Want your students to get more out of their studies? Need to brush up on the current research on teaching? This book knows what you need to know about your teaching and your students . . .

MᴄKEACHIE'S TEACHING TIPS

Strategies, Research, and Theory for College and University Teachers

TENTH EDITION

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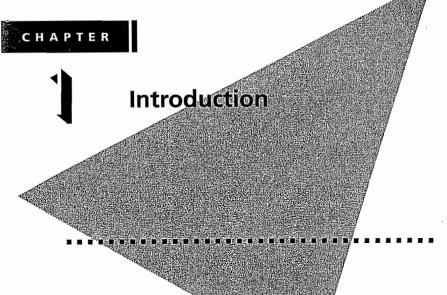**Diana Laurillard,** The Open University

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1 Introduction

The first few months and years of teaching are all-important. Experiences during this period can blight a promising teaching career or start one on a path of continued growth and development.

Most of us go into our first classes as teachers with a good deal of fear and trembling. We don't want to appear to be fools; so we have prepared well, but we dread the embarrassment of not being able to answer students' questions. We want to be liked and respected by our students; yet we know that we have to achieve liking and respect in a new role which carries expectations, such as evaluation, that make our relationship with students edgy and uneasy. We want to get through the first class with éclat, but we don't know how much material we can cover in a class period.

In most cases anxiety passes as one finds that students do respond positively, that one does have some expertise in the subject, and that class periods can be exciting. But for some teachers the first days are not happy experiences. Classes get off on the wrong foot. Sullen hostility sets in. The teacher asserts authority and the students resist. The teacher knows that things are not going well but doesn't know what to do about it.

One likely response of the teacher is retreat—retreat to reading lectures with as little eye contact with students as possible, retreat to threats of low grades as a motivating device, retreat to research and other aspects of the professional role.

What makes the difference in these first few days?

It's probably not the subject matter. More often than not, the key to a good start is not the choice of interesting content (important as that may be) but rather the ability to manage the activities of the class effectively. Simple teaching techniques get the students involved so that they can get to work and learn.

The new teacher who has techniques for breaking the ice, for encouraging class participation, and for getting the course organized is more likely to get off to a good start. Once you find that teaching can be fun, you enjoy devoting time to it, you will think about it, and you will develop into a competent teacher.

When you are just starting, discussions of philosophy of education and theories of learning and teaching can be helpful, but they are probably not as important as learning enough techniques and simple skills to get through the first few weeks without great stress and with some satisfaction. Once some comfort has been achieved, you can think more deeply about the larger issues.

THE COLLEGE OR UNIVERSITY CULTURE

A course cannot be divorced from the total college or university culture.

First of all, the institution makes certain requirements of instructors. In most you must submit grades for the students' work. You probably must give a final course examination. A classroom is assigned for the class, and the class meets in this assigned place. The class meets at certain regularly scheduled periods.

There are, in addition, areas not covered by the formal rules of the college, in which instructors must tread lightly. For example, in most college cultures instructors who become intimately involved with their students are overstepping the bounds of propriety. Certain limits on class discussion of religion, sex, or

politics may exist. Instructors must learn not only to operate within the fences of college regulations but also to skirt the pitfalls of the college mores.

But instructors who consider only college mores in plans for their courses are ignoring a far more important limitation on teaching, for the college or university culture has not only placed limitations on instructors but also pretty much hobbled the students. To stay in college, students must show evidence of achievement. Admission to good careers depends on evidence of outstanding achievement.

In many institutions, students have had experience in previous classes with instructors who, in a more or less fatherly way, gave information and rewarded those students who could best give it back. Not only has the role of the teacher been similar in these classes, but teaching procedures were probably much the same. Depending on the college or university, the method used may have been lecture, question and answer, discussion, or something else. The sort of tests, frequency of tests, and methods of grading also have conformed closely to certain norms. As a result, instructors who attempt to revolutionize teaching with new methods or techniques may find that they are only frustrating the needs and expectations their students have developed in the culture of the college. So, if you are trying something new, be sure that students understand why the new method is likely to be valuable.

Each reader will need to adapt my suggestions to the college culture of which he or she is a part. When you begin a new teaching position, talk to other faculty members about how they teach and perceive others as teaching. Ask for examples of syllabi, tests, and other course materials.

RESEARCH VERSUS TEACHING?

One aspect of the local culture critical for new teachers is the definition of the proper role of a faculty member. In many universities, for example, formal definitions of the criteria for promotion give research and teaching equal weight, but it is not uncommon to find that research is "more equal."

Studies demonstrated that research and teaching are not necessarily in conflict. Many faculty members are excellent researchers and excellent teachers as well. Some excellent researchers are poor teachers; some excellent teachers do not publish research.

Teaching as Scholarship

In 1990, Ernest Boyer's book *Scholarship Reconsidered* stimulated discussion throughout higher education about the nature of scholarship. In most American universities scholarship has been evaluated in terms of published research. Boyer suggested that teachers who keep up with current developments, who devise better ways to help students learn, or who do research on methods of teaching are also scholars. As a result of the debates about Boyer's proposal, there is increasing acceptance of the idea that good teaching involves much scholarly activity.

Find out what the local norms are, and if you feel a conflict, choose the balance that suits your own talents and interests with an informed awareness of the likelihood of support for that self-definition. Although time is not infinitely elastic, most faculty members find that a 50- to 60-hour work week is satisfying because they enjoy both teaching and research.

Whatever your choice, it is likely that teaching will be a part of your role. *Teaching skillfully may be less time consuming than teaching badly.* Teaching well is more fun than teaching poorly. Moreover, you will be better able to focus on your research if you are not worrying about teaching. Thus some investment of time and attention to developing skill in teaching is likely to have substantial payoff in self-satisfaction and effectiveness in your career.

A FEW WORDS ABOUT THE ORGANIZATION OF *TEACHING TIPS*

As the Table of Contents and Preface indicate, *Teaching Tips* begins with the practical information needed to prepare for and teach your first course. Part II provides suggestions about questioning,

lecturing, leading discussions, testing, and the basic skills needed in most courses. Part III deals with a broader array of skills, strategies, and methods. Parts I through III all are directed to ways of facilitating learning. By developing a repertoire of skills and strategies, you should be better able to reach all sorts of learners. Part IV focuses specifically on learners and how to deal with differences among them. Part V shifts the focus to you, the teacher, and your development. Finally, in Part VI we come to a more explicit consideration of the goals that have implicitly guided our activities from the beginning.

IN CONCLUSION

Because the suggestions I make are based on my own philosophy of teaching, you should be forewarned of six of my biases or hypotheses.

1. What is important is learning, not teaching. Teaching effectiveness depends not on what the teacher does, but rather on what the student does. Teaching involves listening as much as talking. It's important that both teacher and students are actively thinking, but most important is what goes on in the students' minds. Those minds are not blank slates. They hold expectations, experiences, and conceptions that will shape their interpretation of the knowledge you present. Your task is to help them develop mental representations of your subject matter that will provide a basis for further learning, thinking, and use.

2. Instructors can occasionally be wrong. If they are wrong too often, they should not be teaching. If they are never wrong, they belong in heaven, not a college classroom.

3. Classes are unpredictable. This can be frustrating, but it also makes teaching continually fascinating. Don't be discouraged if some students don't appreciate your teaching. You can interest all of your students some of the time; you can interest some of your students all of the time; but you can't interest all of your students all of the time.

4. There are many important goals of college and university teaching. Not the least of these is that of increasing the student's motivation and ability to *continue* learning after leaving college.

5. Most student learning occurs outside the classroom. This is a both humbling and reassuring thought for the beginning teacher. It means that the students' education will neither succeed nor fail simply because of what you do or don't do in the classroom. At the same time it reminds one to direct attention to stimulating and guiding student learning outside class even more than to preparing to give a dazzling classroom performance.

6. One key to improvement is reflection—thinking about what you want to accomplish, and what you and the students need to do to achieve these goals. What is contained in this book will not make you a Great Teacher. It may be that Great Teachers are born and not made, but anyone with ability enough to get a job as a college teacher can be a *good* teacher. This book will give you some tips for avoiding common problems and some concepts to think with, but eventually it comes down to you, your personality, and your values. My hope is that this book will help you feel enough at ease that you can reveal the best that is in you.

Supplementary Reading

When the first edition of *Teaching Tips* was published, it was almost the only book offering guidance to college teachers. Now there are a great many, as well as journals and newsletters published in the United States and other countries. Almost every discipline has a journal concerned with teaching that discipline. Check out the holdings of your institution's library. If your institution has a faculty/instructional developmental center, it will have lots of material and a helpful staff.

I am reluctant to list only a few of the many good books on college teaching because I see them all as meeting a need and complementing one another as well as *Teaching Tips*. I will limit myself to seven.

S. D. Brookfield, *The Skillful Teacher* (San Francisco: Jossey-Bass, 1995).

B. G. Davis, *Tools for Teaching* (San Francisco: Jossey-Bass, 1993).

B. L. Erickson and D. W. Strommer, *Teaching College Freshmen* (San Francisco: Jossey-Bass, 1991).

A. E. Grasha, *Teaching with Style* (Pittsburgh, PA: Alliance Publishers, 1996).

F. Marton, D. Hounsell, and N. Entwistle, *The Experience of Learning: Implications for Teaching and Studying in Higher Education*, 2nd ed. (Edinburgh: Scottish Academic Press, 1997).

P. Ramsden, *Learning to Teach in Higher Education* (London: Routledge, 1992).

And especially for science faculty members: Committee on Undergraduate Science Education, *Science Teaching Reconsidered: A Handbook* (Washington, DC: National Academy Press, 1997).

Many university faculty development centers publish newsletters for their own faculties. In addition there are two national publications on college teaching: *The National Teaching and Learning Forum* and *The Teaching Professor*. Both have helpful articles.

Countdown for Course Preparation

For teachers, courses do not start on the first day of classes. Rather, a course begins well before you meet your students.

