Chapter 2
Teaching Large Groups

William B. Jeffries

Abstract The 1 h lecture is a standard delivery mechanism for medical knowledge. In its traditional format, it has been shown to have serious limitations for domains of learning outside of knowledge transfer and students have difficulty maintaining attention throughout the delivery period. In this chapter, I examine some of the root causes of inattention and suggest ways to enhance learner engagement. In addition the

W.B. Jeffries, Ph.D. (✉)
Office of Medical Education, University of Vermont College of Medicine,
The Courtyard at Given, N117, 89 Beaumont Ave, Burlington, VT 05405, USA
e-mail: wbjeffri@uvm.edu

K.N. Huggett and W.B. Jeffries (eds.), *An Introduction to Medical Teaching*,
DOI 10.1007/978-94-017-9066-6_2, © Springer Science+Business Media Dordrecht 2014

steps for organizing and delivering a large group session are outlined and discussed. Important steps in an effective large group presentation include development of a lecture plan, use of a delivery style that enhances enthusiasm and optimization of pacing and content density. Other factors that increase lecture effectiveness include optimal audiovisual materials and the effective use of handouts. Finally, student learning and engagement can be enhanced through the incorporation of active learning methods within the session. Any lecture can be improved through the careful use of effective teaching methods and reflective use of student feedback.

Introduction

Despite many innovations in teaching and learning methods, the 1 h lecture remains a mainstay of medical education. For many faculty, the lecture is seen as an irreplaceable way to inform students about essential aspects of important subjects. However, for some the lecture format conjures up visions of students sitting long hours in their seats, passively listening to an expert expound on an esoteric topic. A large body of educational research has cast doubt on the amount of learning that actually takes place during a traditional lecture. The data show that while this format can be an effective way to transfer knowledge to students, it is not more effective than other methods (Bligh 2000). Further, the lecture is usually not the most optimal way to teach skills or change attitudes as compared to other methods. These findings are at the root of the movement to reduce the number of hours of lecture in the medical curriculum and replace them with the more "active" learning methods that are described in later chapters.

Despite these arguments, it has been reasoned that the lecture remains an effective and valuable format in medical education (Matheson 2008). There are several compelling reasons why lectures have not disappeared from the curricula of most medical schools. First, lectures offer a great economy of faculty time since other formats (e.g., small group teaching) require a larger number of faculty per activity. Second, since this format can be as good as any other for the simple transfer of information, it still makes sense to lecture. Third, many faculty automatically think of lectures as the primary engine of the medical curriculum and really don't have much training, experience or desire to teach in other ways. Finally, students also take this view of the curriculum and often expect to receive lectures as the primary vehicle for knowledge transfer and the exclusive source of material for knowledge assessments.

The goal of this chapter is to present ways of organizing and presenting a large group presentation that goes beyond the traditional boundaries of the lecture format. Our interest is in increasing student learning; this can be accomplished by modifying the format to increase engagement and introduce active learning methods. This will result in better learning, more engaged students and hopefully, better evaluations of your teaching. In this chapter, I will cover methods for constructing and delivering a 1 h presentation. Other large group methods that require formal outside preparation by the students, such as flipping the classroom and Team-Based Learning will be covered in subsequent chapters. I will assume you have been given

the assignment of presenting a lecture for the first time in a large course. The examples will be specific to medical school, but the lessons will apply to any teaching you will be called upon to make in any large group setting.

Creating an Environment That Supports Learning

Before considering the construction of the optimal large group presentation, it is useful to think about how students learn in this environment. Schneider (1983) describe well established ideas of cognitive function that explain how students learn in the lecture hall. First, students must be attentive and determine what to pay attention to. Thus it is your job to make the lecture interesting and facilitate student focus. This includes attention to presentation style, varying the format and eliminating distracters. Next, students must organize this information into a pattern that is understandable to them. The lecturer must therefore pay particular attention to organization, context and prior knowledge of the students. In other words, the presentation must be designed to lead the students to the achievement of the objectives. Finally, students must take the information that is stored in their short-term memory and add it to their existing long-term knowledge base through a process known as **rehearsal**. This implies that the lecturer should enable rehearsal to occur by reinforcing important points, summing up and introducing learning exercises that ensure that new information is applied in context. It also means that you must avoid introducing elements that confound the learning process (e.g., changing topics too quickly, introducing too much or irrelevant information, etc.).

