Interpersonal and Communication Skills Training for Radiology Trainees Using a Rotating Peer Supervision Model (Microteaching)[1]

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February 1999, the Accreditation Council of Graduate Medical Education (ACGME) formulated six core competencies that a new practitioner should possess, but left it to the residency and fellowship programs to define the necessary skills and implement a process of teaching, assessment, and process improvement (1). Programs were mandated to create a process using results of assessments to achieve progressive improvement in residents' competence and performance. Although it is relatively easy to establish comparative metrics for factual knowledge (eg, written in-service examinations) or even manual skills (eg, procedure logs, phantom simulation), traditional methods fall short when sharpening soft skills becomes the goal (2). The ACGME lists interpersonal and communication skills among its core competencies. The challenge rests not only in the definition of what the most effective interpersonal and communication skills are, but also in how they are to be taught, measured, and integrated into the ACGME's other core competency of practice-based learning and improvement.

Habits of interpersonal conduct are difficult to instill or break in a classic lecture. New behaviors are unlikely to emerge from reading assigned material only. People-skill training requires continued interaction with people and a safe setting in which new behaviors can be explored without the consequences of the real encounter. Ideally, methods should permit experiential learning, simulation in a safe setting, and self-reflection, with the associated evaluative understanding as a launching pad for continuous mindful practice.

We adapted a rotating peer supervision model, which one of the authors (E.A.) had developed and used successfully in the training of teachers and medical educators (3), to the interpersonal and communication skill training of radiology residents. We report the evolution and integration of this "microteaching approach" into a communication skills course through 2 successive incoming years of radiology residents and fellows. The results and lessons learned are offered as an example of process improvement in communication.

MATERIAL AND METHODS

Overview

An expedited institutional review board review for this retrospective analysis of our experience was obtained. During 2 years, incoming residents and interventional radiology fellows (to be called trainees) took this mandatory Interpersonal and Communication Skills course. There were a total of 20 trainees (11 men, nine women). The series started with an introductory lecture during one of the regular morning teaching conferences for the entire departmental trainee group. Subsequent activities were restricted to the training group. To facilitate buy-in and ease the disruption of work and study time during the planned noon and evening sessions, lunch/dinner was provided as suggested by the chief residents. Target group

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activities included a preassessment survey, initial videotaped role-play to establish a baseline, self-study of an electronic Web-based teaching module, a debriefing session introducing the principles of microteaching, and the microteaching exercise.

Introductory Lecture

The series of Interpersonal and Communication Skills training started with an introductory lecture that familiarized the trainees with the Outcome Project of the ACGME, the six core competencies, the need to establish a process amenable to improvement, and their future involvement in peer evaluation using 360° instruments from the ACGME Toolbox (1). A pair of teaching videos formed the basis for a case-based large-group discussion format. Videos showed the enactment of a difficult patient-doctor interaction played by a staff member and fellow. In this scenario, the "interventional radiologist" had to tell a patient who had had a lengthy wait and just entered the procedure room that his procedure would have to be postponed because of an emergency. The "patient" was instructed to behave at his worst. Unknown to the "patient," the "doctor" was instructed NOT to match the patient's body language in the first video. In the second video, filmed several months later, the instruction was to match the patient's body language and then lead to a more resourceful state (principle of pacing and leading [4]). In the lecture, trainees were asked how they would rate the communication skills of the doctor, how they would define the grades, and what specific feedback they would give the doctor. After the second video, they were asked to rate again the doctor's performance and identify which specific behavior we had asked the doctor to change. The presentation then showed patient outcomes in radiology obtained by using specific teachable and measurable empathic attentive behaviors (5,6). The goal of this introductory exercise is to illustrate the pitfalls of purely subjective assessment of behavior and the difficulty giving targeted feedback that could bring more desirable outcomes.