TIME: THREE MONTHS BEFORE THE FIRST CLASS*

Write Objectives, Goals, or Outcomes

The first step in preparing for a course is working out course objectives, because the choice of text, the selection of the type and order of assignments, the choice of teaching techniques, and all the decisions involved in course planning should derive from your objectives. At this point your list of goals or objectives should be taken only as a rough reminder to be revised as you develop other aspects of the course plan and to be further revised in interaction with students. Writing out your goals helps clarify your thinking.

Some of you have heard of behavioral or performance objectives and may wish to phrase your objectives in behavioral terms.

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* I have borrowed the idea of three months, two months, and so on from P. G. Zimbardo and J. W. Newton, *Instructor's Resource Book to Accompany Psychology and Life* (Glenview, IL: Scott, Foresman, 1975).

CHAPTER

4 Meeting a Class for the First Time

The first class meeting, like any other situation in which you are meeting a group of strangers who will affect your well-being, is at the same time exciting and anxiety-producing for both students and teacher. Some teachers handle their anxiety by postponing it, simply handing out the syllabus and leaving. This does not convey the idea that class time is valuable, nor does it capitalize on the fact that first-day excitement can be constructive. If you have prepared as suggested in Chapter 2, you're in good shape; the students will be pleased that the instruction is under control, and focusing on meeting the students' concerns cannot only help you quell your own anxiety but also make the first class interesting and challenging.

Other things being equal, anxiety is less disruptive in situations where stimulus events are clear and unambiguous. When the students know what to expect they can direct their energy more productively. An important function of the first day's meeting in any class is to provide this structure; that is, to present the classroom situation clearly, so that the students will know from the date of this meeting what you are like and what you expect. They come to the first class wanting to know what the course is all about and what kind of person the teacher is. To this end, the following concrete suggestions are offered.

One point to keep in mind both the first day and throughout the term is that yours is not the students' only class. They come to you from classes in chemistry, music, English, or physical education, or rushing from their dormitory beds or from parking lots. The first few minutes need to help this varied group shift their thoughts and feelings to you and your subject.

You can ease them into the course gradually, or you can grab their attention with something dramatically different, but in either case you need to think consciously about how you set the stage to facilitate achieving the course objectives. Even before the class period begins you can communicate nonverbally with such actions as arranging the seats in a circle, putting your name on the board, and chatting with early arrivals about what class they have come from or anything else that would indicate your interest in them. While students are coming in, suggest that they spend the time before class starts by getting acquainted with the students sitting near them.

BREAKING THE ICE

You will probably want to use the first period for getting acquainted and establishing goals. You might begin by informally asking first-year students to raise their hands, then sophomores, juniors, seniors, or out-of-staters. This gives you some idea of the composition of the class and gets students started participating.

In my relatively large lecture classes I have then asked the students to take a minute or two to write down words and phrases that describe their feelings on the first day of class. I then ask them, "What have you written?" and list their responses on the blackboard.

Next I ask them, "How do you think your teacher feels on the first day of class?" This takes them aback, but they begin writing. We now list these responses in a second column, and they see some parallels. I comment briefly on my own feelings. (I remember with special affection the senior who came up to me after class and said, "I've been at this university almost four years, and this is the first time it ever occurred to me that professors have feelings.")

In a small class you might then ask all class members (including yourself) to introduce themselves, tell where they're from, mention their field of concentration, and answer any questions the group has. Or you can ask each student to get acquainted with the persons sitting on each side and then go around the class with the persons sitting on each side and then go around the class with each student introducing the next or each repeating the names of all those who have been introduced—a good device for developing rapport and for helping you learn the names, too. A more demanding, but surprisingly effective device is to have each person introduce everyone who was introduced before, ending with the teacher repeating everyone's names. (Try it! You'll be surprised at how well you do.)

Learning names is a start, but students are probably even more interested in you than in their classmates; so give them a chance to ask questions of you. Sometimes I have asked for one or two students to act as interviewers for the class, asking questions they think the other students would like to ask.

Even if you remembered all of the students' names in the "Name Game," you may not recall them later; so it is helpful to supplement the memory in your head with an external memory. I pass out file cards and ask students to write their names, phone numbers, e-mail addresses, and other information on the card. The "other information" might include previous experience relevant to the course, interests, distinctive characteristics that will help me remember them, possible major field, and so on.

Having established some freedom of communication, you can then go on to assess student expectations and goals, and let them know what yours are. One technique for doing this is problem posting.

PROBLEM POSTING*

The technique of posting problems is not only a useful first-day icebreaker, but also of value whenever your goal is to stimulate

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* This technique is one I learned from Norman R. F. Maier and is described in his book *Problem-Solving Discussions and Conferences: Leadership Methods and Skills* (New York: McGraw-Hill, 1963). It is useful in either small or large classes.

interest and assist students in communicating their problems to one another. This may be the case not only at the beginning of the course, but also after a lecture or other classroom method has aroused anxiety or defensiveness. The technique may also be useful to you when you wish to avoid answering questions immediately yourself. This might be because you don't wish to establish an atmosphere in which you dominate, because you wish to lay more groundwork, or because you don't wish to reinforce or to engage in a colloquy with a particular questioner whose concerns are not likely to contribute to the goals of the class as a whole.

Do these potentialities intrigue you? All you need do is to say something like, "Let's see if we can get all the questions out so that we can see what they are and how to handle them."

For this first class meeting, you might say, "Let's see what problems you'd like to tackle during the course. What sorts of concerns do you think we might deal with?" or "What kinds of things have you heard about this course?" "What are your goals?"

Your task then becomes that of understanding and recording student responses on the chalkboard or overhead. This means that you must be ready to accept all contributions whether or not you yourself feel they are important. To test your understanding of the problem it may be useful to restate the problem in different words. Restatement may also be useful in removing emotional loading or in bringing out implicit feelings. When you feel that a question is ambiguous or too general, it is helpful to ask for an illustration or to ask other group members to help you understand.

If possible, the posting should not be ended before there has been a good pause, since some of the most deeply felt problems will not come out until the students have seen that the teacher is really accepting and noncritical. This is a point at which sensitivity is particularly important, for one can often see the visible signs of conflict about whether or not to raise an emotion-laden problem.

It is important in problem posting to maintain an accepting, nonevaluative atmosphere. Thus, if other members of the group argue that someone's contribution is not really a problem or that the real problem is different from that stated, the teacher needs to make it clear that, even though not everyone agrees about a given problem, anything that is a problem for any member of the group

is entitled to be listed. Disagreement should be used to get additional problems out rather than to persuade a group member to withdraw a contribution.

Inevitably some discussion will come out about solutions. Although this should not be abruptly censored, if it becomes involved or lengthy the teacher may point out that the task of dealing with the problems comes later.

By the end of the problem posting the class normally has become better acquainted, has become used to active participation, has taken the first step toward developing an attitude of attempting to understand rather than competing with one another, has reduced the attitude that everything must come from the teacher, has learned that the teacher can listen as well as talk (and is not going to reject ideas different from his or her own), and, I hope, has begun to feel some responsibility for solving its own problems rather than waiting for them to be answered by the instructor.

INTRODUCING THE SYLLABUS

Your syllabus will provide some of the answers to the concerns raised in the problem posting. In presenting the syllabus outline and mechanics you give the students some notion of the kind of person you are. In a sense, the syllabus is a contract between you and your students. But a contract cannot be one-sided. Thus it is important to give students time to read and discuss it. Give them a chance to make inputs and to be sure that they understand what you expect. Help the students understand the reasons for the plan you have presented, but if they have good reasons for changes, accept them. The students are, of course, interested in course requirements, but they are at least as much interested in what kind of person you are. One important issue is fairness.

Promoting the notion that you are objective or fair can best be handled in connection with marks and the assignment of grades (see Chapters 7 and 9). A large part of the students' motivation in the classroom situation is (perhaps unfortunately) directed toward the grades they hope to get from the course. The very least that students can expect of you is that their marks will be arrived at on some impartial basis. Thus give some time to discussing this section of your syllabus.

The simplest way to show students that you are objective and fair is to let them know that you are willing to meet and advise them. Indicate your office hours. In addition, students appreciate it if you are willing (and have the time) to spend a few minutes in the classroom after each class, answering specific questions. Such queries most often concern questions of fact which can be answered briefly and would hardly warrant a trip to your office at a later time. If time permits, adjournment to a convenient snack bar or lounge may give students with special interests a chance to pursue them and get to know you better. If you teach an evening class, schedule some evening time to see students.

The first class is not the time to make sure students understand your inadequacies and limitations. Frankly admitting that you don't know something is fine after the course is under way, but apologies in advance for lack of experience or expertise simply increase student insecurity.

INTRODUCING THE TEXTBOOK

To continue with the discussion of the first meeting of the class, we turn now to the presentation of the textbook. Explain the features that led you to choose it. Describe how students can learn from it most effectively. In case disagreement between the teacher and the text is inevitable, the students have a right to know what they are supposed to do about such discrepancies on examinations. By facing the situation squarely, you cannot only escape from the horns of this dilemma but also turn it to your advantage. Explain that rival interpretations stand or fall on the basis of pertinent evidence and plan to give your reasons for disagreeing with the textbook. This procedure will accomplish two things: (1) it will give the student the notion that your opinions are based on evidence, and (2) it will frequently point out current problems in theory which often have great appeal for the serious student.

ASSESSING PRIOR KNOWLEDGE

The most important characteristic determining student learning is prior knowledge. Thus you need to get some sense of the diversity of your class's background. You might simply ask questions like, "How many have had more than X previous courses in this subject?" or you might give a short, noncredit test of relevant knowledge sometime during the first few class sessions. For students who lack sufficient background, you might advise that they transfer to the needed courses, or if this isn't feasible, you can at least suggest materials for their own self-study which would help them keep up with the other students. For those with very high scores, you might suggest that they skip your course and go on to a more advanced course, or at least suggest supplementary materials that would be enriching and challenging.

QUESTIONS

Even in a large lecture it seems wise to interrupt these first descriptions of the course for student questions. Some of the questions will be designed as much to test you as to get information. Often the underlying questions are such:

- "Are you rigid?"
- "Will you really try to help students?"
- "Are you easily rattled?"
- "Are you a person as well as a teacher?"
- "Can you handle criticism?"

