

# TEN EASY WAYS TO ENGAGE YOUR STUDENTS

Tara Gray and Laura Madson

**Abstract.** Twenty years of research shows that using interactive techniques more often can make a class more effective. For example, a study of six thousand physics students compared classes using passive lecture to classes using interactive techniques that allowed for discussion among students and between the professor and students. The study showed that students in classes that used interactive approaches rather than lecture learned twice as much.

**Keywords:** *interactive techniques, note taking, student engagement*

We have taught full time at a university for twenty and ten years, respectively. We have seen the blank looks, the tired expressions, and the students seemingly bored out of their minds. We have complained about them. But we have also challenged ourselves to do what we can to be as effective as the most engaging teachers. The most engaging teachers are indeed very effective, and we strive to be like them.

If we rely on only lecture, the odds are against our becoming the most effective teachers. Twenty years of research shows that using interactive techniques more often improves learning. For example, in a six thousand-student study of learning physics via traditional and interactive approaches, the traditional approach relied on passive lectures and the interactive engagement method included immediate feedback through discussion with peers and instructors. Students of teachers who taught with interactive approaches made twice the average gain in learning—greater than two standard deviations (Hake 1998).

We challenge you to try some of these ideas (for a reference list, see table 1).

## Always

If we are to engage students, there are a few things that we must *always* do—occasionally is not enough.

### 1. Maintain sustained eye contact

Sustain eye contact with one student for several seconds throughout an entire sentence or idea. Think of eye contact as the way you stay plugged into your audience, like a source of electricity. Never disconnect from your audience for more than ten seconds (Hoff 1992). Find a friendly face, someone supportive who listens intently, and make this person your anchor and the source of your positive energy. Return to your anchor to refuel when you encounter students who are not looking at you or who are sources of negative energy. Good eye contact can improve your speaking delivery more than any other single change (Hoff).

### 2. Ask before you tell

Whenever possible in a lecture, ask students what they know about a given topic before telling them what you know. For example, you could ask if they know the difference between prisons and jails. Or, you could lecture on the fact that prisons hold inmates for the length of their sentences if more than one year and jails hold inmates awaiting trial and for sentences up to one year, then pose a true-false question to find out if students already know this. By asking students to think about it and make a decision, you are

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**TABLE 1. Ten Easy Ways to Engage Your Students**

*Always*

1. Maintain sustained eye contact
2. Ask before you tell
3. Create a structure for note taking
4. Let your readings share the lectern

*Sometimes*

5. Use the pause procedure
6. Assign one-minute papers
7. Try Think-Pair-Share

*Hold students accountable daily*

8. Quiz daily
9. Use clickers or colored cards
10. Call on a student every two to three minutes

involving them more actively than if you told them first. Therefore, the information is more likely to be retained. Make sure the students write out their answers before revealing yours to them.

Asking before telling capitalizes on several factors that improve human memory (see Terry 2006). It helps students link what they are learning to what they already know, a crucial step in committing information to memory. It increases the meaningfulness and distinctiveness of the new information, both of which improve memory. Students apply more effort to the learning situation because they must generate possible answers on their own. It also focuses students' attention on the subject and raises their interest in it. In fact, students are markedly more interested in your answer because they have tried to articulate their own.

Another advantage to asking before telling is that you might be able to exclude some unnecessary information from your lecture. If students can generate the correct answers on their own, there is less need to include that information in your lecture. You can instead move on to more challenging material, which may again increase your students' interest in the material.

### *3. Create a structure for note taking*

Because the quality of notes is important, teachers should help students take them. A skeletal outline helps students, while detailed notes relax them into passivity (Annis 1981; Hartley and Davies 1978; Kiewra 1989). Therefore, it is not a good idea to post complete notes on the

Web because it encourages passivity and poor class attendance. It is better simply to provide an overall framework that they can fill in by listening (McKeachie 2002, 67).

To leave your notes partially incomplete, include (a) an organizational framework for the students to fill out, (b) the labeled axes of graphs (leave the plotting to the students), (c) diagrams (leave the labeling to the students), (d) a table of data, omitting certain crucial figures, (e) partially completed calculations, and (f) a series of questions the students should be able to answer by the end of the lecture (Gibbs, Habeshaw, and Habeshaw 1992; Howe and Godfrey 1977).

