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THE CONSTRUCTION AND STATISTICAL VALIDATION OF AN INSTRUMENT TO MEASURE TEACHING TECHNIQUES USED BY PHYSICIAN INSTRUCTORS WITH MEDICAL STUDENTS

By

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ABSTRACT

THE CONSTRUCTION AND STATISTICAL VALIDATION OF AN INSTRUMENT TO MEASURE TEACHING TECHNIQUES USED BY PHYSICIAN INSTRUCTORS WITH MEDICAL STUDENTS

By

Lynda J. Farquhar

In contrast to secondary and college level teaching, little attention has been directed toward characterizing effective clinical teaching in medical schools. The present study is an attempt to construct a framework for clinical teaching techniques and an instrument by which to measure these. An instrument for instructor self-assessment purposes would increase self-awareness of teaching behavior, a first step toward instructional improvement. Such instrumentation could also be made available to program planners for faculty development activities, thus increasing the individualization of such endeavors.

In an effort to determine the teaching techniques used by physician instructors of medical students, an instrument entitled Clinical Teaching Techniques Self-Assessment was constructed. The Instrument was designed to incorporate in six techniques the universe of instructional behavior exhibited in clinical teaching. The techniques were; involving,

facilitating, serving as an expert resource, problem solving, role modeling and clinical supervising. The involving technique was designed as a measure of the extent to which the instructor encouraged the student's active involvement in patient care. The facilitative technique incorporated generally supportive instructor behavior with emphasis on the student assuming responsibility for his own education. The construct, serving as an expert resource, included the teaching of medical content information and the setting of high professional standards for the student by the instructor. The problem solving technique included data collection, hypothesis generation and hypothesis testing. This process is taught to the student by the instructor as an approach to patient diagnosis. Additionally, the instructor may use this approach in dealing with student educational problems. The role modeling technique was a measure of the extent to which the preceptor modeled his approach to patient care and exposed the student to his life and practice style. Components of this technique included good collegial and staff relations, evidence of self-assessment by the instructor and demonstration of the instructor's approach. The clinical supervision construct included the contract approach to education; goals setting, observation of student performance and subsequent provision of positive and negative feedback. These techniques or constructs were used as possible approaches or answers to problems posed on the Instrument. Each technique was operationalized as a series of twenty items randomly positioned throughout the self-assessment Instrument. Each twenty items set constituted a sub-scale.

The study had two major hypotheses. These were; that the Instrument would prove to be a reliable and statistically valid measure of the six postulated techniques; and that the physician instructor would choose

to use three of the techniques more than the remaining three.

The Instrument was pilot tested on two physician samples. Coefficient alpha reliability estimates, means and standard deviations were computed for each item and each sub-scale of the Instrument. A major sample (n=131) of physician instructors also responded to the Instrument. Subsequent statistics were computed to determine reliability as well as item and sub-scale stability. In addition factor analytic procedures were computed to determine whether each sub-scale of the Instrument contained a single or multiple factors. A multivariate analysis of variance was computed to test for differences between means of the Instrument sub-scales. Subsequent t-tests determined the levels of differences between sub-scale means.

The study findings included an overall Instrument reliability of .91036. Sub-scale reliability values ranged from .63128 to .77329. Factor analysis procedures indicated the presence of three factors in the sub-scales of involver, facilitator and expert resource. Five factors were formed in each of the sub-scales, problem solving, role modeling and clinical supervising. The multivariate analysis of variance indicated differences between sub-scale means significant at the .0001 level. Paired t-tests were computed to determine the significance levels of single pairs of sub-scales. The sub-scales, involver, facilitator, and expert resource were paired against the sub-scales problem solving, role modeling and clinical supervising. Each pair was significant at the .0001 level except the two pairs facilitation with problem solving and facilitation with role modeling. Those pairs were significant at the .01 and the .05 levels respectively.

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CHAPTER I

INTRODUCTION

The area of effective and appropriate instructional techniques specific to clinical medical student education has only recently began to be studied. Most effort to date has been directed toward understanding the teaching behavior of medical school faculty teaching in lecture hall and lab settings. The clinician who sees and takes care of patients simultaneously with the instruction of medical students has been infrequently studied.

NEED

Delineating and describing teaching techniques which impact medical student instruction positively and which can be used by the practicing physician is the first need the present study addresses. Instrumentation describing clinical instructional behavior is almost non-existent. Such instrumentation is needed to improve the self-awareness of physicians about their teaching behavior. Information about normative clinical teaching behavior would also be of benefit to program planners for faculty development activities. Results from instruments characterizing the present teaching behavior of medical student instructors, could also be used to individualize later instructional improvement programs.

The present study addresses these needs: 1) defining a set of constructs encompassing most clinical instructional behavior, 2) developing an instrument to assess the physician instructors' use of these constructs and 3) conducting a process of statistical examination of the

validity of the constructs and the Instrument, The Clinical Teaching Technique Self-Assessment.

PURPOSES

The purpose of this study is to determine the extent to which physicians use the instructional technqiues of providing feedback, role modeling, problem solving, facilitating, involving (challenging), and information giving in teaching medical students. The validation of an instrument, the Clinical Teaching Technique Self-Assessment, designed to measure these various techniques will be the focus of this study. See Appendix A for complete Instrument.

RESEARCH HYPOTHESES

Hypothesis I: The instrument is a statistically reliable and valid measure of the techniques covered by this study.

Hypothesis II: The techniques of role modeling, problem solving, and clinical supervision will be used more frequently by the clinical instructor group in this study than will the techniques of involving (challenge), facilitating and providing content information (expert resource).

CONSTRUCTS

While considerable research has been done in characterizing effective teaching at the elementary, secondary and at even higher levels of instruction, less attention has been directed at delineating effective instruction in medical schools. Most medical school curricula are divided into a pre-clinical and a later clinical phase. Pre-clinical medical school instruction centers on the basic biological sciences and instructors of those courses generally use lecture and other didactic

modes of instruction, as well as lab-bench instruction. Clinical instruction, in which students are taught by physicians and begin to take care of patients, normally employs an apprentice-learning model and has less frequently been a focus of investigation and research. Clinical instruction makes use of multiple instructors with small numbers of students, and often has little in the way of standardized student performance criteria. Because of these and other problems, research investigating clinical instructional teaching technique, style, and/or effectiveness has been minimal.

The present study is based on the theoretical positions: 1) that clinical medical student instruction is multidimensional and 2) that identifiable and measurable clinical instructional techniques exist. Effective clinical instruction, it is thus assumed, would be characterized by the clinical teacher's adept use of a number of instructional techniques. Extrapolating from previous research six clinical instructional techniques are postulated. These six techniques incorporate most clinical instructional behavior and exclude personality variables idiosyncratic to the individual instructor as well as those aspects of teaching common to all instruction. The six constructs are: serving as an expert resource, a role model, a facilitator, a challenger, a problem solver, and a clinical supervisor. These instructional techniques are more fully defined below. (See also summary chart of techniques and their relation to previous research in Chapter 2.)

DESCRIPTION OF CLINICAL INSTRUCTIONAL TECHNIQUES

Involver - The involver (challenger) construct provides for the direct involvement of the student in patient care. The basic premise of the construct being that unless the student participates in the

care of the patient, learning about patients, disease, diagnosis, treatment, and management cannot occur. The construct also includes the instructor's confidence in student abilities, comfort with student error, and the active involvement of the physician's staff and patients in the process of student education. The subject feedback form is included below.

Subject Feedback Form - A person who scores high on the involver dimension believes in direct involvement of the student in patient care. He or she feels that unless the student participates actively, real learning cannot and does not occur. The involver believes the best student is enthusiastic and anxious to become challenged; a student who makes evident his or her desire to try to examine and talk with patients and in some cases to perform techniques and procedures. The involver is most comfortable with the actively involved student, but students who are reticent are also expected to become involved, and the involver will continue to encourage even a withdrawn student. This teacher believes that students learn skills by doing them again and again until they are an automatic part of a repetoire. The involver believes that students do not learn by watching and thus disdains the coat-tailing method of instruction. This teacher feels comfortable pushing the student to grow and develop as a professional and is also comfortable with mistakes. This preceptor will, however, expect the student to continue to try again. He or she has a good deal of trust in and respect for student toughness and resiliency. The involver also believes that his/her staff and patients are able to handle difficult situations well and will encourage staff and patients to also become part of the students education by providing information, reactions, and opinions. An involver, for

instance, might ask a student to see patients, prior to the preceptor checking the student's findings, and might even ask a student to take calls for the preceptor under appropriate supervision. An involver who utilizes only the technique of active student involvement in patient care risks pushing the student beyond the level of responsibility the student ought to undertake. In addition, the active involvement of the student in patient care may be controversial and even have legal implications. The involver might also cause the student to relinquish time spent in study and in other valuable out-of-office experiences. On the other hand, without the challenge of active participation in patient care, the preceptor risks the "turned off" student, who sees him/herself as unimportant, and who may become less confident in his/her abilities over time instead of actively assuming the responsibility he/she must ultimately undertake. The preceptor who is able to involve the student in patient care while still retaining appropriate responsibility, provides both a powerful learning experience and begins to prepare the student for his ultimate future responsibility.

Facilitator - The facilitation construct insures that the student accept responsibility for his/her own education. The student is thus encouraged to develop goals and make educational decisions. The use of this technique may require that the instructor modify his/her teaching in order to facilitate the student's growth as a professional. The complete facilitation feedback form is included below.

Subject Feedback Form - The person who scores high on the facilitator scale is likely to see the experience of teaching the student as an opportunity to participate in the development of the student as a person and to help the student meet his/her needs in the teaching situation. The

facilitator is likely to accommodate his/her own style to fit the student's needs and to arrange student experiences to meet student expectations and wishes.

The facilitator puts the responsibility for the student's education squarely on the student, asking the student to develop goals, how the student would like to proceed, and encouraging the student to make most decisions. The facilitator is concerned about the student but avoids being judgmental, and is usually supportive. For example, a facilitating preceptor when faced with a student requesting time away from patient care to pursue some related reading, would encourage the student as long as the reading were in line with the student's own goals.

Teachers who use facilitation to exclusion may encounter the student's high level of frustration ("I don't know what I need to know!"), and the student's need for more structure. Students may feel that they are floundering without direction or guidance in some instances and may look to the instructor to provide this.

On the positive side, the use of facilitation encourages a student to identify areas of strength and weakness, plan for remediation and other educational opportunities, and to develop self-evaluation skills. In fields like medicine where students are expected to become self-directed life long learners, facilitation is a crucial technique for the clinical instructor.

Educational Resource - The educational resource construct includes the imparting of medical knowledge and the setting of high standards for student performance. The complete feedback form is included below. Subject Feedback Form - A person who scores high on the resource scale is likely to have a high respect for the traditional educational role,

that is, the imparting of knowledge to the students. This person has a clear sense of the standards to which students should aspire and sees him/herself as a resource from whom students can learn facts, procedures, and medical information.

A resource is likely to present information to the student, and set professional standards for intellectual behavior. A resource uses professional literature for updating him or herself as well as teaching material for students.

Because the resource prefers to stay in an educational role, she/he may be more comfortable with the student observing, asking intelligent questions, and referring to professional literature, rather than directly participating in patient care. The resource asks questions about a student's knowledge base, in order to ascertain the student's level of knowledge and will provide direct teaching in nearly every encounter with the student. The resource enjoys teaching most when students ask questions, read up on their areas of deficiency and return the next day with even more penetrating questions.

Used to exclusion, the resource role may employ an unbridgable gap between the physician teacher and the student. The student may lose confidence in the ability to achieve the teacher's level of knowledge and professional skill and may revert to the level of training where the primary objective was the acquisition of information, not its integration or application.

On the positive side, students learn a great deal from the presentation of facts, procedures, and information and consistently value this skill in their teachers over most others. The expert resource may become a source of inspiration for the student in this regard as

the student experiences the exhilaration of learning the content of medicine.

Problem Solver - The problem solving construct operates through the teaching of the principles and concepts of the medical problem solving process. It concentrates on the teaching of cue interpretation, hypothesis generation, hypothesis testing and the application of logical thinking. This process is also applied to the solution of student educational problems as well as patient problems. See the complete feedback form below.

Subject Feedback Form - A person who scores high on the problem solver scale is likely to see the teaching experience as one in which the student should learn principles and concepts of solving patient problems that will ultimately form the basis of the student's ability to deliver quality health care. The problem solver is likely to emphasize the student's ability to generate defensible hypotheses and apply logic to the solving of patient problems. A problem solver enjoys lively discussion with and helping students to develop and refine these skills which are often focused around developing a differential diagnosis.

A problem solver is likely to have a practical rather than a theoretical approach to problems. A problem solving technique involves being observant of facts, and details and open to a wide range of information (medical, psychological, etc.). The steps of the problem solving process include observation (or acquiring cues), hypothesis (diagnosis) generation, interpreting that information, and evaluating the hypothesis. A person who uses this style may not be able to formally label these steps, but may use them intuitively.

This cycle of problem solving steps may be a continuous process in dealing with patient problems and educating students. If used to exclusion, the student may obtain a method of obtaining diagnoses with little emphasis on the acquisition of other clinical skills, patient relating and additional in depth knowledge. On the positive side, rigorous use of a problem solving process has long been a hallmark of the competent physician's repetoire, and enriches the student who becomes familiar and facile with its use.

Role Model - The role modeling construct focuses on the physician modeling or demonstrating for the student his/her style and method of patient care and the exposure of the student to the physician's life style. In addition the physician models self-assessment through thoughtful evaluation of his/her own behavior. See the complete feedback form included below.

Subject Feedback Form - A person who scores high on the role model dimension believes that his/her behavior serves as a standard for students to emulate. Thus, he or she is self-conscious in a positive way, honestly appraising skills and limitations in him or herself. This teacher believes that thoughtfully evaluating his or her own behavior models self-evaluation for the student.

The role model believes one of the best ways of interacting with the student comes in providing the student exposure to the physician's life as well as practice style. This teacher believes that students learn a great deal by being exposed to the physician's way of life, including home and family, community involvement, colleagial relations and social and recreational opportunities. In addition, this preceptor exposes the student to his or her own as well as other practices. This

preceptor is likely to anticipate the student wishing to work with colleagues in other specialties and to encourage students to spend time with community health care agencies as well as with staff in his or her own office. The role model is acutely aware of the importance of good relationships with colleagues and will not hesitate to ask for their involvement with student education. The role model is especially helpful in demonstrating to the student how he or she goes about the thinking process of diagnosis or dealing with patient problems.

Using the role modeling technique to exclusion weights the educational process toward the preceptor being "on stage" and the student reacting as a suitably impressed audience. However, the total absence of the role modeling technique impoverishes the educational experience for the student by removing the factors of intensive exposure to one individual's life and practice style.

Clinical Supervisor - The clinical supervision construct includes the systematic on-going provision of positive and negative information regarding student performance. It also includes the generally accepted contract approach to education; the setting of goals, observation of performance and subsequent feedback. The complete feedback form is included below.

Subject Feedback Form - A person who uses the feedback mode of instruction and supervision focuses on the systematic giving of on-going positive and negative information about the student's performance (rather than personality traits) and making that information available to the student.

A person who uses this technique well is likely to make feedback specific and appropriate to the student's academic and emotional level

and useful to the student. On either an intuitive or formal level, the teacher is likely to divide the feedback mode into the following stages:

1. preobservation - this level includes the initial contact, rapport building, mutual sharing of rationale, ideals, and goals for student progress.
2. observation - the instructor assesses the student's currect level of performance based on observation in the patient encounter, at the lab, in conferences, etc.
3. analysis and strategy - instructor uses available data to focus on objectives which the student can reasonably attain or begin to make some progress on, while working with the instructor.
4. conference - the instructor helps the student develop and increase self-awareness about performance of tasks, helps student redefine problems and generate solutions. The most specific feedback is likely to occur here which may include praise and/or direct teaching.
5. post-conference analysis - the de-briefing of the learning experience in which the teacher may ask for feedback about how helpful she/he was for the student.

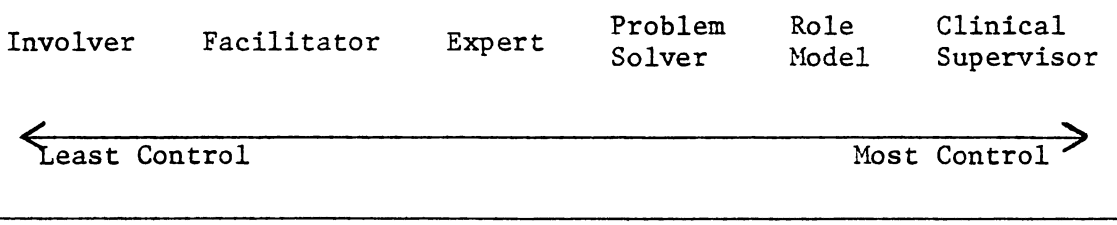
An instructor who uses feedback less effectively may skip one or more of the stages, may give indiscriminate or excessive feedback, or information inappropriate to the student's emotional or performance level. This instructor may also be sidetracked or distracted by student inappropriateness or distancing efforts. Used properly in conjunction with other techniques, feedback in clinical instruction helps students with realistically evaluating their own performances and generating goals for future work.

THEORETICAL CONSIDERATIONS

It is postulated that these six techniques or constructs represent a continuum ranging from little control by the physician over student behavior in patient encounters to extensive control. The continuum is graphically represented in Chart 1.1.

Chart 1.1

Continuum of Teacher Degree of Control for the Six Techniques



The extended training of physicians in this country, the high professional standards of the medical profession, and the necessary acceptance of responsibility for the life and death of patients entrusted to their care, have produced a group of physicians who have great difficulty in relinquishing any degree of control over their patient's health care. When a student physician is introduced into a physician's private practice setting for instruction, it is hypothesized that the physician will tend to use instructional techniques which will encourage the student to observe, ask questions and to perform under heavily supervised conditions. Such techniques will be favored over techniques focused on the providing of medical content, the shouldering of responsibility for the student's education by the student and the direct involvement of the student in patient care.

The construct of involver (challenger) represents the least control over the student's behavior with patients, by the physician supervisor. While it is unlikely that this technique will be used to a great extent, the physician teacher who uses this dimension would continue to provide the student with direct patient care responsibility even under difficult circumstances, ie., the student being less than skilled in handling the particular situation at hand.

The construct of facilitation represents slightly more control over the student's behavior than does challenge. However, because the facilitation technique focuses on placing the responsibility for the student's education on the student, the student may choose patient care interaction and thus interfere with the physician's need to control patient contact. To the extent however, that the student chooses to observe the physician, study, or spend time in other areas than direct patient care, this technique provides the physician instructor with slightly more control over the student's behavior with patients than does the involvement (challenge) technique.

The construct of expert resource provides the physician with slightly more control over the student's patient contacts than those techniques already discussed. The expert resource provides medical content facts and information and explains and describes clinical procedures. Additionally, the resource sets high professional standards of behavior for the student. The expert resource technique supplants the student's involvement in patient care with an observing, questioning, and content learning mode.

The construct of problem solving represents a relatively neutral stance vis a vis limiting student behavior with patients. Essentially

the problem solving technique concentrates on teaching the principles of observation, cue acquisition, hypothesis generation and the evaluation of hypotheses. This technique focuses on teaching the student this process for patient evaluation, and applying this same procedure to problems in the instructional situation. To the extent that a student uses such a process to learn to diagnose patients' problems, rather than to treat patients, the physician is able to effectively limit actual student/patient interaction. The physician can check the student's reasoning process and discuss potential treatment plans prior to actually discussing the problem and the treatment plan with the patient.

The role modeling technique focuses on the physician demonstrating for the student how he or she deals with patient care, management of disease, colleagial relations, community involvement and home and family life. To the extent that the preceptor is involved in actively demonstrating his or her ways of dealing with these aspects of a physician's total life-space, the student will be constrained from active patient care. This construct exerts more control over student/patient behavior because of its emphasis on physician demonstration and student observation.

The clinical supervision technique focusing as it does on the systematic imparting of positive and negative information about student performance, is the most controlling of student/patient contace.

METHOD OF DATA COLLECTION

A number of options exist for collecting information about medical student instructors. Student report, neutral observer report and

self report by the physician have all been used.

The method of data collection for this study will be the administration of the Instrument to physician instructors. Having the physician reporting on their own behavior as instructors has the benefit of obtaining data directly from the physician and of increasing physician self awareness. While self report has some degree of error because of possible problems in accurate reporting, this is a relatively new field and benchmark data from physicians themselves is an important starting point.

OVERVIEW OF CHAPTERS II THROUGH V

In Chapter II a review of the literature is included as background for this study. A chart summarizing the relevant literature on the techniques identified by previous research as well as the techniques defined and measured by this study is also available in Chapter II. Chapter III includes descriptions of the sample population, the instrument, construct definitions, the design and analysis procedures for the study, testable hypotheses, and a summary section. The analysis of data for both pilot and major samples is presented in Chapter IV. The subsections of Chapter IV include: the organization of the chapter, a restatement of hypotheses, interpretation of results, statements of significance and a summary section. Chapter V presents the summary and conclusions. Subsections include the discussion section and implications for future research.

