

Education Techniques for Lifelong Learning

Giving a PowerPoint Presentation: The Art of Communicating Effectively¹

Jannette Collins, MD, MEd

Effectiveness of an oral presentation depends on the ability of the speaker to communicate with the audience. An important part of this communication is focusing on two to five key points and emphasizing those points during the presentation. Every aspect of the presentation should be purposeful and directed at facilitating learners' achievement of the objectives. This necessitates that the speaker has carefully developed the objectives and built the presentation around attainment of the objectives. The best presentations are rehearsed, not so that the speaker memorizes exactly what he or she will say, but to facilitate the speaker's ability to interact with the audience and portray a relaxed, professional, and confident demeanor. Rehearsal also helps alleviate stage fright. The most useful method of controlling nervousness is to visualize success. When showing images, it is important to orient the audience with an adequate description, point out the relevant findings, and allow enough time for the audience to assimilate the information before moving on. This can be facilitated with appropriate use of a laser pointer, cursor, or use of builds and transitioning. A presentation should be designed to include as much audience participation as possible, no matter the size of the audience. Techniques to encourage audience participation include questioning, brainstorming, small-group activities, role-playing, case-based examples, and directed listening. It is first necessary to motivate and gain attention of the learner for learning to take place. This can be accomplished through appropriate use of humor, anecdotes, and quotations. Attention should be given to posture, body movement, eye contact, and voice when speaking, as how one appears to the audience will have an impact on their reaction to what is presented.

©RSNA, 2004

Index terms: Education • Radiology and radiologists

RadioGraphics 2004; 24:1185–1192 • **Published online** 10.1148/rg.244035179 • **Content Code:** HP

¹From the Department of Radiology, University of Wisconsin Hospital and Clinics, E3/311 Clinical Science Center, 600 Highland Ave, Madison, WI 53792-3252. Presented in the RSNA Faculty Development Workshop, September 2003. Received August 7, 2003; revision requested September 17 and received September 22; accepted September 23. **Address correspondence to** the author (e-mail: jcollin4@wisc.edu).

See also the article by Collins (pp 1177–1183) in this issue.

©RSNA, 2004

Introduction

The effectiveness of any presentation does not depend predominantly on the quality of the visual aids, but on the ability of the presenter to communicate with the audience. Although the use of visual aids can dramatically enhance the quality of a presentation, very effective presentations can be given without using visual aids. The contrary is not true. No matter how great the visual aids are, if a presenter does a poor job communicating with the audience, the presentation will suffer. A review of speaker evaluations at a national radiology meeting showed that 74 (8.6%) of 862 comments were negative and related to the delivery of the presentation (1). Thirty-one (38%) of 81 speakers received one or more negative comments related to delivery (eg, monotone voice, not loud enough, too many “ums” and “uhs,” didn’t speak well into the microphone, shaking pointer, sloppy language, and didn’t use laser pointer/cursor). This article will focus on how to communicate effectively with an audience of any size. After reading this article, it is hoped that your next presentation will be better, by virtue of my reminding you about some things that you already knew, and teaching you some things you may not have known. After reading this article, you should be able to emphasize two to five key points when giving a lecture; discuss the purposes of rehearsing a lecture; describe several ways to make a lecture interactive and entertaining; and describe appropriate posture, body movement and eye contact for effective lecturing.

Basic Rules of Good Presenting

Focus on Objectives

Follow the rule of *tell'em*. Tell'em what you are going to tell'em, tell it to them, and then tell'em what you told them. This rule means start with an introduction, including an “agenda” or set of objectives; provide the content; and summarize the presentation. People will remember no more than five key points (2). It is incumbent on the presenter to determine the appropriate key points, communicate them effectively to the audience, and get the audience to remember them. Don't leave it up to the audience to determine what the important points are. Although the audience will prioritize information based on prior knowledge and experiences, it should not be assumed that they understand the information in the intended way. They may remember minor points and miss key ideas. The job of the presenter is to ensure

that the audience will consider the same things to be important that the presenter does. One way to make this happen is to start with the last slide. Writing out the conclusion or summary first, emphasizing the most important points to be made, makes it easy to build a presentation around those points. This strategy comes back to the rule of *tell'em*.