### *4. Let your readings share the lectern*

Readings can transfer information better than lectures for a variety of reasons: reading is less passive, makes it easier to stop and review when confused, extends time on task, and frees up class time for other activities. To guarantee that students will complete the readings, have them reevaluate the assignments themselves. Textbooks and other readings should be carefully examined in terms of the level of detail, reading level, and momentum.

As professors, we do not often put ourselves in the place of our students when choosing readings. Early in her teaching career, one of the authors was ranking textbooks for junior-level students with the help of a senior-level student who had successfully completed the course. After independently ranking a half-dozen textbooks from best to worst, they realized their rankings were exactly opposite. The instructor preferred the ones that taught her the most, whereas the student thought the level of detail in these books would be overwhelming for junior-level students taking their first course in the subject. Nearly everything the instructor intuitively looked for in a book was opposite of what her students need to learn.

What do you look for in your readings? How closely does it mirror what your students need in terms of level of detail, reading level, and momentum? Do you ask students to help you select readings? Consulting with students has taught us that there are important differences among textbooks, even though they all may look similar. We now choose texts that are easier to read, including more paperback supple-

ments. Once you choose texts with the students in mind, you can rely on your readings to do more of your lecturing.

Another way to increase students' reading is to give them reasons to read. Simply assigning the readings is not enough. Even if you choose student-friendly readings, many students feel overwhelmed when facing them. Students need help breaking down their readings into what they are supposed to know. They need a focus. Consider providing study questions to show students what you expect them to know from the readings. A few specific, concrete questions about what they are to know when they finish a reading can be very effective. (Appendix A contains a series of questions that the reader should be able to answer at the completion of reading this paper. Questions like these could be given to students who were expected to read this article for a class.)

Also consider some form of daily accountability, such as a quiz on the readings. If you have assigned study questions, make one of them the question on a daily quiz (this is discussed in the third section). Good readings—ones that are carefully chosen and supplemented with study questions or other guidelines so students have a reason to read—can more than substitute for lectures. If you give a quiz on the readings, so much the better. Let your fingers do the walking? The expression for teachers should be, "Let your readings do (some of) the talking."

### **Sometimes**

The banker-teacher model of teaching assumes that instructors are the repository of information and students are the receptors. Using this model, our job as teachers is to deposit the material in the students the way a banker might deposit money in a bank. Instructors lecture, and the material is duly recorded in students' brains. Thus, research shows that between 80 percent and 90 percent of class time is devoted to lecture or other forms of professor talk, with the rest devoted to silence or student talk (Fischer and Grant 1983; Lewis 1982; Nunn 1996; Smith 1983).

When teachers are challenged about the amount of class time devoted to the lecture, we typically respond, "But in my discipline, I have to cover the material." This reminds us of the fable of the pitch-

er and the glass. In a land before time, at a school not far from yours, a pitcher was trying to teach a glass. The pitcher naturally wanted to teach as much as possible, so it poured in a great rush. Some water was caught by the glass, but much was lost to the table. The moral of the story is that learning is not what is poured from the pitcher, but what lands in the glass. Our instincts as teachers are to pour more water from the pitcher, but more is not always better. Our education makes teachers like huge pitchers—even like fully pressurized fire hoses—compared with our students' tiny glasses. But when we unleash that on a little glass, it backfires.

Indeed, it is not how much the instructor covers in class that determines how much students learn. How much students learn is instead related to how active learning is, specifically how much time they devote to process the material presented (as mentioned earlier). As a result, we would be more effective as teachers if we lecture a bit less to create time for occasional active-learning techniques, such as the pause procedure, one-minute papers, and Think-Pair-Share.