Preassessment Survey

A preassessment tool was constructed to determine in which situations the residents felt least and most comfortable, mimicking real-world scenarios. A variety of statements were given to ascertain the perimeter of the residents' communication skill set, capturing their grasp of both verbal and nonverbal communication. The survey was modeled on the State Trait Anxiety Inventory (7) in the use of wording and consisted of 18 questions in which the residents were asked to self-rate their level of comfort in the given scenario (Table 1). The rating system used a four-point Likert scale with the following values: 1 = not at all, 2 = somewhat, 3 = moderately so, and 4 = very much so, with 4 indicating the greatest ease in a communicative skill, with the exceptions of five questions (* on Table 1) in which a rating of 4 indicated greatest difficulty. For analysis, answers to these questions were reverse scored (eg, 4 becoming 1, and 1 becoming 4) so that a score of 1 always indicated least comfort. Questions focused on the empathic skills we had identified in prior work to be associated with improved patient outcomes (5,8) and issues of feedback believed important within the context of process improvement. At the end of the survey, residents indicated their expectations for the course and which aspects of communication they would like to improve. The goal was not to arrive at a total "communication score," but to identify areas in which most improvement was sought and compare self-assessment with observed performance in a precourse videotaped role-play.

Initial Videotaped Role-Play

Trainees in groups of three to four were asked to choose any communicatively challenging past real or fictitious event or subject, not necessarily of medical orientation, and engage in a 5-minute videotaped role-playing exercise. One trainee would serve as a communication initiator with a peer. The communication recipient was encouraged to portray his or her character in a challenging manner so that the communication initiator could use the full gamut of communicative abilities. The goal was to achieve a satisfying conclusion to the conversation. Trainees received copies of their videos for self-study, without further debriefing at this time.

Study of Computer Module

The Web-based computer module was derived first from a written manual based on previous work describing empathic attentive behaviors (9,10), adapted to a CD Rom–based application (8). However, to track user compliance and receive feedback throughout the course, it was necessary to adapt it to the Web.

The now Web-based course was adapted for mounting on the Harvard Medical School's myCourses Virtual Patient platform. This platform provides for the creation of case-based scenarios with decision-tree branching to many different possible outcomes. Most importantly for our use,

Table 1
List of Questions in Sequence as Presented to the Trainees in the Pre-Assessment.

Number	Question	Average Score
1	I feel comfortable in a difficult conversation	2.57
2	A patient is very upset about his long wait. I feel secure handling the situation	2.86
3	A patient says "You are the best doctor I have ever known," I feel pleased	3.07
4	A house staff is passively hostile and distant not providing enough information about the patient. I am skilled in leading the situation to a more resourceful setting	2.46
5	I cope well with passive aggressive behavior of others	2.23
6*	When a patient leans repeatedly closely towards me during a conversation, I feel threatened	2.64
7*	When a peer leans away from me during a conversation I become upset	2.86
8	I feel comfortable in dealing with overt hostility of others	2.07
9	I know what to do when I feel I am not in rapport with a conversation partner	2.08
10*	I get nervous when I receive feedback of any kind	3.07
11	I know well how a patient is affected by what I say when preparing him for a painful stimulus	2.36
12	I am skilled in giving feedback to my superiors	2.14
13	I am at ease giving feedback to my peers	2.36
14	In general, when communicating with a referring physician I feel mostly pleasant	3.21
15*	I get upset when I am critiqued	2.79
16	I am comfortable when I encourage a nurse or technologist in supporting the patient	3.14
17*	I have difficulties obtaining rapport with people I don't like	2.64
18	When a peer avoids my efforts of eye-contact my self-confidence remains unchanged	2.43

Each question was followed by a Likert Scale answering column in which answers were circled according to "Not at all", "Somewhat," "Moderately so," "Very much so." Ratings were coded from 1 to 4 in ascending order from "not at all" to "very much so" with the exception of questions 6, 7,10,15, and 17 which were reverse-coded (e.g. "very much so" = 1). Average scores represent mean scores of answers obtained for the entire group.

the myCourses platform provided us with the ability to track residents' progress in the course, recording numbers of attempts, best attempts, answers given, dates active, and whether the course was completed.

The Web-based course consisted of the following 10 modules encompassing different aspects of communication skills: encouragement, matching, distance versus closeness, sensory term preferences, giving the perception of control, negative suggestions, instructions, pacing and leading, eye movement, and eye contact. The last three modules were added in the second year, and another on attentive listening is pending. Methods were constructed to be respectful of different learning styles of students (8) and contained the elements of the Kolb learning cycle (11). They integrated experiencing, reflection, conceptualization, and planning. Each module used the same seven-step process: (1) introduction: a short statement of the concept to be learned in the module; (2) reflection: a problem or case is presented and students are encouraged to reflect; (3) student analysis: after reflecting, students answer focused questions about the problem and give feedback; (4) teacher analysis: an expert provides background information and identifies the problem; (5) alternative behaviors: the teacher suggests alternative ways to appropriately address the communication challenge; (6) daily task: students are instructed to practice the new concept with peers or others; and (7) evaluation: students report back on their experience with the daily task and answer a series of multiple choice questions to test their comprehension of the concept. After completion of the seven steps, the student begins the cycle anew with another module. Modules required little time to complete by design (~5–10 minutes) in an effort to accommodate the residents' full schedules. The intention is to have the residents attempt just one module at a time every few days during "downtime," leaving opportunity to practice the daily tasks.

