

Three Exemplary Models of Case-based Teaching

Abstract—Teaching in response to case presentations is an essential feature of clinical teaching in medicine. Yet, this form of case-based teaching is often done poorly. Using qualitative methods of interviews, observations, and recordings of teaching rounds, the author describes three different yet exemplary pedagogical strategies for organizing teaching rounds in general internal medicine. These include: (1) case–bedside teaching that involves case discussion in a conference room followed by demonstrations at the bedside, (2) case–lecture teaching that blends quick reviews of cases with more formal presentations

on relevant topics, and (3) case–iterative teaching that involves discovery-learning using complex cases. From these three case studies, five general principles of experiential learning in clinical settings are derived: anchoring instruction in cases, actively involving learners, modeling professional thinking and action, providing direction and feedback, and creating a collaborative learning environment. These three approaches to teaching rounds overcome common problems associated with learning in clinical settings. *Acad. Med.* 69(1994):947–953.

Clinical teaching in medicine takes place in the discourse surrounding particular cases. This stylized form of dialogue is the hallmark of teaching rounds, where attending physicians engage in case-based teaching with their ward teams. In this context, expert practitioners articulate their own knowledge of practice, and facilitate the development of knowing-in-action for medical students and residents.^{1,2} Yet, this format of teaching is often criticized for (1) containing lengthy case presentations that are repetitions of work rounds, (2) failing to actively involve and meet the diverse needs of team members, and (3) providing little learning.^{3–8} Are there teaching strategies that can overcome these problems and that can facilitate experiential learning in clinical settings?

One way to address this question might be to study outstanding clinical teachers. Instead of examining the “unimaginative practices of the uninspired,” a few case studies of distinguished teachers might illuminate the wisdom of practice and demonstrate alternative case-based teaching strategies.⁹ Such case studies could serve as

exemplars for faculty development. Spiro¹⁰ and Shulman⁹ both argue that the best way to learn the wisdom of practice and to develop cognitive flexibility is through experience with a variety of case studies. Thus, learning how to teach from case studies of excellent teachers may be as important as assimilating knowledge of general principles derived from educational research.

In this essay, I describe three distinctive ways of organizing teaching rounds demonstrated by excellent clinical teachers in medicine and relate these pedagogical strategies to five general principles for facilitating experiential learning in clinical settings. This is the last of my three articles on the instructional knowledge, reasoning, and actions of distinguished clinical teachers in medicine.^{11,12}

METHOD

I selected three distinctive models of teaching rounds because they offer different yet superlative ways to structure teaching in this context. The three models were demonstrated by three different clinical teachers. They were part of a larger group of six attending physicians that I studied as a way of illuminating the knowledge, reasoning, and actions of distinguished clinical teachers.^{11,12} These attending physicians were among the top 20 teachers in the Department of Medicine of the University of Washington School of Medicine (which has a faculty of 330) as measured by students' and residents' ratings of clinical teaching.¹³ In addition, they were

independently nominated as being among the best clinical teachers in the department by both the department chairman and the director of the residency program.

The context of instruction was teaching rounds in general internal medicine at two university hospitals in Seattle (the University of Washington Medical Center and Harborview Medical Center). *Teaching rounds* is a case-oriented instructional session held predominantly in a hospital conference room with the ward team and is the teacher's primary opportunity to teach medical concepts in the context of patient care. The three ward teams each consisted of two third-year medical students, two interns, and a senior resident.

Data for the study came from two-hour interviews with the attending physicians, 30-minute interviews with each of the team members,¹⁴ observations of each team for one week,¹⁵ and audio recording and transcriptions of teaching rounds.¹⁶ The method and the results of the teachers' knowledge and reasoning have been described in more detail elsewhere.^{11,12}

While most of the six attending physicians in the larger study used all of the strategies described in this article, each of the three physicians selected for this article used his or her particular teaching method as the predominant mode of instruction. I selected teaching rounds' transcripts and interview quotes to illustrate the key features of each method and the teacher's rationale for using it. The teachers' names used here are pseudonyms and their comments have been

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edited slightly for readability.

