program should be at a time of year when interruptions by vacations, rotations, and meetings would be at a minimum.

4. An attempt should be made to coordinate the program at a time when many residents have grand rounds presentations to prepare. The immediacy of the need might result in greater motivation and provide a practical application for some of the skills. In addition, a session

in which residents teach actual medical students or fellow residents, under supervision, should be tried.

5. Scheduling a program session immediately following another conference, which happened with the family practice group, should be avoided. Such a situation was not found to be conducive to learning.

6. The same instructor(s) should meet regularly with the residents in order to develop a trusting, working relationship, wherein residents feel free to request assistance and their strengths and weaknesses are known to the instructor.

7. A physician educator should be utilized, in conjunction with an education specialist, in sessions where application of educational principles to the medical setting is practiced. This would assist those individuals requiring more specific assistance.

8. Residents should be given continued support and feedback as they begin to implement their teaching skills in the clinical setting. Studies show that individuals will tend to discontinue new behavior if the behavior is not performed or valued by the group in which the individual finds himself.

9. Experimentation with different session lengths and program durations should be undertaken since many residents indicated a preference for a shorter program. In view of the fact that the residents did not suggest eliminating any of the skills, and some even requested additional practice time, a minimum of 12 contact hours was recommended.

10. A group size of four to five residents was recommended for program sessions. Frequent absences in some small groups of three was found to reduce the effectiveness of group interaction and peer feedback. The larger group of seven sometimes prevented all participants from

having the opportunity to teach and be critiqued. A corollary problem associated with the larger group was the arrangement of schedules for videotaping and instructor critique without consuming excessive program time.

11. Microteaching is an effective tool for practicing teaching skills in a small group setting and should be utilized in teaching skills training programs. Most residents reacted favorably to the method and appreciated prompt feedback. The significant improvement from pretest to posttest and the change in attitudes were attributed, in part, to the use of this method in conjunction with videotaping.

12. Self-evaluation via videotape feedback should be utilized in teaching skills programs considering the documented strength of this medium to act as a strong motivator for change, and the significant number of residents who did exhibit a positive change in attitude toward the use of the procedure. Effective instructor feedback, in combination with this method, seemed to be preferred, however, to a strictly independent self-evaluation. Because the use of videotaping is a relatively expensive undertaking in both manpower and resources, the medium should be used together with other methods.

13. A teaching skills program of short duration should be developed to meet the needs of full and part-time clinical faculty and other health professionals, such as nurses and social workers, who instruct residents.

14. Microteaching and videotaping procedures used in this program should be incorporated into traditional teacher education programs which usually contain the three basic components of course work, observations in the schools, and student teaching. Using the microteaching method of examining and practicing individual instructional skills in a low-

risk environment can assist the beginning teacher in gaining experience. In turn, the transition to the actual classroom is facilitated and theory is related to practice earlier in the program.

15. A follow-up study on the degree to which residents implement their newly acquired teaching skills should be conducted.

16. The question as to why physicians have such negative attitudes toward teaching should be explored.

17. Further research into what constitutes effective clinical teaching should be conducted in order for educational specialists to better assist physicians in the application of educational principles.

18. This study should be replicated, using a larger sample, to determine the validity of the findings and to obtain more conclusive results on certain factors, such as the relationship between residents age and attitude toward a teaching skills program.

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APPENDIXES

APPENDIX A

PRE-PROGRAM TEACHING ASSIGNMENT

You will have one week to prepare a 15 minute presentation on a topic of your choice which has been approved by your departmental chairperson or director. Adhere to the following guidelines when preparing for your presentation.

1. Prepare a written statement of aims and/or objectives for the topic you plan to present.

2. Divide the 15 minute time allotment between a brief lecture of five to seven minutes and a discussion period of eight to ten minutes. Prepare a written list of questions that would be appropriate to ask the group about your topic, and utilize some of these questions as you lead the discussion.

