

Active Learning

Peter D. Hurd

SUMMARY. Active learning strategies are based on the active engagement of students in their acquisition of knowledge, skills, and attitudes. A number of techniques are described in the context of class content, encouraging class discussion, assessment, and large classes. Controlling the level of risk and the complexity of the exercises is important in the selection of active learning approaches that will be most productive in the class. Active learning strategies have been shown to be effective: they can add energy to a lecture, and they can help make a three-hour class more tolerable. Involving the student in the learning process is designed to increase understanding of the class content. [*Article copies available for a fee from The Haworth Document Delivery Service: 1-800-342-9678. E-mail address: getinfo@haworthpressinc.com <Website: <http://www.haworthpressinc.com>>*]

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INTRODUCTION

Think of an analogy that would suggest the difference between active and passive learning. Really, take a moment to come up with an illustration, even if you think your meaning might be different from

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mine. . . . How about music? The difference between listening to music on a headset and playing an instrument in band practice begins to describe the passive and active ways of learning. Both can be enjoyable, and both are important in developing knowledge, skills, and attitudes about music. One requires much more participation by the student (whether novice or expert); it is much more active from the learner's viewpoint. How can a teacher do both in the traditional classroom setting?

In the past few years, many pharmacy educators have encouraged the use of active learning. One of the best examples would be Background Paper II from the Commission to Implement Change in Pharmaceutical Education (1). It encouraged a transition from the dependent learner to the independent learner, using teaching approaches that involved students as "active learners." In that paper, the emphasis was on thinking skills and problem-solving outcomes in the educational process. Programming at national meetings for educators, in pharmacy and in less discipline-specific national meetings, has also encouraged various forms of active learning. This has been quite apparent at the various meetings of the American Association of Colleges of Pharmacy.

The pharmacy literature includes many examples of active learning. Very recently, one could find articles on a group project in medicinal chemistry, writing in the medical record, cooperative learning, and active learning in biochemistry (2-5). In my own research, we have used active learning strategies in pharmacy courses ranging from geriatrics to pharmacy law (6, 7).

Turning to the bookcase and selecting the oldest copy of the *American Journal of Pharmaceutical Education* that I had (February 1979), the lead article described the use of videotaped interviewing of a simulated patient, with preparation for the interview that included group discussion and role-playing in addition to the use of videotape (8). The next issue had an article on experiential instruction that used the term "active student involvement" in the methodology section (9). The lesson to be learned was clear: pharmacy educators have been doing this for a long time.

A DEFINITION OF ACTIVE LEARNING

The cornerstone of active learning is the active engagement of students in their acquisition of knowledge, skills, and attitudes. A

variety of activities and techniques can facilitate this in the classroom. With this in mind, active learning can be “instructional activities involving students in doing things and thinking about what they are doing” (10). Bonwell and Eison consider this a working definition and point out that educational literature in the past has been comfortable with a broad and inclusive definition of active learning.

As you have noticed already, this article is written with the intent of involving the reader in a variety of ways. A pencil and paper would be helpful for some sections. The point of these activities is to demonstrate some of the active learning techniques that could become part of a class session. If you wish, this can be an active-learning reading assignment.

THINK-PAIR-SHARE

So in the context of an individual reading an article, we are going to simulate an activity that would normally include three or more people. Take a few moments to:

1. Make a short list of the characteristics of a really *good* lecture.
2. Make another list of the characteristics of a *poor* lecture.
3. Make a short list of the characteristics of a really *good* classroom *environment*.

Now, if you were in a classroom situation, you could ask individuals to turn to another person and compare lists. This works in classes of 180 as well as in small classes, say less than 15 students. Why would you do this? Perhaps you are trying to generate an interest in this topic by involving the students through the use of their own ideas. At the same time, you can discover what the students are thinking when they share their answers with the class (e.g., their level of preparation, biases, and misconceptions).