An old adage related to effective communication is “KISS.” This term does not refer to a rock band or physical communication with the lips. It translates to “Keep It Simple Stupid” (2). The more complicated the presentation, the more opportunity for trouble. The use of new technology can create havoc with a presentation if the presenter isn't completely familiar with how it functions. The presentation should be focused on the objectives and not get sidetracked with special effects. In the best presentation, every spoken word and every word on every presented slide will be important and related to the objectives. Many speakers use PowerPoint (Microsoft, Redmond, Wash) to create their presentation and end up writing too much text on the slides. I recommend heavy editing, taking out sentences and replacing them with key words and phrases, taking out excessive clip art, and taking out most punctuation. In most cases, I wind up cutting my original presentation by as much as half to streamline my slides.

Rehearse

On occasion, it is necessary to address an audience “on the fly.” This happens when a radiologist is asked by a clinician to review a radiologic study “hot off the press,” when the radiologist “staffs” (eg, reads films) with a resident and the resident asks a question, or when a radiologist is asked to spontaneously discuss an issue at a multidisciplinary conference. However, delivering a presentation at a national meeting is not the time to “wing it.” Giving an effective presentation requires rehearsal. It's okay to occasionally leave the main “script,” but wandering presentations that lack focus, those too dependent on working from notes, or long pauses to compose thoughts detract from the quality of the presentation. Rehearsing is one thing, but committing the presentation to memory and performing it by heart is not the way to go. There is a difference between presenting and reciting.

Rehearsing allows the presenter an opportunity to gauge how long the talk will take, plan for pauses at opportune times during the presentation, and be completely familiar with the slides. The latter will allow the presenter to modify the presentation on the fly to meet the needs of the audience or to answer a question from the audi-

ence with, “I will answer your question when I discuss that point in an upcoming slide.” If a speaker allows questions from the audience during the presentation, he or she can easily jump forward or back in the slide show to use information on the slides to reinforce answers to questions. The speaker can quickly navigate among the slides by pressing the slide number followed by “enter.” When the speaker knows where key segments of the presentation are, he or she can easily move around when answering questions, rather than scrolling through the slides.

The rehearsal should include testing the equipment being used and creating a backup plan if the equipment fails. I recommend practicing a presentation out loud, saying it differently each time it is presented. Spontaneity is an infinite number of rehearsed possibilities. It can be helpful to practice with someone who has never seen the presentation. This person can provide honest feedback about colors, content, and any effects or graphics.

Few presentations are really finished and “in the can” even a couple days before the presentation is given—even with the best intentions. But getting an early start on creating a presentation allows time to find the image that will make the talk great, replace the image that wasn’t so great, add state-of-the-art content as it comes hot off the press, and think of ways to make the presentation interactive. I try to have the first draft of a presentation finished a month or two before the deadline, and I use the extra time to make it better. No matter when I start, I’m always changing the presentation at the last minute.

Reading from notes should be done sparingly. Good lecturers seldom need any notes. Too much time spent reading notes may convince the audience that the presenter is unprepared. Many people carry notes for insurance. As Winston Churchill said when he was asked why he carried notes but seldom used them, “I carry fire insurance, but I don’t expect my house to burn down” (3).

Although it is possible for a presenter to talk too slowly, I seldom encounter this as a problem in radiology lectures. I often observe radiologists talking too fast and moving through slides too fast. As a general rule, every slide deserves at least 10 seconds, and few if any rate more than 1–2 minutes. If it takes longer than 2 minutes to cover a slide, it would probably be appropriate to redo the content in two slides. This guideline is a general rule; some charts or graphics may take several minutes to properly present.

It is important to pay attention to timing. The audience will have expectations as to when the

presentation will start and end, and presenters who stray from those times risk irritating the audience. A good strategy is to plan, prepare, and practice for 75% of the allotted time. It is better to end a little early than late. Ending late reflects poor planning. If there is to be audience involvement, it is appropriate to plan on using 50% of the time for the planned presentation and 25% for interactive facilitated sessions.