I observed three distinctive ways of organizing teaching rounds. The first method is the classic approach of case–bedside teaching. In this format, teaching is conducted in the conference room in response to case presentations and then continued at the bedside. Dr. Baker used this case–bedside style of teaching. The second model, employed by Dr. Charles, is case–didactic teaching. This approach is designed to reduce case presentations to a minimum and to use the time for lecture presentations on topics of general interest to the team and of direct relevance to the patients being cared for on the ward. The third variation is to use a difficult case that neither the attending physician nor the team understands to engage in iterative hypothesis testing and discussion as advocated by Kassirer and Kopelman.¹⁷ This teaching method resembles a stop-action process where small amounts of information are provided sequentially as the data were originally available to the team. At each stage of the discussion, the team members think aloud about what the problem might be, what further information should be obtained, and why. Dr. Fagan used this case–iterative instructional strategy.

CASE: BEDSIDE TEACHING— DR. BAKER

Dr. Baker, a 44-year-old professor of medicine, joined the faculty 13 years ago after serving as a chief resident and completing an MPH degree. A high-energy, fast-paced academician, he has heavy administrative responsibilities and enjoys teaching. His teaching style is directive and he relies heavily on a question-and-answer method of instruction. Dr. Baker structures teaching rounds into three parts:

I spend about one-third of our time transmitting and exchanging information about specific patients . . . reviewing the history, physical exams, clinical course, and treatment. Another third of the time, I teach about management in a more didactic way. The other third of the time, I examine or talk to patients, or observe residents and students examining and talking to patients at the bedside. I

have found that if I don't explicitly make a point of doing bedside teaching it is real easy to talk about patient care but the patient gets left out.

In preparation for teaching rounds, Dr. Baker talks with the senior resident the night before to determine which cases to focus on the following day. He joins the team for the X-ray conference at 10:00 A.M. and teaching rounds at 10:30 A.M. At the beginning of teaching rounds, he clarifies his expectations for the session and enters directly into case presentations. For example, "We have a heavy load of new admits today, so let's move quickly." He starts with cases that have been previously presented and asks that they be reviewed briefly. I observed that the average length of time for a case presentation of a previously reviewed patient was less than one minute. This was typically followed by an additional one to ten minutes of discussion. New admits received a more thorough presentation (three to eight minutes) and discussion (one to 27 minutes). Typically, Dr. Baker takes the team to the bedside of every new patient so he can introduce himself, summarize the goals for the patient's stay, ask the patient if he or she has any questions for him, and state that he will return to visit the patient in the afternoon.

On one of the days when there were no new admissions, Dr. Baker devoted a large amount of time to teaching. One of the cases served as a stimulus for discussing endocrine problems. This was a case of a 50-year-old Chinese man who probably had liver cancer. At the conclusion of the student's case presentation, the student summarized the case by stating that pituitary function had been compromised by cancer, surgery, and radiation. Dr. Baker went to the blackboard and asked, "How did we start thinking about pituitary problems?" As team members responded, he put up the key issues on the blackboard, explained the concepts, and asked for lab data relevant to the discussion. Then he proceeded through a series of questions that elicited answers from the team, such as "What do these lab values and X-rays mean? What can we do for this patient? What are the out-

comes of such actions? What does the literature say? What is the underlying pathophysiology?" Neither surgery nor chemotherapy offered a cure, and the life expectancy for this patient was anticipated to be less than one year. At the end of teaching rounds, Dr. Baker handed out a practice-oriented chapter on endocrinology, and the senior resident asked him to explain the tumor to the patient.