Developing a Large Group Presentation

Context

Before planning your large group presentation it is a good idea to consider the role of each presentation in the course. Since many medical school courses are team-taught, your presentation is likely to be interrelated to those of one or more instructors. Thus preparation should begin with a thoughtful discussion between the lecturer and course director. First, you should discuss the overall course objectives and assessment methods. Within that framework, what is your presentation supposed to accomplish? Second, you should determine the depth and scope of your area of responsibility. What do you expect the students to have learned (or to do) when the presentation is over? The answer to this question is best framed by writing out the objectives for the presentation (see below). Third, you should determine the relationship of the content assigned to you compared to that of the rest of the course. Is this topic related to other material in the course or curriculum? You should review the teaching materials presented by others on this topic to avoid gaps and

Table 2.1 Potential types of large group presentations and their purpose

Presentation of information about a subject. For example, a discussion of the etiology of heart failure
Development of critical thinking skills. For example, how to interpret epidemiological data about heart failure and apply that information to the diagnosis and treatment of a hypothetical patient
Demonstration of a procedure or clinical approach. For example, a demonstration of the use of the electrocardiogram in the diagnosis of heart ailments
Construction an academic argument. For example, influencing student attitudes regarding ethical policies of the distribution of donor hearts among transplant patients

Adapted from Newble and Cannon (2001)

redundancies of coverage. For example, if assigned a lecture on diabetes mellitus, you should consider how much carbohydrate metabolism should be included in your presentation. Fourth, you should become familiar with the instructional format of the course to ensure that your methods complement those used by others in the course. Within these boundaries, you should strive to include active learning methods to enhance student learning and maximize retention. In this vein, an appropriate question to ask is whether a lecture is the most appropriate format to use to cover the objectives. Other learning methods, found in later chapters in this book, may well prove to be the most optimal way to accomplish the course objectives. Assuming that this is not the case, planning for the lecture should continue as described below.

Purpose of the Presentation

Perhaps the most important question you can ask yourself when preparing a lecture for the first time is "what do I want my students to learn from this presentation?" Is it knowledge about a metabolic pathway? Is it how to perform a skill? It is how to critically interpret medical data? Is it to influence student attitudes about health policy? The answers to these question helps frame the objectives that you will construct to prepare the framework of the presentation. Further, they will influence how you present the material in the classroom. Table 2.1 shows some of the types of large group presentations that are classically used by medical teachers.

Development of the Content

If you are lecturing as part of a larger course, your broad goals and objectives are probably already defined. The content for your individual session is likely left up to you. It is therefore initially useful to consider the subject broadly and reflect on the topic and its many aspects without regard to the limitations imposed by the course. Depending on your own preferences, the ideas can be in the form of lists of topics, concept maps, outcome lists, taxonomies, etc. An approach I find helpful is create a list of the possible areas of instruction needed to cover a particular broad topic,

and then organize them into a logical order. For example, let's say you have been assigned to teach the pharmacology of drugs used to treat heart failure:

Heart Failure Drugs

1. Normal cardiac function
2. Etiology of heart failure
    (a) Cellular
    (b) Organismal level
3. Strategies to combat heart failure
4. Drugs used to treat heart failure (repeat for each drug/class)
    (a) Chemistry
    (b) Pharmacokinetics
    (c) Pharmacodynamics
        (i) Molecular and cellular effects
        (ii) Cardiac and hemodynamic effects
        (iii) Effects on other organs
    (d) Toxicity
    (e) Therapeutics

When organized in this way, you will quickly discover several things about your presentation:

1. Your outline overlaps other areas of the course/curriculum. Students may have already been exposed to normal cardiac function and etiology of heart failure. As stated earlier, a discussion with the other faculty in the course will help set your boundaries. However, your outline is still helpful since it helps define the prerequisite knowledge that students must have to understand your lecture. The stage is set for seamlessly integrating your presentation into the rest of the course.
2. There is too much to cover! If you did it correctly, you have created an exhaustive outline of the topic. Aside from areas outside the topic areas as discussed in #1, your outline helps you understand/define the scope of knowledge you expect to cover in the lecture. If this topic is your particular area of expertise, you will be tempted to include a plethora of the latest research findings, new hypotheses about cardiac failure, drugs on the horizon, etc. However, if your learners are first year medical students, your focus should be on covering the basics, saving the advanced material for another audience. One of the most common mistakes I see among new faculty is an overestimation of what students need to know in lecture. An advantage of developing a topic list is to help identify the essentials.
3. There is more than one way to organize the material. The organization of topics need not be too refined at this stage. Thus you should just make sure at this point that all your ideas are captured. Later, you will organize the material based on your objectives and the styles of the course.