3. You may use audiovisuals during your presentation if you wish.

4. Your statement of aims/objectives and your list of questions will be collected following your presentation and kept for future reference.

Your presentation will be videotaped for the purpose of assessing needs and providing you with feedback on your own teaching at the beginning of the program.

APPENDIX B

Name _____

INSTRUCTIONAL SKILLS NEEDS ASSESSMENT

Rate your responses to the following statements on a 1 - 5 scale by circling the appropriate number. Use the following criteria:

1= very negative
2= negative
3= indifferent
4= positive
5= very positive

A. Indicate your interest in knowing more about the following topics as they relate to clinical teaching, education of patients, presentations to physicians, etc.:

1. Developing and stating aims and objectives.	1 2 3 4 5
2. Planning and organizing for teaching.	1 2 3 4 5
3. Developing an instructional package.	1 2 3 4 5
4. Delivering an effective lecture.	1 2 3 4 5
5. Questioning techniques.	1 2 3 4 5
6. Leading a discussion.	1 2 3 4 5
7. Use of audiovisuals.	1 2 3 4 5
8. Teaching at bedside or on rounds.	1 2 3 4 5
9. Demonstration techniques.	1 2 3 4 5
10. Evaluating student performance.	1 2 3 4 5
11. Evaluating your own teaching effectiveness.	1 2 3 4 5
12. Other. _____.	1 2 3 4 5
_____.	1 2 3 4 5
_____.	1 2 3 4 5

B. Place an asterisk * to the left of three topics listed above which hold the highest priority for you. Include any others you may have added to the list when prioritizing.

C. Using the rating scale explained at the beginning of the questionnaire, answer the following questions.

1. Are you interested in participating in a program designed to improve teaching skills?	1	2	3	4	5
2. How do you feel about having your teaching being videotaped in such a program?	1	2	3	4	5
3. Do you feel comfortable with the idea of teaching?	1	2	3	4	5
4. Are you willing to spend a reasonable amount of time to improve your teaching skills (one hour in a group session and 1-2 hours of independent study per week for approximately 13 weeks)?	1	2	3	4	5
5. Do you feel the residency period is a good time to offer a program on improving teaching skills?	1	2	3	4	5

Comments:

D. Have you had any prior teaching experience? Yes _____, No _____
If yes, explain the nature of the experience.

E. Have you had any prior training in educational methodology (courses, workshops, etc.)?
Yes _____, No _____
If yes, explain the nature of the training.

F. How does "teaching" fit into your future professional plans? Check response(s) which apply.

_____ Education of patients

_____ Practitioner/part-time educator

_____ Clinical teacher - full time

____ Teaching students in other health care professions

____ Presentations to professional and community organizations.

____ Other. _____

Comments:

APPENDIX C

PROGRAM EVALUATION QUESTIONNAIRE

A. On a scale of 1 - 5, rate your degree of satisfaction with the following aspects of the program by circling the appropriate number. Use the following criteria:

1	2	3	4	5
Very Dissatisfied	Moderately Dissatisfied	Indifferent	Moderately Satisfied	Very Satisfied

1. The duration of the program.	1	2	3	4	5
2. The duration of each session.	1	2	3	4	5
3. The time of year in which the program was offered.	1	2	3	4	5
4. The teaching skills emphasized in the program.	1	2	3	4	5
5. The methods used to teach the skills in the program.	1	2	3	4	5
6. The amount of time devoted to "practicing" skills.	1	2	3	4	5
7. The printed material handed out for instructional and reference purposes.	1	2	3	4	5
8. The audiovisuals used throughout the program.	1	2	3	4	5
9. The size of the group.	1	2	3	4	5
10. The amount of time required to complete the outside assignments given during the program.	1	2	3	4	5
11. The use of videotaping to evaluate your teaching.	1	2	3	4	5
12. Other (fill in the blank if you wish to evaluate a factor not listed). _____	1	2	3	4	5
13. Rate how you now feel about having had the opportunity to participate in the program.	1	2	3	4	5

B. Using the scales which follow, <u>circle</u> the attitude you initially had toward participating in this program and then circle the attitude you now have after participating in the program.