The team went to the bedside and found the patient's 20-year-old daughter there with him. Since the patient spoke no English, the daughter translated for him. Dr. Baker described the size of the tumor, stated that it was serious, and outlined the next steps to make a definitive diagnosis. He asked the patient whether he had any questions and waited silently for long periods of time. The daughter had to look up the word tumor in the English/Chinese dictionary so that she could translate what was being said to her father. Dr. Baker assured the patient that the health care team would be there for him and his family, would do the best they could, and would do what was right. The attending physician said that he would return later to answer other questions as they arose. This was an emotional experience for everyone. During the visit, the daughter cried and the senior resident wept as well.

Outside the patient's room afterward, the attending physician discussed the need for team members to go back later in the day to reassure the patient and answer questions. The patient and his daughter needed time to themselves to process the news. He noted that sometimes patients leave the hospital at this point. The team was grateful for this demonstration of compassionate care for the patient and relieved that they did not have to convey the bad news. Later that afternoon, Dr. Baker returned to visit with the patient and with his other patients.

This was a powerful learning experience for the team. It would probably not have occurred if Dr. Baker had not routinely gone to the bedside to serve as a model of compassionate care for his patients. The team remarked favorably upon Dr. Baker's teaching

methods. In particular, they commented on his ability to demonstrate skills at the bedside, to clearly present practical and relevant teaching points in the context of specific patients on the service, to treat team members as colleagues, and to ask questions effectively.

CASE: LECTURE TEACHING— DR. CHARLES

Dr. Charles, a 33-year-old assistant professor in general internal medicine, has been on the faculty for two years. In that time he has developed a strong reputation for being one of the best teachers in the Department of Medicine. He joined the faculty after completing his residency training in primary care internal medicine and serving as chief resident at Harborview Medical Center. He directs the department's undergraduate education programs, attends in the general internal medicine clinic at the university's hospital, and frequently serves as a hospital attending physician at both the Harborview and University hospitals. Dr. Charles is an energetic, enthusiastic, caring teacher who has an encyclopedic knowledge base and an interactive teaching style. He comes to attending rounds prepared with case studies, slide shows, journal articles, and handouts on clinically relevant topics.

While his ward team begins the morning with work rounds at 8 A.M., he independently visits the team's patients, reviews their charts, and discusses their care with the nursing staff *before* teaching rounds. His rationale for independently seeing each patient in the morning is to eliminate the time-consuming and often redundant case presentations during teaching rounds that are designed to update the attending physician. His direct experience with the patients allows him to check up on what the students and interns are telling him and to ensure quality patient care. He was the only attending physician in the larger study to visit his patients in the morning. On post-call mornings when the team is seeing their newly admitted patients, Dr. Charles joins the team for work rounds, although he

leaves the resident in charge of the team.

From 9:00 to 9:30 A.M., Dr. Charles joins his team for the X-ray conference, where all of the X-rays from the past 24 hours are viewed and interpreted by a radiologist.

At 9:30 A.M., Dr. Charles takes the team's two medical students to the conference room to listen to their case presentations on new patients, go over their write-ups, discuss common clinical problems, and/or go to the bedside to confirm their physical exam findings. On one day, he listened to a student give a case presentation of a 20-year-old woman who had been admitted for a Tylenol overdose. When the laboratory values failed to fit the normal picture of an overdose case, Dr. Charles took the medical students to see the patient. While with the patient, the attending physician demonstrated how to do both a neurological examination and a pulmonary examination. As each part of the examination was conducted, he provided an explanation and guided each student through the process. When back in the conference room, Dr. Charles asked the students a series of "what if?" questions in relation to the case. He interspersed his questions with answers derived from the literature and from his own professional experience.

On another day, there were no new patients and he discussed common medical problems. Dr. Charles handed out a two-page sheet titled: "Dyspepsia/Peptic Ulcer Disease Problems." The paper contained six mini-case presentations including the following:

A 38-year-old executive presents with a three-week history of gnawing mid-epigastric pain relieved with food. The patient has also noticed relief with use of antacids. (1) How should you work this patient up? (2) Treatment? (3) Follow-up?