Ask students to take two minutes at the end of class to write their reactions to the first day (anonymously). This accomplishes two things: (1) it indicates your interest in learning from them and starts building a learning climate in which they are responsible for thinking about their learning and influencing your teaching; and (2) it gives you feedback, often revealing doubts or questions students were afraid to verbalize orally.

WHAT ABOUT SUBJECT MATTER?

Many instructors simply pass out the syllabus, mention the assignment for the next class, and dismiss class early on the first day. As the preceding sections indicate, I think the first day is important even though the students have had no prepared assignment. I like to give at least some time to subject matter. Typically I give at least a brief overview of the course, indicate some of the questions we'll try to answer, and perhaps introduce a few key concepts. Either on the first day or during the second class period, I ask students to fill in concepts on a concept map (a diagram of key concepts and their relationships).

But there is a limit to what you can do. The balance between content and other activities is one that different teachers will decide in different ways. My only admonition is to use the time. The first day is important, and by using it fully you communicate that you take class periods seriously.

IN CONCLUSION

By the end of the first day, students will have

1. A sense of where they're going and how they'll get there.
2. A feeling that the other members of the class are not strangers, that you and they are forming a group in which it's safe to participate.
3. An awareness that you care about their learning.
4. An expectation that the class will be both valuable and fun.

Supplementary Reading

The first day of class: Advice and ideas, *The Teaching Professor*, August/September 1989, 3 (7), 1–2.

Barbara Gross Davis, *Tools for Teaching* (San Francisco: Jossey-Bass, 1993), Ch. 3.

5

Facilitating Discussion: Posing Problems, Listening, Questioning

Active learning is the buzz word (or phrase) in contemporary higher education. The prototypic teaching method for active learning is discussion. Discussion methods are among the most valuable tools in the teacher's repertoire. Often teachers in large classes feel that they must lecture because discussion is impossible. In fact, discussion techniques can be used in classes of all sizes. Generally, smaller classes *are* more effective, but large classes should not be allowed to inhibit the teacher's ability to stimulate active learning—learning experiences in which the students are *thinking* about the subject matter.

Discussion techniques seem particularly appropriate when the instructor wants to do the following:

1. Help students learn to think in terms of the subject matter by giving them practice in thinking.

2. Help students learn to evaluate the logic of and evidence for their own and others' positions.

3. Give students opportunities to formulate applications of principles.

4. Help students become aware of and formulate problems using information gained from readings or lectures.

5. Develop motivation for further learning.

6. Get prompt feedback on student understanding or misunderstanding.

Why should discussion be the method of choice for achieving such objectives? The first justification is a very simple extrapolation of the old adage "Practice makes perfect." If instructors expect students to learn how to integrate, apply, and think, it seems reasonable that students should have an opportunity to practice these skills. Most importantly, learning should be facilitated if this practice is accompanied by feedback so that the students can identify their errors and successes.

Learning is most effective if there is sufficient guidance to ensure some successes. Research reveals that guidance is most helpful in the early stages of learning, suggesting that the instructor should play a more directive role at the beginning of a course than at its end.

A LITTLE BIT OF THEORY

Research in cognitive psychology has found that memory is affected by how deeply we process new knowledge (see Chapter 26). Simply listening to or repeating something is likely to store it in such a way that we have difficulty finding it when we want to remember it. If we elaborate our learning by thinking about its relationship to other things we know or by talking about it—explaining, summarizing, or questioning—we are more likely to remember it when we need to use it later.

Because many students are accustomed to listening passively to lectures, in introducing discussion you need to explain why and how discussion will help them construct knowledge they can find and apply when needed.

PROBLEMS IN TEACHING BY DISCUSSION

In discussion groups the instructor is faced with several problems:

1. Getting participation in the discussion.
2. Making progress (or making the student aware of the progress) toward course objectives.
3. Handling emotional reactions of students.

The type of discussion method used will determine the extent to which particular roles are dominant. Student-centered discussions tend to be more effective than teacher-centered methods, but first I will describe a middle-of-the-road discussion method particularly useful in a problem-solving discussion. For such a discussion to work, students must have a sense that a problem exists and that it would be interesting to try to work on that problem.

DEVELOPMENTAL DISCUSSION

The term _developmental discussion_ was coined by Professor Norman R. F. Maier (1952) to describe a problem-solving discussion technique in which the teacher breaks problems into parts so that all group members are working on the same part of the problem at the same time. One of the reasons discussion often seems ineffective and disorganized is that different members of the group are working on different aspects of the problem and are thus often frustrated by what they perceive as irrelevant comments by other students.

Stages of Developmental Discussion

In developmental discussion the teacher tries to keep the students aware of the stage of discussion that is the current focus. Typical stages might be

1. Formulating the problem.
2. Suggesting hypotheses.
3. Getting relevant data.
4. Evaluating alternative solutions.

Often an appropriate problem for discussion is the application or implications of principles or findings presented in the assignment or lecture. When starting a discussion with a question

or problem, take time after stating the problem to write it on the chalkboard or overhead. This gives students time to think, and it decreases the possibility that the discussion will wander away from the topic. You might ask the students to use the time in listing concepts that seem relevant.

Breaking a Problem into Subproblems

One of Maier's important contributions to effective group problem solving, as well as to teaching, is to point out that groups are likely to be more effective if they tackle one aspect of a problem at a time rather than skipping from formulation of the problem, to solutions, to evidence, to "what-have-you," as different members of the group toss in their own ideas. In developmental discussion the group tackles one thing at a time.

One of the first tasks is likely to be a _clarification of the problem._ Often groups are ineffective because different participants have different ideas of what the problem is, and group members may feel frustrated at the end of the discussion because "the group never got to the real problem."

A second task is likely to be: What do we know? or _What data are relevant?_

A third task may be: _What are the characteristics of an acceptable solution?_—for example: What is needed?

A fourth step could be: _What are possible solutions?_ and a fifth step may be to _evaluate these solutions_ against the criteria for a solution determined in the previous step.

The developmental discussion technique can be used even in large groups, since there are a limited number of points to be made at each step regardless of the number of participants. Maier and Maier (1957) have shown that developmental discussion techniques improve the quality of decisions compared with freer, more nondirective discussion methods.

SKILLS IN LEADING DISCUSSION

In a developmental discussion the teacher attempts to guide a discussion along a certain line, but not to push it beyond the group's interest and acceptance. Obviously this requires skill in

initiating discussion, getting student participation, appraising group progress, asking questions, and overcoming resistance.

Starting Discussion

After a class has been meeting and discussing problems successfully, there is little problem in initiating discussion, for it will develop almost spontaneously from problems encountered in reading, from experiences, or from unresolved problems from the previous meeting. But during the first meetings of new groups, the instructor may need to assume the initiative in beginning the discussion.

Starting Discussion with a Common Experience   One of the best ways of starting a discussion is to provide a concrete, common experience through presentation of a demonstration, film, role play, short skit, or brief reading. Following such a presentation it's easy to ask, "Why did ——————?"

Such an opening has a number of advantages. Because everyone in the group has seen it, everyone knows something about the topic under discussion. In addition, by focusing the discussion on the presentation, the instructor takes some of the pressure off anxious or threatened students who are afraid to reveal their own opinions or feelings.

However, you will not always be able to find the presentation you need to introduce each discussion, and you may be forced to turn to other techniques of initiating discussion. One such technique is problem posting, which was discussed in Chapter 4.

Starting Discussion with a Controversy   A second technique of stimulating discussion is through disagreement. Experimental evidence is accumulating to indicate that a certain degree of surprise or uncertainty arouses curiosity, a basic motive for learning (Berlyne, 1960). Some teachers effectively play the role of devil's advocate; others are effective in pointing out differences in point of view.

I have some concerns about the devil's advocate role. I believe that it can be an effective device in getting students to think actively rather than accept passively the instructor's every

sentence as "Truth." Yet it has its risks, the most important of which is that it may create lack of trust in the instructor. Of course, instructors want students to challenge their ideas, but few want their students to feel they are untrustworthy, lying about their own beliefs.

Two other dangers lurk in the devil's advocate role. One is that it will be perceived as manipulative. Students may feel (with justification) that the instructor "is just playing games with us—trying to show how smart he is and how easily he can fool us." It can also be seen as a screen to prevent students from ever successfully challenging the instructor.

Not only are all of these possible problems infuriating for the student, but they maintain a superior-subordinate relationship antithetical to the sort of learning environment that this book is plugging for.

Yet the devil's advocate role can be effective. Its success depends a good deal on the spirit with which it is played. My own compromise solution is to make it clear when I'm taking such a role by saying, "Suppose I take the position that ——————" or "Let me play the role of devil's advocate for a bit."

In any case the instructor should realize that disagreement is not a sign of failure but may be used constructively. When rigid dogmatism interferes with constructive problem solving following a disagreement, the instructor may ask the disagreeing students to switch sides and argue the opposing point of view. Such a technique seems to be effective in developing awareness of the strengths of other positions.

As Maier has shown in his studies of group leadership, one barrier to effective problem solving is presenting an issue in such a way that participants take sides arguing the apparent solution rather than attempting to solve the problem by considering data and devising alternative solutions. Maier suggests the following principles for group problem solving*:

1. Success in problem solving requires that effort be directed toward overcoming surmountable obstacles.

* N. R. F. Maier, *Problem-Solving Discussions and Conferences* (New York: McGraw-Hill, 1963).

2. Available facts should be used even when they are inadequate.

3. The starting point of the problem is richest in solution possibilities.

4. Problem-mindedness should be increased while solution-mindedness should be delayed.

5. The "idea-getting" process should be separated from the "idea evaluation" process because the latter inhibits the former.