The content of the slides should be predominantly for the audience and not the speaker, and the speaker should not read from the slides. By doing so, the audience quickly learns that there will be no surprises and therefore, no reason to listen to the speaker. Speakers should face the direction of the audience and not the slides. Speakers should not apologize for anything in the presentation. If a slide will be hard to read or understand, it shouldn’t be used.

The question and answer part of the presentation may be more important than the actual presentation. It is helpful to think ahead of all possible questions that might be asked. The speaker or moderator should paraphrase the questions before they are answered. When answering a question, the presenter should look at all audience members. They may have had the same question. The presenter should avoid complimenting some questions and not others and should treat all questions and questioners with respect.

Giving electronic presentations can simplify travel to the presentation site. I routinely bring only a CD-ROM, which often contains several presentations that I will give at one meeting. When possible, I run my presentation from a hard disk or CD rather than a floppy disk. The latter can slow down the presentation considerably. Many conferences require that presentations be sent electronically before the meeting. In this case, it is safe to bring a backup copy of the presentation on a media format that the meeting computer will accept (eg, CD-ROM, diskette, or zip disk). Some presenters bring their own laptop computers. In this case, it is important that the speaker know how to connect the computer to a projector and bring any necessary equipment to make the connection. More and more, meetings are not allowing speakers the option of using their own laptop for presentation. In this case, it is particularly important to make certain that the presentation, including music and video files, will display properly on any computer.

Overcoming Stage Fright

Many people, including famous executives, are fearful of presenting to large groups. Many who make a living from speaking in public suffer from stage fright, including Laurence Olivier (4). Stage fright is a negative term for excitement. No coach tells the team to be calm (3). This adrenaline can be channeled into enthusiasm. Symptoms of stage fright can be controlled by breathing from the diaphragm, positive visualization, and self-talk, and by being prepared and practiced. One technique used to combat fear of an audience is to picture the people in the front row as either naked or in their underwear. This mental image is said to have a relaxing effect. Another trick people use is to pick one or two people easily visible in the audience and “speak” to them. When using this technique, the speaker must also observe others in the audience. Some well-known medical presenters resort to taking beta-blockers to control performance-related anxiety. This method can be effective, but it represents a rather extreme option. Anecdotally, bananas are said to have much the same effect as beta-blockers and are very effective for some people (5). The most useful method of controlling nervousness is to visualize success. And if this visualization can occur during rehearsal, it can be relived during a live presentation. Nothing helps a presentation more than communicating passion and confidence. The audience will recognize those emotions, and they will add credibility to the message (2).

Presenting Visual Aids

When showing images, the speaker should orient the audience with an adequate description, point out the relevant findings, and allow enough time for the audience to assimilate the information before moving on. I have seen many speakers rush through slides, making statements that allude to findings on images, but not explaining those findings or clearly pointing them out. The presenter is generally the most informed person in the audience on the topic being presented, and it is easy for the presenter to forget that the audience is less informed. A technique that helps the audience to better see and understand abnormalities on an image is to show an example of a normal case, followed by an abnormal case, and clearly point out the differences between the two. It is a mistake to leave it up to the audience to make that connection on their own.

When pointing out findings on a slide, the presenter should consider how that is being done.

Commonly used tools are a laser pointer or mouse cursor. Both can be effective if used properly. Neither should be used as a wand, aimlessly wandering around the slides without purpose. This is highly distracting. Every movement of the pointer or cursor should be purposeful. When either is used indiscriminately, it loses its effectiveness as a tool to emphasize important points.

There are advantages to using a cursor over a laser pointer. If the cursor is enlarged, it can be more visible to the audience. Using a cursor allows the presenter to see the area of interest on the computer screen rather than just on the projected screen, and allows the presenter to face the audience throughout the presentation, making it easier to speak into the microphone. By pressing *Ctrl p* (think of “p” as short for “pen”) on the computer keyboard, the cursor will change into a pen, and notations and drawings can be made on the screen through movement of the mouse. Pressing *Ctrl a* (think of “a” as short for “arrow”) changes the pen back to a cursor, and pressing *Ctrl e* (think of “e” as short for “erase”) erases the on-screen markings. More of these handy “hot keys” in PowerPoint can be found by pressing “help” while in Slide Show. Annotating images is a way of pointing out findings without using a laser pointer or cursor. However, if there are many important findings on one image, too many annotations may be confusing. In this circumstance, it may be better to use a pointer or utilize “builds” to progressively show abnormal findings that are annotated.