<u>Initial attitude</u>:

Very negative, negative, indifferent, positive, very positive

<u>Present attitude</u>:

Very negative, negative, indifferent, positive, very positive

C. On a scale of 1 - 5 assess each of the following topics included in the program according to its personal value to you. Use the following criteria and circle the appropriate number.

1	2	3	4	5
No Value	Little Value	Undecided	Moderate Value	Great Value

1. Stating objectives and planning and organizing for teaching.	1	2	3	4	5
2. Leading a discussion.	1	2	3	4	5
3. Questioning techniques	1	2	3	4	5
4. Use of audiovisuals.	1	2	3	4	5
5. Demonstration techniques.	1	2	3	4	5
6. Presenting a lecture.	1	2	3	4	5
7. The activities and practice sessions.	1	2	3	4	5
8. Other (fill in if you so desire).					
_____	1	2	3	4	5
9. Assess the overall value of the entire program.	1	2	3	4	5

D. Do you think this program should be offered on a regular basis to new residents?

Yes _____ No _____ Undecided _____

E. Check one: This program should be (1) on a voluntary basis (_____), (2) required of all residents (_____).

F. Using the numbers 1 through 4, rank each of the following methods for improving teaching according to how valuable each was in helping you improve your teaching behavior during the program. Number 1 should indicate the <u>most</u> valuable method while number 4 should indicate the <u>least</u> valuable.

_____ Critique of your teaching by your peers.

_____ Evaluating your own teaching via videotape.

_____ Viewing examples of other individuals teaching (Your instructor and videotaped models).

_____ Critique of your teaching by the program instructor.

G. Comment on what aspects of the program were of most benefit to you personally.

H. Suggestions for improving the program:

Name _____

APPENDIX D

INSTRUCTIONAL SKILLS EVALUATION INSTRUMENT

Using the following criteria as guidelines, rate each of the objectives by checking the column with the appropriate descriptive term.

Optimal (Opt) = The objective was accomplished skillfully (not to be interpreted as meaning "perfect").

Adequate (Ade) = The objective was accomplished to a satisfactory degree most of the time.

Minimal (Min) = The objective was accomplished unsatisfactorily most of the time or too seldom.

Unfulfilled (Unf) = The objective was not attempted.

Not Applicable (N.A.) = The objective does not apply to the presentation.

OBJECTIVE

LECTURE	Opt	Ade	Min	Unf	N.A.
1. Speaks at appropriate volume	___	___	___	___	___
2. Speaks clearly (enunciation).	___	___	___	___	___
3. Speaks at a suitable pace.	___	___	___	___	___
4. Uses gestures purposefully.	___	___	___	___	___
5. Uses a variety of facial expressions.	___	___	___	___	___
6. Is free from annoying mannerisms.	___	___	___	___	___
7. Exhibits enthusiasm in subject.	___	___	___	___	___
8. Appears confident.	___	___	___	___	___
9. Has eye contact with audience.	___	___	___	___	___
10. Speaks in a conversational manner (natural, not formal).	___	___	___	___	___
11. Avoids "reading" notes or text.	___	___	___	___	___
12. Objectives (purposes) of lecture are clear.	___	___	___	___	___
13. Gains audience's attention (interesting/relevant opening statements).	___	___	___	___	___
14. Introduces topic.	___	___	___	___	___