He asked a student to read the case and answer his questions. Each student took a turn. Typical questions included "What more information would you want?" "What would that tell you?" "How is that related to the other facts of the case?" "What is the underlying mechanism?" "What are you

thinking?" He switched back and forth from asking questions to discussing what was important and why. Each case took about ten minutes to discuss. On this particular morning, the team's intern voluntarily sat in halfway through the session and participated in the discussion. By 10:30 A.M. the rest of the team had begun to assemble and Dr. Charles brought the case discussion with the medical students to a close.

Formal teaching rounds are scheduled from 10:30 A.M. until noon daily. The standard format for Dr. Charles's teaching rounds is to spend the first ten to 30 minutes going over patient problems. The remaining time is devoted to covering a specific topic. "I try to cover topics that are important and common. I also include topics that they won't get in their day-to-day medical work-ups on the wards."

On this particular day, teaching rounds began at 10:40 A.M. because of several interruptions from phone calls and pages. Since there were only five patients left on the service and every member of the team was familiar with the current status of each case, the presentations took less than one minute each. Thus, the conversation focused on concerns raised by the team: what drugs to use with one patient, the cost-effectiveness of a particular treatment for another patient, plus safe sex and life expectancy for an AIDS patient. The discussion of each case lasted from three to 13 minutes. Dr. Charles offered practical and formal knowledge in the context of dealing with specific patients. The team appreciated his practical advice, supporting data, and handouts.

At 11:05 A.M. the team left the ward conference room and moved to a room with a slide projector. Dr. Charles distributed a ten-page outline on skin infections that included definitions, epidemiology, clinical features, and recommended diagnostic approaches along with a dozen references. The slide show graphically illustrated the skin lesions caused by the infections outlined in the paper. Some of the slides were gruesome, and occasionally some members of the team covered their eyes to avoid looking at the lesions, while others made humorous

comments. Throughout the session, Dr. Charles continuously asked questions and actively involved everyone in his 45-minute presentation. At noon the team dispersed for lunch and individual work.

In describing his approach to teaching rounds, Dr. Charles stated,

I have evolved what I do based upon what I saw done that I didn't like. The worst attending rounds were when the third-year medical students would use the time to do their presentations and be instructed on how to do a better presentation. The students didn't like that because they would not look very bright if they were being corrected all the time and there was very little learning for the team. The other problem with attending rounds is that it often becomes attending work rounds where the attending gets updated on the patients but the team already knows all about the patients. So there is little learning going on in that type of rounds.

I've moved the student session earlier where it is one-to-one and then I try to make sure that in each attending round they walk out of there with some new information. So I have changed attending rounds into an interactive didactic session. I use two forms. One is problem solving, where we go over problems and I get all three levels of learners to participate in the discussion. The other format involves presenting slides of visual things, like clinical slides of what skin lesions look like or what chest X-rays look like. I have 15 to 20 topics that I am prepared to cover. I use these based upon what I feel the team needs. I usually cover ten out of 20 topics in the course of a month. When the residents want to go over topics I'm not equipped to do, I find somebody who is.

The team's response to Dr. Charles and his organization of teaching rounds is extremely positive. His teaching style is described as enthusiastic and exuberant, Socratic, case-based (teaching general principles in the context of specific cases), and one that emphasizes caring about team members and patients. Dr. Charles's extensive knowledge base and his commitment to teaching, as evidenced by the time given to preparing talks, slides, and handouts; visiting each patient independently before rounds; and meeting with students separately, were highly praised.

CASE: ITERATIVE TEACHING— DR. FAGAN

Dr. Fagan, a 36-year-old assistant professor in the Department of Internal Medicine, joined the faculty seven years ago. Her training is in primary care internal medicine and she practices predominantly in the adult outpatient clinic at Harborview Medical Center. Teaching is her passion; she carries heavy teaching responsibilities in the first two years of the curriculum and attends regularly at Harborview. She is enthusiastic, talkative, accepting, accessible, and committed to teaching.