Incorporating Interaction into a Presentation

Tell me and I forget. Show me and I remember. Involve me, and I understand.—Chinese proverb

Learning is a dynamic process requiring the active participation of the students (6). Educational research has shown that students who are actively involved in the learning activity will learn more than students who are passive recipients of knowledge (7–9). Other studies have demonstrated that increased attention and motivation enhance memory (10–12).

Conventional lecturing has been a means of instruction since even before printing was introduced. In the past, it was widely respected, but in recent times, lectures as a method of teaching and transmitting information have come under increasing criticism. A lecture may be considered worthwhile today only if it aims at arousing students’ curiosity, motivating them to learn, and guiding them into creative thinking, or, in short, if it accomplished more than what any book can

Table 1
Techniques to Encourage Participation during Lectures

Technique	Description
Questions	Asking or inviting questions of the audience, which can be rhetorical or allow participants to respond by a show of hands or an audience response system
Brainstorming	Inviting the audience to think creatively and share ideas with the group
“Think-pair-share” sessions	Thinking independently and then sharing ideas with a neighbor
Small group activity	Breaking the audience up into small groups, asking each group to share ideas
Demonstrating	Using visual examples (eg, a live patient), with the audience asking questions
Role playing	Asking a member of the audience to play a patient or doctor (similar to a demonstration)
Problem-solving	Asking the audience to seek clinical information on a case and justify the request
Case-based examples	Presenting history and radiologic images in sequential order, asking the audience to think about the next logical step at each sequence
Directed listening	Directing the audience to signal (eg, through a raise of hands) each time a specified word or phrase is used or image is shown
Pre- or post-testing	Presenting test questions before, during, or at the end of the presentation that the audience can answer silently, on paper, or through an audience response system

Source.—Reference 14.

(13). Critics argue that lectures are less effective than other methods when instructional goals involve the application of knowledge, the development of thinking skills, or the modification of attitudes. In addition, students are frequently seen as passive recipients of information and, as a result, not engaged in the learning process. However, when done effectively, the lecture can allow students to learn new material, explain difficult concepts, organize thinking, promote problem solving and challenge attitudes.

A presentation should be designed to include as much audience participation as possible. Audience participation should start with the introduction, which should serve to gain the attention of the audience, outline the educational objectives, and provide an outline of the content (14). First impressions are lasting, and student awareness and receptiveness are highest during the first 5 minutes of a lecture (15). Examples of ways to include audience participation are outlined in Table 1.

The climate of the lecture is important because factors that distract the audience’s attention will impair learning. Physical climate refers to the noise, temperature, and lighting. Emotional climate refers to fatigue, hunger, and anxiety experienced by the audience. Student, teacher, and setting can all influence the climate. The speaker always modifies the emotional climate either intentionally or unintentionally (14). A safe and relaxed environment facilitates learning, and the lecturer has a key role in conveying the environment by both verbal and nonverbal communica-

tion. Informal interaction with the audience, including an introduction and, if appropriate, humor, may help set a climate that is conducive to learning.