Performance tracking on the module was as follows: each module had components A (the case) and B (response to the daily task). Successful completion of each component resulted in one point; starting, but not completing, a component resulted in 0.5 point; and not taking part received 0 point. In 2003, when the program was started, seven modules were available for study, resulting in a maximal point score of 14 per resident. In 2004, a total of 10 modules was available, resulting in a maximal score of 20. For assessment of compliance with the course, the sum of scores of all trainees taking the course

was divided by the product of trainees and module components.

Debriefing

Debriefing of the initial videos was postponed until the residents had an opportunity to study the Web-based module. The hope was that this would sharpen skills in identifying behavioral patterns and assessing behavior in self and others so that discussions could stem from a common denominator and vocabulary and facilitate giving and receiving feedback.

Microteaching

Background.—There are concerns today that medical curricula can no longer produce the omniscient humanistic physician in the time allotted, and teacher training faced similar challenges when Armstrong (3) originally developed the rotating peer supervision concept for the training of teacher students. The literature at the time suggested that teacher personality traits frequently were the direct opposite of the kind of traits educators hoped to develop in children (3), and the premise was that teacher trainees need to be made aware of themselves and their own unique potential before they can attempt to instill the same in children (12). The goal of the rotating peer supervision model was to help trainees understand their own teaching repertoire (and how it could be modified) by observing and analyzing other repertoires in action (13); stimulate self-evaluation and encourage a professional dialogue through constructive criticism, openness toward other's ideas, and willingness to share ideas and opinions; and develop a questioning attitude toward one's own actions in teaching (3). Armstrong's rotating peer supervision model adapted a five-stage sequence of supervision developed by Goldhammer (14) and expanded it for practical use in a college setting.

Rotating peer supervision is defined as a process in which students teach other students and themselves about teaching through observation, analysis, and evaluation of their own teaching, as well as that of their colleagues, and this process was integrated in 1-hour long teaching presentations given by the students. The model included: (1) a preobservation, in which the teacher trainee presents a lesson plan with a statement of objectives and a brief summary of the content; (2) the observation, in which each member of the supervisory team makes as complete and objective a record of the lesson as possible while the lesson is videotaped; (3) an analysis and strategy session, at which the teacher trainee is not present and one member volunteers to be the leader; a few patterns amenable to being altered and improved are chosen for further discussion with the teacher trainee; (4) videotape viewing by the teacher in private; and (5) the supervisory conference, in which the teacher trainee is asked to present his own critique of the lesson. With this new information, the team leader presents the findings of the supervisory team, always starting with positive comments, and the teacher trainee is encouraged to interact freely with the team so that all comments are clarified to satisfaction in a climate of positive reinforcement and constructive criticism. Because reaction to self-viewing of one's performance on videotape is determined largely by the disposition of the viewer (15), immediate feedback from the supervisory group is particularly important. This ensured consideration of both positive and negative aspects of the lesson.

The term "rotating peer supervision" was later replaced by the shorter designation "microteaching exercise," and Armstrong used this tool successfully in training medical school faculties to enhance their teaching skills. The method has stood the test of time and proved to be a highly regarded component across cultures in medical education leadership programs administered by the Harvard Macy Institute and Harvard Medical International.