Questioning

The most common discussion opener is the question, and the most common error in questioning is not allowing students time enough to think. You should not expect an immediate response to every question. If your question is intended to stimulate thinking, give the students time to think. Five seconds of silence may seem an eternity, but a pause for 5–30 seconds will result in better discussion. In some cases you may plan for such a thoughtful silence by asking the students to think about the question for a few seconds and then write down one element that might help answer the question. Such a technique increases the chance that the shyer or slower students will participate, since they now know what they want to say when the discussion begins. In fact, you may even draw one in by saying, "You were writing vigorously, Ronnie. What's your suggestion?"

Factual Questions   There are times when it is appropriate to check student background knowledge with a series of brief factual questions, but more frequently you want to stimulate problem solving. One common error in phrasing questions for this purpose is to ask a question in a form conveying to students the message, "I know something you don't know and you'll look stupid if you don't guess right."

Application and Interpretation Questions Rather than dealing with factual questions, discussions need to be formulated so as to get at relationships, applications, or analyses of facts and materials. Solomon, Rosenberg, and Bezdek (1964) found that teachers who used interpretation questions produced gains in student comprehension. A question of the type: How does the

idea that————apply to————? is much more likely to stimulate discussion than the question: What is the definition of ————? The secret is not to avoid questions or to lecture in statements, but rather to listen and to reflect on what is heard. Dillon (1982), a leading researcher on questioning, advises that once you have defined the issue for discussion, keep quiet unless you are perplexed or didn't hear a comment. Questions are tools for teaching, but as Dillon demonstrated, they sometimes interfere with, as well as facilitate, achievement of teaching goals. What happens depends on the question and its use.

Problem Questions A question may arise from a case, or it may be a hypothetical problem. It may be a problem whose solution the instructor knows; it may be a problem which the instructor has not solved. In any case it should be a problem that is meaningful to the students, and for the sake of morale, it should be a problem they can make some progress on. And even if the teacher knows an answer or has a preferred solution, the students should have a chance to come up with new solutions. The teacher's job is not to sell students on a particular solution, but rather to listen and to teach them how to solve problems themselves.

A common error in question phrasing is to frame the question at a level of abstraction inappropriate for the class. Students are most likely to participate in discussion when they feel that they have an experience or idea that will contribute to the discussion. This means that discussion questions need to be phrased as problems that are meaningful to the students as well as to the instructor. Such questions can be devised more easily if you know something of the students' background. An experiment by Sturgis (1959) showed that a teacher's knowledge of student background makes a significant difference in students' learning.

Another error in raising questions is to ask your question before finding out about the students' problems. Often a good question fails to elicit responses because students are hung up on some prior problem.

Suppose you ask a question and no one answers, or the student simply says, "I don't know." Discouraging as this may be, it should not necessarily be the end of the interaction. Usually the student can respond if the question is rephrased. Perhaps you

need to give an example of the problem first; perhaps you need to suggest some alternative answer; perhaps you need to reformulate a prior question. More often than not, you can help the students discover that they are more competent than they thought.

Other Types of Questions   *Connective and causal effect questions* involve attempts to link material or concepts that otherwise might not seem related. One might, for example, cut across disciplines to link literature, music, and historical events or one might ask, "What are the possible causes of this phenomenon?"

Comparative questions, as the name suggests, ask for comparisons between one theory and another, one author and another, one research study and another. Such questions help students determine important dimensions of comparison.

Evaluative questions ask not only for comparisons but for a judgment of the relative value of the points being compared; for example, "Which of two theories better accounts for the data? Which of two essays better contributes to an understanding of the issue?"

Critical questions examine the validity of an author's arguments or discussion. Being so critical that students feel that their reading has been a waste of time is not helpful, but presenting an alternative argument or conclusion may start students analyzing their reading more carefully, and eventually you want students to become critical readers who themselves challenge assumptions and conclusions.

Socratic Discussion

The "classic" (and I do mean *classic*) discussion technique is the Socratic method. In television, novels, and anecdotes about the first year of law school it is usually portrayed as a sadistic, anxiety-producing method of eliciting student stupidity, and even when I place myself in the role of slave boy taught by Socrates in the *Meno*, I feel more like a pawn than an active learner.

Perhaps this is why I've never been very good at Socratic teaching; nonetheless I believe that it can be used as an effective method of stimulating student thinking, and it can have the quality of an interesting game rather than of an inquisition. The leading modern student of Socratic teaching is Allen Collins, who

has observed a variety of Socratic dialogues and analyzed the strategies used (1977, 1982).

Basically, most Socratic teachers attempt to teach students to reason to general principles from specific cases. Collins (1977) gives 23 rules, such as the following:

1. Ask about a known case. For example, if I were trying to teach a group of teaching assistants about student cheating, I might say, "Can you describe a situation in which cheating occurred?"

2. Ask for any factors. "Why did the cheating occur?"

3. Ask for intermediate factors. If the student suggests a factor that is not an immediate cause, ask for intermediate steps. For example, if a teaching assistant says, "Students feel a lot of pressure to get good grades," I might say, "Why did the pressure for grades result in cheating in this situation?"

4. Ask for prior factors. If the student gives a factor that has prior factors, ask for the prior factors. For example, "Why do students feel pressure to get good grades?"

5. Form a general rule for an insufficient factor. For example, "Do all students who feel pressure cheat?"

6. Pick a counterexample for an insufficient factor. For example, "Do you think these students cheat on every test?"

7. Form a general rule for an unnecessary factor. For example, if a teaching fellow suggests that cheating occurs when tests are difficult, I might say, "Probably the pressure to cheat is greater when tests are difficult, but does cheating occur only on difficult tests?"

8. Pick a counterexample for an unnecessary factor. For example, "Is cheating likely to occur on college admissions tests, such as the SAT?"

9. Pick a case with an extreme value. For example, "Why is cheating minimized on SAT tests?"

10. Probe for necessary or sufficient factors.

11. Pose two cases and probe for differences. For example, "Why is there more cheating in large classes than in small ones?"

12. Ask for a prediction about an unknown case.

13. Trace the consequences of a general rule. For example, if the teaching assistants conclude that cheating will occur when tests are difficult and are not well proctored, I might say, "Engineering classes are considered difficult, and I understand that there is little cheating even though tests are unproctored." (The school has an honor code.)

In general, the rules involve formulating general principles from known cases and then applying the principles to new cases. Even if one does not use the Socratic method to its fullest, the questioning strategies described in Collins's rules may be generally useful in leading discussions.

WHAT CAN I DO ABOUT NONPARTICIPANTS?*

In most classes some students talk too much, and others never volunteer a sentence. What can the teacher do?

Unfortunately, most students are used to being passive recipients in class. Some of your students may come from cultures whose norms discourage speaking in class. To help students become participants I try to create an expectation of participation in the discussion section. You can start to do this in the first meeting of the course by defining the functions of various aspects of the course and explaining why discussion is valuable. In addition to this initial structuring, however, you must continually work to increase the students' awareness of the values of participation. Participation is not an end in itself. For many purposes widespread participation may be vital; for others it may be detrimental. But you want to create a climate in which an important contribution is not lost because the person with the necessary idea did not feel free to express it.

What keeps a student from talking? There are a variety of reasons—boredom, lack of knowledge, general habits of passivity, cultural norms—but most compelling is a fear of being embarrassed.

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* Some students who are reluctant to participate orally will participate in a computer conference or by e-mail.

When one is surrounded by strangers, when one does not know how critical these strangers may be, when one is not sure how sound one's idea may be, when one is afraid of stammering or forgetting one's point under the stress of speaking—the safest thing to do is keep quiet.

What can reduce this fear? Getting acquainted is one aid. Once students know that they are among friends, they can risk expressing themselves. If they know that at least one classmate supports an idea, the risk is reduced. For both these reasons the technique of subgrouping helps; for example, you can ask students to discuss a question in pairs or small groups before asking for general discussion.

Asking students to take a couple of minutes to write out their initial answers to a question can help. If a student has already written an answer, the step to speaking is much less than answering when asked to respond immediately. Even the shy person will respond when asked, "What did you write?"

Rewarding infrequent contributors at least with a smile helps encourage participation even if the contribution has to be developed or corrected. Calling students by name seems to encourage freer communication. Seating is important too. Rooms with seats in a circle help tremendously.

Getting to know the nonparticipant is also helpful. For example, I have found that it is helpful to ask students to write a brief life history indicating their interests and experiences relevant to the course. These autobiographies help me to gain a better knowledge of each student as an individual, to know what problems or illustrations will be of particular interest to a number of students, and to know on whom I can call for special information. One of the best ways of getting nonparticipants into the discussion is to ask them to contribute in a problem area in which they have special knowledge.

The technique of asking for a student's special knowledge deals directly with one of the major barriers to class discussion—fear of being wrong. No one likes to look foolish, especially in a situation where mistakes may be pounced upon by a teacher or other students. One of the major reasons for the deadliness of a question in which the teacher asks a student to fill in the one right word—such as, "This is an example of what?"—is that it puts the

student on the spot. There is an infinity of wrong answers, and obviously the teacher knows the one right answer; so why should the student risk making a mistake when the odds are so much against the student? And even if the answer is obvious: Why look like a pawn for the teacher?

One way of putting the student in a more favorable position is to ask general questions that have no wrong answers. For example, you can ask, "How do you feel about this?" or "How does this look to you?" as a first step in analysis of a problem. Students' feelings or perceptions may not be the same as yours, but as reporters of their own feelings, they can't be challenged as being inaccurate. While such an approach by no means eliminates anxiety about participation (for an answer involves revealing oneself as a person), it will more often open up discussion that involves the student than will questions of fact. Problem posting, the technique discussed in Chapter 4 as a method for establishing objectives during the first day of class, is an example of a discussion technique minimizing risk for students. It can be useful in introducing a new topic at the conclusion of a topic, or for analysis of an experiment or a literary work. An added advantage is that it can be used in large as well as small groups.

Another technique for reducing the risk of participation for students is to ask a question a class period before the discussion and ask students to write out answers involving an example from their own experience. Similarly, one can ask students to bring one question to class for discussion. This helps participation, helps students learn to formulate questions, and also provides feedback for you.

Finally remember that out-of-class learning is often more important than that in class. E-mail, computer conferencing, and other interactive technologies can support active learning, discussion, and debate.