LECTURE (Continued)	Opt	Ade	Min	Unf	N.A.
15. Displays apparent knowledge of subject.	___	___	___	___	___
16. Has subject matter well organized.	___	___	___	___	___
17. Provides for audience participation (during lecture)	___	___	___	___	___
18. Explains clearly.	___	___	___	___	___
19. Makes subject matter meaningful (points out importance, application, etc. of information).	___	___	___	___	___
20. Uses verbal/visual illustrations (examples, analogies, etc.) to explain ideas.	___	___	___	___	___
21. Has selected reasonable objectives for the time allowed (15 minutes).	___	___	___	___	___
22. Summarizes major points.	___	___	___	___	___
23. Effectively concludes presentation.	___	___	___	___	___
USE OF AUDIOVISUALS					
1. Uses audiovisuals that support the objectives of the lesson.	___	___	___	___	___
2. Uses audiovisuals that are easily visible and/or audible.	___	___	___	___	___
3. Uses well designed audiovisuals.	___	___	___	___	___
QUESTIONING/DISCUSSION					
1. Answers carefully and precisely questions raised.	___	___	___	___	___
2. Encourages critical thinking and opinions from group.	___	___	___	___	___
3. Clarifies questions and/or comments made by group members.	___	___	___	___	___
4. Questions individuals in a non-threatening manner.	___	___	___	___	___
5. Uses divergent or open-ended questions to stimulate discussion.	___	___	___	___	___

APPENDIX E

LESSON PLAN EVALUATION GUIDE

General Objectives	Yes	Needs Improvement
1. Is each general objective appropriate for the lesson?	____	____
2. Is each general objective stated in terms of student performance (rather than teacher performance)?	____	____
3. Is each general objective stated in terms of students' terminal behavior (rather than the subject matter to be covered)?	____	____
Specific Objectives		
4. Are objectives clear and concise?	____	____
5. Do specific objectives contain a verb that specifies observable behavior (e.g. identify, describe, list, ...)?	____	____
6. Is each specific objective related to the general objective?	____	____
7. Is there a sufficient number of specific objectives to adequately describe the behavior of students who have achieved the general objectives?	____	____
8. Are the objectives representative of different levels of learning?	____	____
9. Are the topics, tasks, etc. presented in a logical order (simple to complex, known to unknown, etc.)?	____	____
10. Is the main content related to the objectives of the lesson?	____	____
11. Is an introduction planned for the lesson?	____	____
12. Is proper closure planned for the lesson?	____	____
Instructional Method(s)		
13. Is the selected method one which will best meet the objectives which have been set?	____	____

	Yes	Needs Improvement
14. Is/are the selected method(s) at a level suitable to the learner (not too elementary or too advanced)?	____	____

Instructional Aids (Materials)

15. Are the instructional aids appropriate for the objective(s) of the lesson?	____	____
16. Are the instructional aids appropriate for the instructional method selected to teach the lesson?	____	____

DELIVERY EVALUATION GUIDE

	Yes	Needs Improvement
1. Was the method of introducing the lesson interesting in itself?	____	____
2. Was the relationship between the introduction and main part of the lesson clear?	____	____
3. Did the instructor move about purposefully rather than remaining stationary or pacing?	____	____
4. Were gestures (hands, body, head, face) used to convey extra meaning?	____	____
5. Was there variation in rate, volume and expressiveness of speaking?	____	____
6. Were important points stressed in using gestures (pointing, etc.) or through words ("Note this", "Listen carefully", etc.)?	____	____
7. Was there variation in the kind of learner participation? (Instructor-group, instructor-learner, learner-learner)?	____	____
8. Were pauses used to give learners time to think, to pay attention, to emphasize a point . . . . .?	____	____
9. Were visual materials used to enhance the oral information obtained by listening?	____	____
10. Were explanations clearly presented?	____	____
11. Did the explanations cover the essential features?	____	____
12. Were the analogies, illustrations, and/or examples used, interesting?	____	____
13. Were the analogies, illustrations, and/or examples used, relevant?	____	____
14. Was the method of ending the lesson interesting in itself?	____	____
15. Was the relationship clear between the main part of the lesson and the ending (closure)?	____	____

Comments:

APPENDIX F

QUESTIONING/DISCUSSION EVALUATION GUIDE

	Usually	Sometimes	Rarely
1. Questions were clearly understood.	____	____	____
2. Questions were coherently expressed.	____	____	____
3. Pauses were used after asking questions.	____	____	____
4. Questions were directed at specific individuals.	____	____	____
5. Questions were distributed among the whole group.	____	____	____
6. Prompting techniques were used if necessary in helping individuals to formulate answers.	____	____	____
7. Probing techniques were used to help individuals think more deeply about their answers.	____	____	____
8. The teacher answered his/her own questions.	____	____	____
9. The teacher asked questions in a non-threatening manner.	____	____	____
10. Lower and higher order questions were used effectively.	____	____	____
11. Most members of the group participated in the discussion.	____	____	____
12. The discussion leader summarized the main points of the discussion.	____	____	____

APPENDIX G

LECTURE EVALUATION GUIDE

Rate each of the criteria by checking the appropriate column where:

G = Good
Ade = Adequate
N.I. = Needs Improvement
N.A. = Not Applicable

	G	Ade	N.I.	N.A.
1. Body movements and gestures	___	___	___	___
2. Eye contact	___	___	___	___
3. Speech - clarity, rate and loudness	___	___	___	___
4. Exhibits interest in topic	___	___	___	___
5. Exhibits self-confidence	___	___	___	___
6. Talks in a conversational manner from an outline	___	___	___	___
7. Has knowledge of subject	___	___	___	___
8. Material is well organized	___	___	___	___
9. Amount of material is suited to the time alloted	___	___	___	___
10. Objectives are made clear	___	___	___	___
11. Introduction is appropriate	___	___	___	___
12. Main points are presented clearly	___	___	___	___
13. Content is based on objectives	___	___	___	___
14. Appropriate examples, illustrations, etc. are used to illustrate main points	___	___	___	___
15. Explains clearly	___	___	___	___
16. Uses questioning effectively	___	___	___	___
17. Summarizes appropriately, especially at end	___	___	___	___
18. Uses audiovisuals effectively	___	___	___	___

APPENDIX H

PROGRAM GOALS AND OBJECTIVES

Goals:

1. To improve certain identified clinical teaching skills of the resident physicians.

2. To develop critical self-evaluation skills which would enable continued improvement after the completion of the program.

Objectives:

I. Planning and Organization.

The learners will be able to:

1. Distinguish between general and specific instructional objectives.

2. Write specific instructional objectives.

3. Carry out elementary topic analyses.

4. Apply the knowledge of writing objectives and lesson planning by developing a five-minute lesson on a concept of their choice.

II. Delivery Techniques.

The learners will be able to:

1. Identify the main characteristics of effectively beginning and ending a presentation.

2. Use their voice, body language, and eye contact to enhance a presentation.

3. Demonstrate effective delivery techniques and introducing and concluding a lesson by presenting the five-minute lesson prepared for Unit 1.

III. Discussion/Questioning Techniques.

The learners will be able to:

1. State the characteristics of effective discussion-leading techniques.

2. State the characteristics of effective questioning techniques.

3. Select a topic and develop questions which represent different levels of thinking.

4. Plan and lead a five to ten minute small group discussion utilizing questioning techniques.

IV. Demonstration Techniques/Use of Audiovisuals.

The learners will be able to:

1. State the characteristics of an effective demonstration.

2. State the basic principles of selection of audiovisuals to support and enhance a presentation.

3. State the basic principles of designing effective visuals.

4. Design an effective visual for a transparency on the assigned topic.

V. Lecture Techniques.

The learners will be able to:

1. State the characteristics of providing clear explanations.

2. Select appropriate examples, illustrations, analogies, etc., to illustrate main ideas.

3. Demonstrate the ability to provide clear explanations during a simulated physician-patient encounter.

4. Plan and present a five-minute lecture demonstrating effective lecture techniques and use of audiovisuals.

APPENDIX I

EBEL'S INTRACLASS CORRELATIONS FOR INTER-RATER RELIABILITY

Person	Rater A	Rater B	ΣX_p (A+B)	$(\Sigma X_p)^2$
1	3.48	3.44	6.92	47.89
2	3.52	3.55	7.07	49.98
3	3.71	3.67	7.38	54.46
X_r	10.71	10.66	21.37	152.33