4. The process has uncovered gaps in your own knowledge about the subject. One of the benefits of teaching is that it helps you develop your own knowledge of various subjects. Your knowledge gaps will prompt you to read more on the topic or consult a colleague to bring yourself up to date. You should also familiarize yourself with the relevant chapters from the assigned textbooks for the course. This will help you decide what information needs to be emphasized in class vs. that which is best left to the student to learn from the textbook.

At this stage you can then go back and compare your ideas with the specific objectives assigned for your course and lecture. Are the objectives appropriate? Are they achievable in the time allotted? Are they in the need of modification? You will likely conclude that the objectives need to be modified in some way. For example, if the objectives are not achievable in the time allotted, you will have to prioritize information to be presented (that which will be deferred for student reading or other out-of-class exercise, etc).

Development of the Lecture Plan

A well organized presentation improves learning and retention. What is the best way to organize a lecture? There is no best answer to this question; however, the organization should be dictated by several factors: the type of lecture (Table 2.1), the most logical sequence of information and the fostering of student attention, motivation and cognitive processing. Some common organizing principles are shown in Table 2.2.

Inductive approaches imply that a real world example is first presented and then the case specifics are used to generalize and develop the underlying theories. For example, a case could be presented in which a patient has developed some of the signs and symptoms of heart failure. This would allow a discussion of the mechanisms by which the patient developed this condition, and the principles of treatment. This would lead to a discussion of the specific drugs. **Deductive approaches** begin with a discussion of the underlying concepts (e.g., cellular physiology of the heart, hemodynamics, etc.) which lead to the discussion of specific cases. Time sequencing can be an effective approach (e.g., the development of heart failure treatment as a series of scientific breakthroughs) since the telling of stories promotes retention. Similarly, presenting a **pro vs. con** framework promotes retention because the academic argument presented promotes engagement and retention. A **familiar to unfamiliar** progression helps establish for the students the context into which the material fits.

Obviously, several of these principles may be used within the same lecture and all of them can convey information and enhance student learning. The plan will also be dictated by the type of large group session that is needed. If the purpose of the session is primarily the delivery of information or demonstration of a procedure, the objectives should be ordered in a simple outline format. If the purpose is the development of critical thinking skills or construction of an argument, then the organization and sequence has to be less defined to allow adjustments during the

Table 2.2 Ways to organize a large group presentation

Inductive approaches
Problem to solution
Clinical case to diagnosis and treatment
Phenomenon to theory
Deductive approaches
Concept to application
General discussion to specific cases
Chaining of ideas (e.g., if A and B are true, then C must also be true)
Time sequence (e.g., chronological stories)
Pro vs. Con to solution
Familiar to unfamiliar (what students know to what they don't know)

Adapted from McKeachie and Svinicki (2006, p. 63)

teaching process. In this latter case the number of objectives also must be scaled back since the development of skills and attitudes needs time for development during the class period. Most importantly, regardless of the plan used, the students must be made aware of the organizational structure of the lecture to avoid confusion and enhance their ability to process information.

Presenting a Large Group Session

Using one or more of the formats outlined in the previous section, you should present a session that is designed to promote a learning-enabled environment. This means you will enhance attention, and use strategies to enhance cognitive function.

Planning the Beginning and the End

A great way to increase attention and instill student confidence is to have a well planned beginning to your lecture. In your first lecture, it is a good idea to introduce yourself and briefly discuss your larger role in the school (e.g., "I am a neuroscientist who researches the coordination of skeletal muscle movement by the brain, which is why I was chosen to discuss Parkinson's disease"). A brief, general outline of what will be covered is often the next step. It will aid learning if the student's understand the framework of your talk in advance. It is convenient to use the learning objectives in the outline to clarify their importance. Depending on the type of lecture, the next step may be to address the gap between the student's current knowledge and that needed to understand the subject (e.g., "You all have an excellent understanding of carbohydrate metabolism. Today we will attempt to apply that knowledge to the

understanding of the etiology of Diabetes Mellitus"). Alternatively, you may use this opportunity to introduce a case or open-ended problem, which will then form the basis for the content to come. The ending of the lecture should also be well planned. Here is it often best to summarize the most salient points of the lecture. This will aid in student rehearsal and provide them with a focus for later review. Time for final questions should also be allotted. This should include time for students to approach you immediately after the lecture in case they are uncomfortable asking their question in front of the class.