Depending on the size of the class, you could ask each group to respond, select a few groups to respond, ask groups that you have chatted with to respond (you have a hint as to what they might say, but you'll be surprised some of the time), or you might walk around with a blank overhead and jot down the phrases that you feel are most important from the groups that you talked to during the discussion (this works great for very large groups). Variations of this approach can

achieve other outcomes (you might want students to put their names on the paper, modify their responses as they wish, and then collect the page to monitor attendance that day—great way to get feedback, too).

This activity is sometimes called **think-pair-share** (11). One of the crucial components is the time spent by the individual writing a personal response. Each person has thought about a response as evidenced in his or her written comments. This makes it much easier for everyone to participate and helps shy students prepare what they will share with another.

So, what did your lists include? For a good lecture, I had: humor, emphasis on a few basic ideas, illustrations and examples of the points being made, and some kind of emotional response or realization that this involves me. For a poor lecture, I included: reading from a prepared text in a monotone, a mismatch between the content of the lecture and the audience's needs and background, lack of preparation as evidenced during the lecture, little eye contact, and little animation in the delivery of the lecture. A really good classroom environment for me would include: a well-informed teacher, a climate of interaction, and a high level of trust between students and the instructor. Your list probably included some important ideas that I missed.

ACTIVE LEARNING AND CONTENT

The purpose of active learning techniques is to facilitate the student's learning. Learning includes knowledge, and active learning can be a very effective method to help the student gain a better grasp of the content that is crucial to the class. Much as bold type and margin notes can highlight a textbook, active learning can emphasize the content that is most crucial to a course. Usually, learning includes more than knowledge, and these techniques can also help develop abilities to use the knowledge. Active learning is especially effective when students see a clear connection between the activity, the class content, and their own interests in the course.

Bonwell and Eison review evidence that active learning strategies lead to student learning (10). One of their most fundamental points deals with the attention span of most people in a lecture format: approximately 20 minutes. While they cite a number of research articles, you might simply look at your watch when students are beginning to lose attention, shuffle papers, talk, and shift in their seats; it's

usually about 20 minutes. As Bonwell and Eison point out, you can use active learning as a modification of the lecture to energize the class, essentially starting the 20-minute clock again. Bonwell has called this an “enhanced lecture” because it allows the teacher to use the strong points of a good lecture (communicating personal interest, including very recent information, and modeling a thought process in problem solving) and still reap the benefits of actively involving the students in the content of the class (11).

CONTROLLING LEVEL OF RISK

Some active learning techniques are of greater risk than others, and this risk could apply to the students or the faculty member. The **think-pair-share** technique is of moderate to low risk. Some of the techniques will include very little that might go wrong, in either the activity (props may fail or handouts will not be ready) or among the students (the instructions will be misinterpreted or students will be unprepared). Of course, the instructor controls the level of risk in the plans for the class.

Controlling the level of risk in the classroom can be an important part of the teacher’s planning, and an active learning technique that would be considered a high risk for one faculty member might be of much lower risk for another. Trying think-pair-share for the first time in a very large class of 150 students would involve more risk than using the same approach in a class of 15 students. Student expectations can affect the risk involved also. Using a role-playing activity in a biochemistry course might have a much greater chance of not working than a role-playing activity in an elective communications class.

Bonwell and Sutherland discuss a number of different dimensions to be considered when implementing active learning:

simple tasks-complex tasks
acquisition of knowledge-acquisition of skills/attitudes
limited interaction-extensive interaction
inexperienced student-experienced student. (12)

When applying these dimensions, teachers should take into consideration that some students may be operating in the lower end of Bloom’s

cognitive domain, which starts with knowledge and progresses through comprehension, application, analysis, synthesis, and evaluation (13). Students focused on acquiring knowledge would require more structure and direction than students at higher levels, who may be frustrated by activities that would be appropriate for others.

Similarly, Perry has suggested that students progress through various stages of thinking: dualistic thinking, multiplicity, and a commitment to relativism (14). At the earliest stages, students are more likely to look for the single correct answer (dualistic: correct or wrong), while at the later stages, students are willing to recognize the possibility of many correct answers or may even be ready to make a personal commitment to one answer as the correct one for themselves. “Dualistic” students may become frustrated if they are working on an activity such as a case study and hear the faculty member mention that a number of possible solutions would be acceptable (or refuse to explain what “really” happened in the case). These students are expecting a single correct answer. The instructor needs to adapt active learning strategies to meet the needs of the various students participating in the class. When used in a sensible manner, the active learning exercises can also help individuals develop greater maturity in their thinking abilities.