She typically joins the team for the X-ray conference at 9:30 A.M. and begins teaching rounds at 10:30 A.M. On post-call mornings, Dr. Fagan participates in work rounds, and on Tuesdays, when there are combined teaching rounds at noon, she works with the team's two medical students separately from 10:30 A.M. to noon.

On other days, the process of teaching rounds lasts from 10:30 A.M. until noon and is divided into two parts: a quick review of easy cases followed by an in-depth discussion of difficult cases or relevant topics. The initial time is devoted to updates and questions on easy cases. In these instances, the presentations last less than a minute and the discussions range from one to five minutes. Difficult cases are discussed for up to 80 minutes.

Dr. Fagan uses the teaching strategy of iterative hypothesis testing advocated by Kassirer and Kopelman to explore complex cases.¹⁷ In this form of case-based discussion, small bits of information are presented in the order in which they were originally available to the team, and each member of the team is asked to think aloud about what might be going on with the patient. Participants ask questions, state why they want to know that information, and describe what they learned when the data were shared. The serial questioning, justifications, and interpretations continue until all relevant information is shared or until all important diagnostic and management issues are discussed.

On one morning an intern presented

the case of a comatose 16-year-old girl with a head injury and several other problems. The patient had arrived the night before as a transfer from a nursing home specializing in head-trauma cases. Initial concern was for a presumed urinary tract infection. The case turned out to be more confusing and frustrating than initially anticipated. Neither the attending physician nor the team understood what was going on with the patient. As the intern began to present the case, Dr. Fagan interrupted:

DR. FAGAN: Let's stop there before you give any more information. This lady is very confusing to me for a number of reasons. . . . If you saw her in the emergency room, what would be your first thoughts?

MEDICAL STUDENT: Urinary tract infection.

DR. FAGAN: So she probably has a UTI, is that going to cause her LFT abnormalities and jaundice?

MEDICAL STUDENT: I'm not sure.

DR. FAGAN: . . . You can get some mild liver dysfunction in sepsis, but you don't get bilirubins of 22 and very high SGOT and SGPT. She could be mildly septic and have some elevation of her LFTs but 2,900 is very high. The second thing is that her bilirubin probably wouldn't get that high. So, how are you going to explain those?

As the discussion progressed, other hypotheses emerged: sepsis, dehydration, hepatitis, and acute tubular necrosis. As they thought through each of these concerns, additional information was shared. Dr. Fagan directed the flow of the discussion by asking questions such as "What produces high LFTs?" "What else would you like to know?" "Why do you want to know?" As team members responded, she interjected relevant information into the conversation. At various points, the intern was looking something up in a textbook and the attending physician and the other intern were using a calculator to figure out what the renal outputs should be. After ruling out several alternatives, the team came to the conclusion that acute tubular necrosis was the most probable diagnosis. As time ran out, attention shifted to establishing an action plan for the day. By the time the session ended at 12:20 P.M., the discus-

sion of this case had lasted for 80 minutes. Later that afternoon, Dr. Fagan saw each of her patients independently.

In reflecting on her teaching, Dr. Fagan indicated that her ideal for teaching rounds is "keeping everybody involved." She enjoys teaching even when she doesn't know what is going on with the case. She recalls one example in particular:

Early in my teaching we were talking about a mitral valve prolapse and what you would normally see. Two of the students, one of the interns, and I were talking through what you would expect to find pathophysiologically, thinking our way through it logically. Each student picked up a separate textbook and the intern was looking through one of the pocket manuals. In the middle of this discussion as it was coming to a crescendo, my colleague walked in to get a chart and then left. Just as we came to our decision (thinking it through pathophysiologically), the student found it in the textbook, the intern found it in another text, and both started blurting it out at the same moment. I thought that was the model of perfection because some of us were using knowledge we had—even though I acknowledged that I couldn't remember.