Projecting Enthusiasm

Students respond to the enthusiasm of the instructor with increased attentiveness (Bligh 2000). There are many ways to project enthusiasm. The easiest is to move around the room and directly engage the audience. Conversely, the quickest way to induce classroom boredom is to use a monotone presentation and stand directly behind the podium. This is particularly true in a large lecture hall where students may not easily see your facial expressions. In this case it is important to get out from behind the podium and mingle with the audience. Make eye contact with specific students and vary your vocal expression. A technique that I use is to arrive early and scan the class photo (usually available from the course director or Office of Medical Education) to identify several students in the audience. During the lecture, you can call them by name and engage them specifically. Be careful to do this in a non-threatening manner! The judicious use of humor can also help maintain attention. If you are not comfortable with verbal witticisms, you can show a humorous cartoon. Relevant anecdotes also can enhance arousal and improve retention. Such overtures let the students see you are engaged and interested in a rapport with them. Student attention and engagement are bound to dramatically rise.

A note of caution is needed when discussing enthusiasm. Although enthusiasm does promote learning in the classroom, studies have shown that excellent engagement alone can be perceived as excellent learning by the students, irrespective of the actual value of the content (Ware and Williams 1975; Murray 1997). In these studies, a fictional "Dr. Fox" gave lectures with either a high degree of enthusiasm (movement, vocal emphasis, humor, etc.) or low enthusiasm (unexpressive, monotone delivery) and varying degrees of meaningful content. As expected, it was found that student learning was greatest in high enthusiasm/high content lectures. However, student ratings revealed that they considered a high enthusiasm teacher to be effective regardless of the level of content. Ware and Williams (1975) called this the "Dr. Fox Effect." Thus, students appreciate the entertainment value of the lecture and the instructor may come to an erroneous conclusion as to his/her effectiveness based on student feedback. One should always keep in mind that while enthusiasm is an effective tool to promote attention, challenging and meaningful content must also be introduced to produce student learning (Table 2.3).

Table 2.3 Tips for engagement

Arrive early; stay late
Move around room, delivering various points from different locations
Make eye contact with students
Call students by name
Make expressive gestures and body movements
Vary the tone of your voice
Ask questions
Use humor
Vary presentation style

Pacing and Density of Content

The speed at which material is introduced is a critical factor that influences learning. Often students are unfamiliar with material being introduced and must build their knowledge base over the course of the lecture. Studies of lecture pacing revealed that students hardly ever complain if the lecturer has a delivery that is too slow (Bligh 2000, p. 223). On the other hand, if a lecture is paced too quickly, the ability of students to build concepts is overwhelmed and learning is impaired dramatically. The pace of delivery is directly related to the amount of information to be covered. In health science education it is common to see an instructor attempt to cover 80 or 90 detailed slides in a 50 min presentation. In this case, you can expect very little long term learning to occur. The speed necessary to deliver material of this density will reduce attention, depress cognition, inhibit effective note taking and decrease learning. Thus you must limit the amount of material in your presentation and focus it on major points to be remembered. If you have been assigned too much material and too little time it will be necessary to employ additional learning methods, such as assigned reading or homework problems to accomplish the learning objectives. The important thing to remember (and stress with the course director) is that simply speeding up the presentation is not a viable option.

Attention Span vs. Lecture Length

Some authors suggest that despite an enthusiastic presentation, student attention in the lecture hall can wane dramatically after only 10–15 min (summarized in Bligh 2000 and McKeachie and Svinicki 2006). While other authors suggest that this decline in attention span varies widely (Wilson and Korn 2007), even highly motivated learners can begin to squirm in their seats and become distracted well before the lecture is over. Lecture length has another negative impact on learning: **interference**. Since there is a finite capacity to short-term memory, new material just learned can displace material learned just minutes earlier. This combination of reduced attention and interference can potentially create a gap in learning, particularly in the middle of the lecture. Fortunately there are measures you can take

to prevent this. It has been shown that varying the format can restore attention. Further, providing opportunities for rehearsal of short-term memories into long-term learning can effectively combat interference. Therefore no more than 10–15 min should pass before summing up (which aids rehearsal) and introducing an active learning exercise to promote "hard coding" of student learning experiences. Some suggested exercises are included in the next section.