Adaptation for use in the radiology department.—The microteaching exercise in radiology was shortened for each communication initiator, and the designated communication recipient was accorded a greater participatory role than the students in the original rotating peer supervision model. Groups of four to nine trainee teams met with a faculty facilitator for successive 20-minute long microteaching exercises. Each exercise had a trainee who was given the responsibility to be the initiator of a conversation while another trainee played the role of recipient of a challenging message and was encouraged to behave in a typically difficult manner. In 2–3 minutes, the communication initiator defined one or two behavioral objectives for the upcoming communication based on reflection of the initial videotaped role-play, study of the computer module, and self-defined desire for improvement. The remainder of the group observed as the two trainees enacted the difficult conversation for 5 minutes. The conversation also was videotaped. The communication initiator viewed the videotape in a different room while the remaining consultant group formulated feedback to be given by a designated speaker for the group. On return, the communication initiator delivered a self-appraisal that was followed by feedback summarizing: (1) what was done well, (2) how well the objectives for im-

provement were achieved, and (3) what could have been done better or differently. Further input and discussion between the communication recipient and entire group concluded the exercise.

For the microteaching exercise, we proceeded with simulations that condensed some of the situations in which trainees had shown greater unease in the initial unstructured role-play. Simulations can be understood as role-plays in which the background parameters of the conflict are defined (16). Trainees were offered to choose one of these three challenging simulations:

1. An outpatient with vague abdominal pain undergoes a computed tomographic scan and has a severe reaction to contrast medium. He dies despite resuscitative efforts. The resident is to give the news to the brother in the waiting room, whom he or she has never met.
2. A senior and junior resident share a series of night calls. During the past few nights, the junior resident has repeatedly read comparatively fewer films, leaving a larger workload for the senior, who is concerned that this pattern will continue. The senior wants to improve the situation by talking to the junior resident.
3. During read-out, a resident mentions a finding that, as the resident understands it, the attending has dismissed. The resident reluctantly eliminates the finding from the report before signing off. In the follow-up, the resident's finding turns out to be correct. At the morbidity/mortality conference, the same attending indicates that the resident was asked to report the finding. After the conference, the resident, who feels treated unfairly, meets the attending.

After these three basic scenarios had been exhausted in a microteaching group, additional scenarios followed that focused on topics that had arisen during the feedback sessions as points of interests. These scenarios typically were targeted to include elements of negotiation (eg, negotiation for the first job after residency with the current chairwoman; convincing the residency director about a change in the vacation structure). For the negotiatory settings, both parties received secret instructions about their constraints and liberties in dealing with their counterpart's demands. This was done following principles of the Program on Negotiation at Harvard Law School (17) by using a mutual gains approach in which the outcome of the conversation was to be at least satisfying, if not maximally beneficial, to all parties involved (18).

Outcome assessment.—Performance on the initial videos and microteaching videos was assessed by using adherence checklists for the 10 behaviors contained in the electronic module that had been developed for and validated in prior research assessing the effect of provider behavior on patients (5). Demonstration of behavior was ranked as having occurred not at all or little (<25% of time), occasionally (25%–75% of time), predominantly (>75%), or not applicable. Reviewers had been trained to apply this instrument with an interrater reliability of 0.70 intraclass correlation (19). Because not all behaviors applied to all situations and scenarios were different and more complex and challenging in the microteaching video, it was not possible to compare total scores. Therefore, tallies were made on whether any trainee improved or worsened by at least one category within any one specific behavior.

RESULTS

Introductory Lecture

Trainees' ratings of the doctor behavior in the first video ranged from "good" to "poor," with relatively global statements of what the physician could have done better (such as "he should have been firmer," "he should have shown more understanding"). However, trainees were unable to give concrete feedback on how this could have been implemented, with one exception: both years, trainees chided the doctor in the first video for not having introduced himself, although the doctor clearly had introduced himself, as shown in the replay. This helped stress how a gestalt impression can taint perception of specific occurrences and adversely impact on feedback. All trainees agreed that the interaction in the second video went much smoother, but could not identify the changed behavior, with the exception of one third-year resident who had participated in a prior voluntary communication skills training with our research group.

Preassessment Survey

On a scale of 1 (least comfortable) to 4 (most comfortable), average scores of individual perceived difficulty/unease in a situation ranged from 2.07 to 3.21, with a mean and median of 2.61 and SD of 0.37. Trainees felt the greatest unease, in descending order, when dealing with the overt hostility of others and when they are not in

rapport with a conversation partner (scores for both, 2.07), giving feedback to superiors (score, 2.14), coping with the passive-aggressive behavior of others (score, 2.23), assessing the effect of words said to a patient in preparation for painful stimuli, and giving feedback to peers (both scores, 2.36).