#### 5. Use the pause procedure

In this procedure, the teacher pauses for two minutes to allow students time to discuss their notes together, with no interaction from the teacher. The teacher pauses three times in a fifty-minute period. When this was done for five class periods in one section—but not in another section—the section with pauses scored up to 17 percent more points on tests (Ruhl, Hughes, and Schloss 1987). An advantage of this method is that it requires little preparation from teachers. All a teacher must do is decide which six minutes of material could be covered by students outside of class. Another advantage is that the pause procedure gives students time during class to delve deeper into more difficult material, while learning less difficult material outside of class.

#### 6. Assign one-minute papers

The one-minute paper is an in-class assignment in which the teacher asks students to write for one minute, usually about the main point of the class or the student's biggest question. One-minute papers are

usually assigned toward the end of each class period. One-minute papers help students synthesize and think holistically (Angelo and Cross 1993, 149). The most typical questions include the following:

- What was the most important thing you learned during this class?
- What important question remains unanswered?
- What was the muddiest point?

Of course, you can also ask for the most illuminating example, the most powerful image, the most convincing argument or counterargument, the most surprising information, the most memorable character, or the most disturbing idea (Angelo and Cross, 152). Students can compare answers, share with you orally, or turn in their papers to you. If they turn in their papers, be sure to read some of them and respond to them at the beginning of class the next day. This closes the feedback loop: students have told you what they know and do not know, and you have responded by addressing the issues with which they are having most problems. The one-minute paper has been subjected to rigorous empirical tests, and its daily use has been found to increase student knowledge significantly (Chizmar and Ostrosky 1998).

#### 7. Try Think-Pair-Share

As its name implies, Think-Pair-Share occurs in three phases. In the first phase, students think or write about a question or statement. This usually lasts thirty to sixty seconds (Millis and Cottell 1998, 73). In the second phase, students compare their answers in pairs. In the final phase, they share their answers with the entire class. This procedure has the advantages of a one-minute paper, plus the advantage of comparing one's answers with others; however, it takes longer—usually about ten minutes. The extra time of the Think-Pair-Share versus the one-minute paper is worthwhile when it is important that students process what they write or think about with other students and the instructor. Think-Pair-Share can be done at any point during a class period. Students can turn in their papers, but do not have to. Think-Pair-Share increases student time on task, helps them internalize content by teaching and discussing it, and gives them a chance to hear the content in words other than the instructors.

## Hold Students Accountable Daily

Many courses are taught with lecture punctuated by three tests. The problem with the three-test approach is that frequency of studying is related to the frequency of accountability, and both are related to time on task. When there are three tests in a term, students study three times. To maximize study and learning, students need to be held accountable daily. In one study in which students were tested infrequently, students initially recalled 62 percent of lecture content but declined to 24 percent after eight weeks. When students were quizzed at the end of each lecture, however, they retained twice as much after eight weeks (Jones 1923). More recently, Menges (1988) concluded that

[m]ore studies of [the impact of holding students accountable daily] would be redundant. Even though further studies of this effect are unnecessary, we do need better ways of understanding why teachers fail to apply that well-established principle. Our students' learning would certainly be enhanced if, as a condition for leaving the classroom, they had to demonstrate mastery of the day's instruction. (260)

Quizzing is one way to hold students accountable daily. Other methods include using clickers or colored cards, or by calling on a student every two to three minutes.

#### 8. Quiz daily

A daily quiz can be one short-answer or multiple-choice problem asked at the beginning of class, the end of class, or both. As long as the quiz is short and the class is small, it will not be overwhelming to grade. You can also have students assess each other's quizzes (perhaps just for feedback rather than a grade), especially if your class is large. Just the act of trying to get a correct answer changes the tone of the class. If you quiz at the beginning of the class, you will arrive at class and find students studying together. If you quiz at the end of the class, you will notice an increased attentiveness and seriousness among students during class. Either way, students will learn more.

#### 9. Use clickers or colored cards

Clickers—also called wireless response technology or classroom performance system (CPS)—work like remote controls,

except instead of selecting a channel on a television, each student selects the answer to a multiple-choice question. Clickers allow you to instantly see in a bar chart if everyone agreed on the right answer. If they did, you can move onto the next question; if they did not, you can have them turn to a neighbor and discuss the question, then vote on the answer again. Because the best way to learn is to teach, all students benefit from this discussion. There is usually more convergence of the answers after the discussion. There is no grading because the clickers automatically record answers, making it possible to give quizzes and exams as well as easily ask many practice questions. Clickers are new, but preliminary research suggests they increase class attendance and help students prepare for tests (Woods and Chiu 2003).