Getting Feedback

Even the best lecturers can lose their audience. I have witnessed well thought-out, enthusiastic lectures that were unfortunately delivered at a level well beyond the student's learning capacity. Thus it is imperative to obtain feedback from your learners during the presentation to determine that they are actually following and comprehending your presentation. The easiest way to get this information is to ask at the end of each major point if there are any questions.

This often elicits no response, especially in the large lecture hall. This may be because everyone understands, but it may be that some students are too intimidated in the presence of their peers to admit that they don't understand something. One of the ways to approach this challenge is to create buzz groups (see next section) which can be used to identify the "muddiest point". Another newer solution is via the use of an audience response system. This system, described in Chap. 10, can elicit anonymous answers to questions posed by you during lecture. This approach serves a dual purpose. First, you can obtain real-time feedback as to whether students comprehend your lecture. Second, you are allowing rehearsal of the most important concepts during lecture, which enhances the likelihood of retention.

Handouts

Studies have shown that note-taking increases learning and retention of the material presented in large group formats. Thus it is a good idea to prepare handouts that lend themselves to note taking and reinforcement of the lessons given in class. A familiar format is a general outline that can be filled in with specifics during the lecture. Another common format is to provide an exact copy of your presentation slides in paper or electronic form to the students. This allows students to annotate your presentation in the lecture hall. Both of these formats are easily posted into online content management systems and allow students to use their computers to take detailed, typed notes on your presentation. One should beware three things when preparing handouts for use in class. First, make sure that you have not provided too much information, such as long, detailed bullet points. This discourages note taking and encourages the instructor to read them off in the lecture, reducing engagement. Second, make sure that slides that are easily seen when projected are also easily read when printed. Slides featuring detailed histology can become amorphous

Table 2.4 Effective slide presentations

Avoid dark background with white letters. This requires lower room lighting, which encourages dozing
Don't put too much information on a single slide. The number of bullet points should not exceed 4–5. The font size should be as large as possible, at least 18 pt
Ensure that figures are legible when projected
Do not put conflicting information formats on a single slide (e.g., a graph with bullet point explanation)
Bullet points should not be detailed sentences. Rather, they should be heading names that allow for expansion in class
Allow 2–3 min per slide
Allow for other educational elements to be included in the presentation. A single lecture of 50 PowerPoint slides is a sure way to lose the student's attention

smudges, graph legends can disappear and complex biochemical reactions can be undecipherable when rendered as six black and white images per page. Thus, it is worth taking the time to look over how the handout of your presentation will look before entering the lecture hall. Finally, ensure that you have secured copyright permissions for figures and materials you will include in your handouts. Once in the student's hands, these documents fall into the public domain and you are responsible for the content in them.

Audiovisual Materials

Audiovisual materials introduced in a large group presentation should complement the presentation and promote active learning. The most common presentation method in large group settings is the "slide show," in which the instructor can project text and images to illustrate the important points of the lecture. The physical slide has given way to electronic presentation formats, most commonly Microsoft PowerPoint. Some tips for an effective slide show can be found in Table 2.4. More specific guidelines for use of PowerPoint© can be found in Chap. 10.

Other audiovisual materials can include videos, demonstrations, white or black board, models, etc. The key to the use of these materials is that they are relevant, visible at a distance, and easily comprehended in the lecture hall. With regard to this latter point, I recall a colleague who developed a detailed animation of a physiological process for presentation in class, but the students who viewed it could not comprehend it's complexity in the allotted time. Audiovisual materials should help explain things, not provide barriers to understanding.

Active Learning Methods in the Lecture Hall

As stated previously, a key to increasing learning in the large group setting is involving the students with active, rather than passive methods. When introducing active learning methods into the lecture hall, you may meet some resistance. Some students

do not understand the need for active learning methods. A question you may sometimes get is "why can't you just tell us what we need to remember for the exam?" In this case you should state that the purpose of the presentation is to learn about the material IN THE CLASSROOM. Tell them that valid educational data show that sitting for an hour just listening is not the best way to learn. Thus other elements of active learning MUST be incorporated into the hour. Finally, you must ensure that your assessment questions on examinations require more than just rote memorization. If students are made aware of this, there will be great interest in active learning in the classroom. Students who initially disapproved of these techniques have regaled me years later with stories about how they still remember lecture points solidified by active learning methods. In this Section I will introduce some ideas for incorporating active learning into a large group session. The list is not exhaustive, but is intended to start you in a search for the best methods to complement your own presentation style.