CHAPTER II: REVIEW OF RELATED LITERATURE

CHAPTER II

REVIEW OF RELATED LITERATURE

OVERVIEW

Clinical teaching is, for the purpose of this study, defined as the instruction of medical students by physician teachers which has as its focus the care of the patient. A review of the literature on clinical teaching indicates that such instruction is multidimensional. Good clinical instructors apparently use a number of teaching techniques simultaneously. Much of the research, however, while recognizing this multidimensionality, has focused on a single dimension; the didactic teaching of facts. Additionally, a number of other studies have centered on the problem of how physicians teach problem solving or patient diagnosis procedures. Fewer studies have concentrated on the interaction between the student, the physician, and the patient; the amount of responsibility students should undertake for patient care, and the providing of evaluation and feedback to students.

As a whole, the area of clinical teaching has not been extensively studied. The complexity of the setting in which the physician instructor works, the small numbers of students per instructor and the highly variable nature of patient problems encountered are some of the reasons for the paucity of the clinical teaching research.

Four types of studies provide criteria by which effective clinical teaching may be judged. These are: 1) the opinions of "experts", 2) student assessment of good clinical instruction, 3) observational studies

of clinical teaching and 4) theoretical models detailing what good clinical instruction could, or might be.

Expert Opinion Studies

"Expert" opinion is defined simply as the data collected from physician teachers as they have participated in self-assessment or peer review studies in the area of clinical teaching. Adams, et. al. (2) conducted an eight week course for physicians on clinical teaching and assessed changes in teaching behavior as a result. Participants demonstrated an increased awareness of alternative styles and methods of teaching, enhanced ability to observe and verbalize interaction between teacher and student, improved recognition of variable student needs and self acceptance of their own strengths and weaknesses as teachers. Gage (16) stressed the need for more precision in the defining of variables under study in the clinical teaching process and the multidimensionality of most teaching techniques. Helfer (20) reviewed the literature on peer review and evaluation. An important facet of his review emphasized the use of peer review for providing early and timely feedback on the interpersonal relationships between physicians and patients.

Jason (23) used an observational instrument, the Medical Instruction Observation Record (MIOR), to record observations of teaching behavior. Three hundred and eighty instructors were observed, although only about 4% were observed during clinical teaching sessions. Instructors were described in terms of the seven dimensions of the MIOR: handling of student questions, attention to physical comfort of students, attitude toward students, use of instructional materials, reaction and adaptation to students' needs, use of teaching methods or techniques,

and use of challenge. Clinical teachers were rated consistently higher by their peers in all these categories than were teachers in small formal, large formal, laboratory or ward settings.

Peterson (32) used internists to observe 90 general practitioners in a year long study over twenty years ago. While the study concentrated mainly on the quality of care delivered to patients in North Carolina, the authors also considered one aspect of validity which might be problematic in such peer review studies. The question of whether a physician under observation altered his habitual patterns of practice, in order to create a more favorable opinion of his performance, was addressed. Peterson (32) was able to solidly discount this type of possible "halo effect" by arguing that observations were made over a year long period and by a number of observers with no appreciable change in practice pattern by the physician.

Other studies included in the category of physician self or peer assessment focused on the description and critique of specific teaching techniques. Ross (36) urges the effectiveness of teaching by example, or modeling. Engel (12,13) stresses the teaching of methods for understanding the behavior and emotional needs of the sick, and the deficiencies of the "case" method of teaching.

A working group from the Royal College of General Practitioners in England (37) added to the body of knowledge about clinical teaching by identifying four goals of clinical instruction. These were; to help students integrate and assimilate factual information in problem solving, to teach manual skill performance, to teach interpersonal skills development, and to provide the student with the opportunity for self understanding. The Royal College also identified four styles of clinical

instruction to accompany these goals. They specifically stressed the counseling style, as one technique well suited to the fostering of student self-awareness.

Student Report Studies

The second category of studies on clinical instruction concern the eliciting of opinions and data from the medical students themselves. Such studies have yielded the greatest specificity toward the understanding of clinical teaching and were among those most carefully designed and executed.

Byrne and Cohen (4) conducted a study to describe the activities of clerks in a clinical clerkship to identify teaching and learning experiences, and to assess the relationship of career selection to responsibility, skill development, and enjoyment of the program. The investigators observed a small number of clerks and validated these observations by conducting a questionnaire study of 119 clerks in eight teaching hospitals. Ten learning modes were identified:

"1. instructed (performing procedures and presenting cases in the presence of an instructor who provides feedback),
2. practice (repeating procedures until mastery is achieved),
3. team problem solving,
4. inquiry (asking peers, house officers and/or staff members questions for clarification, elaboration and information),
5. question-answer (student is required to answer questions put to him/her),
6. self (unsupervised discussion and research),
7. modeling (performing procedures or presenting cases in the same way as performed by physicians the student has observed),
8. trial and error (performing tasks and subsequently modifying performance on the basis of self-assessment of effectiveness),
9. didactic (involvement of the clerk is limited to "listening" in rounds, seminars, etc.) and
10. observation." (Byrne, p. 922)

Of the ten learning modes observed, instructed, practice and team problem solving were rated as most effective. Learning modes with

active involvement by the clerk were given highest ratings; those modes involving little active participation by the clerk (didactic and observational learning) received the lowest ratings. The authors hypothesize that the greater the fit between the preferred learning modes of students and actual learning experiences, the more likely that the instructors will receive high student ratings.

Coombs and Boyle (5) reported that faculty members conveying a sense of enthusiasm, organizing material well, manifesting genuine interest in students and presenting material as important, were highly rated by students.

Metz (29) discovered an apparent relationship between the age of faculty members and their ratings by students as bedside teachers. The younger faculty members, regardless of specialty, teaching techniques used or personal qualities, were most highly rated.

Irby (22) formed the factors of clinical competence, clarity, modeling, and enthusiasm for teaching as descriptive of the best clinical teachers. Irby asked students, residents and faculty to rate best and worst teachers on seven dimensions. Best teachers were ranked highly on all seven dimensions. Worst teachers lacked these abilities and had negative personal attributes as well. The results of this study support the multidimensional contention about clinical teaching. The best discriminators of teaching competence were those common to both classroom and clinical teaching. Stritter, Hain and Grimes (39) developed an instrument which they used to survey all clinical medical students at the University of North Carolina and the University of Alabama. They compiled a set of specific behaviors students identified as helpful in the facilitation of clinical learning. When the data were factor analyzed,

six general dimensions of teaching behavior were identified. They labeled the factors as; 1) active student participation, 2) preceptor attitude toward teaching, 3) emphasis on applied problem solving, 4) student centered instructional strategies, 5) humanistic orientation and 6) emphasis on content and research.

Cotsonas and Kaiser (8) reported a factor analysis of ratings of 21 clinical teachers of medicine by both administrators and students. The rating form consisted of 35 items divided into four categories: 1) personal qualities like sympathy, and courtesy, 2) teaching techniques, ie. use of questions, discussion, teaching sessions, teaching by example, 3) knowledge reflected in references to literature, and 4) extensive knowledge in a subspecialty. The analyses revealed three major factors: 1) the teacher's attitude toward patients and students, 2) the teacher's use of various teaching techniques, and 3) an estimation of the teacher's knowledge base by the student.

Another study described active student participation in the clinical setting, close supervision and evaluation of students, the teacher's positive attitude toward teaching, emphasis on problem solving and a student centered instructional strategy as central factors. Overall, highest ratings from the students were given to techniques in which they were highly involved. Lowest ratings were given to passive methods of instruction, didactic and observational learning.

Coppernoll (6) asked students and faculty to rate the success of a number of educational methods in accomplishing the teaching of the following: communication skills, factual knowledge, problem solving, lab and clinical skills, initiative and professional behavior. The faculty and students agreed almost overwhelmingly that clerkships and

departmental rounds were better at accomplishing those objectives than were seminars, indepentdent study, lecture, lab sessions and exams.

Costin (7) in a review of the literature emerged with highest overall ratings of clinical teachers by students in the areas of imaginative presentation, intelligence, emotional stability, agreeableness and enthusiasm. His review tends to neglect specific instructional techniques and to focus on personality attributes. Since personality is difficult to measure and to modify, Costin's review did not yield particularly helpful information in providing useful directions for subsequent research.

Student ratings of teachers have been investigated to determine their reliability, validity, usefulness and generally appear to be valid and reliable. However, other researchers have examined the correlations between student attitudes toward their teachers and actual student performance and have found less than positive and even negative correlations. It appears that actual student performance may have less to do, at least at the professional student level, with teaching technique than with underlying stable personality traits of the student, which have led to the usually superlative prior academic performance. It does seem clear from the literature, however, that medical students, residents and teaching faculty have strong preferences about their clinical instruction and can identify with a fair degree of consistency the factors contributing to their positive evaluation of clinical teaching.

Observational or Naturalistic Studies

In the category of observational research, studies were included which used outside and relatively neutral observers who categorized behavior of clinical instructors. The distinction is perhaps fine, but

studies classified as observational, employed noon-peer, non-physician raters.

An observational study of 82 clinical teaching sessions was conducted by Reichsman, Browning and Hinshaw (33). Results of the study consist mainly of extensive case studies and anecdotal material. Of serious concern to the authors was the finding that in less than 25% of the sessions observed did the clinical teachers attempt to stimulate acquisition of new knowledge.

In Reichsman's (33) study, five criteria for effective clinical teaching emerged including: close supervision of students, integration of clinical medicine with didactic instruction, clarity of teaching, effective problem solving and providing challenge to students. Fosson (15) had good success at teaching content to pediatric clerkship students with self-instructional materials. Scores rose on final clerkship examinations over previous years when student instruction was supplemented with mediated learning materials.

In another observational study in which raters evaluated other teachers, Adams (1) found that mose evaluators rated their own styles of teaching most highly. Their ratings of others were high to the degree that they corresponded to the rater's own style. Additionally from Adams (1) criteria for effective clinical teaching were derived from his naturalistic study of teaching in a clinical clerkship. These included:

"1. A problem-solving method is used integrating basic science content with clinical method. This is effectively done by providing for student participation.
2. A patient-centred rather than a disease orientation is used.
3. Students are helped to develop their own problem-solving methods.
4. Students are carefully supervised.
5. Teachers are outgoing, friendly and enjoy teaching.
6. Manual skills are taught.
7. Students are allowed to learn about themselves.
8. Readings and research interests are shared." (Adams, p. 175)

Adams, et.al. (1) conducted a study to assess what teachers emphasize as they work with senior medical students in the process of delivering health care to patients. Nineteen individual teaching performances were observed by four observers. Observations were classified as "emphases relevant to the patient" and "emphases relevant to the student." Teacher performance was evaluated on two dimensions: activity and effectiveness. The authors noted that theoretically a great deal of teaching activity may occur in teaching physician examinations, for example, but little actual learning may take place. From ratings of instructor performance, individual teaching profiles were constructed to provide feedback to the instructor. The authors suggest that the greatest value of such rating activity may be in the heightened awareness of observers which occurs as a result of participation in the evaluation activity.

Theoretical Studies

The final area of studies reviewed included those paradigmatic or theoretical articles which detail models for ideal clinical instruction. These varied from general studies emphasizing the role of behavioral objectives and contracting for specific student experiences to more specific technique-oriented studies. Of particular interest was the

article by Field (14) who argues eloquently for the establishment of a climate of trust and support between the student and supervising instructor.

Simon (38) in his publication, A Role Guide and Resource Book for Clinical Preceptors, identifies three "roles" physicians assume in teaching medical students. These are: role model, clinical supervisor and educational resource. Two of these three roles, or perhaps more accurately techniques in clinical instruction, correspond well to the Stritter, Hain and Grimes (39) factors of "student-centered instructional strategy", (clinical supervision) and "emphasis on references and research" (educational resource).

TEACHING TECHNIQUES IN CLINICAL INSTRUCTION

A categorization of the literature on clinical teaching was also attempted on the basis of the specific instructional technique or techniques emerging from the study. Thus, the literature was reviewed in order to ascertain the number of studies stressing the providing of medical content information to students. This particular technique was stressed as central in nearly every observational, expert or theoretical study reviewed. Since "knowing"; the acquisition of facts about disease, drugs and treatment is the usual societal expectation about the physician, this finding is perhaps not surprising. In studies of student reaction, however, students are less than enamored with this particular aspect of the teaching they receive. Students tend to stress the importance of less passive learning modes.

Only slightly less stressed in the literature is the teaching of the medical problem solving process to students. Problem solving

was stressed as central in twelve of the studies reviewed. Dudley (10) in his study, considered how to teach the problem solving process apart from the technique of collecting and imparting factual information. His findings indicate that the diagnostic process is a separate operation from the rest of patient care. Effective teaching of this process necessitates teachers who are able to articulate their own cognitive processes when making a diagnosis. Dudley (10) maintains that students need a theory of problem-solving and decision making in order to engage in these operations successfully. Dudley's (10) work supports that of Elstein (11) who studied the process of how physicians diagnose and problem solve. Elstein (11) maintains that problem solving is considered to require a conceptual framework for organizing and synthesizing data, as distinct from the acquisition of facts. Student reactions to the teaching of problem solving puts it high on the list of desirable instructional behaviors. In some cases, however, problem solving is taught by way of patient "paper cases". When this format is used, students regard the teaching of problem solving less favorably.

Modeling, or the demonstration of the professional behavior of the physician, is another crucial component in effective clinical instruction. Eleven studies stress the necessity of the clinician modeling desirable behaviors for the student. It seems almost commonplace to assert that students learn by observation of professionals already working in their chosen fields. However, faculty may be less aware than students that this process is taking place. The question of which behaviors to model and which behaviors are seen as having positive impact is an empirical as well as a judgmental one. Research studies emphasize a demonstrated sensitivity to patient needs, good relations with colleagues

and staff, demonstration of the practical application of knowledge and the provision of time for discussion and questions as important to model.

Also stressed as critical were the provision of feedback and evaluation data to students. This process is usually labeled clinical supervision. Clinical supervision also includes the communication of expectations about learning, the observation of student performances and provision of positive as well as negative feedback. The realistic nature of learning objectives, the systematic assessment of student progress and rewarding the student positively were stressed in the Stritter study (39).

More heavily stressed by students than faculty were the components of clinical teaching which involve active student participation in the patient care process and the facilitation of the student taking responsibility for his or her own education. These components are highly valued by students as Stritter (39), Miller (30), Irby (22), & Cotsonas (8) attest. Faculty are conflicted about allowing students to practice techniques and procedures on patients and about allowing students patient care responsibilities. Heavily supervised practice is the norm.

In addition to valuing active patient care responsibility, medical students look for generally facilitative behavior from their clinical instructors. Students value the establishment of rapport, the ability of the instructor to listen attentively, a non-threatening environment, demonstration of sensitivity to students and patients and encouragement of the students to share attitudes, values, and experiences in learning.

While it is difficult to distinguish between personality variables and generic instructional techniques, some highly valued attributes were stressed which fell into the domain of personality. These were

enthusiasm, humanism, politness, modesty, sense of humor and the ability to inspire and stimulate. In addition, some elements of instruction were highly valued which were not specific to clinical instruction. These were, an emphasis on clarity of presentations, and an evidence of organization in the instructional process.

RELEVANCE OF RESEARCH TO PRESENT STUDY

Three studies of those reviewed were central to the logical delineation of the constructs used in the present study. The work of Stritter (39), Irby (22), and Cotsonas (8), identified a number of factors which contribute substantively to the positive evaluation of clinical instruction by the instructors themselves, students and residents. These research studies also identified certain personality variables as central. Other variables were those organizational and presentation factors crucial to all effective instruction; not specific to the clinical instructional environment. Since personality is a relatively stable set of personal predispositions, not amenable to training or change except through rather stringent efforts, personality variables were eliminated from consideration in the present study. Also eliminated from consideration were elements of instruction common to all instructional settings.

A logical process was applied to the large number of separate variables, subsumed under the rubric of factors, in order to define six clinical instructional techniques. These techniques were, involving (challenging), facilitating, serving as a expert resource, problem solving, role modeling and clinical supervising. Each of these techniques has been defined in Chapter 1, therefore only the most critical components of these definitions will be elaborated here.

Chart 2.1 is a graphic presentation of the extent to which the factors formed by Stritter (39), Irby (22), and Cotsonas (8), contributed to the present definitional work. In forming factors, the title assigned to the factor is usually less descriptive than are the clusters of sub-components themselves. Therefore, Chart 2.1 contains the actual sub-components and does not list the factor title. Each of the constructs in the present study will be defined and compared narratively to similar sub-components in the work of other researchers. Chart 2.1 will serve to graphically represent the discussion.

Construct Definitions

Involvement (challenge) - The construct of involvement (challenge) is defined for the present study as the extent to which the medical student is involved in patient care, by his/her instructor. Earlier research normally includes this concept as a part of a cluster of other variables. Since students consistently value this segment of their clinical training most highly, it was decided that the construct should be narrowed simply to assess the active involvement of the student in the patient care arena. Thus, it was separated in the present study from such other components as Stritter (39) includes in his factor "Active Student Involvement". Stritter groups the active involvement of the student in patient care with such other variables as demonstration of respect for students, display of personal interest in students and accessibility.

Facilitation - The construct of facilitation is based on the premise of the acceptance by the student of responsibility for his/her own education. The instructor who uses a facilitative technique encourages the development of goals by the student, and attempts to facilitate

CHART 2.1

COMPARISON OF DIMENSIONS CONTAINED IN THE TEACHING TECHNIQUES OF

INVOLVING, FACILITATING, SERVING AS A RESOURCE,

PROBLEM SOLVING, ROLE MODELING & CLINICAL SUPERVISING

	Involver (Challenger)	Facilitator	Expert Resource	Problem Solver	Role Model	Clinical Supervisor
Present Study	Direct involvement of student in patient care. Student needs active participation to learn repetition of skills. Disdains coat-tailing, respects student toughness. Comfortable with mistakes, encourages staff & patients to become involved in student education.	Teaching is opportunity to participate in students development as professional. Will accommodate own needs to those of students. Puts responsibility for student education on student, supportive, students make most decisions re: education.	Imparts medical content information to student. Sets standards for student, is a resource for student to learn facts, procedures, etc., uses prof. literature, asks questions to determine students knowledge level, provides direct teaching in nearly every encounter.	Teaches principles & concepts of the solving of patient problems. Wants student to generate hypotheses & apply logic. Helps student develop differential diagnosis skills, practical approach, observant of wide range of patient & student data to use in problem solving.	Recognizes that own behavior should serve as standard for student to emulate, honestly self appraising. Provides student exposure to physicians way of life, demonstrates collegial relations demonstrates process of dealing with patients.	Focuses on systematic giving of positive & negative information. Sets contract, develops goals, observes student performance, helps student develop self awareness about limitations and strengths, may also ask for student feedback.
Irby	Encourages active participation, has respect for students abilities provides practice opportunities.	Establishes rapport, listens attentively, asks non-threatening questions provides professional support, maintains rapport, demonstrates sensitivity.	Answers questions, discusses current developments, reveals broad reaching, makes use of professional literature.	Emphasizes problem solving, integration with other disciplines synthesizes, good skills at data gathering, interprets data.	Demonstrates personal interest in students, discusses divergent points of view, demonstrates clinical procedures utilizes consultants works with health care team, is self critical, recognizes own limitations.	Communicates what is expected to be learned, observes student performance, identifies strengths & weaknesses, provides feedback, positive reinforcement, corrects students without belittling them.
Stritter	Develops opportunities for students to practice skills. Provides an environment in which the student is an active participant.	Sensitive to students personal needs in learning situations, encourages students to share values & experiences as part of their learning.	Shares research findings, reveals broad reaching uses important references, occasionally challenges points presented in texts.	Emphasis on clinical problem solving process, employs practical applications. Uses comprehensive conceptualization. Uses personal & social aspects of patients in relation to their illness in data gathering.	Explains basis for actions & decisions, advises students effectively on non-medical problems when approached, maintains pleasant and cordial relations with students and staff.	Provides realistic learning objectives, systematically assesses & advises student of progress rewards students for good performance.
Cotsonas	Respects students & patients as persons.	Sympathetic toward students, gains students cooperation.	Emphasizes basic pathophysiology.	Sensitive to emotional aspects of patient problems, employs socratic method, uses lab data in problem solving.		Finds out what students do not know.

student achievement of these goals. Stritter's (39) factor "Humanistic Orientation" contains a number of sub-components which fit the definition of facilitation assumed in this study. Cotsonas (8) also identifies sub-components such as "sympathetic toward students, and gains student cooperation". Irby (22) includes the sub-components "establishes rapport, respect for the student, listening attentively, non-threatening questions, and the demonstration of sensitivity toward students and patients" in his "Group Instructional Skills" factor.

