

MIT OpenCourseWare
<http://ocw.mit.edu>

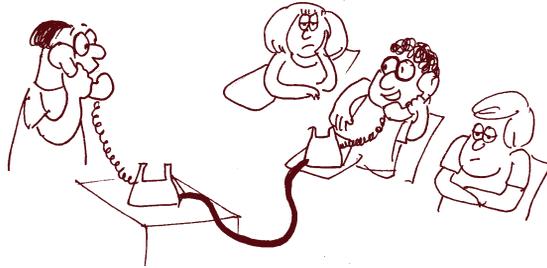
Resource: The Torch or the Firehose
Arthur Mattuck

The following may not correspond to a particular course on MIT OpenCourseWare, but has been provided by the author as an individual learning resource.

For information about citing these materials or our Terms of Use, visit: <http://ocw.mit.edu/terms>.

Questions: Theirs and Yours

Their questions and your answers, your questions and their answers: that's the way most interaction takes place in the classroom, or the way it ought to. But with all the possible pitfalls, many teachers just give up and lecture. What goes wrong?



The private line

Students mumble their questions. If they could, they'd send the question to you over a private wire, so no one else could hear it, just in case it turns out to be a poor one. You answer it while the rest of the class (which didn't hear it) waits patiently.

Frequent-question-askers often sit in the front row. The rest of the class is put on hold while you and the student up front have a nice chat. Even experienced and popular teachers fall into this trap. For the other students, who hear only you, it's like listening to one end of a telephone conversation.

Ships that pass in the night

The instructor gives an answer, sometimes a long and elaborate one, but alas, not to the question that was asked.

What we have here is a failure to communicate.

—Cool Hand Luke

Perhaps the question wasn't posed very clearly; perhaps it was misinterpreted. Regardless, only the bravest or most irritating students will say "That's not what I meant." Usually they just remain silent, and after this happens a few times, they will stay permanently silent.

The problem is particularly common in the sections taught by non-native English speakers who usually understand written English better than spoken English. They catch a few words, make a wrong guess what the question must be, and launch into an explanation. Their students switch to other classes, probably complaining about the teacher's accent, even though the trouble really lies elsewhere.



The solution: echolalia

Both problems have the same solution. It's the way every student question (even the "could you work problem 10 on page 256?" kind) should be greeted: with echolalia, then with clarification.

"Did everybody hear that? Would you repeat it, Susan?"

"That's a good question, Joe. Do you mind if I repeat it for the benefit of the back row?"

"Let me see if I understand what you're asking. You want to know (blah, blah)...Have I got that right?"

"Does everyone understand the question now?"



The purpose of all this delay is to make the question public, to guarantee you've understood it, to give yourself some time to think about how to answer it (assuming you can walk and chew gum at the same time), and to give the students a little time to think and wonder about it too.

And now you are ready to answer it, and they are ready to hear the answer. Maybe some of them can answer it themselves. If so, you might let them try, and with a little luck, stir up a debate.

The art of bluff

But what if you can't answer the question? Choose one of the following responses:

"I'm not going to answer this question directly, since I think it would be a good exercise for you to figure it out yourselves after I talk about something closely related." (*Followed by a long, irrelevant digression.*)

"We'll be coming to that later in the course; we'll talk about it then."

"That sort of thing won't be on your next exam, so I'm not sure it would be profitable to spend time in class on it."

"That's a good question; can anybody help Susan with it?"

"Hmm...I don't see how to answer that right now. Does anyone have a suggestion? (*long, long pause*) Well, it looks like we're stuck. Let me think about it and I'll talk about it next period (or I can see you in my office, Tom, before then if you'd like)."



(Warning: The first three fool nobody and the fourth is very risky.)

The welcome mat

Remember in the last chapter about peer-group pressure making students hesitant to risk answering your questions? It stifles their questions too. To counteract it, phrases like "That's a good question, Bill" or "I'll bet others of you were wondering about that point," will go a long way toward relieving anxiety and convincing others that they should not be afraid to speak. Don't be insincere, but try to find something nice to say. Alas, how many teachers respond instead with:

"Didn't we cover that last time?"

"Is there anyone else who couldn't do this problem?"

Answers like these with their undertone of criticism discourage questioners. Put out the welcome mat instead.

The T.A. was so nice he answered all the stupid questions too.

Soliciting questions

Maybe at this point you're thinking, "All the stuff in the chapter up to this point is a joke: if I ever got a question, I'd jump for joy and handle it lovingly, but nobody ever asks anything; they just sit."

Well, did you ask them if they had any questions? *Really* ask? Miles of videotape show instructors finishing an explanation, asking (or mumbling) "Any questions?" and almost in the same breath continuing, "Well, if there are no questions, let's go on with..."

If you do this, most likely it is to avoid the awkward silence you are afraid will follow "Any questions?" But the effect is to convince the students you really don't want to be interrupted (that old steamroller again), and they will be only too happy to oblige you.

So wait a decent length of time. Suggest things that might not be clear. Show from the way you solicit questions that you really want them: the tone of your voice, your body language, your eyes looking around the room are all important.