USING A PAUSE

One active learning approach that is very low risk is the **pause technique** (15). Basically, you pause for 30 seconds or more and let students turn to those around them and ask a question about what they did not understand, tell the students to ask another for clarification of an issue, or ask students to find out if the other person understands the concept. (I’ve used all of these; you can experiment with others.) This is especially useful when you have gone over a difficult topic, when you can sense that there is some misunderstanding for some in the class, or when your scan of the audience reveals dazed or confused looks. Of all the active learning techniques that I use, the **pause** is the most consistently mentioned in course evaluations as something that students really appreciate, year after year.

Illustrative case: A newer faculty member fell under the spell of a writing-across-the-curriculum guru. The guru’s dynamic per-

sonality, good looks, and energetic teaching style convinced the young faculty member to add a significant writing component to the required class. Next semester's enrollment was projected to be about 150 students. Things went well in the planning and preparation stages; it was fun to work on these new ideas. A journal, weekly writing assignments, and rewrites were planned, with self-assessment and peer assessment to help with the grading.

What do you think happened?

-pause and review the case-

Of course you know already: the course was a disaster. (If this were presented to students, I would pause and ask them to see if the person next to them understands the case or has any questions.) The faculty member was overwhelmed with the work of reading all the material, many of the assignments didn't work as well as expected, the students had no training in peer assessment and gave everyone great grades (well, almost everyone did), and there was no support system for the students who needed help in writing. The faculty member has never tried this again. One of the themes of this case would be that too many high-risk changes can be detrimental for both faculty member and students.

The **pause** technique is a very simple and low-risk application of active learning that has great potential for achieving desired outcomes in the class. To me, the **pause** technique brings two analogies to mind. The first analogy is pouring from a small-mouthed container filled with a liquid, like a gallon jug of cider or a quart of oil. If you try to pour too rapidly, the content tends to spill all over and make a mess. If you pour a little slower, the content streams out and you actually end up with more in the container and less of a mess. The pause can give students time to slow things down and help the students keep up with the flow of ideas. The second analogy is making a wrong turn when driving in an unfamiliar place. When the driver has traveled in the wrong direction, the best option may be retracing the path and making a new turn in the correct direction. When students are confused about something, they occasionally have followed a thought process that has led them to a dilemma, which would be similar to the driver's realization that the road signs are inconsistent with the direction that the

driver wanted to travel. Students may need a moment to rethink their thought process and start down the correct path. Talking with others in the class often helps students regain the correct train of thought.

Sometimes, complex active learning activities, like a case study, may be more effective if preceded by less complex activities like pause or think-pair-share. High complexity and high risk are often associated, and active learning techniques can help troubleshoot problems with complex tasks, reducing the risk. Nevertheless, issues that appear relatively simple in design may be of low risk for the instructor and yet be of high risk for the student.

Case example: The guest lecturer surveyed the class. He knew that they were present because the class was required, but there was lots of energy in the class and students seemed to be in a good mood. He gave a brief introduction to the drug approval process of the FDA and asked the class to take a guess at how much paper was needed for a new drug application. The class fell silent, eyes avoided the speaker, no one spoke. Finally, one of the front-row students made a guess. “Wrong,” said the teacher. “Who else wants to try?” No one did. . . .

While this teacher can be complimented for attempting to involve the audience in the presentation, one of the many mistakes was to ask for a behavior that was too risky and to ask too early. Asking students to offer a suggestion that might be wrong in front of their peers before any sense of trust has evolved in the classroom is asking for a risky behavior for many students. Active learning techniques can help set the proper climate and facilitate student participation so that students will answer questions.