Initial Videotaped Role-Play

For their first role-play, trainees picked difficult conversations that were rooted in real-life experiences in which the conversational counterpart was either hostile or aggressively unhelpful (eight times), passive-aggressive (six times), malingering (one time), upset (two times), or unrealistic in their expectations (one time) and when feedback was to be given to a peer (one time) or received (one time). Scenarios ranged from medical settings (giving bad news), residency-related experiences (being bullied by clinicians, having unhelpful support staff), and dealings of daily lives at the mercy of unpleasant third parties (lost reservations at car rental counters, airline cancellations, bringing spoiled chicken back to a supermarket clerk).

Web-Based Module

Median compliance score was 78% for the entire group. All fellows had a 100% score. Five residents had nonpassing scores (<50% completion) before the microteaching exercise, predominantly because of lack of Web attendance, although it was made clear that completion of the modules was mandatory. Trainees in both years tended to complete the entire course within the 1–2 days preceding the debriefing session despite repeated email reminders to use a gradual approach. After the entire course was completed, trainees continued to consult the Web course on their own without further prompting and received passing scores.

Debriefing

All trainees reviewed their videos before the debriefing session. Because not all had fully studied the Web-based module at that time, a short review of the module was done to ensure clarity of vocabulary and concepts of behaviors. Several videos then were reviewed in the group, with different trainees focusing on identifying specific behaviors (eg, one each focusing on eye contact, matching body language, sense of closeness/distance, matching of sensory term preferences in verbiage, and pacing and leading). It was helpful to show that behaviors from the module occurred "naturally" and that trainees who used them intuitively seemed conversationally more poised. The debriefing also created a climate in which trainees became curious to practice some of the behaviors.

Microteaching

For microteaching exercises, trainees chose as their special focus, in descending order of frequency, alone or in combination: matching body language, giving encouragement, observance of appropriate distance/closeness, matching verbal sensory preferences, eye contact, and pacing and leading.

The communication initiators self-rated accurately, concordant with the consultant observations in all cases with regard to their chosen focus of interest in the exercise, points they did well and areas that could be improved or done differently. Consultants contributed variably to additional potential solutions. An advantage of having offered the Web course and vocabulary clarification was that it helped keep feedback nonpersonal, as an assessment of technical skill rather than a character feature.

Compared with the first videotaped performance, at least one behavior on the adherence checklist objectively improved in eight residents, worsened in one, and remained at a high functioning level in the others. The one case in which a score decreased from "reliably" to "occasionally" concerned matching of body language when the conversation turned considerably more challenging than in the first role-play. We noted that among all trainees, matching of body language, as well as pacing and leading, was maintained relatively well in less critical parts of the conversation, but tended to be lost at the more sensitive and potentially emotionally loaded points of the conversation.

With trainees split into small groups, different group dynamics evolved with varied emphasis and conclusions in the discussions. In particular, the treatment of simulation 3 (resident/faculty discordant film interpretation) brought view points into the foreground ranging from notions of whether any verbalized disagreement with faculty represents inappropriate "confrontation" to issues of restoring fairness in an unequal setting of power and the need to preserve and nurture relationships without "giving in" between individuals who have to continue to work together. Of note was that several weeks later, a resident proposal appeared during the faculty conference about how to address issues of disagreement of interpretation during read-out. Although the initial impulse was to come up with a written policy, it was helpful that the course

director could point out to the faculty that the opportunity for constructive and relationship-building communication should be an integral part of the solution for any future faculty/trainee read-out session disagreements.

DISCUSSION

The communication training was based heavily on establishing rapport rapidly by use of behavioral awareness and adaptation to the conversation partner's preferred mode of communication. Our assumption is that an individual who feels comfortable in a situation will be at greater ease to find the right words. If tension can be eased quickly, the potential for conflict is lessened. Expectancy of adverse outcomes often results in self-fulfilling prophecies that express themselves in nonverbal cues (20). Awareness of such nonverbal messages in oneself and others, coupled with the ability to reach nonverbal rapport, thus should increase the likelihood of a positive outcome (4). Rapport and empathy have been linked in theory and research (21), and greater rapport correlates positively with participants appearing to move their bodies "in time" to each other in an "interactional dance" (22). This was largely confirmed in the role-plays and simulations in which greater ability to match intuitively or consciously produced more agreeable interactions. The rapid-rapport approach also was suitable to the radiology environment, in which patient-doctor and trainee-staff interactions often are fast paced and may lack the luxury of prior development of in-depth relationships.