Expert Resource - The educational or expert resource construct definition for the present study includes the imparting of medical content knowledge to students and the setting of high professional performance standards. Stritter's (39) factor "Emphasis on References and Research" contains important and corollary sub-components such as; cites important references, occasionally challenges points presented in exams and journals, reveals broad reading in his medical specialty, and describes personal research when appropriate. Irby's (22) "Knowledge" factor contains the sub-components; discusses current developments, reveals broad reading, discusses divergent viewpoints, and directs students to professional literature. Cotsonas (8) includes the emphasis on teaching basic pathophysiology in his "Teaching" factor.

Problem Solving - The problem solving construct appears in a variety of ways in most of the clinical teaching research. It was separated from other variables to contain only the teaching of the principles and concepts of the medical diagnostic procedure. It thus includes, cue interpretation, hypothesis generation and testing, and the application of logic to the generation of treatment plans. For the purposes of this study, it was assumed that such a process might well be applied

in this exact manner to approaching a student's educational problems. Irby (22) places emphasis on problem solving, as part of his "Group Instructional Skills" factor. Stritter (39) includes in his factor titled "Emphasis on Applied Problem Solving" such sub-components as; stresses topics of broad applicability to all students, requests student employ concepts to demonstrate comprehension, draws on data from related fields to solve problems; in considering problems, discusses practical application of knowledge and skills, and emphasizes problem solving approaches rather than solutions per se. Cotsonas (8) includes the use of lab data in developing problem solutions, use of socratic method to ascertain student thinking processes and the sensitivity to emotional aspects of patient problems in order to draw out further information with which to solve problems.

Role Modeling - The role modeling construct was defined as the clinical teacher's recognition that his/her behavior serves as a standard which students may emulate. Also included as part of the role modeling construct were good relations with staff and colleagues, and the exposure of the student to the physician's total life style, including home and family life. Irby's (22) factor "Modeling Professional Characteristics" includes sub-components of; is self critical, recognizes own limitations, does not appear arrogant, and has self-confidence. As part of a number of Stritter's factors and apparently related to modeling are the sub-components of; advising students on non-medical aspects of life, cordial relations with students, staff and colleagues and the explaining of the basis for actions and decisions.

Clinical Supervision - The construct of clinical supervision was defined as the giving of on-going, performance-specific information to

students. It includes regular feedback sessions and the provision of both positive and negative information. In previous research Irby's (22) "Clinical Supervision" factor and Stritter's (39) "Student-centered Instructional Strategy" factor both contain related sub-components. Irby's (22) sub-components include; observes student performance frequently, identifies student strengths and weaknesses, provides feedback and reinforcement and corrects students without belittling. Stritter's (39) sub-components include; defines realistic objectives for students, assesses student progress systematically, advises students on progress regularly, compliments students for good contributions and contributes suggestions to students on feelings of inadequacy and frustration.

In Chart 2.1 may be found a display of the extent to which Irby (22), Stritter (39), and Cotsonas'(8) factors and their sub-components relate to the present study's definitions of the constructs purportedly measured by the Instrument.

SUMMARY

A review of the clinical teaching literature indicates that the teaching of the medical student in the context of providing care to patients in a complex process. Such teaching is multidimensional; requiring the adept use of a number of teaching techniques, certain personality variables and evidence of good organization. Since the crux of effective patient care requires the knowledgeable physician who can diagnose accurately and rapidly, most studies reviewed stressed these components. In addition, effective clinical instruction requires that the physician act as a role model for students and follow a rigorous

and supportive process of setting objectives and reviewing student performance. Finally, students particularly stress the necessity for active involvement in their own education by taking responsibility for learning and by assuming patient care tasks. Certain personality variables and organizational abilities are also components of sound clinical instruction. While the area has not been thoroughly researched, studies have been sufficiently creative, reflective, and carefully done to warrant the conclusion that clinical instruction is a multidemin-sional process.

CHAPTER III: DESIGN OF THE STUDY

CHAPTER III

DESIGN OF THE STUDY

INTRODUCTION

The study is a statistical validation of an instrument designed to measure six techniques used by physician instructors in the clinical instruction of medical students. In addition to assessing the validity of the Instrument, the study examines which techniques are most often used by the physician sample, and the overall pattern of usage of the techniques by the instructors.

SAMPLE

Two pilot samples were used to validate the instrument in this study. One pilot testing sample consisted of a group (n=16) of osteopathic physicians with teaching and staff privileges at a hospital in Grand Rapids, Michigan. The sample was a totally male group of D.O. physicians with an age range of from 29 to 51 years. The mean length of time the physician group held teaching privileges, and thus the estimate of their teaching experience was 6.86 years. The total size of this population was 20. (Mean group responses and group profiles are reported in Chapter IV.)

A second pilot sample consisted of ten M.D. second and third year residents. Each was a graduated M.D, physician with full teaching and hospital privileges. The sex distribution was nine males; one female. The groups' teaching experience was limited, the second year group (5) had a mean teaching experience of one year. The third year group had

two years of teaching experience. The age range was from 28 to 34 years. The total group was used. (See Chapter 5 for group responses.)

The major testing group consisted of preceptors acting as clinical instructors participating in the Cooperative Michigan Primary Care Preceptorship Program. The physicians were located in 136 communities across the entire State of Michigan in both the Lower and Upper Peninsulas. The age range of the group was 34 to 72. The population was primarily M.D. trained, nine were D.O.'s. The group was predominantly male, 217; female, 12. All held hospital privileges and were involved in office practice based medical student education. The mean length of time involved in clinical student instruction was four years. The total size of the population at the time of the study was 229.

INSTRUMENT DEVELOPMENT

A brief description of the instrument, An Inventory of Clinical Teaching Techniques, was provided in Chapter 1. Since it constitutes the measure of the extent to which the population uses the educational techniques investigated, its construction will be described in more detail in this section. Two major processes were undertaken in order to construct this instrument, a process to define the questions, and a second to define and code the responses.

The questions to be constructed for the instrument were to represent common instructional situations found to be problematic for both medical students and their instructors. Toward the end of defining these problems, a small group (n=10) of beginning second and third year medical students were interviewed, as were a small group of physician preceptors (n=10). The responses to these interviews were collected and thus a beginning set of problems were identified. In addition, meetings were

held with two groups (n=24, n=32) of medical students who had recently returned from their first clinical experiences working in the practice settings of clinical instructors. The initial set of problems identified by the interview groups were discussed in these debriefing meetings and additional problems contributed. Also, three preceptor workshops were held in the Spring of 1978. At these, a nominal group process (43) was conducted to identify common instructional problems encountered by the preceptors. This data confirmed and validated the problem set. (See Appendix B)

The list of 30 common problems in clinical instruction which emerged from the interviews, meetings and workshops, were re-written as incidents and thus became the situations, or questions on the Instrument. After being written as clinical problem incidents, six physicians in the College of Human and Osteopathic Medicine at Michigan State University as well as two M.D. residency directors critiqued the incidents and clarified the wording of each.

Concomitantly with the development of these problem/incident questions, six techniques in clinical instruction were defined. (See Appendix C for narrative definitions.) Using these definitions as criteria, six responses to each question were constructed. Once constructed, a small group of eight physicians responded to the instrument as a whole and eliminated all responses that seemed not to fit either the criteria, or were unlikely to be selected, for a variety of reasons. This group of reactants also indicated difficulty in responding to six responses to each clinical problem incident and so two responses were randomly deleted from each question, leaving an equal number of opportunities (20) for the respondent to select each of six instructional

techniques.

Five Ph.D. Faculty members at the College of Human Medicine were then given the definitions of the techniques and the instrument responses and asked to sort them into the six categories of modeling, facilitation, clinical supervising, problem solving, involving, and serving as an expert resource. Talking with these raters and scoring the reliability indicated two problems, 1) that the items were virtually impossible to sort apart from the context of the problem/incident, and 2) that a number of items in the problem solving and role modeling dimensions should be discarded. In addition, items were crossing over in the categories of facilitating and clinical supervising. These items were re-written, in an attempt to eliminate the problems. A second reliability sort indicated an overall initial reliability in an acceptable range (alpha = 82.9).

Subsequently, a group of third year M.D. residents took and reacted to the Instrument and indicated that a negative emotional tone experienced as part of the expert resource items caused the residents not to select those items. Subsequent editing was done to try to achieve an emotionally neutral tone.

Given the contention that clinical instruction is multidimensional, and that using a number of instructional techniques would characterize the effective instructor, the scoring of the instrument needed to allow respondents latitude to select several techniques with which to respond to each incident/problem. Thus, the instrument was constructed to allow for every response to be selected and/or rated separately without the necessity of ranking or of a forced choice. In addition, responses could be eliminated from consideration if the respondent chose a "4" rating which indicated that they would never use the particular technique.

DESIGN AND ANALYSIS

In addition to the critique of both situations and responses by physician instructors, the following procedures were undertaken for the pilot and major samples. As one evidence of the content validity of the instrument, three faculty members of the College of Human Medicine sorted each item into one of the six techniques. Items were retained which were cast correctly by two of the three people. Items discarded were rewritten and a small set including the rewritten items were then re-cast. The overall reliability from this final cast was acceptable and will be detailed in Chapter 4.

The pilot data was also computer coded and a coefficient alpha reliability computed. Coefficient alpha was selected because it is the usual procedure applied to instruments where items have weighted scores and where there are no right and wrong answers.

One of the assumptions of this model is that the concept of reliability is restricted to short-range random changes that would characterize the test performance rather than the entire behavioral domain being tested. It is a coefficient of internal consistency based on the single administration of a single form, a clear advantage when obtaining data from busy practicing physicians. A second assumption of the test is that any difference between a person's scores on the two half tests would represent chance error. The variance of these differences divided by the variance of total scores would give the proportion of error variance in the scores. When the error variance is subtracted from 1.0 the proportion of true variance can be calculated, which is equal to the reliability coefficient.

The reliability of the whole test was thus calculated as was a reliability between the items and the scales. In addition, means for

each item were computed as was the standard deviation of each item. An item discrimination was computed consisting of the numbers of subjects selecting each of the possible responses to each item. Since the two pilot samples were small (n=16, n=10) they were combined to increase the power of the procedures.

The computer procedures of coefficient alpha reliability between item and scale and for the entire Instrument were calculated for the major sample, as were frequencies, means, standard deviations, absolute frequencies, and relative frequencies (percents).

A factor analysis (setting the eigen value at 1) with a verimax rotation was computed to determine the extent to which the constructs formed factors. In addition, a correlation matrix was calculated to determine the extent to which factors correlated with each other. Overall mean responses (percents) were calculated and an average profile was drawn to indicate the mean response to each scale. In order to test the hypothesis that preceptors would select the techniques of problem solving, role modeling and clinical supervision more frequently, paired t-tests of these constructs against the set involving, facilitating, and serving as a resource were computed. A multivariate analysis of variance was run to test for significance between the sub-scales.

TESTABLE HYPOTHESES

Alternate hypothesis I: The Instrument will be a valid measure of the clinical instructional techniques of: involver, facilitator, expert, problem solver, role model, and clinical supervisor.

Alternate hypothesis II: The sample of medical student

instructors in the study will select the techniques of problem solving, role modeling and clinical supervision most frequently.

Null hypotheses are not stated because of the usual understanding that the Null will be tested before the alternates are examined.

SUMMARY

In order to validate the constructs upon which this instrument has been based, the following procedures were done. As one evidence of content validity of the Instrument, three faculty members of the College of Human Medicine were given each of the descriptions of the six techniques and a copy of the Instrument without the key. Items were retained which either two of three persons cast correctly. The reliability score resulting from this procedure was 82.9%.

A pilot testing of the Instrument was conducted with a population of preceptors at the D.O. hospital in Grand Rapids, Michigan. This population of preceptors was small (n-16), however access to this group enabled a coefficient alpha reliability test to be conducted and some initial data to be computed on mean response and standard deviation of items. An additional pilot testing was done with an M.D. resident group and the same procedures applied.

Later validation on a larger population, preceptors participating in the jointly administered Cooperative Michigan Primary Care Preceptorship Program was also conducted. This program includes clinical preceptors from Michigan State University, the University of Michigan and Wayne State University (n=229). This administration constituted a cross-validation, following which item analytic procedures and coefficient alpha reliability were calculated. A factor analysis to

estimate the construct validity of the instrument was done with a varimax rotation to determine which factors emerged and whether the factors were orthogonal. Multi-variate analyses and correlation matrixes were also calculated. Mean responses to each sub-scale were computed and a mean profile of scores drawn.

CHAPTER IV: ANALYSIS OF RESULTS

CHAPTER IV

ANALYSIS OF RESULTS

Chapter four is organized in the following manner. This section is followed by a section re-stating the hypotheses. Two sections, one each describing the interpretation of results for the pilot and major samples, will follow. Statements of significance for the hypotheses precede a summary section.

RESTATEMENT OF HYPOTHESES

Hypothesis I: The Clinical Teaching Techniques Self-Assessment instrument will show evidence of construct validity, predictive validity, expert opinion validity and reliability as measured statistically.

Hypothesis II: The medical student instructors used as subjects will choose the techniques of role modeling, problem solving and clinical supervising, significantly more often than the techniques of involving, facilitating and serving as an expert resource.

INTERPRETATION OF RESULTS FOR PILOT STUDY

An analysis of the pilot data on the Family Practice M.D. resident and the D.O. preceptor group was conducted (n=26). Reliabilities were computed for each of the six sub-scales using the coefficient alpha reliability procedure. Means, variances, standard deviations and alpha levels were generated for the scale and for each item. These statistics were also generated for the instrument as a whole.

For the involver (challenger) sub-scale the standardized item alpha was .83756. Deletion of any one item would have failed to raise this

over-all level, therefore this scale was judged to be acceptable and was not altered in the final form of the instrument.

The sub-scale facilitation had a standardized item alpha of .68160. Deletion of item 71 (variable 71) however, raised that alpha to .70295. Item 71 was negatively correlated at -.14650 with the rest of the scale. Closer examination of the stem for answer 71 and the responses to item 71, indicated that the connection between stem and response was weak. Note, "You have a student this term who is very different from yourself, but she appears to be getting along well with patients, you".... (71) "say nothing since the student is taking appropriate responsibility for her own education." In effect it was possible that the pilot testing group felt that merely because the student was getting along well with patients, was not an indication that she was taking appropriate responsibility for her education. Item 71 was not re-written. While it may show up in the major analysis as a problem, it was felt that an insufficient number of pilot responses were collected and analyzed to justify the elimination of this item.

The sub-scale expert was the most problematic. The overall reliability was .50433. Five of the items: 9,18,31,85 and 91, were negatively correlated with the scale. Upon closer examination it was clear that each of these items and possibly others in the expert sub-scale had a negative emotional tonality. In effect, while this scale was intended to measure the providing of content and the setting of high professional standards, the actual items conveyed dogmatism, irascibility and petulance. Each was re-written and the entire scale examined for this type of tone. It is hoped that major data analysis will indicate a change toward more cohesion and a higher reliability.

The sub-scale labeled as problem solving, had a standardized item alpha of .80415. The deletion of item 95 negatively correlated at the -.32911 level, would have raised the over all alpha to .82650. Inspection of the data revealed that the stem was problematic and was changed from "your student can take an excellent history, but has trouble prioritizing which symptoms are the most significant and urgent", to read "your student has insufficient information to adequately diagnose patient problems". This change was made on the basis of consultation with physician preceptors who indicated that medical students do not commonly have difficulty with prioritizing significant and urgent symptomatology. Thus, they felt the credibility of that stem was weak and suggested the replacement item as a much more common student problem. Variable 95 was then also re-written to read, "assign her a patient with hypertension, ask her to outline the patient's problems and prepare a problem list together". Hypertension was selected as one of the few disease entities for which there is absolute diagnostic criteria.

The role modeling subscale alpha level was .70482. The alpha level was apparently lowered by five negatively correlated items; no one of which, however, would have substantively raised the alpha level. Four were examined and minor punctuation and or phraseology changes made. The last item was re-worked to eliminate a possible cross-over with the expert sub-scale. The item originally read, "tell her that Dr. P is a respected professional and if she has concerns she should address them to him", to its new form, "ask her to join with you and Dr. P at rounds since you respect his abilities and would like her to see another side of him". This change was made to eliminate the possible contamination of the first item by evidence of standards setting and giving the

student responsibility for her education; aspects of the expert and facilitation sub-scales respectively.

The sixth sub-scale, clinical supervisor, had an alpha level of .80013. One negatively correlated item (63) was re-worked because of punctuational difficulties. Removal of that item would have raised the level to .80825. This was not considered substantive enough to endanger the symetry of the test by its removal. The sub-scale reliabilities and total instrument reliabilities are presented in Table 4.1.

Table 4.1

PILOT DATA: Standardized Item Alpha Levels for sub-scale and total Instrument

Sub-scale	Alpha Level
Involver (challenger)	.83756
Facilitator	.68160
Expert Resource	.50433
Problem Solver	.80415
Role Model	.70482
Clinical Supervisor	.80013
Overall Instrument Alpha Level	.83667

In addition to the reliability data summarized above, absolute frequencies, relative frequencies (percents) adjusted frequencies and cumulative adjusted frequencies were calculated for each item.

One item (120) was eliminated and a new item substituted because it had zero variance. Each of the other potentially problematic items identified by the coefficient alpha reliability data, were inspected for problems in distribution and frequency. The usual probem was one of unequal distribution of responses across the (1 to 4 valence) rating scale. It is expected that raising the n in the major data sample will increase the variability of response and eliminate some of these problems.

MAJOR SAMPLE

Preceptors participating in the Cooperative Michigan Primary Care Preceptorship Program were sent letters requesting that they complete the Clinical Teaching Technique Self-Assessment. An addressed and stamped envelope was included for their reply. Additionally, a research consent form was included specifying that their participation was completely voluntary and that their individual scores would be kept confidential. The first mailing yielded 90 responses. A second mailing was initiated as a reminder. This second mailing yielded 41 additional responses. Selected telephone calls failed to raise this number. The final response rate was 57.2%. Copies of the first and second contact letters as well as the consent form are included in Appendix D.

INTERPRETATION OF RESULTS FOR MAJOR SAMPLE COEFFICIENT ALPHA RELIABILITIES

Coefficient alpha reliabilities were computed for each sub-scale and for the instrument as a whole. The overall standardized coefficient alpha for the Instrument was alpha .91036.

The involver sub-scale received a standardized alpha of .77329. The facilitation sub-scale alpha value was .63128. The expert resource sub-scale standardized alpha value was .71940. The problem solving and role modeling sub-scales received standardized alpha levels of .68171 and .67332 respectively. The clinical supervision alpha level was .66513. These values are summarized in Table 4.2.