The Role of Entertainment

People will pay more to be entertained than educated.—Johnny Carson

According to the conditions of learning discussed by Gagne et al (16), it is first necessary to motivate and gain attention of the learner in order for learning to take place. When done properly, this aspect of the lecture offers a distinct advantage over written text or computerized programs. The importance of entertainment in the perceived effectiveness of a lecture was shown in a study by Naftulin et al (17). The authors hired a professional actor, whom they named Dr Myron L. Fox, to deliver a lecture to a group of highly trained educators on mathematical game theory as applied to physician education. The source material was derived from a complex but sufficiently understandable scientific article geared to lay readers. One of the authors of the article coached “Dr Fox” to present his topic and conduct his question and answer period with an excessive use of double talk, neologisms, non sequiturs, and contradictory statements. All this was interspersed with parenthetical humor and meaningless references to unrelated topics. The participants not only responded favorably to the lecture,

but several even noted that they had read Dr Fox's publications! The authors of the study concluded that the extent to which students are satisfied with teaching, and even the degree to which they feel they have learned, reflects little more than their illusions of having learned. Furthermore, the relationship between the illusion of having learned to motivation for learning supports the possibility of training actors to give legitimate lectures, or to provide the educator with a more dramatic stage presence to enhance student satisfaction with the learning process.

The right amount of humor, used judiciously, can go a long way to build rapport with the audience, help set a climate conducive to learning, and keep the audience interested and attentive. As a general rule, jokes should be told only when they relate to a point or serve to break up sections. If in doubt, rehearsing a presentation in front of real people is a way to test the "acceptability" of humor.

Appropriate quotations can also be used to keep an audience's attention and to illustrate the initial opposition people may have to new ideas and technology, emphasizing a need to keep an open mind. For example, Thomas Watson (former chairman of IBM) "didn't think computers would ever be popular." Ken Olson, founder and former president of Digital Equipment Corporation, "couldn't figure out why anyone would want a computer at home." Bill Gates thought, "640K of memory would be enough for everyone." These quotes, which are all way off the mark, provide a cautionary tale about how perceptions are not always right and would be relevant to any discussion of developing technology or application in radiology. There are numerous books of quotations and jokes, some related specifically to medicine, that speakers can consult to find material for a presentation (18,19). An abundance of quotes can also be found on the Internet (20).

Anecdotes or stories can be used to attract the audience's attention. They are most effective when they illustrate a principle to be taught, are interesting to listen to, are personal, allow the audience to relate to a situation, and are funny. A blank slide can have the same effect as a verbal pause to grab the audience's attention. When in

Slide Show, one can make a black screen appear by pressing "b" on the keyboard. When ready to start or resume the presentation, one can press "b" again to cause the slide show to reappear.

Gigliotti (21) offered suggestions for using novelty and humor to develop an effective slide presentation. The author's premise was that it will not matter how important the content of a presentation is if it is not heard due to lack of interest. For example, she suggested that a road sign reading "Gas Next Exit" would attract more interest from the audience than a slide that reads "Abdominal distention."

Van Dokkum (22) also offered suggestions for effective lecturing that included audience entertainment. He stated, "The two basic elements of a presentation are that it is both scientific and entertaining at the same time."

Posture, Body Movement, and Eye Contact

How one appears to the audience will have an impact on their reaction to what is presented. The speaker should be comfortable and controlled while presenting, or at least give the audience the impression that he or she is relaxed and in control. To achieve this impression through posture, one should stand with feet about 6–8 inches apart, parallel to each other with toes pointed straight ahead, with knees slightly flexed and weight on the balls of the feet (23). Standing in this position prevents swaying or rocking and diminishes distracting heel movements. Arms should be relaxed and hanging down at one's sides. Arms folded across the chest are seen as being defensive. The head should be held up high, with chin up. A raised chin gives the aura of being in control; chin down connotes acquiescence. When seated, one should sit up straight in the chair with spine straight, feet flat on the floor, and hands open on the table.

Gestures are a visual reinforcement of the words and ideas communicated to an audience. Hand, arm, and head movements can enhance a presentation or detract from it. One should avoid putting hands in pockets, which often results in jingling of change or keys. Clasp hands into a folded position, such as used when praying, tightens one up and "pulls in energy instead of releasing it and allowing one to reach out to the audience" (23). The most effective gestures are spontaneous. They come from what the speaker is thinking and feeling and help the audience to

relate to the speaker and what the speaker is saying. It is much more effective to watch a speaker who uses movement than to listen to someone standing behind a podium with hands clasped in front of himself or herself. When gesturing, one should use the upper quadrant of the body and make gestures up and out to the audience. Movements should be broad and flowing, not fast and jerky. The most effective gestures are natural extensions of oneself. Gestures should be varied. The same motion shouldn't be used over and over again. Repetition can be distracting. Some gestures, such as finger pointing and fist waving, are threatening. It is better to use the palms of the hands and open them up to the audience. Bigger audiences need bigger gestures (eg, a broader movement of the arm and hand as a single unit gesturing up and out toward the audience). Nodding the head and smiling can be used to emphasize what is being said.