This course evolved through feedback in a continuum of process improvement from lecture format through Web-based teaching and experiences with microteaching. Our earlier efforts in teaching rapid-rapport skills followed the typical classroom design during national meetings and within our research group. The goal of training larger audiences, particularly in response to the ACGME mandate for interpersonal and communication skills training, resulted in the construct of the Web-based electronic teaching module. However, as we found out, even a design that permits access in short 5–10-minute segments proved insufficiently enticing for trainees to pursue voluntarily. Even after it was made clear that the mandatory daily tasks would take time, the majority of residents completed the entire Web-based module within 1 or 2 days, rather than following the instructions of practicing each behavior for at least 1 day at a time for maximal benefit. This suggests that even short-segment teachings on the Web and simple daily tasks may be beyond the time allotments that residents can or are willing to spare without additional motivation. However, in an encouraging development, residents who had failed the Web course signed on to the Web module voluntarily after the microteaching exercise, and several trainees kept reaccessing the module later on. One may speculate that, at least for some, practice, reflection, and observation during the microteaching exercise created sufficient incentive or curiosity to learn more about the topic.

Our trainees already had undergone a very competitive application process to arrive at their positions, which assumes that their verbal and cognitive skills were already highly developed. Fortunately, we did not need to work on detecting individuals who were not expected to overcome their deficiencies (23), but could concentrate on further enhancing competency. In this context, it is not surprising that many scenarios chosen by the trainees reflected situations in which they were stressed by the unexpected, inappropriate, or unfair behavior of others; power inequality; and settings in which relationships had to be preserved without giving in on important principles of fairness to self and others. The initial role-play confirmed that trainees possessed already fairly mature communication skills and any course that would keep their interest had to present new challenges. We designed the microteaching simulations accordingly. That improvement in communicative behavior and reflective ability could be shown in this already highly evolved group with this approach suggests the usefulness of the teaching model.

Interpersonal skill training often uses standardized patient-actors. However, these are expensive and, in our experience, at least in the United States, tend to be kinder than what a trainee may meet in real life. The videotaped exercises showed that trainees quickly and expertly assumed their assigned roles, feeling free to "push the buttons" of their role-playing counterpart. Although this was fun to watch, it also made the interaction real for the participants and provided them with an authentic feeling of challenge. Playing the role of the communication recipient further permitted the trainees to broaden the experience of behavior.

Epstein and Hundert (24) noted the difficulties in the assessment of soft skills compared with factual knowledge in medical education. Although global rating scales may be more valid than behavioral checklists according to their analysis (25), our initial experience in the lecture showed that this might not be the case in our setting. In addition, the background of faculty evaluators can intro-

duce differences in standards and bias (26–28). The microteaching exercise has the advantage of bringing such potential issues into the open and permits trainees to establish their own standards and routes to process improvement. Use of an adherence checklist in our case was helpful to show objective growth in behavioral aptitude and was facilitated because three of the authors had prior training with this instrument.

Practice-based learning and improvement include the expectation for trainees to analyze practice experience and perform practice-based improvement activities by using a systematic method. The experience of this article indicates that the microteaching exercise is suitable to such pursuit and permits the level of reflection sought by educators and the ACGME as a prerequisite for refinement of skills (29,30). Progress was so fast that trainees requested the addition of negotiatory elements to later exercises within the first few sessions. Expansion that includes negotiation training will be a goal for further course improvement and thus provides the feedback loop for process improvement sought by the ACGME.