Table 4.2

Major Sample Standardized Item Alpha Levels for Sub-scales, and Total Instrument

.77329	Involver (challenger)
.63128	Facilitation
.71940	Expert Resource
.68171	Problem solving
.67332	Role modeling
.66513	Clinical supervising
.91036	Instrument

Comparison of the alpha coefficients generated from the pilot and major samples show changes which were generally downward. The involver alpha level declinded from a .83756 to a .77329. The facilitation sub-scale showed a decline in alpha level from a .68160 to a .63128. The expert resource sub-scale which was problematic in the pilot data analysis and toward which much effort was directed, rose from a .50432 to a .71940. The problem solving sub-scale coefficient alpha value fell from a .80415 to a .68177. Similarly the role modeling sub-scale declined from a .70482 to a .67332. The clinical supervision sub-scale fell from a .80013 alpha value to a .66513 value. The over-all test reliability rose from a .83667 to a .91036. These comparisons are summarized in Table 4.3

Table 4.3

Comparison of Standardized Alpha Levels for Pilot and Major Sample Data for Total Instrument & Sub-scales

Total Instrument	Pilot Data .83667	Major Data .91036
Sub-scales	alpha	alpha
Involver	.83756	.77329
Facilitation	.68160	.63128
Expert resource	.50433	.71940
Problem solving	.80415	.68171
Role modeling	.70482	.67332
Clinical supervising	.80013	.66513

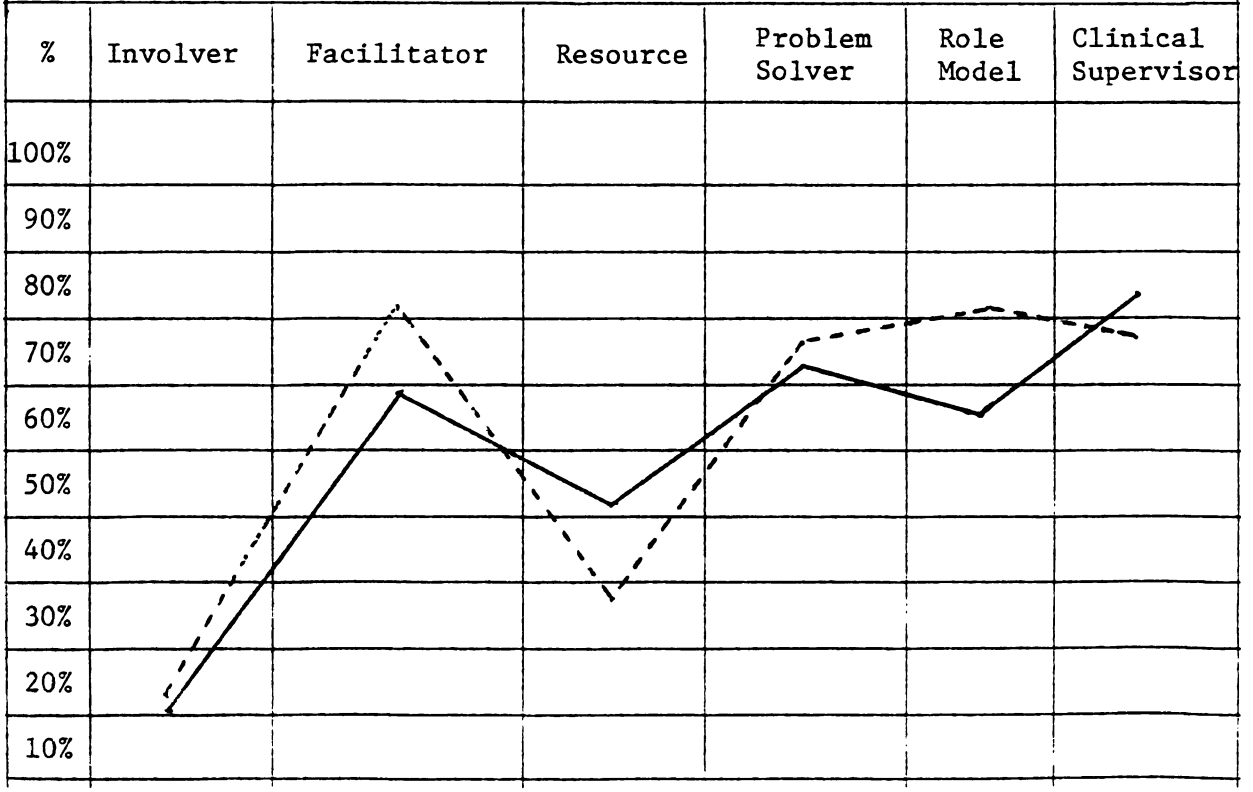
One explanation for this downward trend is the dissimularity of the two pilot sample groups. The resulting variability of response may explain the high alpha level. The pilot sample consisted of 16 D.O. and 10 M.D. physicians. The D.O. physicians had nearly seven years of teaching experience. The M.D. group was just completing residency training and had minimal teaching experience. As a group, they were dissimilar and their responses exhibited a discernable pattern of variance. Table 4.4 contains the mean percents for both pilot groups.

Table 4.4

Mean Percent Scores of Pilot Subjects Selecting Each Sub-Scale

M.D. Pilot Group n=10, -------

D.O. Pilot Group n=16 _____



	Involver	Facilitator	Resource	Problem Solver	Role Model	Clinical Supervisor
D.O.	20%	67%	51%	72%	66%	83%
M.D.	22%	81%	37%	76%	80%	77%

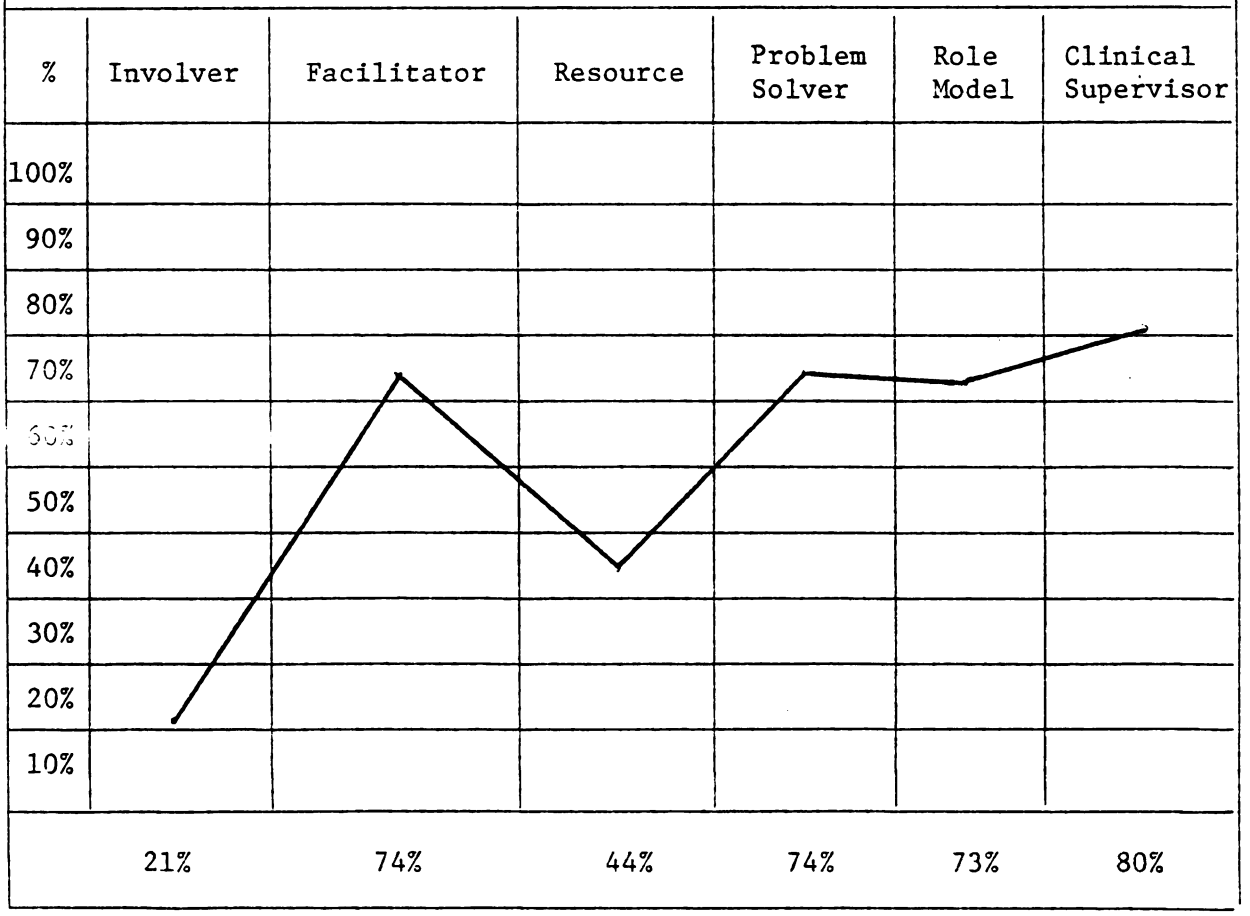
Table 4.5 summarizes the mean percent of the pilot subjects as a total group selecting each sub-scale.

Table 4.5

Mean Percent of Pilot Subjects

Selecting Sub-scales

(n=26)



The major sample consisted of M.D. physicians with extensive practice experience and four years of teaching experience in one tri-university teaching effort, the Cooperative Michigan Primary Care Preceptorship Program. The group had also received twice yearly workshops about preceptorship teaching, and yearly feedback from the medical schools on their teaching performances. Given this concerted effort

stressing contracting, objective setting and student evaluation, it was probable that the preceptor group would exhibit less variability of response and this decrease in variance, might well lower the reliability alpha coefficients. Table 4.6 contains the mean responses to each sub-scale for the major study group. Table 4.7 summarizes the mean percents for the major sample.

Table 4.6

Scale Means for

Major Sample Subjects

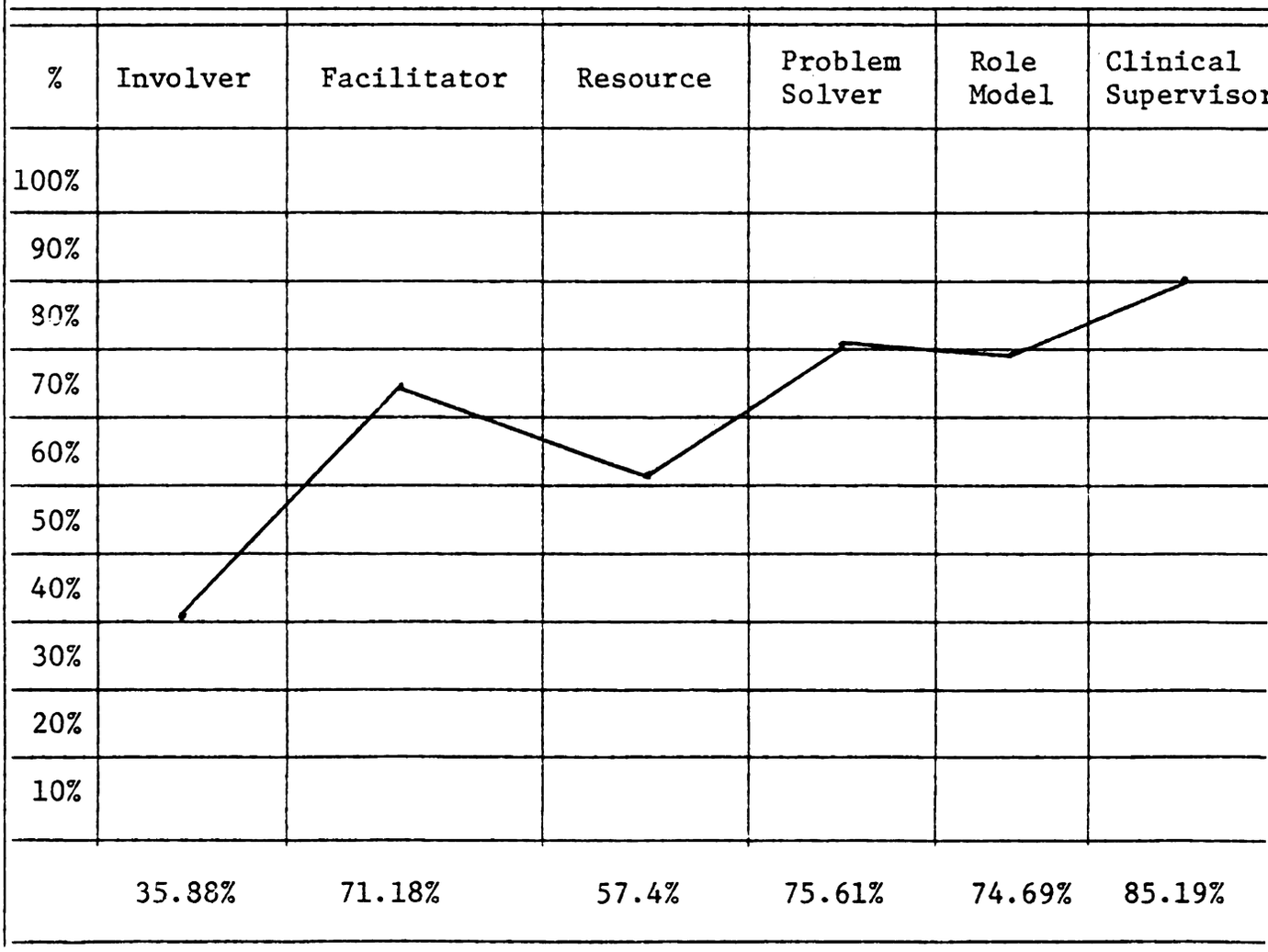
(n=131)

	Involver	Facilitator	Resource	Problem Solver	Role Model	Clinical Supervisor
1.0						
1.5						
2.0						
2.5						
3.0						
3.5						
4.0						
	2.77	1.85	2.16	1.78	1.78	1.48

Table 4.7

Mean Percent of Major Sample Subjects

Selecting Sub-scales (n-131)



%	Involver	Facilitator	Resource	Problem Solver	Role Model	Clinical Supervisor
100%						
90%						
80%						
70%						
60%						
50%						
40%						
30%						
20%						
10%						
	35.88%	71.18%	57.4%	75.61%	74.69%	85.19%

DISCUSSION OF TABULAR MATERIAL

The data from Tables 4.4 through 4.7 require further discussion. Table 4.4 graphically represents the differences between the M.D. and D.O. pilot samples. Table 4.5 combines the two pilot groups in a mean percent representation. In comparing Table 4.5 to Table 4.7, containing the major sample mean percents, a noticeable flattening of the line is evident. Specifically the major sample selected the involver dimension 35.88% of the time as compared to the pilot group's 21%. Thus, the major sample reports involving the student in patient care substantially more than the pilot group. Also, the major sample selected the resource scale at a 57.4% rate as compared to only a 44% by the pilot sample. These two differences when taken together seem to indicate a pilot sample which is less willing to take risks in educating students. Involving the student in patient care and teaching the content of medicine are both risk-taking activities. These differences may also indicate differences between M.D. and D.O. physicians. Additionally, length of time in teaching may explain part of these differences.

Table 4.6 contains the scale means for the major sample. These scale means take into account the differences between a physician selecting a 1 (always) and a 2 (sometimes) response. In calculating the mean percent tables, these two ratings were combined as were the 3 (rarely) and 4 (never) responses. Table 4.6 is a totally accurate rendering of subject's choices. Tables 4.4, 4.5, and 4.7 were calculated from the combination of ratings.

ITEM STATISTICS

In addition to these sub-scale statistics; absolute frequencies, percents, adjusted, and cumulative percents were generated for each item; as were means and standard deviation values. Twelve items of the total (120) appeared to be discriminating poorly. In each case, over 100 subjects selected the response, "I would always", to these items. The items were: 8,16,32,42,65,72,72,85,86,90,109, and 114. Only one of these, item 85, had appeared problematic in the pilot data analysis. Item 85 was re-written between the pilot form and the major sample form of the Instrument. See Table 4.8 for item summary.

Of thest twelve items, six appear as a part of the clinical supervision sub-scale. Items 8,16,32,72,109, and 114, constitute over one quarter of the items in that scale. Of the remainder of items listed in Table 4.8, two appear in the problem solving sub-scale and three are a part of the role modeling sub-scale. One item appears in each of the two sub-scales, facilitation and expert. The involver sub-scale contained no items (rated "always") selected by over 100 subjects.

The remaining 108 items appeared to be operating well and had means and standard deviations within the expected parameters. The distribution of responses across the one to four rating scale also appeared to be reasonable.

FACTOR ANALYSIS - SUB-SCALE STATISTICS

A factor analysis procedure, with a verimax rotation, was computed for each of the sub-scales. It was decided to rotate the items within sub-scales in order to determine whether each sub-scale was comprised

Table 4.8

Items Selected as "Always"

By Over 100 Subjects

(n=131)

Item No.	1 I would always	2 I would usually	3 I would seldom	4 I would never	Out of Range
8	118	12	1		
16	122	6	1	2	
32	121	7	1	1	1
42	104	20	2	5	
65	103	18	4	?	4
72	108	18			5
73	119	6	2		4
85	123	5			3
86	103	18	6		4
90	115	12	1		3
109	102	15	2		0
114	111	13	1		6

of single or multiple factors. Additionally, standard computer programming will only accommodate rotation of 100 simultaneous variables, which was twenty fewer than would have been necessary to rotate all the variables contained in the Instrument. Thus, each set of items within the factor was rotated until the eigen values fell below 1. In each case this occurred after seven items, and before ten items were rotated. At this point, for each sub-scale, approximately 60% of the variance was accounted for by the seven to nine columns formed. For the involver scale, seven items accounted for 61.4% of the variance. The facilitation sub-scale required nine items to be rotated before 66.4% of the variance was explained. Seven items accounted for 63.6% of the variance within the sub-scale, expert resource. Seven items within the problem solving sub-scale accounted for 60% of the variance. Eight items accounted for 65% of the variance within the role modeling sub-scale. Seven items were required to account for 59.5% of the variance within the sub-scale clinical supervision. Each item was then rotated across these seven to nine factors to determine whether a coalescence would occur. This iteration yielded three factors[1] for the involver, facilitator, and expert resource sub-scales. The problem solving sub-scale was comprised of five factors as were the sub-scales role modeling and clinical supervising. The involver factors were labeled, confidence in student abilities, patient and support personnel feedback to student, and patient care involvement. Each of these factors is listed in Chart 4.1.

[1]Using the Keil-Wrigley convention of eliminating factors with fewer than three variable loading at significant levels.

Chart 4.1

FACTORS IDENTIFIED WITHIN SUB-SCALES

Involver	Facilitator	Expert Resource
F.1 Confidence in student abilities to solve problems	F.1 Evidence of supportiveness by Preceptor	F.1 Using professional literature for student teaching
F.2 Patients and support personnel provide student feedback	F.2 Obtaining information from students	F.2 Setting Standards for students
F.3 Direct involvement of student in patient care	F.3 Encouraging student responsibility for own education	F.3 Student learns preceptor methods and standards

Chart 4.1

(Continued)

Problem Solver	Role Model	Clinical Supervisor
F.1 Data gathering	F.1 Preceptor offering problem solution	F.1 Preceptor provides feedback (1)
F.2 Student generation of treatment plans	F.2 Preceptor self-examination	F.2 Goals setting
F.3 Student generation of educational strategies	F.3 Preceptor demonstrates approach	F.3 Preceptor feedback (2)
F.4 Student testing diagnoses against criteria	F.4 Sharing learning strategies	F.4 Feedback (3)
F.5 Preceptor demonstrating problems solving approach	F.5 Positive relations with colleagues	F.5 Self Evaluation by student

The sub-components of the factors are available in Appendix E. The facilitation sub-scale yielded factors which were entitled, evidence of support by preceptor, obtaining information from student, and encouraging student's responsibility for education. The expert resource sub-scale factors were labeled, using professional literature, setting standards for student and learning preceptors methods and standards.

The problem solving sub-scale yielded five factors. These were labeled as data gathering, student generation of treatment plans, student generation of educational strategies, student testing diagnoses against criteria, and preceptor demonstrating a problem solving approach. The role modeling sub-scale also yielded five factors. While these were each labeled, they failed to conform to the demands of logical linkage and may be too diffuse to really be considered factors. The role modeling factors were labeled preceptor offering problem solutions, preceptor self examination, preceptor demonstration of approach, shared learning strategies, and positive relations with colleagues.

The clinical supervision sub-scale included five factors, each of which mainly consisted of the preceptor provision of feedback to the student. These factors were labeled separately, but failed to logically separate or to coalesce around single and distinct concepts. The factors were labeled preceptor provides feedback (1), goals setting and feedback, provides feedback (2), feedback (3), and self evaluation by student.

A second type of factor analytic procedure was employed to estimate the percent of variance accounted for by statistically limiting the items within sub-scales to a single factor. This process confirmed the presence of multiple factors within each sub-scale.

Forming the involver sub-scale to a single factor accounted for only 20.8% of the variance. The succeeding sub-scale values were; facilitation (single factor) 12.7%, expert resource 16.9%, problem solving 17.7%, role modeling 16.1%, and clinical supervising 19.9%. The results of this procedure are summarized in Table 4.9 below.

Table 4.9

Percent of Variance Accounted For By Single Factor Loadings for Sub-scales

Sub-scale	Percent of Variance
Involver (challenger)	20.8%
Facilitator	12.7%
Expert resource	16.9%
Problem solver	17.7%
Role model	16.1%
Supervisor	16.9%

An additional factor analytic procedure was calculated in which all the variables from three of six sub-scales were rotated. The variables in the sub-scales involving, facilitating, and serving as an expert resource were entered, without regard to sub-scale of origin. The procedure rotated these sixty variables to two, three and four factors. Appendix E contains the variable numbers (with numerical values of .39 or higher) which formed these factors. Additionally in Appendix E, the variables themselves, their wording and code letters indicating the

sub-scale orientation are available. Inspection of the numerical values, and the wording of the variables indicate that the sub-scales involving, facilitating, and expert resource constitute separate orthogonal factors. Therefore, it can be maintained that the original design of the sub-scales is confirmed by the factor analysis. This constitutes good evidence of the construct validity of these three sub-scales. In as much as the factors confirmed the sub-scales, the sub-scale titles were retained as factor titles.

An identical procedure was also undertaken for all the variables from the sub-scales problem solving, role modeling and clinical supervising. All sixty variables were rotated, independent of the sub-scale coding, and formed to two, three and four factors. Appendix E contains the variable numbers at two, three and four factors, and a listing of the variables in each of these iterations. When the variables from these three sub-scales were rotated to two factors, a coalescence failed to occur. When rotated to three factors, role modeling, as a construct, failed to achieve values higher than .39 in any of the factors formed. Each of the three factors contained problem-solving and clinical supervision items. The first factor was a blend of both dimensions, the second factor was primarily problem solving, and the third was primarily clinical supervising. When rotated to form four factors, the variables clustered numerically but failed to conform to the original design of the sub-scales or to a logical and defensible set. Factors one and two were highly correlated and blended problem solving and clinical supervision, factors three and four were correlated and blended role modeling and clinical supervision items. This analysis failed to confirm the presence of three independent and orthogonal factors. When the variables within

the sub-scale were rotated, five factors were formed for each of these sub-scales. It is possible that the entire set of variables might form more defensible and logical factors if the set were rotated to five, six or seven factors. Removal of the role modeling sub-scale might also yield separate clinical supervising and problem solving factors. Earlier research also failed to establish the independence of role modeling as a factor.