Voting could have helped in this situation. The lecturer might have asked students to raise their hands if they thought that the application would be at least the size of a large textbook or a package of paper (good opportunity for a visual effect-bring a package of paper), a case of paper, ten cases of paper, or a truck full of cases. Depending on the level of risk that the instructor was comfortable with in this situation, he might even chide the students who did not raise their hands for the “package of paper” question. (An example of the risk: What if the student says that it should all be computerized?) When this activity is handled correctly, it can energize the students and facilitate discussion. When the instructor gets to the “truck full of cases of paper,” he can

ask one of those students why he or she thinks so much paper is required. The primary objective of the speaker, to dramatize the amount of paper required, has been made forcefully, and those students who dropped their hand too early, hopefully, have been motivated to learn why they were incorrect. If everyone has their hand up at the end, by the way, the lecturer knows that he may be working at too simplistic a level for this audience.

CASE STUDY

In addition to risk and complexity, variety is a key component of effective active learning. Or, put in a slightly different way, repeating the same technique too often could reduce effectiveness. This will be the third example of a brief **case study**. Time to change?

Case: One famous college decided to promote active learning for the coming academic year. To help the faculty get in the spirit of things, a number of experts on various aspects of active learning were invited to present seminars.

“Write down on a sheet of paper five of the best ways to keep a student’s attention,” said the first expert. Then these issues were discussed around the table in small groups. Each group wrote information on a large sheet of paper, and the group presented the idea to everyone. The expert then developed the session around these ideas.

Faculty responded so well to this that many started using this approach in the class, with very favorable results.

The second expert came, “Write down on a sheet of paper the five values that all students have.” The faculty knew what was coming, and they jumped on the task with excitement; this approach was fun. The session went well, and more faculty adopted this strategy in their classes.

“Write down on a sheet of paper . . .,” said the next expert. The faculty groaned. “We are so tired of this approach,” they said to each other. They laughed in their groups, and developed comical answers (Note: this is sometimes a sign of team development). Meanwhile, the expert was wondering why this time-tested approach didn’t seem to be working at this particular college. Of course, he concluded that the faculty were uncooperative and resistant to new forms of teaching and learning.

If you are starting to tire of a certain activity, the students may be sharing the same feelings, maybe yours are too polite to complain. I'm starting to tire of case studies in this article, how about you?

ENCOURAGING WRITING

Active learning can go hand-in-hand with efforts to increase the amount of writing students do in the class. While you may require writing as an ability in your class as a part of a writing-across-the-curriculum effort, you might also be using writing to facilitate thinking skills or to promote the learning of class material. One of the simplest ways to use writing would be with a **minute paper**, although you will use more time than a minute in most instances (16). Students are given a relatively focused assignment to write for a short period of time (such as one to five minutes).

Students hear: I'd like you to take out a sheet of paper and put your name on it. For the next minute or two, I'd like you to apply the concept that I just presented to your personal life.

Usually, some student is concentrating on something else, so I have found it very useful to have an overhead ready with the instructions, to write the instructions on an overhead, or to have a handout ready if the instructions are more complicated. In a larger group, an overhead will greatly improve the responses.

The **minute paper** works well for feedback to the instructor about the class, energizing students when attention is starting to wander, initiating discussion after the writing since each person has thought about the issue, or giving credit for attendance (or extra credit when another class has an exam). Modifications of this basic idea lead to a variety of uses, and students seem to enjoy the chance to work with class material. As you noticed, this technique is hardly restricted to a writing outcome.

Having the written responses read by other students, or read and evaluated, can also be effective. In some instances, information about the class responses is important for class members. They may want to know what you are expecting or be curious to see how others are answering. This can be achieved in many ways, perhaps a brief summary on an overhead at the start of the next class or comments from

the instructor indicating the nature of the responses. Students also like to get feedback on how they are doing. While this is relatively easy in a very small class, larger classes require other strategies. One approach is to select a few examples, remove the names, and share the anonymous samples with the class. I usually try to have at least one really good example so students not only see what I expect but also see that a fellow student can reach this level of performance. Choosing examples of less-than-satisfactory papers helps students improve their performance on subsequent activities but must be done with sensitivity.