Lecture Respites

The simplest way to promote student learning during a lecture is to provide a short respite from lecture. This can be done every 10–15 min to maintain student arousal. One way is to say "at this point I will stop for a **note check** I want you to review your notes and then ask me questions if needed." This simple device allows students to begin to make sense of the lecture, clarify points they don't understand, and process the information into long-term memory. You can help the process along by suggesting areas to focus on in their brief review, or present or ask a question yourself for them to go and answer from their notes. The solitary review should last only about a minute, to discourage social chatting with neighbors.

Small Group Activities

The best way to overcome the limitations of a large group is to break up the class into smaller units that can engage in other activities. **Buzz groups** are a form of peer learning that can be introduced into any large group presentation. The instructor poses a problem, and then divides the class in groups of about four students each to quickly solve it. In my lectures I simply ask the students to turn to their neighbors and discuss the problem. After a short interval (2–3 min) the instructor calls on a reporter from selected groups to present their answer. The question can be subdivided so that different groups have different parts of the question, which can promote a class-wide discussion to synthesize the best solution. Further questions can be introduced during the discussion by the instructor to promote further discussion. I sometimes create impromptu buzz groups if I feel that the class is having difficulty understanding a concept. The buzz group format is quite adaptable and

can occupy just a few minutes or an extended time as needed. A variant of the buzz group is the **"Think-Pair-Share"** or "**Pair Discussion**." Here students work on a problem or discussion question of limited complexity by themselves for 1–5 min (**think**), then form a working pair with their nearest neighbor (**pair**). The discussion time allotted is also short (about 3–5 min), and the instructor calls on a limited number of pairs to report and discuss their answer (**share**). Despite the limited discussion period, all students work on the problem with a peer and derive benefits from actively applying their new knowledge in this format. The pair discussion format can also be combined with the note check strategy described above in which students determine if they have missed anything, discuss the salient points and ensure that they both agree on what was important.

Reading or problem solving activities can also be attempted in a large group setting. There are many variations to this format, but it usually the assignment of a specific reading, viewing a video vignette or problem-solving task. Students complete the tasks individually for a defined period of time, then break into pairs or small groups for discussion and resolution of problems. Then the groups report to the large group during a general large group discussion facilitated by the instructor. There are many possible variants to this scenario.

Classroom Survey Techniques

Classroom survey techniques are methods to poll the class about their preferences on certain topics or answers to questions during the session. This can be done by eliciting a simple show of hands, by holding up numbered cards or by use of sophisticated audience response systems as described in Chap. 10. This format can create a lively and interactive environment to promote learning in a large group. The most common approach to the method is to periodically ask the students a multiple choice question and to quickly tally the answers from the class. There are tangible benefits to both the instructor and the student. The instructor receives instant feedback as to the comprehension of the class and can adjust the content and pace of the lecture accordingly. Disparate answers can also be used to generate a class discussion. For the student, attentiveness is improved and knowledge gained during the lecture is directly applied to promote long-term retention. Use of an automated audience response system can greatly facilitate this process. In addition to instant feedback, the audience response system offers the advantage of anonymous responses, integration with presentation software, individual tracking and grading of responses and immediate graphical display of the results. When using any classroom survey technique, the instructor must be prepared to alter the course of the presentation based on the level of comprehension of the students. A final use of classroom survey techniques worth discussing is for assessment. Short quizzes can be introduced at the end of lectures to reinforce learning. Conversely, quizzes can be introduced at the beginning of each lecture to assess prior knowledge or to ensure completion of the reading assignment.