DISCUSSION OF FACTOR ANALYSIS

The factor analytic procedures indicated the presence of multiple factors in each sub-scale. While this was divergent from expectations, it is logically defensible. Each of the sub-scales, although labeled as a single technique was comprised of a number of subsidiary components. These components were presumed to form a single construct. For instance, the problem solving construct contains components of data collection, hypothesis generation, and evaluation of hypotheses and treatment plans. In addition, this construct contains such components as the preceptor's use of a similar problem solving approach when faced with student educational problems. These components were all conceived of as coalescing into a single construct. However, it may be that each separate part of the patient diagnosis procedure is taught and demonstrated separately and learned by the student as a separate operation. Indeed, most medical schools teach courses in patient interviewing followed by courses in the physical examination, and only then is the student allowed to actually participate in treating patients and thus evaluating diagnostic hypotheses.

If this is the case, one might expect multiple factors to arise from rotating the items, which summarize the factors, within the sub-scales. The finding of multiple factors confirm the multidimensionality

of clinical instruction detailed in earlier studies.

Rotation of all variables within sets of these sub-scales confirmed the contention that involving, facilitating, and serving as an expert resource are independent and orthogonal factors. The sub-scales role modeling, problem solving and clinical supervising, failed to form independent orthogonal factors. The role modeling sub-scale is apparently too diffuse to stand independently. When formed to three factors, the sub-scales problem solving and clinical supervising are independent and orthogonal. The sub-scale role modeling, lacks significant numerical values (above .39) to appear in any of thre three factors.

MULTIVARIATE ANALYSIS OF VARIANCE PROCEDURES

A multivariate analysis of variance to determine whether there were differences between sub-scale means was computed to test hypothesis II. The multivariate procedure indicated differences significant at the .0001 level. Subsequently a series of paired t-tests were computed to determine the significance leveles of single pairs of sub-scales. The sub-scales; involver, facilitation and expert resource were paired against the sub-scales, problem solving, role modeling and clinical supervising. Each pair was significant at the .0001 level except the two pairs facilitation with problem solving and facilitation with role modeling. Those pairs were significant at the .01 and the .05 levels respectively. This analysis clearly substantiates the hypothesis that the physician sample in the study used the techniques of problem solving, role modeling and clinical supervising significantly more than the techniques of involving, facilitating and serving as an expert resource. The data from the paired t-tests is summarized in Table 4.10.

Table 4.10

Summary of Paired t-tests Between Sub-scales

	Mean	S.D.	2 Tailed Test
Involver with Problem solving	2.7766 1.7835	.453	.000
Involver with Role modeling	2.7766 1.7898	.432	.000
Involver with Clinical Supervising	2.7766 1.4888	.396	.000
Facilitation with Problem solving	1.8570 1.7835	.330	.012
Facilitation with Role modeling	1.8570 1.7890	.403	.058
Facilitation with Clinical Supervising	1.8570 1.4888	.309	.000
Expert with Problem Solving	2.1633 1.7835	.362	.000
Expert with Role modeling	2.1663 1.7898	.357	.000
Expert with Clinical Supervising	2.1633 1.4888	.301	.000

PEARSON CORRELATION COEFFICIENTS

A pearson product moment correlation coefficient matrix was calculated as a measure of the extent to which sub-scales were correlated with each other. The range of these correlations was from .2708 to .6835. Most highly correlated were the problem solving and clinical supervision sub-scales at .6835. Lowest correlations were calculated for the role modeling with facilitation sub-scales. All the correlation coefficients were significant at the .001 level. Thus, it would seem that the six sub-scales are interdependent to some degree and that the Instrument is conceptually a whole, rather than a loose association of six sub-tests.

STATEMENT OF SIGNIFICANCE

Hypothesis I was supported in evidence of construct validity, predictive validity, expert opinion or face validity and reliability.

Construct validity - The factor analytic procedures identified the presence of involving, facilitating, serving as an expert resource, problem solving and clinical supervising as independent factors.

Predictive validity - The multivariate analysis of variance supported differences between sub-scales at the .0001 level.

Expert opinion - The reliability of the expert opinion assigning of item to categories was 82.9. Other face validity evidence will be discussed in Chapter V.

Reliability - The coefficient alpha reliability for the Instrument was .91.

Hypothesis II was supported at the .0001 level by the overall test for differences between sub-scale means.

The t-tests for differences between the pairs of sub-scale means were significant at the .0001 level. Two pairs, of the nine pairs tested, were significant at the .01 and .05 level.

SUMMARY

The concept of validity, or the extent to which a test measures what it purports to measure, is extremely difficult to determine. The present study was designed to use statistical techniques for this purpose rather than physician observation by a researcher or a medical student for a number of reasons. First, any observer entering the teaching relationship between student and physician may not see a representative sample of the physician's teaching behavior. The exigencies of patient care, the presence of the observer, and the level of student are some of the confounding problems.

Obtaining data from students about individual physician teaching performance is also problematic. Over a given period, most practicing physicians who volunteer to teach medical students, teach only two students in a three year period. Across a number of years the students assigned to a physician may vary from first year to fourth year in their training. Perceptions of teaching behavior change a great deal depending on the student's educational level. Given these factors, and in the absence of observer or student report data, self report data from the physician was chosen.

Statistical validation of an Instrument created to obtain data from physicians was the methodology employed. Three approaches to the establishment of validity were used. These were, measures of judgmental authority, predictive validity and construct validity. The

techniques used to measure each of these were faculty ratings, multivariate analysis of variance, and factor analysis respectively. One measure of judgmental authority was faculty ratings of the extent to which items corresponded to the definitions of constructs. The statistic resulting from this procedure was a 82.9% reliability estimate. The measure of predictive validity, the multivariate analysis of variance and subsequent paired t-tests, were significant at the .0001 level. The measure of construct validity, the factor analysis procedures, confirmed the multidimensionality of clinical instruction. The factor analysis also confirmed the independence and orthogonality of three factors of involving, facilitating and serving as an expert resource. The factors of problem solving and clinical supervising are also orthogonal and independent. The role modeling sub-scale failed to form an independent factor and failed to achieve values above .39 in the three factor iteration. Additional face validity evidence and further discussion of the multivariate analysis of variance and its relation to the validity question will be discussed in Chapter V.

CHAPTER V: SUMMARY AND CONCLUSIONS

CHAPTER V

SUMMARY AND CONCLUSIONS

SUMMARY

A definitional exercise was conducted for the present study narrowing the multidimensional activities conducted by the clinical instructor in the course of teaching medical students. Six techniques were postulated which purported to account for most clinical teaching behavior. The six techniques were; involving (challenging), facilitating, serving as an expert resource, problem solving, role modeling, and clinical supervising. A review of related research on clinical teaching confirmed these techniques as logically defensible on the basis of earlier studies.

An instrument was created to measure the physician instructor's use of these techniques. Thirty problematic situations in clinical instruction served as the questions on the Instrument. The responses to the questions were written to operationalize the domains of the six defined techniques. For example, the clinical supervision technique incorporates the processes of student observation and feedback. Item 58, coded for the clinical supervision sub-scale, attempts to capture this concept. In response to the stem, "In planning for your students' arrival you..." (Item 58 reads) "plan to follow your system of an observation period during which you can determine the student's level, and periodic sesions during which you and the student can assess performance."

Two pilot samples and one major sample were surveyed and the data

assessed. In attempting to determine the reliability and statistical validity of the Instrument and to determine whether the techniques problem solving, role modeling and clinical supervising were more frequently selected by the physician sample, a number of procedures were undertaken. Coefficient alpha reliabilities for sub-scales and the entire Instrument were computed for each sample. Item statistics of means, standard deviations, absolute frequencies and percents were also computed. A factor analytic procedure was computed, by sub-scale, to determine whether each construct consisted of single or multiple factors. A multivariate analysis of variance tested for the presence of differences in means between sub-scales. Following this procedure, t-tests computing the significance of differences between pairs of sub-scales were performed. Faculty raters assigned individual items to categories for an additional reliability estimate.

CONCLUSIONS

Two hypotheses were tested in the course of this study. Hypothesis I asserted that the Clinical Teaching Techniques Self-Assessment Instrument would show evidence of construct validity, predictive validity, expert opinion validity and reliability. A measure of construct validity; factor analysis, identified the presence of multiple factors within Instrument sub-scales. A measure of predictive validity, multivariate analysis of variance supported differences between sub-scale mean values at the .0001 level. A measure of expert opinion validity, faculty assignment of items to sub-scales, indicated a reliability value of 82.9. The coefficient alpha reliability procedure indicated an Instrument reliability of .910.

Hypothesis II asserted that physician instructors would choose the techniques of problem solving, role modeling and clinical supervision more frequently than the techniques of involvement (challenge), facilitation, and serving as an expert resource. Following a multivariate analysis of variance which indicated overall significance at the .0001 level, nine separate t-tests were computed. The t-tests detected differences between the means of seven pairs of sub-scales at the .0001 level. The two pairs of facilitation with role modeling and facilitation with problem solving were significant at the .05 and .01 levels respectively.

DISCUSSION

The rationale for using a set of statistical techniques to begin to establish instrument validity has been made. A further analogy may clarify the concept. If one were to design an intensive clerkship experience in which medical students were to be taught patient interviewing, patient examination techniques and the rationale for certain treatment plans, a number of instructors might be necessary. If each instructor taught only a specific segment of the course and provided evaluation about the student to the course coordinator, a multiplicity of evaluations attesting to different abilities of the student would result. In effect by looking at the relationship of the entire range of evaluations a picture of the total student performance would begint to emerge. The argument is made here for the application of that analogy. In effect, by combining evidence of many types of validity from many sources and by a number of statistical techniques a total picture of the Instrument and its limitations begins to emerge. These evidences of validity will be discussed sequentially.

Evidences of predictive validity and expert opinion validity were solidly substantiated for the Clinical Teaching Techniques Self-Assessment Instrument. A set of constructs has been postulated along with a set of relationships among those constructs. Many physicians with a great deal of experience in educating student physicians were asked to comment on, and criticize the constructs set forth. Invariably, these instructors attested to the completeness of the constructs and their logical linkages. In addition, these experts expressed the opinions that the postulated constructs corresponded to their view of the clinical teaching process and included all the relevant choices a clinical instructor would make in such a setting. This set of data, along with the faculty ratings of the items, gives a strong argument for the face validity of the Instrument. The multivariate analyis of variance was used to test for an hypothesized set of relationships among the constructs. The significance level of .0001 is a strong argument that the hypothesized set of relationships exists; in effect, constituting an additional and independent measure of the Instrument's construct validity.

Measures of reliability and construct validity require further discussion. While the overall Instrument reliability, as measured by the coefficient alpha technique, was a .91036, the sub-scale reliabilities ranged from .77329 to .63128. These values are acceptable for sub-scales containing only twenty items. However, the sub-scale reliabilities fell from the pilot to the major sample. The pilot subjects consisted of two groups; ten (year three) M.D. residents working out of an ambulatory clinic adjacent to a hospital, and sixteen D.O. physicians based in a hospital in Grand Rapids, Michigan.

Given the presence of osteopathic and allopathic physicians, recent graduates and experienced practitioners working in widely different settings, the variability of response was significant. These differences may explain the high reliability coefficients for the pilot sample. The major testing sample consisted of a highly cohesive group of teaching physicians, some of whom had participated in a single type of teaching effort for as long as seven years. All the preceptors had been offered bi-annual workshops on teaching skills improvement, were asked to achieve a common set of goals for students and were provided yearly written feedback from the medical schools. Thus, they constituted a sample of physicians who responded in very similar ways to questions on the Instrument. In effect; lowered variance may explain the lowered reliability.

The measure of construct validity, factor analysis, indicated the presence of numerous factors within the six sub-scales of the Instrument. Since the sub-scales had been created originally to include a number of components, this is to be expected. For four of the sub-scales, these separate components corresponded well to the factors formed when the items were rotated.

The involver sub-scale contained factors of confidence in student abilities, patient and support personnel feedback to student, and patient care involvement. These factors correspond well to the original components the sub-scale was designed to include. The original components were; instructor confidence in student abilities and comfort with student error, active involvement of physician staff and patient in the process of student education and direct involvement of the student in patient care.

The facilitator sub-scale yielded factors which were entitled preceptor support of student, elicitation of data from student, and student takes responsibility for education. The facilitation sub-scale included components of the student accepting responsibilities for his/her education, (developing goals and making educational decisions), instructor modifying his/her teaching on the basis of student input, and generally supportive and facilitative preceptor behavior. Thus, little divergence between the factors and the original design of the sub-scale was evidenced.

The expert resource sub-scale also formed three factors. These were labeled, use of professional literature in teaching, setting standards, and student learning about preceptor methods and standards. The sub-scale included the imparting of medical content information and the setting of high standards. These factors were not as clearly defined as factors in the two previously discussed sub-scales. There was one item which appeared in factor 1 (use of professional literature) which seemed to belong logically in factor 2. Additionally, factor 3 combined observation of the preceptor's method with standards setting on the part of the preceptor. However, the items which crossed over into standards-setting were those expressing personal standards not professional ones. It was decided that personal standards (ie., a record keeping system adopted by a preceptor, and personal hygiene standards) were close to, if not a part of, a preceptor's method of practice.

The problem solving sub-scale formed five factors. These were titled, data gathering, student generation of treatment plans, student generation of educational strategies, student testing diagnoses against

criteria, and preceptor demonstrating problem solving approaches. These factors correspond well to the original problem solving sub-scale components of data gathering (cue interpretation), hypothesis generation, hypothesis testing, the preceptor demonstrating a problem solving process for patient care and student educational problems.

The role modeling and clinical supervision sub-scales were much less clear. Conceptually the role modeling construct is difficult to pinpoint. A preceptor may choose to order a certain lab test, for example, to demonstrate the use of problem solving sequence, or to model the correctness of such a procedure. The rationale is difficult to ascertain; the preceptor's level of self awareness is crucial in his depicting why a certain technique was chosen. These difficulties pose certain methodological problems as well. While the role modeling scale formed five factors, they were not clear-cut and showed cross-over with each other. The factors were labeled preceptor offering problem solution, preceptor self-examination, demonstrating approach, sharing learning strategies, and positive relations with colleagues. Although occasional items fit less than perfectly under factor titles, the factors do fit the originally postulated components for the modeling sub-scale. These were; preceptor demonstration of style, preceptor honestly appraising skills and limitations, involving others in student learning and positive collegial relations.

The clinical supervision sub-scale yielded five factors. All five of these factors were heavily feedback oriented, with either the preceptor, the patient and staff member, or the student himself providing performance feedback. Interestingly in the characteristic roots and vectors (principal iteration) performed prior to the factor analysis, the clinical

supervision sub-scale formed only one factor on which were loaded 12 of the 20 items at a .39 level or higher. Therefore, it is probable that subsequent factor analytic routines rotating larger numbers of items might yield a smaller number and amore logical set of factors. The factors for this sub-scale were labeled, preceptor provides feedback (1), goals setting, preceptor feedback (2), feedback (3), and self evaluation by student. The original components of the sub-scale included the systematic on-going provision of positive and negative information regarding student performance, the contracting approach, the setting of goals and observation of student performance. When variables were rotated independent of sub-scale alignment, the sub-scales of involver, facilitation, and serving as an expert resource emerged as orthogonal and independent constructs. This increases the Instrument's construct validity. The sub-scales of problem solving, and clinical supervising were also confirmed as independent and orthogonal. These two sub-scales appeared as three factors on this iteration. The role modeling construct did not appear to be orthogonal or independent. A higher number of iterations may serve to seperate these sub-scales further and more defensibly.

Extending the analogy tendered at the beginning of this Chapter, a total picture of the Instrument's operation is available if one combines all the evidence for validity. A further substantiation of the earlier predictive and face validity evidences is provided by the reliability and construct validity statistics. An overall reliability of .91036 combined with five orthogonal and independent factors gives clear evidence of the Instrument's validity.

In summary, the factor analytic routines supported the presence of multiple factors operating in the clinical instructional process. The complexity of the environment, the changing panorama of patient problems, the individual needs of students and the student's level of education provide the necessity for creative use of many techniques on the part of an instructor.

IMPLICATION FOR FUTURE RESEARCH

A number of directions might be pursued in future research studies on clinical teaching. Specifically regarding the further development of the Clinical Teaching Techniques Self Assessment, two processes may prove fruitful. First, a nominal data collection process might be initiated to determine whether M.D. educators encounter different problems in student instruction from D.O. educators. A separate form of the test for osteopathic physicians might result. Additionally, a lack of specificity of the clinical instructional problems posed, was identified by preceptors completing the instrument, as a problem. Note, for example the question "You pride yourself on a warm, friendly relationship with your staff. However, your student relates to support personnel in a way that, as you see it, is inappropriate. You..." Relating "inappropriately" in this case might range from manipulative, using behavior, to flirtatious seductiveness. A videotaped form of the Instrument dramatizing the situations might concretize those clinical problems for instructors. An alternate form validity study could then be undertaken.

A further study might well combine an observational data collecting technique, observing physicians during clinical teaching sessions, with both physician and student, pre and post administration of the Instrument.

If the Instrument were administered to the physician prior to the onset of a clerkship for example, a followed by actual observation of a number of teaching sessions, with a rating form for categorizing teaching behavior, the predictive abilities of the Instrument might be better understood. Student rating of preceptors by means of the Instrument might also be compared to the preceptor's own ratings toward the goal of increasing self-awareness for the preceptor. Student ratings could also be compared to preceptor and neutral observer ratings of preceptor performance.

Knowledge about clinical instructional behavior and its effective and less effective components is as yet incomplete. Much research remains to be initiated before this area is thoroughly understood. The study conducted here indicates additional promising points at which to begin such investigations.

The implications for the field of medical education of beginning to research faculty effectiveness, are great. As medical education begins to address the issues of physician maldistribution, the training of the student in his eventual desired location is offered as a solution. If this idea is pursued, and most projections of governmental spending argue for its efficacy, students will begin to take large amounts of their education in small towns and rural underserved areas. An acute reliance on the local medical personnel as educators will result. Final certification of the student will remain the perogative of the medical schools. In effect the medical school will be placed in the position of reliance upon the judgment of the local physician to attest to the student's preparedness to be graduated. Attesting to the competency of these physicians, the new and local faculty, will become the task of the

medical school. A diffusion model may well result. The medical school educating its field faculty on effective teaching; the local physician teaching the student and attesting to the student's competency. In such a relationship, research indicating or predicting faculty teaching style becomes a benchmark for faculty assessment and development.

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APPENDICES

APPENDIX A

CLINICAL TEACHING TECHNIQUES SELF-ASSESSMENT

INSTRUMENT AND KEYS

CLINICAL TEACHING TECHNIQUE

SELF-ASSESSMENT

For Office Use Only

Name (please print) _____ Date _____

Address _____

This instrument has been designed to provide you some information about the extent to which you may use certain techniques in teaching medical students. The instrument contains thirty situations identified by physicians as commonly encountered in clinical instruction. Each situation is followed by four possible reactions. Each reaction requires a decision from you about how you would respond to that alternative. Because these alternatives have been designed to reflect your experience and judgment, there are no right or wrong answers. Your results will be provided to you later.

This instrument presupposes the existence of six clinical teaching techniques. These are operationally defined in the example below. Please respond to the following item rating each alternative on this continuum.

I would usually	I would sometimes	I would rarely	I would never
1	2	3	4

As a physician engaged in medical student instruction, I see myself as

1 2 3 4 1. teaching him problem solving skills.

1 2 3 4 2. planning to give him positive and negative feedback.

1 2 3 4 3. planning to challenge him with patient care responsibilities.

1 2 3 4 4. building the student's knowledge base.

1 2 3 4 5. helping the student assume responsibility for his own education and development.

1 2 3 4 6. exposing the student to your style, practice patterns, colleagues, and to some extent personal life.

I would usually	I would sometimes	I would rarely	I would never
1	2	3	4

Please circle your answer

Please rate each alternative

You meet the student with whom you'll be working over the next month. The student asks you, "What will be expected of me?" You answer

1 2 3 4 1. "I'd like you to observe me at first, then you'll be able to fit in appropriately."

1 2 3 4 2. "I'd like you to develop your own goals."

1 2 3 4 3. "Do all the physicals you can."

1 2 3 4 4. "We will be improving your ability to generate and evaluate patient diagnoses."

You've been assigned a student your patients do not appear to be comfortable with. You

1 2 3 4 5. continue to assign the student to patient care. Assume it's the only way he'll learn.

1 2 3 4 6. spend some time clarifying the problem with the student and ask the student to come up with some ideas about what is going on.

1 2 3 4 7. talk with the student about the problem as patient perceive it, emphasizing the student's performance, not personality.

1 2 3 4 8. show the student some ways of relating to patients that will ease this situation.

You've been teaching as a volunteer clinical faculty member for three years. You realize that your faculty appointment in recognition of your effort has not come through. You

1 2 3 4 9. forget about it; your own standards are probably higher than the University's anyway.