All of these techniques will still not make every student into an active, verbal participant. Two group techniques can help. One is buzz groups; the other is the inner circle technique.

Buzz Groups—Peer Learning

One of the popular techniques for achieving student participation in groups is the buzz session. In this procedure, classes are split into small subgroups for a brief discussion of a problem. Groups

can be asked to come up with one hypothesis that they see as relevant, with one application of a principle, with an example of a concept, or with a solution to a problem. In large classes I march up the aisles saying, "Odd," "Even," "Odd," "Even" for each row and ask the "odd" row to turn around to talk to the "even" row behind, forming themselves into groups of four to six. I tell them to first introduce themselves to one another and then to choose a person to report for the group. Next they are to get from each member of the group one idea about the problem or question posed. Finally they are to come up with one idea to report to the total class. I give the group a limited time to work, sometimes five minutes or less, occasionally ten minutes or more, depending on the tasks. Peer-led discussions need not be limited to five or ten minutes or even to the classroom (see Chapter 14).

The Inner Circle or Fishbowl

In using the inner circle technique I announce that at the next class meeting we are going to have a class within a class, with several of the students (6 to 15) acting as the discussion group and the others as observers. If the classroom has movable chairs, I then arrange the seating in the form of concentric circles. I am impressed that students who are normally silent will talk when they feel the increased sense of responsibility as members of the inner circle.

THE DISCUSSION MONOPOLIZER*

If you have worked on nonparticipation effectively, the discussion monopolizer is less likely to be a problem, but there will still be classes in which one or two students talk so much that you and the other students become annoyed. As with nonparticipation, one solution is to raise with the class the question of participation in discussion—"Would the class be more effective if participation were more evenly distributed?"

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* Be sensitive to the fact that the most common monopolizer is the teacher. In our research, our observers reported that in a typical discussion class the teacher talked 70 to 80 percent of the time.

A second technique is to have one or more members of the class act as observers for one or more class periods, reporting back to the class their observations. Perhaps assigning the dominant member to the observer role would help sensitivity.

A third possibility is to audiotape a discussion, and after playing back a portion, ask the class to discuss what might be done to improve the discussion.

A fourth technique is to use buzz groups with one member chosen to be reporter.

Finally, a direct approach should not be ruled out. Talking to the student individually outside class may be the simplest and most effective solution.

APPRAISING PROGRESS

One of the important skills of discussion leaders is the ability to appraise the group's progress and to be aware of barriers or resistances that are blocking learning. This skill depends on attention to such clues as inattention, hostility, or diversionary questions.

Skill at appraising is of little avail if instructors don't respond to the feedback they receive. In some cases you may need to respond only by interposing a guiding question or by emphasizing a significant contribution. In other cases you may need to summarize progress and restate the current issue or point out the stumbling block or diversion that has stopped progress. In extreme cases, you may have to stop the discussion to begin a discussion of the reasons for lack of progress.

HOW CAN WE HAVE A DISCUSSION IF THE STUDENTS HAVEN'T READ THE ASSIGNMENT?

It's hard to have a discussion if students haven't studied the material to be discussed. What to do?

One strategy is to give students questions at the end of one class, asking them to get information on the questions before the next class. You might even give different assignments to teams of students. Another strategy is to ask students to bring one or more

questions on the assignment to be turned in at the beginning of the next class.

If there are extenuating circumstances, you (or a student who is prepared) can summarize the needed points. Alternatively, you can give students a few minutes to scan the material before beginning the discussion. If used often, however, such strategies may discourage out-of-class preparation.

If the problem persists, present it to the students. What do they suggest? One likely proposal is a short quiz at the beginning of class—which usually works. However, you'd like to have students motivated to study without the threat of a quiz. Usually the quiz can be phased out once students find that discussion really requires preparation and that the assignments are more interesting as they develop competence.

BARRIERS TO DISCUSSION

A primary barrier to discussion is the students' feeling that they are not learning. Occasional summaries during the hour not only help students chart their progress but also help smooth out communication problems. A summary need not be a statement of conclusions. In many cases the most effective summary is a restatement of the problem in terms of the issues resolved and those remaining. Keeping a visible record on the chalkboard of ideas, questions, data, or points to explore helps maintain focus and give a sense of progress.

Barriers to Discussion

- Student habits of passivity
- Failure to see the value of discussion
- Fear of criticism or of looking stupid
- Push toward agreement or solution before alternative points of view have been considered
- Feeling that the task is to find the answer the instructor wants rather than to explore and evaluate possibilities

Another common barrier to good discussion is the instructor's tendency to tell students the answer before the students have developed an answer or meaning for themselves. Of course, teachers can sometimes save time by tying things together or stating a generalization that is emerging. But all too often they do this before the class is ready for it.

Agreement can be a barrier to discussion. Usually instructors are so eager to reach agreement in groups that they are likely to be happy when the students are agreeing. But agreement is not the objective of most educational discussions. Students come to class with certain common naive attitudes and values. Although the attitudes they hold may be "good" ones, they may be so stereotyped that the students fail to develop an understanding of the complex phenomena to which their attitudes apply. The teacher's task is often directed not so much toward attitude change as toward increased sensitivity to other points of view and increased understanding of the phenomena to which the attitude applies. As I suggested earlier, the instructor may sometimes need to assume a role of opposition.

When you oppose a student's opinions, you should be careful not to overwhelm the student with the force of the criticism. Your objective is to start discussion, not smother it. Give students an opportunity to respond to criticisms, examining the point of view that was opposed. Above all, avoid personal criticism of students.

HANDLING ARGUMENTS

In any good discussion conflicts will arise. If such conflicts are left ambiguous and uncertain, they, like repressed conflicts in the individual, may cause continuing trouble. The teacher helps focus these conflicts so that they may contribute to learning.

- Reference to the text or other authority may be one method of resolution, if the solution depends on certain facts.
- Using the conflict as the basis for a library assignment for the class or a delegated group is another solution.
- If there is an experimentally verified answer, this is a good opportunity to review the method by which the answer could be determined.

- If the question is one of values, your goal may be to help students become aware of the values involved.
- Sometimes students will dispute your statements or decisions. Such disagreements may often be resolved by a comparison of the evidence for both points of view, but since teachers are human, they are all too likely to become drawn into an argument in which they finally rest on their own authority. To give yourself time to think, as well as to indicate understanding and acceptance of the students' point, I suggest listing the objections on the chalkboard. (Incidentally, listing evidence or arguments is also a good technique when the conflict is between two members of the class.) Such listing tends to prevent repetition of the same arguments.
- In any case it should be clear that conflict may be an aid to learning, and the instructor need not frantically seek to smother it.

The Two-Column Method

Another of Maier's techniques, the two-column method, is a particularly effective use of the board in a situation in which there is a conflict or where a strong bias prevents full consideration of alternative points of view. Experimental studies (Hovland, 1957) suggest that, when people hear arguments against their point of view, they become involved in attempting to refute the arguments rather than listening and understanding. Disagreement thus often tends to push the debaters into opposite corners, in which every idea is right or wrong, good or bad, black or white. The truth is often more complex and not in either extreme.

The two-column method is designed to permit consideration of complications and alternatives. As in problem posting, before the issues are debated, all the arguments on each side are listed on the board. The leader heads two columns "Favorable to A" and "Favorable to B" or "For" and "Against" and then asks for the facts or arguments that group members wish to present. The instructor's task is to understand and record in brief the arguments presented. If someone wishes to debate an argument presented for the other side, the instructor simply tries to reformulate the point so that it can be listed as a positive point in the

debater's own column. But even though an argument is countered or protested it should not be erased, for the rules of the game are that the two columns are to include all ideas that members consider relevant. Evaluation can come later.

When the arguments have been exhausted, discussion can turn to the next step in problem solving. At this point the group can usually identify areas of agreement and disagreement, and in many cases it is already clear that the situation is neither black nor white. Now the issue becomes one of *relative* values rather than good versus bad. When discussion is directed toward agreements, some of the personal animosity is avoided, and some underlying feelings may be brought to light. The next stages of the discussion are thus more likely to be directed toward constructive problem solving.

Challenges and disagreements may be an indication of an alert, involved class. But the instructor should also be aware of the possibility that they may be symptoms of frustration arising because the students are uncertain of what the problem is or how to go about solving it.

TEACHING STUDENTS HOW TO LEARN THROUGH DISCUSSION

I have already implied that classes don't automatically carry on effective discussions. To a large extent students have to learn how to learn from discussions just as they have to learn how to learn from reading. How can this occur?

First, they need to understand the importance of discussion for learning. Expressing one's understanding or ideas and getting reactions from other students and the teacher makes a big difference in learning, retention, and use of knowledge.

What skills need to be learned? One skill is clarification of what the group is trying to do—becoming sensitive to confusion about what the group is working on and asking for clarification.

A second attribute is the students' development of a willingness to talk about their own ideas openly and to listen and respond to others' ideas. It is important for students to realize

that it is easy to deceive themselves about their own insights or understandings and that verbalizing an idea is one way of getting checks on and extensions of it. Teachers can encourage development of listening skills by asking one group member to repeat or paraphrase what another said before responding to it, and repeatedly pointing out the purpose and values students gain from discussion.

A third skill is planning. Discussions are sometimes frustrating because they are only getting under way when the end of the class period comes. If this results in continuation of the discussion outside the class, so much the better, but often learning is facilitated if students learn to formulate the issues and determine what out-of-class study or followup is necessary before the group breaks up.

A fourth skill is building on others' ideas in such a way as to increase their motivation rather than make them feel punished or forgotten. Often students see discussion as a competitive situation in which they win by tearing down other students' ideas. As Haines and McKeachie (1967) have shown, cooperative discussion methods encourage more effective work and better morale than competitive methods.

A fifth attribute is skill in evaluation. If classes are to learn how to discuss issues effectively, they need to review periodically what aspects of their discussion are proving to be worthwhile and what barriers, gaps, or difficulties have arisen. Some classes reserve the last five minutes of the period for a review of the discussion's effectiveness.