At a more advanced level, **dissection of a journal article** can be very effective in a class. Ideally, each student receives a copy of the article. Sometimes it is helpful to highlight or number certain parts of the article that will be discussed in class: key parts of the literature cited, research questions, or controversial statements can help focus student attention. Students can work individually or in groups, providing the basis for an interaction with the instructor. Ideally, the faculty member can model the way an article is read and the thought process that the class is attempting to develop.

ENCOURAGING CLASS DISCUSSION

A number of the techniques considered so far have the added benefit of encouraging class discussion. **Think-pair-share** and **minute paper** are two examples. Classrooms occasionally have a twofold problem: most students are reluctant to voice their thoughts and a few students talk too often. **Talking chips** corrects both problems.

This technique is based on the distribution of approximately five objects to each student. These objects could be something like poker chips or playing cards, preferably inedible objects that are not made to be played with—colored pipe cleaners did not work very well. When students make a comment, they turn in one of the objects. The instructor will need to be assertive in collecting them from each person who speaks at the start of this activity and during the session if she has a student who loves to make comments. Each student must use all his chips, and each student is prohibited from further comments until the other students have responded.

Once the instructor has established the ground rules, the group actually helps enforce these rules, encouraging the quiet students and silencing those talking without any chips. I have used this approach

with students who were about 13 years of age to graduate students who were over 30. It has always given the quiet students an excuse to be more assertive in making class contributions, as well as limited the input from other students. This technique is designed for smaller classes.

Take a moment and try to visualize using this technique in a small class. What would it sound like? How would you feel as you gave out the chips? As you told that loud student that he or she was out of chips? As the very quiet and very bright student made a very insightful comment?

For medium-size groups with a good size room, **sides of the room** can help promote discussion about a topic. The instructor brings a list of relevant issues to the classroom. Students are asked to move to one side of the room if they agree and to the other side if they disagree. Undecided students stand in the middle. With the instructor controlling the discussion, each side is asked to explain its position. Students in the middle and on opposite sides can move when an argument convinces them that a side is right for them.

Much of the success of this exercise is in the instructor's choice of issues. The list must be long enough so that you can move on to another issue when the discussion fades, when no one will move, or when everyone chooses one side. The goal is to stimulate discussion about issues, not to gain consensus. Typically, you move on to another topic when people are still arguing on both sides of the room rather than looking for some sort of closure in the debate. This is a good "icebreaker" activity for the beginning of the semester and works best when topics have no correct answer. In longer classes and workshops, **sides of the room** gets the audience moving around and energized while still focusing on the material.

For groups of any size, including very large groups, a modification of the **voting** technique works. **Thumbs up/down** simply asks students to put their thumbs up if they agree, down if they disagree, and sideways if they are undecided. For issues with very mixed responses, the audience can turn to those around them and ask why others have voted one way or the other. With the proper topics, this can add a great deal of energy to the class session.

USING A FEW INDIVIDUALS BUT INVOLVING MANY

Sometimes a relatively small group of students can engage in an activity that will benefit the entire class.

Role play is a riskier active learning technique than some of the others because you never can be certain how students will play their roles. Sometimes it takes a few rewrites of the roles before most of the miscues and misunderstandings are eliminated. The payoff is that it is meaningful and enjoyable. You also become more adept at dealing with unexpected responses over time. In fact, when the **role play** activity is repeated from year to year, you will have seen most of the responses that students will make and have developed your own responses to keep the activity on track.

Typically, students are asked to play a particular role. They often want to know how much they can elaborate, how firmly they must hold a position or role, and the extent to which they can tell the other person what the written instructions said they were supposed to do. The excellent role plays by a majority of the students outweigh the few individuals who do not follow instructions. When I have specific objectives for the **role play** activity, I can guide the actors or restart things to see “what would have happened if . . .,” and these usually work the best for me. In one role play exercise, I have enough situations so that each student knows that he or she will play some part by the end of the 50-minute class during the week (up to a class of about 25 students). In larger classes, consider selecting the students in advance and do this with the intention of having a meaningful presentation. There is no need to use randomly chosen students. Some students will be uncomfortable with this activity in a large group, in which case you should select another student rather than creating undue pressure.