The sum of squares for persons:

$$\Sigma d^2_p = \Sigma \frac{(\Sigma X_p)^2}{k} - \frac{(\Sigma X)^2}{kN}$$

$$\Sigma d^2_p = \frac{152.33}{2} - \frac{(21.37)^2}{(2)\ (3)}$$

$$\Sigma d^2_p = 76.17 - 76.11 = 0.06$$

The sum of squares for raters:

$$\Sigma\, d^2_r = \Sigma \frac{(\Sigma X_r)^2}{N} - \frac{(\Sigma X)^2}{kN}$$

$$\Sigma\, d^2_r = \frac{(10.71)^2 + (10.66)^2}{3} - \frac{(21.37)^2}{(2)\ (3)}$$

$$\Sigma d^2_r = 76.11 - 76.11 = 0.00$$

The total sum of squares:

$$\Sigma X^2_t = \Sigma X^2 - \frac{(\Sigma X)^2}{kN}$$

$$\Sigma X^2 = 76.17 - \frac{(21.37)^2}{(2)\ (3)}$$

$$\Sigma X^2_t = 76.17 - 76.11 = 0.06$$

The sum of squares for remainder:

$$\Sigma\, d^2_e = \Sigma\, X^2_t - \Sigma\, d^2_p - \Sigma\, d^2_r$$

$$\Sigma d^2_e = 0.06 - 0.06 - 0.00 = 0.00$$

Source	Sum of Squares	Degrees of Freedom	Variance
From Persons	0.06	2 (N-1)	0.03
From Raters	0.00	1 (k-1)	0.00
From Remainder	0.00	2 (N-1)(k-1)	0.00
Total	0.96	5 Nk-1	0.012

Variance: $$r = \frac{V_p - V_e}{V_p}$$

$$r = \frac{0.030 - 0.00}{0.030}$$

$$r = 1.00$$

Intra-Rater Reliability for Rater A

Subject	Rating 1 X	Rating 2 Y	X^2	Y^2	XY
1	3.44	3.55	11.83	12.60	12.21
2	3.55	3.66	12.60	13.40	12.99
3	3.67	3.77	13.47	14.21	13.84
Sum	10.66	10.98	37.90	40.21	39.04

r = 1.0

Intra-Rater Reliability for Rater B

Subject	Rating 1 X	Rating 2 Y	X^2	Y^2	XY
1	3.48	3.52	12.11	12.39	12.25
2	3.52	3.55	12.39	12.60	12.50
3	3.63	3.67	13.18	13.47	13.32
Sum	10.63	10.74	37.68	38.46	38.07

r = 1.0

VITA

VITA

BARBARA KINDERNAY LAWSON

Personal Data:
Date of Birth: September 2, 1938
Place of Birth: Rahway, New Jersey
Marital Status: Married

Education:
Public Schools, Miami and Hollywood, Florida
East Tennessee State University, Johnson City, Tennessee; biology, secondary education, B.S., 1960; biology, M.A., 1965.

Professional Experience:
Doctoral Fellow, East Tennessee State University; Johnson City, Tennessee, 1978-1979, 1976-1977.
Assistant Professor, Health Sciences, East Tennessee State University, Johnson City, Tennessee, 1965-1976.
Research Assistant, East Tennessee State University, Johnson City, Tennessee, 1964-1965.
Teacher, Blacksburg High School, Blacksburg, Virginia, 1961-1964.
Graduate Assistant, East Tennessee State University, Johnson City, Tennessee, 1960-1961.

Honors:
Phi Delta Kappa
Who's Who in American Colleges and Universities
Kappa Delta Pi
Outstanding Chemistry Student, East Tennessee State University.
Phi Society