1 2 3 4 10. call the Dean's Office at the University on the telephone to check out your ideas about why it has been held up and ask what they could do.

1 2 3 4 11. ask your colleagues how they've handled it.

1 2 3 4 12. treat the University as you would a student, and call the Dean's Office to give them the feedback that this is important to you.

I would usually	I would sometimes	I would rarely	I would never
1	2	3	4

Please circle your answer

Please rate each alternative

You are working with two students. One is skilled in patient interaction, but his physical examination skills are minimal. The other is skilled in physical examination but she has an abrasive manner. You

1 2 3 4 13. try to put them in equally challenging situations.

1 2 3 4 14. ask them to teach each other the skills in which they feel most competent.

1 2 3 4 15. ask each to develop objectives for improving what they feel to be their weak points.

1 2 3 4 16. talk with each about both their strengths and deficiencies.

You meet with your new students the first day they arrive. One is dressed in levis and a plaid shirt and one is dressed in a white jacket, shirt and tie. You

1 2 3 4 17. have a session with the students setting the contract, including student dress.

1 2 3 4 18. let them know about the hospital dress code for students.

1 2 3 4 19. be supportive of both students.

1 2 3 4 20. ignore it. Your patients will give them feedback if the student's attire is bothersome.

You notice that some of your patients do not appear comfortable when you have your student with you. You

1 2 3 4 21. ask yourself if your patient's discomfort is reflective in any way of your feelings.

1 2 3 4 22. ask the student to observe when with patients, afterwards you can discuss each case.

1 2 3 4 23. since you are still in the observation period, relate what you've observed about the patient discomfort to the student, and use that as a basis on which to negotiate later student objectives.

1 2 3 4 24. ask the student how he would like it handled.

I would usually	I would sometimes	I would rarely	I would never
1	2	3	4

Please circle your answer

Please rate each alternative

A student questions your record keeping system in comparison to the problem oriented medical record. You

1 2 3 4 25. acknowledge her interest, but indicate to the student that your system is the standard one being used by your group.

1 2 3 4 26. demonstrate the benefits of your system the next time you need to retrieve patient information.

1 2 3 4 27. listen to the student's concern, indicating that she could take this opportunity to begin thinking about her own design for a patient record system.

1 2 3 4 28. ask the student to try both methods for the next week in order to test her hypothesis about record keeping.

You learn that your male student spends time flirting and talking with adolescent women, especially about their sexual activity. You

1 2 3 4 29. figure it's temporary and make sure a nurse is present when he examines adolescents.

1 2 3 4 30. help the student use a problem solving process to generate some alternative ways of dealing with this.

1 2 3 4 31. give him a book to read about adolescent medicine.

1 2 3 4 32. speak with him about it and help him to understand the possible ramifications of such behavior.

You and your student have previously agreed to begin an observation period today, but your student wants to be excused because he has not yet found a place to live. You

1 2 3 4 33. expect the student to honor standards previously set.

1 2 3 4 34. suggest that he make the decision.

1 2 3 4 35. you offer him a temporary place in your home. It will be a good chance for him to observe a physician's home life.

1 2 3 4 36. help the student gather data about the various alternatives open to him.

I would usually	I would sometimes	I would rarely	I would never
1	2	3	4

Please rate each alternative

Please circle your answer

You pride yourself on a warm, friendly working relationship with your staff. However, your student relates to support personnel in a way that, as you see it, is inappropriate. You

1 2 3 4 37. describe what you see as the benefits of your particular staff relationships.

1 2 3 4 38. give the student your reactions to this problem.

1 2 3 4 39. explain your feelings but continue to support the student.

1 2 3 4 40. assume that if it's a problem the support personnel will tell him.

You find your student has no awareness that her poor personal hygiene could have a profound impact on patient care. You

1 2 3 4 41. let the student know that your standards for her include good personal hygiene.

1 2 3 4 42. explain your expectations for personal grooming and dress and why you see each as important for patient rapport.

1 2 3 4 43. indicate that you are choosing to allow the student to live with the consequences of her own decisions.

1 2 3 4 44. without rejecting her as a person, tell her specifically what she needs to do to improve.

Your student has indicated that he would like to know more about industrial medicine. You have referred him to a local plant which conducts a hypertension clinic. When the student returns, he indicates the experience was disappointing. You

1 2 3 4 45. use the student's experience as background and help the student work out how patient care could be better delivered in such a setting.

1 2 3 4 46. find another site to place him; he needs more experience.

1 2 3 4 47. spend some time with the student discussing the experience, and ask the student if he would like to choose some other means of meeting his goals.

1 2 3 4 48. ask the student to see hypertensive patients with you so that you can demonstrate a method of dealing with this problem that has been developed in your practice.

I would usually	I would sometimes	I would rarely	I would never
1	2	3	4

Please rate each alternative

Please circle your answer

The student with whom you are working has given you some feedback about your colleague, Dr. P. She says, "Dr. P. couldn't treat a woman sensitively if his life depended on it." You

1 2 3 4 49. tell her you have some concerns about the way she expresses her feelings about other professionals.

1 2 3 4 50. listen to her concerns without being judgmental.

1 2 3 4 51. assign her to spend some time in Dr. P.'s office. If she still has concerns she can address them to him at that time.

1 2 3 4 52. ask her to join you and Dr. P. at rounds, since you respect his abilities and would like her to see another side of him.

Your student wants to establish the agreement or contract under which you will work together. You

1 2 3 4 53. ask her about her present level of skills and deficiences and using that as a basis you test out several possible plans with her.

1 2 3 4 54. let the student know your standards for her.

1 2 3 4 55. have the student write down her objectives.

1 2 3 4 56. outline a contract with her which will include an observation period and regular feedback sessions.

In planning for your student's arrival, you

1 2 3 4 57. ask for copies of your student's evaluations from the medical school to evaluate the strategies you used in working with prior students.

1 2 3 4 58. plan to follow your system of an observation period, during which you can determine the students level, and periodic sessions during which you and the student can assess performance.

1 2 3 4 59. wait and plan to discuss with your incoming students their plans for the experience.

1 2 3 4 60. attend a CME meeting in your specialty area to be sure that your information will be up to date for the teaching you plan to do with the students.

I would usually	I would sometimes	I would rarely	I would never
1	2	3	4

Please circle your answer

Please rate each alternative

You cannot attend the meeting you have prearranged with your student this afternoon. You

1 2 3 4 61. make arrangements with your partner to cover the meeting.

1 2 3 4 62. give the student an article in a current journal concerning the topic the two of you were recently discussing.

1 2 3 4 63. ask your student to continue working on his objectives and indicate that you will be asking for his self assessment tomorrow.

1 2 3 4 64. ask the student to gather data about the office routine in your absence and identify strategies for such situations.

On the way to your teaching session with your student, you are called away on an emergency. You

1 2 3 4 65. ask the student to come with you and identify the patient's problem and come up with an emergency treatment plan.

1 2 3 4 66. plan to work out some new time for the session, if this is important to the student.

1 2 3 4 67. call your student and ask him to look over the articles you recommended earlier.

1 2 3 4 68. ask the student to continue to see patients while you are gone.

You have a student this term who is very different from yourself, but she appears to be getting along well with patients. You

1 2 3 4 69. hold her responsible for the same standards as your previous students.

1 2 3 4 70. examine your own patient interaction style in order to determine what you might learn from the student.

1 2 3 4 71. say nothing, since the student is taking appropriate responsibility for her own education.

1 2 3 4 72. share with her the positive patient feedback you've received, relating the specific behaviors the patients found helpful.

I would usually	I would sometimes	I would rarely	I would never
1	2	3	4

Please rate each alternative

Please circle your answer

A patient who has been seen by your student tells you that the student offended her. You

1 2 3 4 73. talk with the student about his perception of the encounter.

1 2 3 4 74. ask the patient to talk with the student about it.

1 2 3 4 75. using the information from the patient visit, ask the student to speculate about the patients adherence to her regimen.

1 2 3 4 76. ask the student to evaluate his contact with this patient. You want him to self-evaluate accurately.

Your student is spending too much time on each patient encounter. You

1 2 3 4 77. recommend that the student adhere to a set amount of time for his patient contacts.

1 2 3 4 78. assign the student more patients so that he'll have to figure out what's the best use of his time.

1 2 3 4 79. ask the student to come up with some ideas about how he might shorten the time without sacrificing meaningful medical and psychosocial information.

1 2 3 4 80. give student as many patients as possible who need the attention and have limited physical problems.

You have two students from different medical schools. You realize that they are competitive and work hard to "out do" each other. You

1 2 3 4 81. tell the students that their behavior is not in keeping with professional standards.

1 2 3 4 82. identify the issue and help the students generate some ideas about competition and its effect on the office.

1 2 3 4 83. discuss it with them in the context of your relationships with your colleagues.

1 2 3 4 84. assign the two to work together and figure they'll work it out.

I would usually	I would sometimes	I would rarely	I would never
1	2	3	4

Please rate each alternative

Please circle your answer

You are seeing S., a patient with recurrent urinary tract infections for the follow up visit. Your student asks for information about how to diagnose and treat such problems. You

1 2 3 4 85. tell her about your approach and the studies you are using as a basis for your decisions.

1 2 3 4 86. provide her with lab data from S.'s patient record from which you can help her answer her questions.

1 2 3 4 87. assign her to a number of patients with U.T.I.'s to improve her skills with this problem.

1 2 3 4 88. discuss your approach in dealing with this problem, honestly indicating the limitations of your experience.

Your student can't seem to relate lab data to appropriate diagnoses. You

1 2 3 4 89. assign the student several patients with sore throat.

1 2 3 4 90. demonstrate how you use lab data to arrive at diagnosis.

1 2 3 4 91. send your student to the hospital where a lecture is being given.

1 2 3 4 92. ask the student what would be helpful to him with this problem.

Your student has insufficient information to adequately diagnose patient problems.

1 2 3 4 93. identify for her what you perceive to be her strengths and weaknesses.

1 2 3 4 94. ask her what she feels might be helpful to her with this problem.

1 2 3 4 95. assign her a patient with hypertension, ask her to outline the patients problems and prepare a problem list together.

1 2 3 4 96. give the student the next few patients with clear cut single disease entities.

I would usually	I would sometimes	I would rarely	I would never
1	2	3	4

Please circle your answer

Please rate each alternative

Your student asks for more individual teaching than you originally agreed to give him. You

1 2 3 4 97. ask him to assess his current skills and deficiencies and how he thinks extra teaching would help.

1 2 3 4 98. fit him in where you can, continue his patient load assuming he'll answer some of his questions for himself.

1 2 3 4 99. ask one of your colleagues to work some extra time with him.

1 2 3 4 100. support him for taking initiative and plan to give him more time.

You want your student to learn about handling certain kinds of vaginal infections. You

1 2 3 4 101. present a series of related problems and ask the student to generate hypotheses about the management of these patients.

1 2 3 4 102. share with the student the plans you have for improving your skills with this problem in order to emphasize the importance you place on continuing education.

1 2 3 4 103. ask the student to examine and talk to a patient with chilimydia.

1 2 3 4 104. present your method with documentation from the professional literature.

You have just observed your student's performance with the pediatric examination. She asks for feedback. You

1 2 3 4 105. review the pediatric exam procedures with her.

1 2 3 4 106. ask the student what kinds of information would be helpful to her.

1 2 3 4 107. tell her each of the things she did correctly and incorrectly.

1 2 3 4 108. reivew the student's findings emphasizing your own techniques for the pediatric examination.

I would usually	I would sometimes	I would rarely	I would never
1	2	3	4

Please circle your answer

Please rate each alternative

After six weeks, your student has improved in his ability to relate to geriatric patients. You

1 2 3 4 109. give him specific information about what he is doing well and what he still needs to improve on.

1 2 3 4 110. assign him to the Extended Care Facility to work with more geriatric patients.

1 2 3 4 111. assign him to the Extended Care Facility to work with your colleague, a gerontologist.

1 2 3 4 112. ask the student to identify principles he now uses in delivering health care to geriatric patients and how his experience has influenced his original ideas.

Your student asks how she did on an H & P after you observed her. You

1 2 3 4 113. demonstrate on the next patient the specific portions of the exam she needs to work on, illustrating the shortcuts you employ.

1 2 3 4 114. relate what you saw her doing well and what she still needs to work on.

1 2 3 4 115. using her performance as data, you go on to help the student generate a treatment plan for the patient.

1 2 3 4 116. answer her questions and assign her to more H & P's.

Your student indicates an interest in working with families. You

1 2 3 4 117. ask the student to develop a criteria for handling a family problem and test it.

1 2 3 4 118. develop with the student a list of goals he would like to achieve and set a weekly supervision session.

1 2 3 4 119. assign him a home visit.

1 2 3 4 120. ask him to develop a bibliography on this topic.

KEY - TEACHING STRATEGY INSTRUMENT

1.	A.	expert	3
	B.	facilitator	2
	C.	challenger	1
	D.	problem solver	4
2.	A.	challenger	1
	B.	problem solver	4
	C.	feedback	6
	D.	role model	5
3.	A.	expert	3
	B.	problem solver	4
	C.	role model	5
	D.	feedback	6
4.	A.	challenger	1
	B.	role model	5
	C.	facilitator	2
	D.	feedback	6
5.	A.	feedback	6
	B.	expert	3
	C.	facilitator	2
	D.	challenger	1
6.	A.	role model	5
	B.	expert	3
	C.	feedback	6
	D.	facilitator	2
7.	A.	expert	3
	B.	role model	5
	C.	facilitator	2
	D.	problem solver	4
8.	A.	challenger	1
	B.	problem solver	4
	C.	expert	3
	D.	feedback	6
9.	A.	expert	3
	B.	facilitator	2
	C.	role model	5
	D.	problem solver	4
10.	A.	role model	5
	B.	feedback	6
	C.	facilitator	2
	D.	challenger	1

KEY - TEACHING STRATEGY INSTRUMENT

11.	A.	expert	3
	B.	role model	5
	C.	facilitator	2
	D.	feedback	6
12.	A.	problem solver	4
	B.	challenger	1
	C.	facilitator	2
	D.	role model	5
13.	A.	feedback	6
	B.	facilitator	2
	C.	challenger	1
	D.	role model	5
14.	A.	problem solver	4
	B.	expert	3
	C.	facilitator	2
	D.	feedback	6
15.	A.	problem solver	4
	B.	feedback	6
	C.	facilitator	2
	D.	expert	3
16.	A.	role model	5
	B.	expert	3
	C.	feedback	6
	D.	problem solver	4
17.	A.	problem solver	4
	B.	facilitator	2
	C.	expert	3
	D.	challenger	1
18.	A.	expert	3
	B.	role model	5
	C.	facilitator	2
	D.	feedback	6
19.	A.	facilitator	2
	B.	challenger	1
	C.	problem solver	4
	D.	feedback	6
20.	A.	expert	3
	B.	challenger	1
	C.	problem solver	4
	D.	facilitator	2

KEY - TEACHING STRATEGY INSTRUMENT

21.	A.	expert	3
	B.	problem solver	4
	C.	role model	5
	D.	challenger	1
22.	A.	expert	3
	B.	problem solver	4
	C.	challenger	1
	D.	role model	5
23.	A.	challenger	1
	B.	role model	5
	C.	expert	3
	D.	facilitator	2
24.	A.	feedback	6
	B.	facilitator	2
	C.	problem solver	4
	D.	challenger	1
25.	A.	feedback	6
	B.	challenger	1
	C.	role model	5
	D.	facilitator	2
26.	A.	problem solver	4
	B.	role model	5
	C.	challenger	1
	D.	expert	3
27.	A.	expert	3
	B.	facilitator	2
	C.	feedback	6
	D.	role model	5
28.	A.	feedback	6
	B.	challenger	1
	C.	role model	5
	D.	problem solver	4
29.	A.	role model	5
	B.	feedback	6
	C.	problem solver	4
	D.	challenger	1
30.	A.	problem solver	4
	B.	feedback	6
	C.	challenger	1
	D.	expert	3

KEY - TEACHING STRATEGY INSTRUMENT

1.	3	37.	5
2.	2	38.	6
3.	1	39.	2
4.	4	40.	1
5.	1	41.	3
6.	4	42.	5
7.	6	43.	2
8.	5	44.	6
9.	3	45.	4
10.	4	46.	1
11.	5	47.	2
12.	6	48.	5
13.	1	49.	6
14.	5	50.	2
15.	2	51.	1
16.	6	52.	5
17.	6	53.	4
18.	3	54.	3
19.	2	55.	2
20.	1	56.	6
21.	5	57.	4
22.	3	58.	6
23.	6	59.	2
24.	2	60.	3
25.	3	61.	5
26.	5	62.	3
27.	2	63.	6
28.	4	64.	4
29.	1	65.	4
30.	4	66.	2
31.	3	67.	3
32.	6	68.	1
33.	3	69.	3
34.	2	70.	5
35.	5	71.	2
36.	4	72.	6

KEY - TEACHING STRATEGY INSTRUMENT

73.	2	101.	4
74.	1	102.	5
75.	4	103.	1
76.	6	104.	3
77.	3	105.	3
78.	1	106.	2
79.	4	107.	6
80.	2	108.	5
81.	3	109.	6
82.	4	110.	1
83.	5	111.	5
84.	1	112.	4
85.	3	113.	5
86.	4	114.	6
87.	1	115.	4
88.	5	116.	1
89.	1	117.	4
90.	5	118.	6
91.	3	119.	1
92.	2	120.	3
93.	6		
94.	2		
95.	4		
96.	1		
97.	6		
98.	1		
99.	5		
100.	2		

CHALLENGER

Items Coded As 1

3

5

13

20

29

40

46

51

68

74

78

84

87

89

96

98

103

110

116

119

FACILITATION

Items Coded As 2

2

15

19

24

27

34

39

43

47

50

55

59

66

71

73

80

92

94

100

106

EXPERT

Items Coded As 3

1

9

18

22

25

31

33

41

54

60

62

66

69

77

81

85

91

104

105

120

PROBLEM SOLVING

Items Coded As 4

4

6

10

28

30

36

45

53

57

64

65

75

79

82

86

95

101

112

115

117

ROLE MODEL

Items Coded As 5

8

11

14

21

26

35

37

42

48

52

61

70

83

88

90

99

102

108

111

113

CLINICAL SUPERVISION
(Feedback)

Items Coded As 6

7
12
16
17
23
32
38
44
49
56
58
63
72
76
93
97
107
109
114
118

APPENDIX B

NOMINAL GROUP PROCESS DATA SUMMARIES

NOMINAL GROUP DATA
FROM PRECEPTORSHIP PROGRAM
1978

Task Statement:

Priority		Points	Weight
1.	Lack of faculty status	38	390
2.	No orientation program for faculty	30	210
3.	No orientation program for students	20	180
4.	Participation vs non-participation of students with patient care	21	140
5.	Teaching time consuming	23	130
6.	Ill defined teaching criteria	17	130
7.	Goals of program too rigid	16	130
8.	Different levels of students have differend needs	21	125
9.	Lack of preceptor recognition by medical schools	12	105
10.	Not enough teaching guidence for preceptors	17	105
11.	Difficulty of working with preclinical students	6	95
12.	Lack of faculty appointment	14	95
13.	Lack of physician remuneration	11	90
14.	Communicating preceptor goals to students	12	85
15.	Too little time to teach students	14	80
16.	Different standards for medical care in preceptors' office than in medical school	13	80
17.	Student payment problems	9	65
18.	Three medical schools at variance	11	55
19.	Ill defined preceptor authority	9	50
20.	Identifying content at different levels	11	47
21.	Patient reaction to students	9	40
22.	Lack of feedback from medical schools on preceptor impact on students	3	31

NOMINAL GROUP TOTAL

PROBLEM LIST

1. Low preceptor morale
2. Lack of student orientation for preceptorship
3. Lack of preceptor orientation for preceptorship
4. Preceptor is expected to arrange housing
5. Lack of knowledge of student academic progress to date
6. Unpredictable maturity level of students
7. Difficulty working with pre-clinical students in a clinical setting
8. Some patient's reactions to medical students
9. Mutual dissatisfaction with assigned projects
10. Poor attitude of some medical students
11. Preceptor is apparently expected to provide transportation
12. Students are too passive-Don't ask questions
13. Students lack of choice not to accept responsibility
14. Difficulty of time control during discussion
15. Uncertainty of preceptor responsibility: practical vs. didactic
16. Inadequate home-base or med. school supervision during rotation
17. Uncertainty as to role of extracurricular activities
18. Preceptor's lack of faculty status (Parking, football tickets, etc.) and other reward system
19. Personal appearance of student
20. Student's uncomfortable in early phase of preceptorship
21. Concern about malpractice with regard to the student
22. Inadequate number of qualified preceptors
23. Student ignorance of realities of medical practice
24. Uncertainty as to whether pre-clinical students can be responsible for identifying chief complaint or parts of history (subjective)
25. Discomfort or uncertainty about student's presence during female exams
26. School pressures to overextend preceptors
27. Age differential of student to patients
28. Lack of feedback from schools regarding preceptor experience on career choice
29. Poor student evaluation form

1. Claustrophobic environment
2. Information (pre-match) re: how receptor runs his teaching program
3. Racist physician
4. Entreprenurial attitude of preceptor
5. Physician never addresses patient by name
6. Preceptor not aware of student's background
7. Student using own equipment rather than preceptor's (offensive to preceptor)
8. Hospital's attitude toward student (not accepting)
9. Housing/commuting
10. Insufficient diagnostic skills to get a lot out of preceptorship
11. Patient not accepting an alternative physician
12. Lack of knowledge of program goals (preceptor)
13. Poor medical records
14. Different standards of medical treatment than in medical center (clinical trial and error)
15. Isolation from fellow students
16. Physicians changing schedules during match
17. Incongruity of patients seen vs study
18. Too little time teaching student (direct contact)
19. Inequitable matching system
20. Physical exam rarely done
21. Little use of community resources
22. Preceptor doesn't initiate interaction with student
23. Timing of payment
24. Inability of preceptor to set limits
25. Participant vs. non-participant/observer role re: patient, physician, student
26. Too high patient volume
27. Physician not having enough time to teach
28. Preys on 3rd party payers
29. No patient education
30. Information about preceptors" too little, too late, too old
31. Long hours
32. Physicians goals for student unclear (expectations)
33. Preceptor's limited knowledge of pathophysiology
34. Unsatisfactory treatment of personnel
35. Intolerance of questions student asks during history
36. Lack of supervision - physician doesn't re-check
37. Student alientated from preceptor via preceptor's ethnic discrimination
38. Number of patients seen by student (amount of patient exposure)
39. Combines 33 and 14: preceptor's limited knowledge of pathophysiology/ and/different standards of medical treatment than in medical center (clinical trial and error)
40. No orientation program: Student one-to-one with physician (on the second go 'round, this was selected and the students decided to include under this topic the previously given items: 6, 12 and 32 viz. - preceptor not aware of student's background; lack of knowledge of program goals (preceptor); physician's goals for students unclear (expectations).
41. Match rules not clear or enforced.