If you like the idea of clickers but do not have the technology they require, you can use colored cards labeled A, B, C, and D to achieve much of the same effect. When you ask a question and the answer is given in a rainbow of colors, you know that a student-to-student discussion is necessary. If all the answers come back correct, you can move on to new material. Colored cards are not as perfect as clickers because students can wait to see each other's answers before raising their cards and because you cannot use them to administer a quiz or an exam. But they do help you hold students accountable daily.

#### 10. Call on a student every two to three minutes

Another way to hold students accountable daily is to call on a student every two to three minutes and let peer pressure do some of the work. Students are more likely to prepare for class so that when their name is called, they can appear knowledgeable (or at least avoid appearing foolish). This technique creates a high energy level in class—students seem eager to know what is going to happen next, who will be called on next, and what he or she will say.

Index cards make calling on students easier and more systematic. Write each student's name on a card; every time you need to call on a student, turn up the next card and call out that name. Visibly shuffle the cards before class begins and peri-

odically throughout the class. This way, students still have to pay attention after they have been called on once because their names can come up a second time. In a small class, this method allows you to call on every student every day. Even in a big class, calling on twenty or thirty students randomly will make them more accountable than they are when you call on only five or six students (and probably the same five or six ones consistently).

The cards make calling on students far more neutral than calling on students unsystematically. You are not singling out a student for not paying attention or because you are picking on him or her. You are simply calling the next name on the next card. Therefore, being called on loses some of its sting. We also recommend you write your own name on a card and challenge the students to "ask me anything" when it comes up.

Teaching with cards requires organizing your class around questions. We have seen cards work especially well in modern language classes and technical problem-solving classes. In both cases, it is easy to call on different students in rapid succession because the questions readily suggest themselves. That is, in a language class you can converse with different students; in a problem-solving class, you can ask how to do the next step of the problem. In some classes, it is not as obvious what questions to ask. One way to structure a class around questions is to devise a set of study questions for the readings and your lecture; then, lecture by going through the list of study questions. ("Mark, can you help me on number one?") We have found this to be very effective in two ways: (1) it greatly increases reading of the material because students know for what to read, and (2) they are more inclined to pay attention in class because they may be called on at any time.

### Conclusion

To engage students, always maintain eye contact, ask before you tell, create a structure for note taking, and let your readings share the lectern. To add variety, try an occasional interactive technique. For example, if the pause procedure intrigues you, consider trying it three times every class period for a week. Then try a one-minute paper instead of one of

the pauses. Later, replace a pause with a Think-Pair-Share activity. Ultimately, you should hold students accountable daily, because this has been shown to greatly increase student learning (Menges 1988). However, making this change may require waiting for a new semester. Think about if you want to do this with daily quizzes, clickers or colored cards, or calling on a student every two to three minutes.

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**APPENDIX A**  
**Sample Study Questions to Guide Note Taking**  
**(If This Article Were a Lecture)**

Study Questions

1. In a six thousand-student study of learning physics via traditional and interactive approaches, the interactive engagement method yielded learning compared with the more passive lecture approach that was:
  - a. Less by two standard deviations
  - b. Less by one standard deviation
  - c. More by one standard deviation
  - d. More by two standard deviations
2. What are some good traditional questions to ask on one-minute papers?
3. How long should a speaker maintain eye contact with an audience member?
4. A speaker should not break eye contact with audience members for more than \_\_\_ seconds.
5. When using the pause technique, a teacher should pause how many times in a seventy-five-minute class?
  - a. One to two
  - b. Three
  - c. Four to five
  - d. Six
6. When using the pause technique, a teacher should pause for how long each time in a seventy-five-minute class?
  - a. One minute
  - b. Two minutes
  - c. Three minutes
  - d. Four minutes
7. By how much does a quiz at the end of the lecture increase retention?



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