Reflective Techniques

A number of techniques exist (see Angelo and Cross 1993) that call on the student to directly apply new knowledge in the class to increase comprehension and allow higher level of learning. For example, the two (or one) minute paper or "half sheet response" is an effective way for students to synthesize the knowledge gained during the large group session (McKeachie and Svinicki 2006, p. 256). Typically, the students are asked to take 2 min at the end of class to produce a short essay explaining the most salient point(s) of the lecture. Other topics that could be tasked include "Give an example of this concept' or "discuss treatment options for this disease," etc. This aids in retention and understanding of the material. The essay can be for self evaluation or the instructor can collect them for grading. A variant is where the instructor stops the class and asks them to produce a 1 or 2 min essay on an assigned topic that relates to the lecture material. A related technique is the One-Sentence Summary, where the instructor asks each student to prepare a declarative sentence that summarizes a key point. Directed Paraphrasing is another variant in which students are asked to paraphrase a specific part of a lesson in their own words. This can be done in written form or verbally after allowing a short reflective period. One final example is the student generated test question, in which students are asked to develop a "one best answer" question about a specific point in the presentation. These questions can be used in several ways: they can be graded by the instructor, answered by neighboring students, compiled into a quiz given prior to the next teaching session, posted on the class bulletin board, etc. Several other examples of effective techniques are detailed by Angelo and Cross (1993). In each case, the techniques serve to increase engagement and reinforce student learning in the classroom.

Games

Some faculty are able to introduce active learning in students by catering to their competitive nature. In the game format, quiz questions are introduced and student teams compete to answer them. Scores may be kept and nominal prizes may even be awarded to the best teams. There are many variations to this format. Small competitions can be held during the last 5 min of the session, or entire sessions can be given over to review a course section via this approach. The biggest advantage of the game approach is that it creates a fun, energy filled environment for learning. The primary disadvantages are the time it takes to conduct the sessions and the loss of focus that can occur in the game environment.

Getting Beyond Boundaries of Lecturing

At the beginning of this chapter I stated that although lectures are an educational mainstay, active learning is much more feasible in other educational formats. Recognizing this, educators are beginning to modify the large group setting to

Table 2.5 Common mistakes to avoid in large group teaching

Lack of engagement: monotone presentation from behind the podium
Information overload: too many slides, too fast paced, too many objectives
Poorly thought out beginning and ending
Simply reading bullet points off of the slides
Inadequate knowledge of context of your presentation: gaps, redundancies and conflicting information
No time for assimilation and reflection
Not knowing your learners: teaching is too elementary or beyond their comprehension
Entertaining, but not informative: beware the Dr. Fox effect!

reduce or eliminate lectures and maximize the opportunity for active learning and peer teaching. Two related formats warrant introduction and are the subjects of chapters in this book: flipping the classroom and Team-Based Learning. In both cases, students are responsible for completing assignments before coming to class to ensure a baseline knowledge acquisition. In the large group, students complete assignments or assessments that apply the knowledge, leading to higher levels of learning and better retention. A full discussion of the flipped classroom can be found in Chap. 4 and TBL is introduced in Chap. 6.

A Final Word

Developing and delivering an effective lecture can be a daunting challenge. It is important to review the feedback gained from students and peers and to continue to improve the quality and the amount of learning that takes place in your sessions. Table 2.5 summarizes some of the common pitfalls that can befall even the most experienced lecturers. Further information on diagnosing lecture problems can be found in a humorous but informative paper by McLaughlin and Mandin (2001). Chapter 16 discusses in detail how evaluation data to improve your teaching.

Hopefully this chapter has provided both a framework for engaging students actively in the large group setting and a way of avoiding common mistakes. Additional resources are provided below to provide an in-depth treatment of this topic.

References

Angelo TA, Cross KP (1993) Classroom assessment techniques: a handbook for college teachers. Jossey-Bass, San Francisco

Bligh DA (2000) What's the use of lectures? Jossey-Bass, New York

Matheson C (2008) The educational value and effectiveness of lectures. Clin Teach 5:219–221

McKeachie WJ, Svinicki M (2006) McKeachie's teaching tips. Strategies, research, and theory for college and university teachers. Houghton Mifflin, Boston

McLaughlin K, Mandin H (2001) A schematic approach to diagnosing and resolving lecturalgia. Med Educ 35:1135–1142

Murray HG (1997) Effective teaching behavior in the college classroom. In: Perry RP, Smart JC (eds) Effective teaching in higher education: research and practice. Agathon Press, New York, pp 171–204

Newble D, Cannon R (2001) A handbook for medical teachers, 4th edn. Kluwer Academic Publishers, Dordrecht

Schneider FB (1983) A practical handbook for college teachers. Little, Brown and Company, Boston

Ware JE, Williams RG (1975) The Dr. Fox effect: a study of lecturer effectiveness and ratings of instruction. J Med Educ 50:149–156

Wilson K, Korn JH (2007) Attention during lectures: beyond ten minutes. Teach Psychol 34(2):85–89