Standing behind a podium for any length of time separates the speaker from the audience. The objective is to bring the speaker closer to the audience. Speakers who spend the entire presentation behind the podium can be perceived as aloof. Getting physically closer to the audience increases its attention and interest. It also encourages response to questions asked by the speaker. The accepted public distance zone is 12–25 feet. In smaller group situations, this can be decreased to 4–12 feet, and occasionally as close as 18 inches to 4 feet (23). When forced to stand behind a podium because of the where the microphone is placed, a speaker can use a wireless microphone and remote mouse instead.

Dress for success. Some say you can never overdress for a presentation. Everyone agrees you should never “underdress.” If in doubt, ask the host what dress is appropriate.

Effective speakers make eye contact with the audience. Seeing the audience's reactions can help a speaker's performance (eg, when sensing boredom, pick up the pace; when sensing enthusiasm, it helps pump up the speaker). To make proper eye contact, the speaker should think of the audience as sitting in a “Z” formation, and look at each person in the audience, moving in a “Z” around the room. Each person can be eyed for 3–5 seconds or as long as it takes to complete a thought. It is important to face the audience, observe them, and make eye contact with as many people in the audience as possible. In doing so,

one should observe people in the audience to see if they are attentive, what their body language says, whether they are fidgeting or checking their watches, taking notes, or taking naps. Speaker wandering can be a sign of nervousness, whereas looking down may be perceived as “trying to figure out what's next.”

It isn't easy to smile and speak at the same time, but it is important to smile during the presentation if congruent with the message being spoken. It can be very instructive for a speaker to watch his or her face while speaking, either by looking in a mirror or being videotaped. Speakers may be unaware of facial gestures they make, such as squinting, frowning, or making strange faces. A person never gets a second chance to make a first impression.

Voice

A sure way to lose an audience's attention is to speak in a soft, monotone voice. It is hard work to listen to someone who speaks this way, and many members of the audience will not make the effort. To engage the audience, a speaker should speak in a natural conversational tone. This style involves varying voice inflection and speed of talking, and occasional incorporation of pauses. The pace should be slow enough for the audience to hear and assimilate what is said. Many speakers speak too fast, and trying to keep up with the fast pace can be fatiguing for the audience. An audience can detect when a speaker is interested in the topic (and caring of the audience's interests). A speaker should use a voice that can be heard clearly by every member of the audience, even those in the back of the room. It can be instructive for a speaker to have someone sit in the back of the room and signal whether the speaker can be heard well.

A speaker needs to speak clearly. Speaking clearly is different from conversational speaking, when more “loose” language and style of speaking is tolerated. It takes work and practice to speak clearly in a way that allows an audience to easily understand a speaker. This is particularly true if one is speaking in a language that is not their primary language. In this case, it can be helpful for the speaker to rehearse in front of a representative audience.

Table 2
Skills for Effective Lecturing

Rehearse the presentation to be completely familiar with the content and organization of the slides
Vary voice inflection, speaking in a conversational tone rather than a monotone voice
Speak at an appropriate pace, not too fast, and incorporate pauses into the presentation
Use slides to emphasize key points, without reading the slides word for word
Speak with enthusiasm, showing interest in the topic and regard for the audience's interest
Speak loudly enough so that everyone, especially those in the back of the room, can hear
Speak clearly and consider rehearsing in front of a representative audience, especially if speaking in a language less familiar than one's primary language
Follow time limits
Incorporate interaction into the presentation, such as asking the audience questions (rhetorical or otherwise), directing the audience to think of or perform a specific task, using case-based examples, or using an audience response system
Use appropriate gesturing and facial expressions and avoid being a dull, immovable object
Incorporate appropriate humor or anecdotes into the presentation to engage the audience
Speak directly into the microphone, even when turning the head or moving away from the podium

Source.—Reference 1.