Fish bowl will work in medium and large classes. Usually, the instructor chooses an issue where there are a variety of viewpoints. Individuals representing each of the viewpoints are given a chair in front of the class. This works well when the chairs are arranged in a circle, creating a “fish bowl” that everyone in the class can see. Only those in the fish bowl can talk, but others may take a place in the circle when another is willing to give up a chair. This has worked best when the issue is one that generates lots of opinions and interest from the students.

Because this is a more complex technique, the instructor may want

to use simpler active learning strategies in preparation. A minute paper may help students determine their initial opinions, and voting may help assure that enough students will represent different positions. Small group discussions may help determine who will be the students in the fish bowl for each position.

Debate can also be used in a variety of class sizes. I have always had a written case or information sheet to serve as the background for the debate. Most of our larger classrooms have a center aisle, so those on one side of the room are assigned one viewpoint and those on the other must argue the other side. For very large classes, I split the class into smaller groups—perhaps based on seating arrangements—and ask each group to develop arguments for use in the debate. Time per group is limited by a clock, and the debate goes back and forth between groups on the two sides of the room. Usually, each group is called on in order, perhaps from the front to the back of the class. The discussion in the small groups is a key component of this exercise, as is the instructor's handling of the issues and the feedback given to the various groups.

ASSESSMENT

Active learning can be a part of class assessment, as described in the **minute paper** (16). In assessment, the primary goal might be to provide students with feedback on how well they are doing (formative assessment) or to assess how well they have done (summative assessment). You could think of formative assessment as the beep that your car makes until you fasten the seat belt, while summative assessment is the ticket you receive for driving without the seat belt fastened. Both can be an important part of active learning in the classroom.

As an example of formative assessment, consider using a **quiz to assure learning** that is ungraded. Students complete the quiz during the class; you may choose to collect it or to let the students keep the quiz. You might ask another student to grade the quiz before it is returned to the student, or the students can grade themselves. I have used this approach to highlight important areas of content, to familiarize the student with the type of test I will use, and to develop test questions for later use on the exam. Sometimes the quiz can be used as a stimulus for class discussion. This approach seems to work well with both objective questions (multiple choice or true/false) or short essays.

When reviewing the answers on an objective test, you can use the **pause** technique, where students turn to someone near them to explain why an answer is incorrect.

Active learning can also be used in a **group testing** approach. In one class, we determined that the class content seemed to dictate a weekly quiz because it was very important for the students to keep up with the material. Students took a short quiz each Friday and turned it in for a grade. Before the correct answers were given, students met in groups of five to complete a group test—one answer for each question, five names on the answer sheet. These groups were determined by random assignment at the start of the class and continued throughout the semester. The group test score counted as a proportion of the total grade for the quiz. After all the group tests were collected, we reviewed the correct answers for those questions. After the group discussions, most students have the correct answers for most questions. The beauty of this approach is that students teach each other the correct answers and all students are motivated to do well so they don't let their group down. While you would think that groups would listen to other groups or share answers, we kept the groups separate and made it clear that groups were to do their own work.

As an aside, if you write poor multiple-choice questions this can be a humbling experience, and even if you write good questions, be prepared for some students who have very good arguments for alternative answers. One suggestion would be to have the group explain in writing why they chose their answer, supporting this with material from lecture or text. My experience has been that I can re-ask the best and most important questions on the final, where there is no group testing, and weak students will still make errors.

Can you list five active learning techniques?

Try to jot down five active learning examples.

If you can't, how would you feel in a group that could?

You might expect to encounter some students who complain about the low level of performance in their group. Sometimes this is legitimate, but my experience has been that posting anonymous group and personal score distributions is an effective way to counter this problem. Of course, if some group truly is performing much worse than the

others, the instructor needs to determine carefully what the real problems are and make appropriate adjustments.

ACTIVE LEARNING FOR LARGE CLASSES

Active learning can work in large classes, and I have used most of the techniques that have already been described in classes with more than 150 students. Three issues—control, involvement, and feedback—are challenging, especially in large classes. While these are not the only issues, effectively managing these will lead to better outcomes in large classes.