1. 3 Med schools at variance
2. Identifying content for different levels
3. Too time consuming
4. Ill defined teaching criteria
5. Conflicting teaching opinions
6. Students desires exceed abilities
7. Student's over-interested in technical aspects of medicine
8. Program manipulates physician's personal time
9. Ill-defined preceptor authority
10. Poor time scheduling
11. Lack of student initiative
12. Lack of physician renumeration
13. Lack of faculty appts.

1. Excess, non-preceptorship work
2. Too much paperwork
3. Not enough guidance for preceptor
4. Different levels of students with different needs
5. Lack of understanding of preceptorships
6. Different students with different expectations
7. Manual too rigid
8. Misinformation from university
9. Overly enthusiastic student
10. Lack of respect by student for patient rights
11. Lack of preceptor recognition
12. Student pre-empting physician's role
13. Excessive implied requirement for contact
14. Time too short
15. Extra time required to teach
16. Lack of individualization for preceptor
17. Time to familiarize student with patient case
18. Communicating preceptor's goals to student
19. Place of students when counseling
20. Inability to delegate responsibility for clinical procedures
21. Medico-legal responsibility
22. Anti-social student
23. Lack of clarity on procedure for replacing student
24. Personal time conflicts
25. Poor evaluation form regarding student
26. Poor evaluation form regarding preceptorship program

APPENDIX C

SUBJECT FEEDBACK FORMS

INVOLVER

*"The most effective clinical teacher provides a personal environment in which the student is an active participant..."**

A person who scores high on the involver dimension believes in direct involvement of the student in patient care. He or she feels that unless the student participates actively, real learning cannot and does not occur. The involver believes the best student is enthusiastic and anxious to become challenged; a student who makes evident his or her desire to try to examine and talk with patients and in some cases to perform techniques and procedures. The involver is most comfortable with the actively involved student, but students who are reticent are also expected to become involved, and the involver will continue to encourage even a withdrawn student. This teacher believes that students learn skills by doing them again and again until they are an automatic part of a repetoire. The involver believes that students do not learn by watching and thus disdains the coat-tailing method of instruction. This teacher feels comfortable pushing the student to grow and develop as a professional and is also comfortable with mistakes. This preceptor will, however, expect the student to continue to try again. He or she has a good deal of trust in and respect for student toughness and resiliency. The involver also believes that his/her staff and patients are able to handle difficult situations well and will encourage staff and patients to also become part of the students education by providing information, reactions, and opinions. An involver, for instance, might ask a student to see patients, prior to the preceptor checking the student's findings, and might even ask a student to take call for the preceptor under appropriate supervision. An involver who utilizes only the technique of

*Stritter, F.T., Jack D. Hain, David A. Grimes, Clinical Teaching Reexamined, p. 878.

active student involvement in patient care risks pushing the student beyond the level of responsibility the student ought to undertake. In addition, the active involvement of the student in patient care may be controversial and even have legal implications. The involver may also cause the student to relinquish time spent in study and in other valuable out-of-office experiences. On the other hand, without the challenge of active participation in patient care, the preceptor risks the "turned off" student, who sees him/herself as unimportant, and who may become less confident in his/her abilities over time instead of actively assuming the responsibility he/she must ultimately undertake. The preceptor who is able to involve the student in patient care while still retaining appropriate responsibility provides both a powerful learning experience and begins to prepare the student for his ultimate future responsibility.

FACILITATOR

*"...the student chooses his/her own direction...the student helps to discover his/her own learning resources...he/she formulates his/her own problems...identifies his/her own course of action & lives with the consequences of each of these choices." **

The person who scores high on the facilitator scale is likely to see the experience of teaching the student as an opportunity to participate in the development of the student as a person and to help the student meet his/her needs in the teaching situation. The facilitator is likely to accommodate his/her own style to fit the student's needs and to arrange student experiences to meet student expectations and wishes.

The facilitator puts the responsibility for the student's education squarely on the student, asking the student to develop goals, how the student would like to proceed, and encouraging the student to make most decisions. The facilitator is concerned about the student but avoids being judgmental, and is usually supportive. For example, a facilitating preceptor when faced with a student requesting time away from patient care to pursue some related reading, would encourage the student as long as the reading were in line with the students own goals.

Teachers who use facilitation to exclusion may encounter the student's high level of frustration ("I don't know what I need to know!"), and the student's need for more structure. Students may feel that they are floundering without direction or guidance in some instances and may look to the instructor to provide this.

On the positive side, the use of facilitation encourages a student to identify areas of strength and weakness, plan for remediation and other

*Rogers, Carl, Freedom to Learn, 1969.

educational opportunities, and to develop self evaluation skills. In fields like medicine where students are expected to become self directed life long learners, facilitation is a crucial technique for the clinical instructor.

RESOURCE

*"The most frequently listed important characteristic for best clinical teachers was a breadth of medical knowledge."**

A person who scores high on the resource scale is likely to have a high respect for the traditional educational role, that is the imparting of knowledge to the students. A resource has a clear sense of the standards to which students should aspire and sees him/herself as a resource from whom students can learn facts, precedures, and medical information.

A resource is likely to present information to the student, and set professional standards for intellectual behavior. A resource uses professional literature for updating him or herself as well as teaching material for student.

Because the resource prefers to stay in an educational role, she/he may be more comfortable with the student observing, asking intelligent questions, and referring to professional literature, rather than directly participating in patient care. The resource asks questions about a student's knowledge base, in order to ascertain the student's level of knowledge and will provide direct teaching in nearly every encounter with the student. The resource enjoys teaching most when students ask questions, read up on their areas of deficiency and return the next day with even more penetrating questions.

Used to exclusion, the resource role may imploy an unbridgable gap between the physician teacher and the student. The student may lose confidence in the ability to achieve the teacher's level of knowledge and professional skill and may rever to the level of training where the primary

*Irby, David M. "Clinical Teacher Effectiveness in Medicine" p. 311

objective was the acquisition of information, not its integration or application.

On the positive side students learn a great deal from the presentation of facts, procedures, and information and consistently value this skill in their teachers over most others. The expert resource may become a source of inspiration for the student in this regard as the student experiences the exhilaration of learning the content of medicine.

PROBLEM SOLVER

*"Medical problems typically require that additional data be gathered and evaluated...these activities are summarized in a four stage model of medical inquiry that calls attention to cue acquisition, hypothesis generation, cue interpretation and hypothesis evaluation."**

A person who scores high on the problem solver scale is likely to see the teaching experience as one in which the student should learn principles and concepts of solving patient problems that will ultimately form the basis of the student's ability to deliver quality health care. The problem solver is likely to emphasize the student's ability to generate defensible hypotheses and apply logic to the solving of patient problems. A problem solver enjoys lively discussion with and helping students to develop and refine these skills which are often focused around developing a differential diagnosis.

A problem solver is likely to have a practical rather than a theoretical approach to problems. A problem solving technique involves being observant of facts, and details and open to a wide range of information (medical, psychological, etc.). The steps of the problem solving process include observation (or acquiring cues), hypothesis (diagnosis) generation, interpreting that information, and evaluating the hypothesis. A person who uses this style may not be able to formally label these steps, but may use them intuitively.

This cycle of problem solving steps may be a continuous process in dealing with patient problems and educating students. If used to exclusion, the student may obtain a method of obtaining diagnoses with little

*Elstein, Arthur S., Medical Problem Solving, et al., Harvard University Press, 1978.

emphasis on the acquisition of other clinical skills, patient relating and additional in depth knowledge. On the positive side, rigorous use of a problem solving process has long been a hallmark of the competent physician's repetoire, and enriches the student who becomes familiar and facile with its use.

ROLE MODEL

*"One cannot 'prepare' for role modeling behavior. A preceptor must be himself. The responsibility as a role model, however, is to be self-conscious enough to have the student reflect on his behavior as a model, what he is comfortable with and what he is anxious about and how he handles the demands to be a scientist, leader, business manager, spouse, citizen, professional colleague and parent." **

A person who scores high on the role model dimension believes that his/her behavior serves as a standard for students to emulate. Thus, he or she is self conscious in a positive way, honestly appraising skills and limitations in him or herself. This teacher believes that thoughtfully evaluating his or her own behavior models self-evaluation for the student.

The role model believes one of the best ways of interacting with the student comes in providing the student exposure to the physician's life as well as practice style. This teacher believes that students learn a great deal by being exposed to the physician's way of life, including home and family, community involvement, colleagial relations and social and recreational opportunities. In addition, this preceptor exposes the student to his or her own as well as other practices. This preceptor is likely to anticipate the student wishing to work with colleagues in other specialties and to encourange students to spend time with community health care agencies as well as with staff in his or her own office. The role model is acutely aware of the importance of good relationships with colleagues and will not hesitate to ask for their involvement with student education. The role model is especially helpful in demonstrating to the student how he or she goes about the thinking process of diagnosis or dealing with patient problems.

**Simon, John L., "A Role Guide and Resource Book for Clinical Preceptors", pg. 6

Using the role modeling technique to exclusion weights the educational process toward the preceptor being "on stage" and the student reacting as a suitably impressed audience. However, the total absence of the role modeling technique impoverishes the educational experience for the student by removing the factors of intensive exposure to one individual's life and practice style.

CLINICAL SUPERVISOR

*"..., we have found more strength than weakness in a supervision that incorporates explicit contract-building... highly detailed observation and recording of human data; analyses of such data and regular opportunities for feedback and discussion."**

A person who uses the feedback mode of instruction and supervision focuses on the systematic giving of on-going positive and negative information about the student's performance (rather than personality traits) and making that information available to the student.

A person who uses this technique well is likely to make feedback specific and appropriate to the student's academic and emotional level and useful to the student. On either an intuitive or formal level, the teacher is likely to divide the feedback mode into the following stages:

1) preobservation - this level includes the initial contact, rapport building, mutual sharing of rationale, ideals, and goals for student progress.
2) observation - the instructor assesses the student's current level of performance based on observation in the patient encounter, at the lab, in conferences, etc.
3) analysis and strategy - instructor uses available data to focus on objectives which the student can reasonably attain or begin to make some progress while working with the instructor.

*Goldhammer, Robert, Clinical Supervision, Holet, Rinehart & Winston, Inc., 1969, p. 369.

4) conference - the instructor helps the student develop and increase self-awareness about performance of tasks, helps student redefine problems and generate solutions. The most specific feedback is likely to occur here which may include praise and/or direct teaching.

5) post-conference analysis - the de-briefing of the learning experience in which the teacher may ask for feedback about how helpful she/he was for the student.

An instructor who uses feedback less effectively may skip one or more of the stages, may give indiscriminate or excessive feedback, or information inappropriate to the student's emotional or performance level. This instructor may also be sidetracked or distracted by student inappropriateness or distancing efforts. Used properly in conjunction with other techniques, feedback in clinical instruction helps students with realistically evaluating their own performances and generate goals for future work.

APPENDIX D

CONTACT LETTERS AND RESEARCH CONSENT FORM

The Cooperative Michigan Primary Care Preceptorship Program

MICHIGAN STATE UNIVERSITY COLLEGE OF HUMAN MEDICINE
WAYNE STATE UNIVERSITY SCHOOL OF MEDICINE
THE UNIVERSITY OF MICHIGAN SCHOOL OF MEDICINE

May 15, 1979

Dear Doctor:

Enclosed in this envelope is a self assessment instrument created especially for preceptors in the Cooperative Michigan Primary Care Preceptorship Program. The instrument has been designed to help identify the teaching techniques you use in working with medical students. The instrument will specify the amount of instructional time you spend in teaching the student content information, problem solving skills, helping the student to assume responsibility for his education and for patient care, acting as a role model for the student and providing the student with feedback. Please fill out the instrument and return it to us, spending only 15 to 20 minutes filling it out. As soon as we receive your instrument, we will score it and send you, by mail, a profile of your results, the techniques you personally use with your students, and descriptions of all the techniques the instrument measures.

We will also be holding a workshop in Lansing on June 27, from 1:00 to 5:00 p.m., at the University Club, 3435 Forest Road. At the workshop we will provide you additional and personal feedback on your instrument scores and discuss the recent legislative actions which bear on the future of the Preceptorship Program. Please let us know if you will be able to attend. A tear off sheet at the bottom of this letter has been provided for your reply. We will send you a complete agenda and map to the University Club in a few days.

Please return the instrument in the enclosed stamped envelope by June 8. That will give us sufficient time to be prepared to discuss the instrument on June 27. Your answers on the instrument will be kept confidential and will be returned only to you. Overall preceptor scores may be constructed for

the workshop, however, since the group scores would enable you to compare your replies with the preceptor group as a whole. We believe you will find this an interesting exercise and will be intrigued with your feedback.

We will be looking forward to hearing from you, and receiving your instrument.

Sincerely,

Lynda J. Farquhar
Student Program Coordinator
Preceptorship Program
Michigan State University

LJF/kas

Enclosures

Please detach and return. PLEASE PRINT

I will be able to attend the Preceptorship Workshop in Lansing on June 27, 1979, to be held at the University Club. I have enclosed my completed instrument.

YES ____ NO ____

I will not be able to attend the Preceptorship Workshop in Lansing on June 27, 1979. I have enclosed my completed instrument.

YES ____ NO ____ NAME _____

ADDRESS _____

The Cooperative Michigan Primary Care Preceptorship Program

MICHIGAN STATE UNIVERSITY COLLEGE OF HUMAN MEDICINE
WAYNE STATE UNIVERSITY SCHOOL OF MEDICINE
THE UNIVERSITY OF MICHIGAN SCHOOL OF MEDICINE

June 15, 1979

Dear Doctor:

You recently received a questionnaire, the Clinical Teaching Technique Self-Assessment. The questionnaire was designed to help you assess teaching techniques that you use in student instruction.

As yet, I have not received your completed form. Physicians who have taken the assessment and received feedback about their individual teaching styles have found their feedback to be very helpful.

Enclosed is another copy of the assessment. Please fill it out and return to my office so that we may score it and return your feedback to you.

Sincerely,

Lynda J. Farquhar
Preceptorship Program Coordinator

LJF/kas

Enclosures

CLINICAL TEACHING TECHNIQUES

SELF ASSESSMENT VALIDATION STUDY

CONSENT FORM

I _____ understand that the
please print name
completing of this form will entitle me to an individual explanation of my scores, ie. an estimated percentage of the amount of time I spend using certain teaching techniques in teaching medical students. I freely consent to participating by completing this instrument. I am also free to decide not to complete the instrument. I have been assured that my results will be treated with the strictest confidence.

_____
Signature

_____
Date

By: Lynda J. Farquhar
Instructor
A-254 Life Sciences
Campus

APPENDIX E

DETAILED FACTOR ANALYSIS SUMMARY

Factors Formed for Sub-Scales of
Clinical Teaching Technique Self-Assessment

	1	2	3	4	5
CHALLENGE	Factor: 1 Confidence in Student Abilition V29, V68, V84, V87, V96, V98	Factor: 2 Patient and Support Personnel Feedback to Student V20, V40, V89	Factor: 3 Patient Care Involvement V3, V5, V78		
FACILITATION	Factor: 1 Preceptor Support of Student V2, V19, V39	Factor: 2 Elicitation of Data from Student V50, V55, V106	Factor: 3 Student takes Responsibility for Education V34, V59, V100		
EXPERT RESOURCE	Factor: 1 Use of Professional Literature in Teaching V31, V62, V77, V120	Factor: 2 Setting Standards V18, V54, V67, V105	Factor: 3 Student Learning about Preceptor Methods and Standards V1, V22,V25,V41		
PROBLEM SOLVING	Factor: 1 Data Gathering V36, V53, V86, V115	Factor: 2 Student Generation of Treatment Plans V45, V65, V101, V112	Factor: 3 Student Generation of Educational Strategies V64, V79, V82,	Factor: 4 Student Testing Diagnosis Against Criteria V75, V95, V117	Factor: 5 Preceptor Demonstrating Problem-Solving Approaches V4,V10,V28
ROLE MODELING	Factor: 1 Preceptor Offering Problem Solution V35, V111 V113	Factor: 2 Preceptor Self-Examination V21, V52, V70	Factor: 3 Preceptor Demonstrating Approach V88, V102, V108	Factor: 4 Preceptor Sharing Learning Strategies V11, V14, V90	Factor: 5 Positive Relations With Colleagues V48, V61, V83
CLINICAL SUPERVISION	Factor: 1 Preceptor Provides Feedback (1) V58, V107, V109, V114	Factor: 2 Goal Setting V56, V93, V118	Factor: 3 Preceptor Feedback (2) V23, V38, V44	Factor: 4 Feedback (3) V16, V17, V32, V72	Factor: 5 Self-Evaluation by Student V49, V76, V97

FACTORS FORMED FOR SUB-SCALES OF

CLINICAL TEACHER TECHNIQUES SELF-ASSESSMENT

Challenge Sub-Scales

F1: "Confidence in Student Abilities." V29, V68, V84, V87, V96, V98.

You learn that your male student spends time flirting and talking with adolescent women, especially about their sexual activity. You...
V29 figure it's temporary and make sure a nurse is present when examining adolescents.

On the way to your teaching session with your student, you are called away on an emergency. You...
V68 ask the student to continue to see patients while you are gone.

You have two students from different medical schools. You realize that they are competitive and work hard to "out do" each other. You...
V84 assign the two to work together and figure they'll work it out.

You are seeing S., a patient with recurrent urinary tract infections, for the follow-up visit. Your student asks for information about how to diagnose and treat such problems. You...
V87 assign her to a number of patients with U.T.I.'s to improve her skills with this problem.

Your student has insufficient information to adequately diagnose patient problems. You...
V96 give the student the next few patients with clear cut single disease entities.

Your student asks for more individual teaching than you originally agreed to give him. You...
V98 fit him in where you can, continue his patient load assuming he'll answer some of the questions for himself.

Challenge Sub-Scales (Con't)

F2: "Patient and Support Personnel Feedback to Student." V20, V40, V89.

You meet with your new students the first day they arrive. One is dressed in levis and a plaid shirt and one is dressed in a white jacket, shirt and tie. You...
V20 ignore it. Your patients will give them feedback if the student's attire is bothersome.

You pride yourself on a warm, friendly working relationship with your staff. However, your student relates to support personnel in a way that, as you see it, is inappropriate. You...
V40 assume that if it's a problem the support personnel will tell him.

Your student can't seem to relate lab data to appropriate diagnoses. You...
V89 assign the student several patients with sore throat.

F3: "Patient Care Involvement." V3, V5, V78.

You meet the student with whom you'll be working over the next month. The student asks you, "What will be expected of me?" You answer...
V3 "Do all the physicals you can."

You've been assigned a student your patients do not appear to be comfortable with. You...
V5 continue to assign the student to patient care. Assume it's the only way he'll learn.

Your student is spending too much time on each patient encounter. You...
V78 assign the student more patients so that he'll have to figure out what's the best use of his time.