A sixth attribute is sensitivity to feelings of other group members. Students need to become aware of the possibility that feelings of rejection, frustration, dependence, and so on may influence group members' participation in discussion. Sometimes it is more productive to recognize the underlying feeling than to focus on the content of an individual's statement. One way of helping students develop these skills is to use student-led discussions preceded by a training meeting with the student leader.

Peer learning techniques, such as those discussed in Chapter 14, help in building the sense of community that enables students to confront one another openly and helpfully. Such community

does not come overnight, but building a sense of community may be even more important for student learning than covering every chapter in the textbook.

TAKING MINUTES OR NOTES, SUMMARIZING

One of the problems with discussion is students' feeling that they have learned less than in lectures where they have taken voluminous notes. Thus I like to summarize our progress at the end of the period or ask students to contribute to a summary.

Boris (1983) suggests that a student be assigned each day to keep the "minutes" of the day's discussion and that each class period be initiated with a reading of the minutes. Such a procedure is probably particularly useful for the student taking the minutes, but it also has the value of starting the class with a review of where they have been so that there is a sense of building from one class period to the next.

IN CONCLUSION

The teacher's own needs are more evident in the conduct of discussion than in a lecture, for skillful discussion leading requires a quick awareness of individual and group needs.

In general, if an instructor is enthusiastic, friendly, and obviously interested in the subject, students also will be. Let me emphasize again that both lecture and discussion may have advantages at certain points in a course. But when discussion is appropriate, it can be both valuable and fun for the teacher as well as the students.

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CHAPTER

6 Lecturing

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The lecture is probably the oldest teaching method and still the method most widely used in universities throughout the world. Through the ages a great deal of practical wisdom about techniques of lecturing has accumulated. Effective lecturers combine the talents of scholar, writer, producer, comedian, entertainer, and teacher in ways that contribute to student learning. Nevertheless, it is also true that few college professors combine these talents in optimal ways and that even the best lecturers are not always in top form.

Why have lectures survived since the invention of print? Why have they persisted in the face of the intrusions of radio, television, computers, and other media? Is the lecture an effective method of teaching? If it is, under what conditions is it most effective? These questions will be answered not only in light of research on the lecture as a teaching method but also in terms of analyses of the information-processing techniques used by students in learning from lectures.

RESEARCH ON THE EFFECTIVENESS OF LECTURES

A large number of studies have compared the effectiveness of lectures with other teaching methods. When measures of knowledge are used, the lecture proves to be as efficient as other methods.

However, in those experiments involving measures of retention of information after the end of a course, measures of transfer of knowledge to new situations, or measures of problem solving, thinking, or attitude change, or motivation for further learning, the results show differences favoring discussion methods over lecture (McKeachie et al., 1990).

WHAT ARE LECTURES GOOD FOR?

We do not need to lecture when concepts are available in printed form at an appropriate level for our students. Print presents information in a form that can be covered more rapidly and in a way more accessible for retrieval than lectures. Students using printed materials can choose their own rate of learning: they can review, they can skip; they can vary the order.

The lecturer thus starts with some serious handicaps. However, not all information is available in printed form. For example, most printed sources available to college and university teachers for assignment to students are at least several years out of date by the time they are available for assignments. Lectures are particularly appropriate for helping students get up-to-date information on current research and theories relevant to topics they are studying. Moreover, lecturers may sometimes usefully summarize material scattered over a variety of printed sources, thus providing a more efficient method of conveying information than if students were to be assigned to cover these sources by their own reading. Finally, a lecturer can adapt material to the background and interests of a particular audience—material which in printed form is at a level or in a style not well suited to a particular class.

Lectures also can provide structures to help students read more effectively. In fact the lecture may help students learn to read. Readability of material depends on the expectations brought to material by the reader. Thus appropriate lectures can build structures and expectations that help students read material in the given subject matter area more effectively.

Lectures also have indirect values apart from their cognitive content. Many lectures have motivational functions. By helping students become aware of a problem, of conflicting points of

view, or of challenges to ideas they have previously taken for granted, the lecturer can stimulate interest in further learning in an area. Moreover, the lecturer's own attitudes and enthusiasm have an important effect on student motivation. Research on student ratings of teaching as well as on student learning indicates that the enthusiasm of the lecturer is an important factor in effecting student learning and motivation. You may feel that enthusiasm is not learnable. Clearly some people are more enthusiastic and expressive than others, but you can develop in this area just as in others. Try to put into each lecture something that you are really excited about. Notice how your voice and gestures show more energy and expressiveness. Now try carrying some of that intensity and animation over into other topics. Like other learned behaviors, this takes practice, but you can do it. Murray (1997) showed that enthusiastic teachers move around, make eye contact with students, and use more gestures and vocal variation, and that teachers could learn these behaviors. Both research and theory support the usefulness of enthusiastic behaviors in maintaining student attention.

Not only is the lecturer a model in terms of motivation and curiosity, the lecturer also models ways of approaching problems, portraying a scholar in action in ways that are difficult for other media or methods of instruction to achieve. In fact there is some evidence suggesting that one of the advantages of live professors is the tendency of people to model themselves after other individuals whom they perceive as living, breathing human beings with characteristics that can be admired and emulated.

Finally, there are values in lecturing for professors themselves. Although there is little direct evidence on the point, there is certainly anecdotal evidence, as well as supporting psychological theory, suggesting that preparing and delivering a lecture is an important factor in the professor's ability to integrate and retrieve the subject matter.

A LITTLE BIT OF THEORY

The preceding section has included a good bit of theory of learning and motivation, but I want to be more explicit about one

aspect of the cognitive theory of learning and memory. As I noted in the preceding chapter, memory depends heavily on the learner's activity—thinking about and elaborating on new knowledge. A key difference between modern theories of memory and earlier theory is that earlier theory thought of knowledge as single associations, in some ways like tucking each bit of knowledge into a pigeonhole. Now we think of knowledge as being stored in structures such as networks with linked concepts, facts, and principles. The lecture thus needs to build a bridge between what is in the students' minds and the structures in the subject matter. Metaphors, examples, and demonstrations are the elements of the bridge. Providing a meaningful organization is thus a key function of the lecture. Our research (Naveh-Benjamin et al., 1989) showed that students begin a course with little organization, but develop conceptual structures during a course that more and more closely resemble that of the instructor.

HOW CAN LECTURES BE IMPROVED?

The message of this chapter is that one way of improving lectures is to think about how students process lectures. What are students trying to do during a lecture?

As one looks at students at a lecture and observes their behavior, the most impressive thing one notices is the passive role students have in most classrooms. Some students are having difficulty in staying awake; others are attempting to pass the time as easily as possible by reading other materials, counting lecturer mannerisms, or simply doodling and listening in a relatively effortless manner. Most students are taking notes. Ideally, many students are attempting to construct knowledge by linking what the lecturer says with what they already know.

Attention

One of the factors determining students' success in information processing is their ability to attend to the lecture. Attention basically involves focusing one's cognitions on those things that are changing, novel, or motivating. Individuals have a limited

capacity for attending to the varied features of their environment. The individual's total capacity for attention may vary with the degree of activation or motivation. At any one time, part of the capacity is devoted to the task at hand (in this case listening to the lecturer), part is monitoring other aspects of the classroom, and part of the attention capacity may be available for other uses—in other words, it is simply spare capacity.

Hartley and Davies' (1978) review of the research on attention of students during lectures reports that, typically, attention increases from the beginning of the lecture to ten minutes into the lecture and decreases after that point.

One of the characteristics of a passive lecture situation in which a lecturer is using few devices to get students to think actively about the content of the lecture is that attention tends to drift. Probably all of us have had the experience of listening to a speaker and finding with a start that we have not heard the speaker for some time because our attention has drifted on to thoughts that are tangential to the lecturer's theme. Bloom's (1953) studies of students' thinking during lectures and discussion indicated that more of students' thoughts were relevant to the content during lectures than during discussions, but that there was less active thinking in lectures than in discussions.

What Can Be Done to Get Attention?

In determining how to allocate attention, students use various strategies. Any lecturer knows that one way of getting attention is to precede the statement by the phrase, "This will be on the test." In addition, students listen for particular words or phrases that indicate to them that something is worth noting and remembering. Statements that enumerate or list are likely to be on tests and thus are likely to be attended to.

Changes in the environment recruit attention. The ability of changes to capture attention can work to the advantage of the lecturer. Variation in pitch, intensity, and pace of the lecture, and visual cues such as gestures, facial expression, movement to the blackboard, the use of demonstrations or audiovisual aids—all of these recruit and maintain attention to the lecture.

Auditory attention is directed to some extent by visual attention. As the eyes move, auditory attention tends to shift as well. Distracting movements in the classroom are thus likely to cause students to fail to recall what the lecturer has said. On the positive side, there is some evidence that students' comprehension is greater when the students can see the speaker's face and lips. Look at your audience; eye contact helps communication. When students are not highly motivated, spare capacity of attention is available. This spare capacity is very likely to be used for daydreaming or other tasks which may become more engrossing than listening to the lecture. Hence motivation is important in holding student attention. Linking lectures to student interests, giving examples that are vivid and intriguing, building suspense toward resolution of a conflict—these are all techniques of gaining and holding attention.

All of these devices will help, but recall the Hartley and Davies finding that students' attention tends to wane after ten minutes. A more radical device for maintaining attention requires breaking up the lecture rather than trying to hold attention for an hour or more. Student activities such as problem posting, the minute paper,* pairing, or small group activities can reactivate students' attention.**

TEACHING STUDENTS HOW TO BE BETTER LISTENERS

We assume that listening is an innate skill, but you can train your students to be better listeners. For example, you might begin by asking students to write for one minute on "What do I hope to get out of this lecture?" Then explain how this strategy will help them to be more effective listeners in any lecture.

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* The minute paper (Wilson, 1986) is described later in this chapter in the section "How to Get Students Actively Thinking in a Lecture Situation."

** Brown and Atkins (1988, p. 29) list these and other student activities to get students' attention and thinking during lectures.