Probably the biggest control issue is regaining the class's attention after an exercise has been started. A number of teachers establish a particular behavior, often raising their hand and ceasing conversation, to regain the class's attention at the proper point. Instructors who use this activity establish the ground rules at the start of the time period. Some instructors have used a particular noise or sound, even a tape recorded sound like a game show tune, to indicate the end of the time for the exercise. If you have a microphone, announcing something like "come on back now" will work well. Of course, you also can blow a whistle, but this brings back memories that are best left buried for me. If the active learning activity is going well, you can anticipate a little difficulty in regaining control. You need not interpret this negatively if your activity has caught the students' attention and generated excitement in the class.

Control also is maintained by careful construction of the exercise. Often, you will want to give verbal instructions, repeat them on an overhead, and include them in a handout. In a large class, the redundancy of instructions eliminates the potential for losing the individual student who just cannot seem to understand what is expected. Using material in the text or on written worksheets is helpful also. For larger groups, I try to have especially well-organized tasks prepared ahead of time. Also, wandering around the class is effective in larger groups. You can answer individual questions about the instruction, monitor the progress of groups, and get to know some of the people who tend to sit in the back of the room.

Involvement of the group is a key component to successful large-group activities. My greatest failures come when I design an activity that has most individuals indirectly involved. Techniques like fish

bowl and class debates work best when the activity can be designed so that most people are participating most of the time. This could be in the planning process, in a formal method of observation, or in other types of participation. To maintain control, avoid including too little participation, something that looks like busy work, and overly complex activities. These tend to work against the instructor and make meeting class objectives more difficult.

Feedback is difficult to provide in larger groups. Under the minute paper section, a few methods of giving feedback to large classes were discussed, such as reviewing good and bad responses. Another technique is to skim the products that the students have handed in for general themes and report them back to the class. For example, if most of the class used a particular theory in analyzing a case, you could comment on the frequent use compared to another theory that also would have been appropriate. At times, before class starts, I will put up an overhead that contains a brief summary, either numerical or qualitative, of the last session's responses and then review the overhead at the start of the class. If a student makes a clever remark or does a really good job, I'll approach the student before class or comment on the response during the next class, often anonymously if I have been unable to talk with the student. Providing some feedback that their work is reviewed by the faculty member is very important to students. This is very important in any class setting, including larger classes.

CONCLUSION

Active learning strategies are very effective in the classroom and lots of fun. They can add energy to a 50-minute lecture, they can make a 3-hour class tolerable, and they can help rejuvenate a faculty member's interest in teaching. But, the main purpose is to help create an environment that encourages student learning. Although you might use an active learning strategy, such as the pause, in a very spontaneous fashion as you adapt your presentation to a situation that has just occurred, active learning techniques usually require planning and the development of class materials. In both cases, however, specific outcomes should be a part of the activity. Ask yourself about the knowledge, skills, and attitudes that this strategy will help the students to achieve. Later, you even can use an active learning strategy to assess

the extent to which the students have achieved the outcomes that you had planned.

Active learning can be habit forming. You may devote many of your resources, including class time, to active learning, and you may become much less tolerant of a poor lecture. You might even find yourself rewriting another's presentation using active learning techniques. A few warnings:

- Use active learning at a comfort level that is right for you and your teaching style.
- You can "warn" students that you are trying something new, and you are not sure how well it will work (be sure to ask for feedback afterwards).
- Let your own preferences for teaching guide your choices for active learning.

I have tried to review active learning techniques that I have actually used in class. In addition to describing the techniques, I have attempted to include hints and advice about how these techniques have worked for me. The mechanics of implementing an active learning strategy are as important as the selection of a particular technique, and both benefit from practice. So, I hope that you are ready to practice a new active learning strategy. Remember this old Chinese proverb: Tell me and I forget. Show me and I remember. Involve me and I understand.

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HELPFUL WEB-BASED RESOURCES

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4. The Center for Learning and Teaching [resource on World Wide Web]. URL: <http://wwwctl.wsu.edu/>. Accessed 1999 Feb 16.