About two days later, my colleague cornered me in the hall and said: "I don't know how you can be an attending physician. Wasn't that embarrassing?" I said, "What are you talking about?" She said, "When I came in the resident was checking up on you in Harrison's and you were having this argument . . . I couldn't possibly be an attending. You have to know everything!" I said, "You don't have to know everything. You have to know your limits and be able to say 'I don't know.'"

The team affirms Dr. Fagan's enthusiasm, openness, and accessibility and her interactive and nonthreatening teaching style, humanistic orientation, and use of open-ended questions.

DISCUSSION

Each of the three models of teaching rounds discussed here (case–bedside, case–lecture, and case–iterative) overcomes the weaknesses attributed to this form of clinical teaching: lengthy presentations that are repeti-

tious of work rounds, failure to actively involve and address the varying needs of the team, and little learning. For example, all of these attending physicians held case presentations to a minimum so that time was available for instruction. Drs. Baker and Fagan accomplished this by selecting one or two cases per session to discuss in greater depth, while Dr. Charles used a different strategy. By seeing each patient before rounds in the morning and by meeting with students separately, Dr. Charles reduced case presentations to quick problem-solving interactions, thus saving maximum amounts of time for more formal teaching.

How do these case-based teaching strategies support experiential learning in clinical settings? Experiential learning theory would suggest that these teaching strategies should encourage learners to reflect upon and evaluate their own experiences, to develop and articulate appropriate generalizations, and to predict future effects.^{12,18–22} The three models of teaching rounds share five common instructional characteristics that facilitate experiential learning in clinical settings: anchoring instruction in cases, actively involving learners, modeling professional thinking and action, providing direction and feedback, and creating a collaborative learning environment. These five principles of experiential learning, discussed in more detail below, were derived both from the cases and from the literature.

1. Anchor Instruction in Cases

Clinical teaching involves using cases and case content to teach the wisdom of practice.²³ Building instruction around cases on the ward enables students and residents to see the direct relevance of the information to be learned, so that they more highly motivated to learn it and are more likely to remember it. This instructional method helps learners interpret, reflect upon, and generalize from their experiences with patients.^{11,12} This involves enabling learners to construct coherent representations of a case, filter out irrelevant information, and

make connections between the specifics of the case and generalizations derived from the medical literature and from experiences with other patients. Learning medicine in the context of specific cases facilitates cognitive flexibility¹⁰ and the development of illness scripts and instance scripts in the memory of the learner.^{24,25}

What makes the exemplary clinical teachers described previously so special is their ability to make three critical cognitive connections simultaneously. They are able to (1) relate learners' prior knowledge to (2) the facts of the case and to (3) general principles of medicine—all at the same time. Dr. Baker focused discussion in the conference room on a few cases, followed by demonstrations at the bedside. Dr. Charles used cases as the focal point of his lecture presentations and connected them to general principles of medicine. Dr. Fagan used the most complex cases to model medical reasoning with unknown illnesses. All of these strategies were anchored in cases. Each teacher related the facts of the case at hand to underlying constructs of the illness and to the learners' knowledge base.

2. Actively Involve Learners

All three attending physicians actively engaged the whole team in teaching rounds by asking lots of questions, by structuring problem-solving exercises, and by providing opportunities for reflection on medical practice. Through the dialogue around cases, the team created a joint understanding of the case and gained insight into the practice of medicine.