Summary

Public speaking is an art. Some people seem to be born with the skills and desire to be an effective public speaker. Most of us need to learn these skills and continually work on improving them. It is worth the effort to do so, in order to best communicate with the audience and effect a change in the audience's knowledge, attitudes, or practice, which is the desired outcome from medical education. Table 2 summarizes many of the points discussed in this article and can be used as a checklist by those who want to make changes in their presentation style.

References

- Collins J, Mullan BF, Holbert JM. Evaluation of speakers at a national radiology continuing medical education course. *Med Educ Online* 2002; 7:17. Available at: <http://www.med-ed-online.org>. Accessed June 23, 2003.
- Feierman A. PowerPointers: the art of communicating effectively. Available at: <http://www.powerpointers.com/showarticle.asp?articleid=64>. Accessed June 23, 2003.
- Brody M. PowerPointers: 10 little-known, rarely discussed, highly effective presentation techniques. <http://www.powerpointers.com/showarticle.asp?articleid=25>. Accessed June 23, 2003.
- Olivier L. *Confessions of an actor*. London, England: Orion, 1994.
- Hadfield-Law L. Presentation skills for nurses: how to prepare more effectively. *Br J Nurs* 2001; 10:1208–1209.
- Biggs JB. *What the student does: teaching for quality learning at university*. Buckingham, England: Open University Press, 1999.
- Butler JA. Use of teaching methods within the lecture format. *Med Teacher* 1992; 14:11–25.
- Cross PK. Teaching for learning. *Am Assoc Higher Educ Bull* 1987; 39:3–7.
- Murray HG. Effective teaching behaviors in the college classrooms. In: Smart J, ed. *Higher education: handbook of theory and research*. 7th ed. New York: Agathon, 1991; 135–172.
- Gage N, Berliner D. *Educational psychology*. Dallas, Tex: Houghton-Mifflin, 1991.
- Mannison M, Patton W, Lemon G. Interactive teaching goes to university: keeping students awake and learning alive. *Higher Educ Res Devel* 1994; 13:35–47.
- Meyer C, Jones TB. *Promoting active learning: strategies for the classroom*. San Francisco, Calif: Jossey-Boss, 1993.
- Kumar S. An innovative method to enhance interaction during lecture sessions. *Adv Physiol Educ* 2003; 27:20–25.
- McLaughlin K, Mandin H. A schematic approach to diagnosing and resolving lecturalgia. *Med Educ* 2001; 35:1135–1142.
- McLeish J. The lecture method. In: Cage NL, ed. *The psychology of teaching methods*. Chicago, Ill: University of Chicago Press, 1976.
- Gagne RM, Briggs LJ, Wager WW. *Principles of instructional design*. Orlando, Fla: Holt, Rinehart & Winston, 1988.
- Naftulin DH, Ware JE Jr, Donnelly FA. The Doctor Fox lecture: a paradigm of educational seduction. *J Med Educ* 1973; 48:630–635.
- Bosker G. *Medicine is the best laughter*. St Louis, Mo: Mosby-Year Book, 1995.
- Van Ekeren G. *Speaker's sourcebook II: quotes, stories, & anecdotes for every occasion*. Englewood Cliffs, NJ: Prentice-Hall, 1994.
- The quotations page: your source for famous quotations. Available at: <http://www.quotationspage.com>. Last accessed June 27, 2003.
- Gigliotti E. Let me entertain. . . er. . . teach you: gaining attention through the use of slide shows. *J Contin Educ Nurs* 1995; 26:31–34.
- van Dokkum W. The art of lecturing: how to become a scientific entertainer. *Int J Food Sci Nutr* 1995; 46:95–100.
- Brody M. PowerPointers: capture an audience's attention: points on posture, eye contact and more. Available at: <http://www.powerpointers.com/showarticle.asp?articleid=17>. Last accessed June 23, 2003.