REFERENCES

1. Accreditation Council for Graduate Medical Education. Outcome Project. Chicago, IL: ACGME, 2001.
2. Patton BM. On teaching negotiation. In: Wheeler M, ed. Teaching Negotiation: Ideas and Innovations. Cambridge, MA: PON Books, 2000,7-61.
3. Armstrong EG. Rotating peer supervision: implementation and evaluation of its effect on the inner-direction and internal control constructs of teacher trainees. Doctor of Philosophy Dissertation. Boston, MA: Boston College, 1974.
4. Dilts R, Grinder J, Bandler R, DeLozier J. Neurolinguistic Programming. Volume 1. The Study of Subjective Experience. Cupertino, CA: Meta Publications, 1980.
5. Lang EV, Benotsch EG, Fick LJ, et al. Adjunctive non-pharmacologic analgesia for invasive medical procedures: a randomized trial. Lancet 2000; 355:1486–1490.
6. Lang EV, Berbaum KS. Educating interventional radiology personnel in nonpharmacologic anesthesia: effect on patients' pain perception. Acad Radiol 1997; 4:753–757.
7. Spielberger C. Manual for the State-Trait Anxiety Inventory STAI (form Y). Palo Alto, CA: Consulting Psychologists, 1983.
8. Lang EV, Laser E, Anderson B, et al. Shaping the experience of behavior: construct of an electronic teaching module in nonpharmacologic analgesia and anxiolysis. Acad Radiol 2002; 9:1185–1193.
9. Lang EV, Lutgendorf S, Logan H, Benotsch E, Laser E, Spiegel D. Nonpharmacologic analgesia and anxiolysis for interventional radiological procedures. Semin Interv Radiol 1999; 16:113–123.
10. Lang EV, Spiegel D, Lutgendorf S, Logan H. Empathic attention and self-hypnotic relaxation for interventional radiological procedures. Iowa City, IA: University of Iowa, 1996.
11. Kolb DA. Experiential Learning. Experience as the Source of Learning and Development. Englewood Cliffs, NJ: Prentice Hall, 1984.
12. Jersild AT. When Teachers Face Themselves. New York, NY: Teachers College Press, 1955.
13. Anderson RH. Supervision as teaching: an analogue. In: Supervision: Perspectives and Propositions. Washington, DC: Association for Supervision and Curriculum Development, NEA, 1967.
14. Goldhammer R. Clinical Supervision. New York, NY: Holt, Rinehart, and Winston, 1969.
15. Solomon G, McDonald F. Pretest and posttest reactions to self-viewing one's teaching performance on video tape. J Educ Psychol 1970; 61: 280–286.
16. Susskind LE, Corburn J. Using simulations to teach negotiation: pedagogical theory and practice. In: Wheeler M, ed. Teaching Negotiation: Ideas and Innovations. Cambridge, MA: PON Books, 1999; 285–310.
17. Wheeler M. Teaching Negotiation. In: Teaching Negotiation: Ideas and Innovations. Cambridge, MA: PON Books, 2000: 1–3.
18. Fisher R Ury W, Patton B. Getting to Yes. Negotiating Agreement Without Giving In. 2nd ed. New York: Penguin, 1991.
19. Shrout PE, Fleiss JL. Intraclass correlations: use in assessing rater reliability. Psychol Bull 1979; 86:420–428.
20. Ambady N, Rosenthal R. Thin slices of expressive behavior as predictors of interpersonal consequences: a meta-analysis. Psychol Bull 1992; 111:256–274.
21. Tickle Degnen L, Rosenthal R. Group rapport and nonverbal behavior. In: Hendrick C, ed. Group Processes and Intergroup Relations. Volume 9. Review of Personality and Social Psychology. Beverly Hills, CA: Sage, 1987.
22. Bernieri FJ, Reznick J, Rosenthal R. Synchrony, pseudosynchrony, and dissynchrony: measuring the entrainment process in mother-infant interactions. J Pers Soc Psychol 1988; 54:243–253.
23. Leach DC. Competence is a habit. JAMA 2002; 287:243–244.
24. Epstein RM, Hundert EM. Defining and assessing professional competence. JAMA 2002; 287:226–235.
25. Hodges B, Regehr G, McNaughton N, Tiberius R, Hanson M. OSCE checklists do not capture increasing levels of expertise. Acad Med 1999;74:1129–1134.
26. Kalet A, Earp JA, Kowlowitz V. How well do faculty evaluate the interviewing skills of medical students? J Gen Intern Med 1992; 7:499–505.
27. Wang-Cheng RM, Fulkerson PK, Barrnas GP, Lawrence SL. Effect of student and preceptor gender on clinical grades in ambulatory care clerkship. Acad Med 1995; 70:324–326.
28. Herbers JE Jr, Noel GL, Cooper GS, Harvey J, Pangaro LN, Weaver MJ. How accurate are faculty evaluations of clinical competence? J Gen Intern Med 1989; 4:202–208.
29. Al-Shehri A. Learning by reflection in general practice: a study report. Edu Gen Pract 1995; 7:237–248.
30. Schoen D. The Reflective Practitioner: How Professionals Think in Action. New York, NY: Basic Books, 1983.