Don't browbeat them for not asking. Don't say, "Well, if there are no questions, we can all go home" and dismiss them; your students will feel for the rest of the term that you don't care about them. In fact, to ask a decent question, a student has to be reasonably up-to-date and willing to risk looking foolish; not many of your students fit into both categories.

And remember that giving them something to think about is the best way to get questions: a seat-work problem, a micro-quiz. Of course, having a problem set due the next day doesn't hurt either.

You didn't get any spontaneous questions, and they just sit, avoiding your eyes, when you try to solicit some.

Asking them questions

Then it's up to you to do the asking.

Are-you-with-me?

The simplest thing you can do to try to promote interaction and get some idea of where they are is to ask "are-you-with-me" questions. You pause in the explanation and ask them to supply a detail ("And the derivative of $\sin x$ is?" "Now we need the expression for torque; what is it?") This doesn't require any real understanding of what's going on, so anyone can answer, and you get to hear the sound of voices other than your own.



In the hands of instructors with a lively enough manner, the class can get really swept along by this. For others, however, it's like pulling teeth. The students just don't see why they should bother answering; if they don't, you will supply the answer anyway. Some students feel such easy questions are insulting; at any rate, answering them doesn't chalk up any credit either with you or their peers.

Do it anyway, and try to be upbeat enough to carry it off. They start supplying the answers because they like you, and it seems to make you happy. They continue because they find it helps their concentration, and it helps them to follow your explanations.

More serious questions

These can be questions just a little beyond the are-you-with-me's because they require more understanding of what's going on. ("What would be the next step?" "What would happen if the force were reversed?" "If we increased this value, how would that affect the answer?") Questions like these can often be thought of on the spot.



Other questions will require preparation ahead of time. When you start on new material try to cast it in the form of a problem to be solved and have them think about it for a bit. Ask for suggestions and deal with them seriously; if you dismiss out of hand all the ideas that ultimately won't work, they'll get discouraged. Or you can list possible methods and ask which is likely to be best and why.

Look for paradoxes and puzzles you can spring on your students; you will be rewarded by the sight of them all sitting forward in their seats thinking. Actually, they will do the same thing if you've made a mistake you can't find right away, and some wily teachers have been known to make mistakes on purpose for that reason. You can also give interesting wrong answers from student papers (be sure not to give the student's name) and ask where the mistake is.

If you are lucky enough to get a real discussion going, remember that a discussion has to get somewhere. As the leader, don't let it degenerate into a string of unconnected comments by the students. Use phrases like:

"What do you all think of that last comment?"

"Summarizing what was said so far..."

"We seem to agree at least on this:"

"Does someone have a point that hasn't been covered so far?"

Once again, remember that answering takes time, and you want everyone to have a chance to think about the problem. So, even though it seems like a silent eternity up there at the board, wait for them (try counting to ten). If you jump in and answer for them too soon, they will quickly learn that your questions are rhetorical.

When he asks us if we understand something, we all freeze like small animals caught in the headlights of an 18-wheeler. He assumes that it means yes and moves on to still more complex topics.

A couple of other things:

- When you have a really serious question, warn them it's coming with plenty of chit-chat. Otherwise the wool-gatherers will miss it:

"OK, now I have a question for you to think about. Here it is..."

Did everyone get that? Should I repeat it? Do you understand it?"

- Start asking questions the first day of class; once a class gets used to hearing only your voice, dynamite won't loosen their tongues.

We've spent a lot of time on questions, but the topic is so important for the success of your class that maybe you'll have the patience for two more comments about non-responding classes.

Bad questions

You ask, you wait. It's based on stuff you know they know and can handle, they seem to be trying...: no results or wild answers.

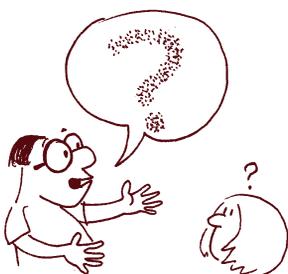
Usually it's because the question is too vague, not pointed enough. Students sit puzzled, unsure of what is being asked or what sort of answer is wanted. Here are some examples of questions which seem natural to the teacher, but are too vague; replacements are suggested.

"How else could we look at this?"

("Could we do this by another method?")

"What was significant here?"

("What was the key step in this argument?")



“What kind of a problem is this?”
 (“In which standard category does it fall?”)

You get the idea. You could always try: “Do you understand what I’m asking?” if you suspect the trouble is in the question. (Alas, teachers never do suspect this.)

Cold-Calling

Again, nobody is answering, or worse, always the same two students with everybody else just sitting back and letting them. You have to indicate firmly that you want the rest to join in.

“How about the rest of you—Jean, do you know?”

This is “cold calling”: like the stockbrokers who call people without knowing if they have any money to invest, you call on students without knowing whether they have any idea of the answer.

Some teachers maintain that you shouldn’t do this. But it can be a good tactic if you get the class used to it from the start. If you do it with some tact and good humor, it won’t seriously embarrass anyone. If a student can’t respond, don’t dwell on it, just pass on to another. Try to get everyone involved. To some extent, you can tailor the question to the student—easier ones for weaker students—but be careful, as students are quick to pick up on this.

Preparing questions that will lead to a good discussion takes some thought, but the result when it goes well is so exhilarating that you and your students are sure to get hooked on it.