"Keeping everyone involved is my ideal," said Dr. Fagan. One way to achieve active involvement and to diagnose learners' difficulties is to ask questions. "I use a lot of questions to get some assessment of the residents' and students' knowledge base," reported Dr. Charles. Similarly, Dr. Baker stated that "the kind of teaching I like to do is Socratic, or a kind of probing question-and-answer. I ask them questions constantly." When students are operating on the frontiers of their conceptual knowledge or when

they encounter contradictions or surprises, a teacher's questions can guide the course and structure of students' thinking by focusing their thoughts on relevant issues.²⁶ Students' discourse also provides opportunities for connecting, challenging, and extending their knowledge. By articulating the structure, organization, and meaning of their knowledge, students and residents actively construct increasingly powerful conceptual structures.^{12,21,23,27-29}

3. Model Professional Thinking and Action

Modeling professional reasoning in the midst of case decision making allows learners to see how an expert clinician thinks through a case and wrestles with uncertainty. These teachers were able to articulate a few carefully selected teaching points per case and were often able to communicate those points in an inductive manner through questions and discussion. They often made explicit their own implicit or tacit knowledge and reasoning. Being reflective and articulate about one's thinking process helps novices to understand how a skilled practitioner approaches a problem.^{2,18,19,23,30}

All three teachers modeled professional thinking-in-action and helped to create conceptual structures to think through a problem. They drew upon the prior knowledge of the students and residents when such information was available. When prior knowledge was limited, they offered the needed conceptual scaffolding and context for learning. This included providing cues about the essential features of an illness, what is relevant, what should have priority, what can be ignored, and how to investigate a concern further.³¹

All three teachers demonstrated competent and compassionate care at the bedside. When a case presentation was unfocused, Dr. Charles went to the bedside. "The easiest way to determine whether it is a patient problem or a student problem is to go talk to the patient." Other attending physicians took their teams to the bedside to validate physical exam findings, to

model professional skills, and to observe interactions of team members with the patient. While each of the attending physicians went to the bedside with the team, only Dr. Baker did so each day.

4. Provide Direction and Feedback

These clinical teachers acted as coaches to their teams. They established clear expectations, observed students and residents in action, guided practice, and provided specific feedback. By observing students and residents in action, these teachers were able to identify and correct misconceptions involving medical concepts and procedures.

Each teacher established clear expectations for performance at the beginning of the rotation. As part of this process, they identified the interests of the team members and attempted to meet those interests during the month. Dr. Fagan said, "My job is to figure out what they want to know this month."

Students and residents were carefully observed and coached. As Dr. Charles said, "Teaching has forced me to be more observant. If I don't pay close attention to case presentations, I can't give constructive feedback." These faculty members provided coaching in the form of reminders, cues embedded in questions, and specific directions for improvement. This form of coaching involves offering learners conceptual scaffolding or support. Scaffolding refers to assistance provided to learners so that they can accomplish tasks that they would not be able to perform on their own.³² As learners develop knowledge and skills, scaffolding fades and learners perform without assistance.^{2,18,19,23,33}

Coaching also involves providing immediate feedback. "I think feedback is real important and label it as such because otherwise they don't know what they are getting," reported Dr. Fagan. All of these teachers provided feedback embedded in the midst of instruction. Providing direction and providing feedback are essential characteristics of effective clinical teachers in medicine.^{12,13}

5. Create a Collaborative Learning Environment

All of these attending physicians demonstrated caring concern for their patients and for their team members. Recognizing the social context of learning, they established a working climate in which questions could be asked, ideas challenged, and information freely shared. At the beginning of each rotation, these attending physicians shared their interests and strengths, and helped to establish a mutually agreed-upon learning agenda. They were also comfortable with saying "I don't know." Dr. Fagan was the best example of this model of self-disclosure and self-assessment. Since learning in clinical environments is in part a function of team cohesion, this facilitates the social bonding and learning of the whole group.^{8,27-29}

FINAL THOUGHT

As Shulman asserts, teachers can benefit from the "careful confrontation of principles with cases, of general rules with concrete documented events—a dialectic of the general with the particular."⁹ These case studies and general principles offer insights into the wisdom of teaching practice in clinical settings.

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