Another strategy is to tell students that you will give them five minutes at the end of the lecture to summarize the main points of the lecture for someone sitting near them. At the end of the class the lecture for someone sitting near them. At the end of the class period, ask them what effect this had on their listening to the lecture, and point out that they can use this approach to lectures even if they summarize it only in their own notes.

SHOULD STUDENTS TAKE NOTES?

Note taking is one of the activities by which students attempt to stay attentive, but note taking is also an aid to memory. *Working memory*, or *short-term memory*, is a term used to describe the fact that one can hold only a given amount of material in mind at one time. When the lecturer presents a succession of new concepts, students' faces begin to show signs of anguish and frustration; some write furiously in their notebooks, while others stop writing in complete discouragement. Note taking thus is dependent on one's ability, derived from past experience (long-term memory), to understand what is being said and to hold it in working memory long enough to write it down. In most cases, when queried about their listening or note-taking habits, students report that they are primarily concerned about getting the gist of the lecture in order to be prepared for an examination. To do this they try to extract significant features from the lecture, to distill some of its meaning.

Hartley and Davies (1978) reviewed the research on note taking and student information processing during lectures. They report that students believe that there are two purposes for taking notes. One is that the process of taking notes will in itself help later recall; the other is that the notes provide external storage of concepts which may be reviewed when needed. The research results indicate some support for both beliefs.

Several studies show that students who take notes remember material better than a control group not taking notes, even though the note takers turned in their notes immediately after the lecture. Note taking involves elaboration and transformation of ideas, which increases meaningfulness and retention (Peper & Mayer, 1978; Weiland & Kingsbury, 1979). But note taking has costs as

well as benefits. Student note-taking strategies differ. Some students take copious notes; others take none. We know that student information processing capacity is limited; that is, people can take in, understand, and store only so much information in any brief period of time. Information will be processed more effectively if the student is actively engaged in note-taking—analyzing and processing the information rather than passively soaking it up, but taking notes takes capacity that may be needed for comprehension if material is difficult. Thus, encourage students to take *fewer* notes and to listen carefully when you are introducing new, difficult material. They can then fill in their notes after class.

Students' ability to process information depends on the degree to which the information can be integrated or "chunked." No one has great ability at handling large numbers of unrelated items in active memory. Thus when students are in an area of new concepts or when the instructor is using language that is not entirely familiar to the students, students may be processing the lecture word by word or phrase by phrase and lose the sense of a sentence or of a paragraph before the end of the thought is reached. This means that lecturers need to be aware of instances in which new words or concepts are being introduced and to build in greater redundancy, as well as pauses during which students can catch up and get appropriate notes.

Snow and Peterson (1980) point out that brighter students benefit more from taking notes than less able students. We believe that this is because the less able students while they write their notes, keep what they hear in their memories, so that their note taking essentially blocks them from processing parts of the lecture. But this is not simply a matter of intelligence; rather, a student's ability to maintain materials in memory while taking notes and even to process and think about relationships between one idea and other ideas depends on the knowledge or cognitive structures the student has available for organizing and relating the material. Thus the background of the student in the area is probably more important than the student's level of intelligence.

Some faculty members hand out prepared notes or encourage the preparation of notes for students to purchase. Hartley's research, as well as that of Annis (1981) and Kiewra (1989), suggests that a skeletal outline is helpful to students, but that with

detailed notes students relax into passivity. It is better simply to provide an overall framework which they can fill in by selecting important points and interpreting them in their own words. Because student capacity for information processing is limited and because students stop and go over a confusing part of a lecture again, you need to build more redundancy into your lectures than into writing, and you need to build in pauses where students can catch up and think rather than simply struggle to keep up.

One can train students to write better notes by collecting student notes, evaluating the degree to which they summarize, translate, and show relationships as opposed to simply representing more or less verbatim accounts.

HOW DO STUDENTS PROCESS THE CONTENT OF A LECTURE?

Let's assume that students are allocating attention appropriately to the lecture. This alone, however, does not ensure that the content of the lecture will be understood, remembered, and applied appropriately. Even though students are trying to meet the demands of the situation, they may differ in the ways they go about processing the words that they have heard.

Marton and Säljö (1976a, 1976b) and other researchers at the University of Göteborg have described differences in the way students go about trying to learn educational materials. Some students process the material as little as possible, simply trying to remember the words the instructor says and doing little beyond this. This would be described by Marton as a "surface approach." Other students try to see implications of what the lecturer is saying, relate what is currently being said to other information either in the lecture or in their own experience and reading, and try to understand what the author intended. They elaborate and translate the instructor's words into their own. They may question. This more thoughtful and more active kind of listening is what Marton and Säljö refer to as "deep processing."

Experienced students can probably vary their strategies from verbatim memory to memory of concepts, depending on the demands of the situation. Obviously there are times when exact recall of what the lecturer said is important, but in general, deep processing is more likely to yield long-term memory and retrieval of the kind of knowledge needed for solving problems.

Strategies of surface processing or deep processing are probably not fixed, and lecturers may be able to help their students process more material at a deep level and in addition help students to learn from lectures more effectively. Pointing out relationships, asking rhetorical questions, or asking questions to be answered by class members are ways of encouraging active thought. Teachers can also ask for examples of how students apply concepts to their own experiences, thus encouraging all students to realize that it is important to try to think about how concepts relate to oneself.

PLANNING LECTURES

A typical lecture strives to present a systematic, concise summary of the knowledge to be covered in the day's assignment. Chang, Crombag, van der Drift, and Moonen (1983, p. 21) call this approach "conclusion oriented." *Don't do it!* The lecturer's task in university teaching is not to be an abstractor of encyclopedias, but to *teach students to learn and think.*

I was a conclusion-oriented lecturer for 30 years. Now more of my lectures involve analyzing materials, formulating problems, developing hypotheses, bringing evidence to bear, criticizing and evaluating alternative solutions—revealing methods of learning and thinking.

One of the implications of the theoretical approach I have taken is that what is an ideal approach to lecturing early in a course is likely to be inappropriate later in the course. As noted earlier, the way students process verbal material depends on the structures that not only enable them to process bigger and bigger chunks of subject matter but also give them tacit knowledge of the methods, procedures, and conventions used in the field and by you as a

lecturer. For, intentionally or not, you are teaching students how to become more skilled in learning from your lectures.

Because this is so, one should in the first weeks of a course go more slowly, pause to allow students with poor backgrounds time to take notes, and give more everyday types of examples. Pausing to write a phrase or sketch a relationship on the chalkboard will not only give students a chance to catch up but also provide visual cues that can serve as points of reference later. Later in the term, students should be able to process bigger blocks of material more quickly.

Adapting to the differences in students' knowledge from the beginning to the later stages of a course is but one example of the principle that one key to good lecturing is an awareness of the audience, not only in lecturing but in preparing the lecture. In every class there is student diversity—not only in background knowledge but also in motivation, skills for learning, beliefs about what learning involves, and preferences for different ways of learning.

PREPARING YOUR LECTURE NOTES

One of the security-inducing features of lectures is that one can prepare a lecture with some sense of control over the content and organization of the class period. In lectures the instructor is usually in control, and this sense of controlled structure helps the anxious teacher avoid pure panic.

But no matter how thoroughly one has prepared the subject matter of the lecture, one must still face the problem of how to retrieve and deliver one's insights during the class period. If one has plenty of time and is compulsive, one is tempted to write out the lecture verbatim. Don't! Or if you must (and writing it out may be useful in clarifying your thoughts), don't take a verbatim version into the classroom. Few lecturers can read a lecture so well that students stay awake and interested.

At the same time, few teachers can deliver a lecture with no cues at all. Hence you will ordinarily lecture from notes. Most lecturers use an outline or a sequence of cue words and phrases.

Day (1980) studied lecture notes used by professors at over 75 colleges and universities. She notes that extensive notes take the instructor out of eye contact with students so that students fall into a passive, nonquestioning role. Day suggests the use of graphic representations to increase teaching flexibility and spontaneity. Tree diagrams, computer flowcharts, or network models enable a teacher to have at hand a representation of the structure that permits one to answer questions without losing track of the relationship of the question to the lecture organization. Pictorial representations using arrows, faces, Venn diagrams, or drawings that symbolize important concepts may not only provide cues for the instructor but can also be placed on the board to provide additional cues for students. Color coding your notes with procedural directions to yourself also helps. I have a tendency to run overtime, so I put time cues in the margin to remind me to check. I also put in directions to myself, such as

- "Put on chalkboard." (usually a key concept or relationship)
- "Check student understanding. Ask for examples."
- "Ask students for a show of hands."
- "Put students in pairs to discuss this."

Whatever your system, indicate *signposts* to tell students what is ahead, *transitions* that tell students when you are finishing one topic and moving to the next, *key points* or *concepts*, and *links* such as "consequently," "therefore," and "because."*

ORGANIZATION OF LECTURES

In thinking about lecture organization, most teachers think first about the structure of the subject matter, then try to organize the content in some logical fashion, such as building from specifics to generalization or deriving specific implications from general

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* These four types of signposts are discussed in George Brown, *Lecturing and Explaining* (London: Methuen, 1979).

principles. Too often we get so immersed in "covering" the subject that we forget to ask, "What do I really want students to remember from this lecture next week, next year?"

Some common organizing principles used by lecturers are cause to effect; time sequence (for example, stories); parallel organization such as phenomenon to theory to evidence; problem to solution; pro versus con to resolution; familiar to unfamiliar; and concept to application.

Leith (1977) has suggested that different subjects are basically different in the ways in which progress is made in the field. Some subjects are organized in a linear or hierarchical fashion in which one concept builds on a preceding one. In such subjects one must follow a particular sequence of ideas in order to reach a sophisticated level. Other subjects are organized more nearly in the manner of a spiral or helix in which the path from one level to the next is not linear but rather depends on accumulating a number of related ideas before the next level can be achieved; and any of the related ideas at one level need not precede other ideas at that level. Still other subjects are organized in the fashion of networks in which one may start at different points of the network and go in various directions. One may build up a network equally well by starting at any one of a number of places and proceeding through a variety of sequences to arrive at comprehension of the subject matter.