Facilitator Sub-Scales
F1: "Preceptor Support of Student." V2, V19, V39.
You meet the student with whom you'll be working over the next month. The student asks you, "What will be expected of me?" You answer... V2 "I'd like you to develop your own goals."
You meet with your new students the first day they arrive. One is dressed in levis and a plaid shirt and one is dressed in a white jacket, shirt and tie. You... V19 are supportive of both students.
You pride yourself on a warm, friendly working relationship with your staff. However, your student relates to support personnel in a way that, as you see it, is inapproriate. You... V39 explain your feelings but continue to support the student.
F2: "Elicitation of Data from Student." V50, V55, V106.
The student with whom you are working has given you some feedback about your colleague, Dr. P. She says, "Dr. P. couldn't treat a woman sensitively if his life depended on it." You... V50 listen to her concerns without being judgmental.
Your student wants to establish the agreement or contract under which you will work together. You... V55 have the student write down her objectives.
You have just observed your student's performance with the pediatric examination. She asks for feedback. You... V106 ask the student what kinds of information would be helpful to her.
F3: "Student takes responsibility for Education." V34, V59, V100.
You and your student have previously agreed to begin an observation period today, but your student wants to be excused because he has not yet found a place to live. You... V34 suggest that he make the decision.
In planning for your student's arrival, you... V59 wait and plan to discuss with your incoming students their plans for the experience.

Facilitator Sub-Scales (Con't)
Your student asks for more individual teaching than you originally agreed to give him. You... V100 support him for taking initiative and plan to give him more time.
Resource Sub-Scales
F1: "Use of Professional Literature in Teaching." V31, V62, V77, V120.
You learn that your male student spends time flirting and talking with adolescent women, especially about their sexual activity. You... V31 give him a book to read about adolescent medicine.
You cannot attend the meeting you have prearranged with your student this afternoon. You... V62 give the student an article in a current journal concerning the topic the two of you were recently discussing.
Your student is spending too much time on each patient encounter. You... V77 recommend that the student adhere to a set amount of time for his patient encounters.
Your student indicates an interest in working with families. You... V120 ask the student to develop a bibliography on this topic.
F2: "Setting Standards." V18, V54, V67, V105.
You meet with your new students the first day they arrive. One is dressed in levis and a plaid shirt and one is dressed in white jacket, shirt and tie. You... V18 let them know about the hospital dress code for students.
Your student wants to establish the agreement or contract under which you will work together. You... V54 let the student know your standards for her.
On the way to your teaching session with your student, you are called away on an emergency. You... V67 call your student and ask him to look over the articles you recommended earlier.

Resource Sub-Scales (Con't)
You have just observed your student's performance with the pediatric examination. She asks for feedback. You... V105 review the pediatric exam procedures with her.
F3: "Learning About Preceptor Methods and Standards." V1, V22, V25, V41
You meet the student with whom you'll be working over the next month. The student asks you, "What will be expected of me?" You answer... V1 "I'd like you to observe me at first, then you'll be able to fit in appropriately."
You notice that some of your patients do not appear comfortable when you have your student with you. You... V22 ask the student to observe when with patients, afterwards you can discuss each case.
A student questions your record keeping system in comparison to the problem oriented medical record. You... V25 acknowledge her interest, but indicate to the student that your system is the standard one being used by your group.
You find your student has no awareness that her poor personal hygiene could have a profound impact on patient care. You... V41 let the student know that your standards for her include good personal hygiene.
Problem Solving Sub-Scales
F1: "Data Gathering." V36, V53, V86, V115.
You and your student have previously agreed to begin an observation period today, but your student wants to be excused because he has not yet found a place to live. You... V36 help the student gather data about the various alternatives open to him.
Your student wants to establish the agreement or contract under which you will work together. You... V53 ask her about her present level of skills and deficiencies and using that as a basis you test out several possible plans with her.

Problem Solving Sub-Scales (Con't)
You are seeing S., a patient with recurrent urinary tract infections for the follow up visit. Your student asks for information about how to diagnose and treat such problems. You... V86 provide her with lab data from S.'s patient record from which you can help her answer her questions.
Your student asks how she did on a history and physical after you observed her. You... V115 use her performance as data, and go on to help the student generate a treatment plan for the patient.
F2: "Student Generation of Treatment Plans." V45 , V65, V101, V112.
Your student has indicated that he would like to know more about industrial medicine. You have referred him to a local plant which conducts a hypertension clinic. When the student returns, he indicates the experience was disappointing. You... V45 use the student's experience as background and help the student work out how patient care could be better delivered in such a setting.
On the way to your teaching session with your student, you are called away on an emergency. You... V65 ask the student to come with you and identify the patient's problem and come up with an emergency treatment plan.
You want your student to learn about handling certain kinds of vaginal infections. You... V101 present a series of related problems and ask the student to generate hypotheses about the management of these patients.
After six weeks, your student has improved in his ability to relate to geriatric patients. You... V112 ask the student to identify principles he now uses in delivering health care to geriatric patients and how his experience has influenced his original ideas.
F3: "Student Generation of Educational Strategies." V64, V79, V82.
You cannot attend the meeting you have prearranged with your student this afternoon. You... V64 ask the student to gather data about the office routine in your absence and identify strategies for such situations.

Problem Solving Sub-Scales (Con't)

Your student is spending too much time on each patient encounter. You...
V79 ask the student to come up with some ideas about how he might shorten the time without sacrificing meaningful medical and psychosocial information.

You have two students from different medical schools. You realize that they are competitive and work hard to "out do" each other. You...
V82 identify the issue and help the students generate some ideas about competition and its effect on the office.

F4: "Student Testing Diagnosis Against Criteria." V75, V95, V117.

A patient who has been seen by your student tells you that the student offended her. You...
V75 use the information from the patient visit and ask the student to speculate about the patient's adherence to her regimen.

Your student has insufficient information to adequately diagnose patient problems. You...
V95 assign her a patient with hypertension, and ask her to outline the patient's problems and prepare a problem list together.

Your student indicates an interest in working with families. You...
V117 ask the student to develop a criteria for handling a family problem and test it.

F5: "Preceptor Demonstrating Problem Solving Approaches." V4, V10, V28.

You meet the student with whom you'll be working over the next month. The student asks you, "What will be expected of me?" You answer...
V4 "We will be improving your ability to generate and evaluate patient diagnoses."

You've been teaching as a volunteer clinical faculty member for three years. You realize that your faculty appointment in recognition of your effort has not come through. You...
V10 call the Dean's Office at the University on the telephone to check out your ideas about why it has been held up and ask what they could do.

Problem Solving Sub-Scales (Con't)
A student questions your record keeping system in comparison to the problem oriented medical record. You... V28 ask the student to try both methods for the next week in order to test her hypothesis about record keeping.
Role-Modeling Sub-Scales
F1: "Preceptor Offering Problem Solution." V35, V111, V113.
You and your student have previously agreed to begin an observation period today, but your student wants to be excused because he has not yet found a place to live. You... V35 offer him a temporary place in your home. It will be a good chance for him to observe a physician's home life.
After 6 weeks, your student has improved in his ability to relate to geriatric patients. You... V111 assign him to the Extended Care Facility to work with your colleague, a gerontologist.
Your student asks how she did on a health and physical after you observed her. You... V113 demonstrate on the next patient the specific portions of the exam she needs to work on, illustrating the shortcuts you employ.
F2: "Preceptor Self Examination." V21, V52, V70.
You notice that some of your patients do not appear comfortable when you have your student with you. You... V21 ask yourself if your patient's discomfort is reflective in any way of your feelings.
The student with whom you are working has given you some feedback about your colleague, Dr. P. She says, "Dr. P. couldn't treat a woman sensitively if his life depended on it." You... V52 ask her to join you and Dr. P. at rounds, since you respect his abilities and would like her to see another side of him.
You have a student this term who is very different from yourself, but she appears to be getting along well with patients. You... V70 examine your own patient interaction style in order to determine what you might learn from the student.

Role-Modeling Sub-Scales (Con't)

F3: "Preceptor Demonstrating Approach." V88, V102, V108.

You are seeing S., a patient with recurrent urinary tract infections for the follow up visit. Your student asks for information about how to diagnose and treat such problems. You...
V88 discuss your approach in dealing with this problem, honestly indicating the limitations of your experience.

You want your student to learn about handling certain kinds of vaginal infections. You...
V102 share with the student the plans you have for improving your skills with this problem in order to emphasize the importance you place on continuing education.

You have just observed your student's performance with the pediatric examination. She asks for feedback. You...
V108 review the student's findings emphasizing your own techniques for the pediatric examination.

F4: "Sharing Learning Strategies." V11, V14, V90.

You've been teaching as a volunteer clinical faculty member for three years. You realize that your faculty appointment in recognition of your effort has not come through. You...
V11 ask your colleagues how they've handled it.

You are working with two students. One is skilled in patient interaction, but his physical examination skills are minimal. The other is skilled in physical examination but she has an abrasive manner. You...
V14 ask them to teach each other the skills in which they feel most competent.

Your student can't seem to relate lab data to appropriate diagnoses. You...
V90 demonstrate how you use lab data to arrive at diagnosis.

Role-Modeling Sub-Scales (Con't)
F5: "Positive Relations With Colleagues." V48, V61, V83.
Your student has indicated that he would like to know more about industrial medicine. You have referred him to a local plant which conducts a hypertension clinic. When the student returns, he indicates the experience was disappointing. You... V48 ask the student to see hypertensive patients with you so that you can demonstrate a method of dealing with this problem that has been developed in your practice.
You cannot attend the meeting you have prearranged with your student this afternoon. You... V61 make arrangements with your partner to cover the meeting.
You have two students from different medical schools. You realize that they are competitive and work hard to "out do" each other. You... V83 discuss it with them in the context of your relationships with your colleagues.
Clinical Supervising Sub-Scales
F1: "Preceptor Provides Feedback." V58, V107, V109, V114
In planning for your student's arrival, you... V58 plan to follow your system of an observation period, during which you can determine the student's level, and periodic sessions during which you and the student can assess performance.
You have just observed your student's performance with the pediatric examination. She asks for feedback. You... V107 tell her each of the things she did correctly and incorrectly.
After six weeks, your student has improved in his ability to relate to geriatric patients. You... V109 give him specific information about what he is doing well and what he still needs to improve on.
Your student asks how she did on a history and physical after you observed her. You... V114 relate what you saw her doing well and what she still needs to work on.

Clinical Supervising Sub-Scales (con't)
F2: "Goals Setting." V56, V93, V118.
Your student wants to establish the agreement or contract under which you will work together. You... V56 outline a contract with her which will include an observation period and regular feedback sessions.
Your student has insufficient information to adequately diagnose patient problems. You... V93 identify for her what you perceive to be her strengths and weaknesses.
Your student indicates an interest in working with families. You... V118 develop with the student a list of goals he would like to achieve and set a weekly supervision session.
F3: "Preceptor Feedback (2)." V23, V38, V44.
You notice that some of your patients do not appear comfortable when you have your student with you. You... V23 (since you are still in the observation period) relate what you've observed about the patient discomfort to the student, and use that as a basis on which to negotiate later student objectives.
You pride yourself on a warm, friendly working relationship with your staff. However, your student relates to support personnel in a way that, as you see it, is inappropriate. You... V38 give the student your reactions to this problem.
You find your student has no awareness that her poor personal hygiene could have a profound impact on patient care. You... V44 without rejecting her as a person, tell her specifically what she needs to do to improve.
F4: "Feedback (3)." V16, V17, V32, V72.
You are working with two students. One is skilled in patient interaction, but his physical examination skills are minimal. The other is skilled in physical examination but she has an abrasive manner. You... V16 talk with each about both their strengths and deficiencies.

Clinical Supervising Sub-Scales (con't)

You meet with your new students the first day they arrive. One is dressed in levis and a plaid shirt and one is dressed in a white jacket, shirt and tie. You...
V17 have a session with the students setting the contract, including student dress.

You learn that your male student spends time flirting and talking with adolescent women, especially about their sexual activity. You..
V32 speak with him about it and help him to understand the possible ramifications of such behavior.

You have a student this term who is very different from yourself, but she appears to be getting along well with patients. You...
V72 share with her the positive patient feedback you've received, relating the specific behaviors the patients found helpful.

F5: "Self Evaluation by Student." V49, V76, V97.

The student with whom you are working has given you some feedback about your colleague, Dr. P. She says, "Dr. P. couldn't treat a woman sensitively if his life depended on it." You...
V49 tell her you have some concerns about the way she expresses her feelings about other professionals.

A patient who has been seen by your student tells you that the student offended her. You...
V76 ask the student to evaluate his contact with this patient. You want him to self-evaluate accurately.

Your student asks for more individual teaching than you originally agreed to give him. You...
V97 ask him to assess his current skills and deficiencies and how he thinks extra teaching would help.

VARIABLE NUMBERS OF FACTORS FOR SUB-SCALES

INVOLVING, FACILITATING AND SERVING AS AN EXPERT RESOURCE

(Rotated to 2, 3, and 4 factors)*

	1	2	3	4
Factors 2	43, 80, 51, 40, 68, 84	120, 106, 60, 62, 110, 31		
Factors 3	80, 78, 68, 51	120, 60, 106, 62	19, 87, 34, 24	
Factors 4	68, 20, 43, 80	84, 25, 98, 69	106, 60, 120, 116	19, 94, 24, 15

*Variable numbers with values of .39 or higher.

VARIABLES OF SUB-SCALES

INVOLVING, FACILITATING AND SERVING AS AN EXPERT RESOURCE

Rotated to 2 Factors

Factor 1

f.	43	Indicate that you are choosing to allow the student to live with the consequences of her own decisions.
f.	80	Give student as many patients as possible who need the attention and have limited physical problems.
i.	51	Assign her to spend some time in Dr. P.'s office. If she still has concerns she can address them to him at that time.
i.	40	Assume that if it's a problem the support personnel will tell him.
i.	68	Ask the student to continue to see patients while you are gone.
i.	84	Assign the two to work together and figure they'll work it out.

Factor 2

er.	120	Ask him to develop a bibliography on this topic.
f.	106	Ask the student what kinds of information would be helpful to her.
er.	60	Attend a CME meeting in your specialty area to be sure that your information will be up to date for the teaching you plan to do with the students.
er.	62	Give the student an article in a current journal concerning the topic the two of you were recently discussing.
i.	110	Assign him to the Extended Care Facility to work with more geriatric patients.
er.	31	Give him a book to read about adolescent medicine.

Rotated to 3 Factors

Factor 1

f.	80	Give student as many patients as possible who need the attention and have limited physical problems.
i.	78	Assign the student more patients so that he'll have to figure out what's the best use of his time.
i.	68	Ask the student to continue to see patients while you are gone.
i.	51	Assign her to spend some time in Dr. P.'s office. If she still has concerns she can address them to him at that time.

Rotated to 3 Factors (con't)

Factor 2

er.	120	Ask him to develop a bibliography on this topic.
er.	60	Attend a CME meeting in your specialty area to be sure that your information will be up to date for the teaching you plan to do with the students.
f.	106	Ask the student what kinds of information would be helpful to her.
er.	62	Give the student an article in a current journal concerning the topic the two of you were recently discussing.

Factor 3

f.	19	Be supportive of both students.
i.	87	Assign her to a number of patients with U.T.I.'s to improve her skills with this problem.
f.	34	Suggest that he make the decision.
f.	24	Ask the student how he would like it handled.

Rotated to 4 Factors

Factor 1

i.	68	Ask the student to continue to see patients while you are gone.
i.	20	Ignore it. Your patients will give them feedback if the student's attire is bothersome.
f.	43	Indicate that you are choosing to allow the student to live with the consequences of her own decisions.
f.	80	Give student as many patients as possible who need the attention and have limited physical problems.

Factor 2

i.	84	Assign the two to work together and figure they'll work it out.
er.	25	Acknowledge her interest, but indicate to the student that your system is the standard one being used by your group.
i.	98	Fit him in where you can, continue his patient load assuming he'll answer some of his questions for himself.
er.	69	Hold her responsible for the same standards as your previous students.

Rotated to 4 Factors (con't)

Factor 3

f.	106	Ask the student what kinds of information would be helpful to her.
er.	60	Attend a CME meeting in your specialty area to be sure that your information will be up to date for the teaching you plan to do with the students.
er.	120	Ask him to develop a bibliography on this topic.
i.	116	Answer her questions and assign her to more H & P's.

Factor 4

f.	19	Be supportive of both students.
f.	94	Ask her what she feels might be helpful to her with this problem.
f.	24	Ask the student how he would like it handled.
f.	15	Ask each to develop objectives for improving what they feel to be their weak points.

VARIABLE NUMBERS OF FACTORS FOR SUB-SCALES

PROBLEM SOLVING, ROLE MODELING AND CLINICAL SUPERVISING

(Rotated to 2, 3 and 4 Factors)

	1	2	3	4
Factors 2	70, 117, 118 112, 102, 72	10, 53, 64 12, 11, 109		
Factors 3	118, 56, 112, 79	10, 57, 12, 64	16, 114, 72, 115	
Factors 4	118, 56, 112, 70	12, 10, 53 64	83, 76, 113, 115	17, 16 88, 114

VARIABLES OF SUB-SCALES

PROBLEM SOLVING, ROLE MODELING AND CLINICAL SUPERVISING

Rotated to 2 Factors

Factor 1

rm.	70	Examine your own patient interaction style in order to determine what you might learn from the student.
ps.	117	Ask the student to develop a criteria for handling a family problem and test it.
cs.	118	Develop with the student a list of goals he would like to achieve and set a weekly supervision session.
ps.	112	Ask the student to identify principles he now uses in delivering health care to geriatric patients and how his experience has influenced his original ideas.
rm.	102	Share with the student the plans you have for improving your skills with this problem in order to emphasize the importance you place on continuing education.
cs.	72	Share with her the positive patient feedback you've received, relating the specific behaviors the patients found helpful.

Factor 2

ps.	10	Call the Dean's office at the University on the telephone to check out your ideas about why it has been held up and ask what they could do.
ps.	53	Ask her about her present level of skills and deficiences and using that as a basis you test out several possible plans with her.
ps.	64	Ask the student to gather data about the office routine in your absence and identify strategies for such situations.
cs.	12	Treat the University as you would a student, and call the Dean's office to give them the feedback that this is important to you.
rm.	11	Ask your colleagues how they've handled it.
cs.	109	Give him specific information about what he is doing well and what he still needs to improve on.

Rotated to 3 Factors

Factor 1

cs.	118	Develop with the student a list of goals he would like to achieve and set a weekly supervision session.
cs.	56	Outline a contract with her which will include an observation period and regular feedback sessions.
ps.	112	Ask the student to identify principles he now uses in delivering health care to geriatric patients and how his experience has influenced his original ideas.
ps.	79	Ask the student to come up with some ideas about how he might shorten the time without sacrificing meaningful medical and psychosocial information.

Factor 2

ps.	10	Call the Dean's office at the University on the telephone to check out your ideas about why it has been held up and ask what they could do.
ps.	57	Ask for copies of your student's evaluations from the medical school to evaluate the strategies you used in working with prior students.
cs.	12	Treat the University as you would a student, and call the Dean's office to give them the feedback that this is important to you.
ps.	64	Ask the student to gather data about the office routine in your absence and identify strategies for such situations.

Factor 3

cs.	16	Talk with each about both their strengths and deficiencies.
cs.	114	Relate what you saw her doing well and what she still needs to work on.
cs.	72	Share with her the positive patient feedback you've received, relating the specific behaviors the patients found helpful.
ps.	115	Using her performance as data, you go on to help the student generate a treatment plan for the patient.

Rotated to 4 Factors

Factor 1

cs.	118	Develop with the student a list of goals he would like to achieve and set a weekly supervision session.
cs.	56	Outline a contract with her which will include an observation period and regular feedback sessions.
ps.	112	Ask the student to identify principles he now uses in delivering health care to geriatric patients and how his experience has influenced his original ideas.
rm.	70	Examine your own patient interaction style in order to determine what you might learn from the student.

Factor 2

cs.	12	Treat the University as you would a student, and call the Dean's office to give them the feedback that this is important to you.
ps.	10	Call the Dean's office at the University on the telephone to check out your ideas about why it has been held up and ask what they could do.
cs.	53	Ask her about her present level of skills and deficiences and using that as a basis you test out several possible plans for her.
ps.	64	Ask the student to gather data about the office routine in your absence and identify strategies for such situations.

Factor 3

rm.	83	Discuss it with them in the context of your relationships with your colleagues.
cs/ rm	76	Ask the student to evaluate his contact with this patient. You want him to self-evaluate accurately.
rm.	113	Demonstrate on the next patient the specific portions of the exam she needs to work on, illustrating the shortcuts you employ.
ps.	115	Using her performance as data, you go on to help the student generate a treatment plan for the patient.

Factor 4

cs.	17	Have a session with the students setting the contract, including student dress.
cs.	16	Talk with each about both their strengths and deficiencies.
rm.	88	Discuss your approach in dealing with this problem, honestly indicating the limitations of your experience.
cs.	114	Relate what you saw her doing well and what she still needs to work on.