The logical structure of one's subject should be one factor determining the lecture organization, but equally important is the cognitive structure in the students' minds. If we are to teach our students effectively, we need to bridge the gap between the structure in the subject matter and structures in the students' minds. As is indicated in all of the chapters in this book, the learner's mind is not *tabula rasa*. The teacher is not making impressions on a blank slate. Rather our task in teaching is to help students reorganize existing cognitive structures or to add new dimensions or new features to existing structures. Thus the organization of the lecture needs to take account of the student's existing knowledge and expectations as well as the structure of the subject matter. Analogies linking new ideas to similar ones that students already know can help.

The Introduction

One suggestion for organization is that the *introduction* of the lecture should point to a gap in the student's existing cognitive structure or should challenge or raise a question about something in the student's existing method of organizing material in order to arouse curiosity (Berlyne, 1954a, 1954b). There is a good deal of research on the role of prequestions in directing attention to features of written texts. Prequestions in the introduction of a lecture may help students to discriminate between more and less important features of lectures. For example, before a lecture on cognitive changes in aging, I ask, "Do you get more or less intelligent as you get older?" and "What is a fair test of intelligence for older people?" Such questions may help create expectations that enable students to allocate their information processing capacity more effectively. If students know what they are expected to learn from a lecture, they learn more of that material (sometimes at the expense of other material; Royer, 1977).

Another approach is to begin with an example, case, or application that indicates the practical relevance of the topic. In many fields it is possible to begin some lectures with presentation of a problem or case from a current newspaper or television show, then ask students how they would think about it in the light of this course, or alternatively illustrate in the lecture how experts in this field would think about it.

The Body of the Lecture

In organizing the *body* of the lecture, the most common error is probably that of trying to include too much. Students' information processing capacities are limited, and a lecturer who is expert in the field is likely to overestimate the students' ability to grasp large blocks of material and to see relationships. An explanation that would be perfect for advanced students may be incomprehensible to beginning students. Lecturers very often overload the students' information processing capacity so that they become less able to understand the material than if fewer points had been presented. David Katz (1950), a pioneer Gestalt psychologist,

called this phenomenon "mental dazzle." He suggested that, just as too much light causes our eyes to be dazzled so that we cannot see anything, so too can too many new ideas overload processing capacity so that we cannot understand anything.

Use the chalkboard, an overhead projector, or PowerPoint to give the students cues to the organization of the lecture. Placing a skeletal outline (or sequence of questions) on the board before the lecture may help; going to the board to construct an outline, fill in the skeleton, or simply write key words is useful in three ways:

1. It gives a *visual* representation to supplement your oral presentation. Using a diagram or other graphic representation will help visualization.

2. Movement (change) helps retain (or regain) attention.

3. It gives students a chance to catch up with what you've said (perchance to think!).

Using Examples   In order to link what is in your head with what is in the students' heads, you need to use examples that relate the subject to the students' experience and knowledge. I am not as effective a teacher today as I was decades ago because I do not know the students' culture and am thus limited in finding vivid examples of a concept in students' daily lives. Since no single example can represent a concept fully, you usually need to give more than one example. Concept formation research suggests that examples differing from one another are likely to be most effective if you point out the essential features of the concept exemplified in each example. And, most important, give students a chance to give examples.

Periodic Summaries Within the Lecture   From our knowledge of students' note-taking behavior and from our theory of information processing, it seems likely that students would be better able to learn from lectures if there were periodic summaries of preceding material. These give students a chance to catch up on material covered when they were not tuned in and also give them a check on possible misperceptions based on inadequate or misleading expectations. Moreover, such summaries can help make clear to students transitions from one theme to another, so that

they are aided in organizing the material not only in their notes but in their minds. In fact, you might try thinking of your lecture as two or more minilectures separated by short periods for questions, discussion, or writing.

Probably one of the greatest barriers to effective lecturing is the feeling that one must cover the material at all costs. Although it may seem irrational to cover material when students are not learning from it, one should not underestimate the compulsion one feels to get through one's lecture notes. A remedy for this compulsion is to put into the lecture notes reminders to oneself to check the students' understanding—both by looking for nonverbal cues of bewilderment or of lack of attention and by raising specific questions that will test the students' understanding.

Most lecturers recognize that they need to check student understanding periodically; so they ask, "Any questions?" and after 3 to 5 seconds without response assume that everyone understands. Not so!

If you really want to know, give students a minute to write down a question, then have them compare notes with students sitting near them before asking for questions. You'll get some.

Once you have used this procedure a few times, so that students have found that questioning is not dangerous, you can simply say, "What questions do you have?"

The Conclusion   In the conclusion of the lecture, one has the opportunity to make up for lapses in the body of the lecture. Encouraging students to formulate questions or asking questions oneself can facilitate understanding and memory. By making the oral headings visible once again, by recapitulating major points, by proposing unanswered questions to be treated in the reading assignments or the future lectures, and by creating an anticipation of the future, the lecturer can help students learn. One good (and humbling) technique is to announce that you will ask a student to summarize the lecture at the end of the period. Another—less threatening—is to have students spend three minutes writing a summary of main points. Either method helps the process of elaboration which is critical for memory.

Having suggested all this, I must admit that my own greatest problem as a lecturer is that I never seem to be ready for the conclusion until it is already past time to dismiss the class.

HOW TO GET STUDENTS ACTIVELY THINKING IN A LECTURE SITUATION

As we have seen, a major problem with the lecture is that students assume a passive, nonthinking, information receiving role. Yet, if they are to remember and use the information, they need to be actively engaged in thinking about the content presented. One easy and effective device is the "Minute Paper." The Minute Paper is, as its title indicates, a paper literally written in a minute (or it can be a two-minute or three-minute paper). Announce at the beginning of the class period that you will interrupt your lecture midway through the period so that the students may write a one-minute paper on a topic derived from the lecture or that you will ask them at the end of the lecture to write the most important thing they have learned. Even better, you can ask them also to write the most important thing they learned from the previous week's lecture.

In Chapter 19, "Teaching Large Classes (You Can Still Get Active Learning!)," I describe other activities to stimulate thinking. Chapters 5 and 14 also describe methods for getting discussion in large classes.

Whatever the method, you ordinarily will want to end with a discussion of the complexity of the issue, the fact that there are pros and cons for each position, and perhaps that a resolution may be found other than a decision for one position and against the other. Since many students feel that the best way to learn is to listen to an expert, you will need here (as in other departures from lecturing) to explain why active thinking is vital for effective learning.

LECTURE AND DISCUSSION

Since discussion offers the opportunity for a good deal of student activity and feedback, it should, according to theory, be more effective than lecture in developing concepts and problem-solving skills.

DISTRIBUTION OF LECTURE AND DISCUSSION TIME

What research adds up to is the use of lecture for communicating information and modeling problem solving, and discussion for practicing problem-solving skills. One way of doing this is to schedule separate lecture and discussion periods. This administrative arrangement is supported by a study in the teaching of psychology in which discussion meetings were substituted for one-third of the lectures (Lifson et al., 1956). There were no significant differences in achievement. However, the partial discussion method, as compared with the all-lecture method, resulted in more favorable student attitudes, which persisted in a followup study two years later.

Warren (1954) compared the effectiveness of one lecture and four recitations to two lectures and three demonstrations per week. The four-recitations plan was superior. Superior students tended to prefer the two-lecture plan, whereas poorer students did not. On the other hand, in Remmers's comparison (1933) of two lectures and one recitation versus three recitations, the poorer students tended to do better in the lecture-recitation combination.

In a course in which the instructors must not only give information but also develop concepts, the use of both lectures and discussions would thus seem to be a logical and popular choice.

Sometimes you will be unable to schedule separate small-group discussions. Do not despair. Discussion is possible in large groups. As we shall see in Chapter 19 there are many practical methods for achieving the advantages of discussion in large groups.

IN CONCLUSION

What is the role of the lecturer in higher education? The lecture is sometimes an effective way of communicating information, particularly in classes where variations in student background, ability, or interest make feedback to the lecturer important. We have

also shown that the organization and presentation of lectures may influence their effectiveness in achieving application of knowledge or in influencing attitudes. Discussion, however, may be more effective than lecturing in achieving some of the higher-level cognitive and attitudinal objectives.

Good lecturers probably do intuitively many of the things we have suggested. Becoming conscious of what is going on in the students' heads as we talk; being alert to feedback from students through their facial expressions, nonverbal behavior, and oral comments; adjusting one's strategies in reference to these cues—these will help the lecturer learn and help students to learn from the lecturer more effectively.

Supplementary Reading

A very practical guide for lecturers is George Brown's classic paperback, *Lecturing and Explaining* (London: Methuen, 1980).

Howard Pollio's Remembrance of lectures past: Notes and note-taking in the college classroom, *Teaching-Learning Issues*, 1990, *68*, Learning Research Center, University of Tennessee, not only reviews the research on note taking but also suggests ways to help students become better note takers.

Jerry Evensky's chapter The lecture, in L. Lambert, S. L. Tice, and P. Featherstone (eds.), *University Teaching* (Syracuse, NY: Syracuse University Press, 1996) is excellent. I like his statement "You should not think of the lecture as the passive period to be relieved by; 'Now we're going to do active learning.'"

CHAPTER

7

Testing and Assessing Learning: Assigning Grades Is Not the Most Important Function

When we think about evaluating learning, most of us think about examinations—multiple-choice tests, essay tests, oral examinations, perhaps even performance tests. But there are other methods of assessment. In this chapter I will begin with suggestions for conventional testing, and then suggest other methods of assessing student learning.

Let me start with seven assertions:

1. What students learn depends as much on your tests as your teaching.

2. Don't think of tests simply as a means for assigning grades. Tests should facilitate learning for you as well as for your students.

3. Use some nongraded tests and assessments that provide feedback to the students and you.

4. Check your assessment methods against your goals. Are you really assessing what you hoped to achieve, for example, higher-order thinking?

5. Some goals (values, motivation, attitudes, some skills) may not be measurable by conventional tests. Look for other evidence of their development.